

# ANNUAL REPORT 2015-16



Government of India  
Ministry of Environment, Forest and Climate Change



**Only after the last tree has been cut down...**

**The last river has been poisoned...**

**The last fish caught...**

**Only Then, We'll find the money cannot be eaten**

**WAKE UP - ADOPT - GREEN LIFE**



# ANNUAL REPORT 2015-16



**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**New Delhi-110003**



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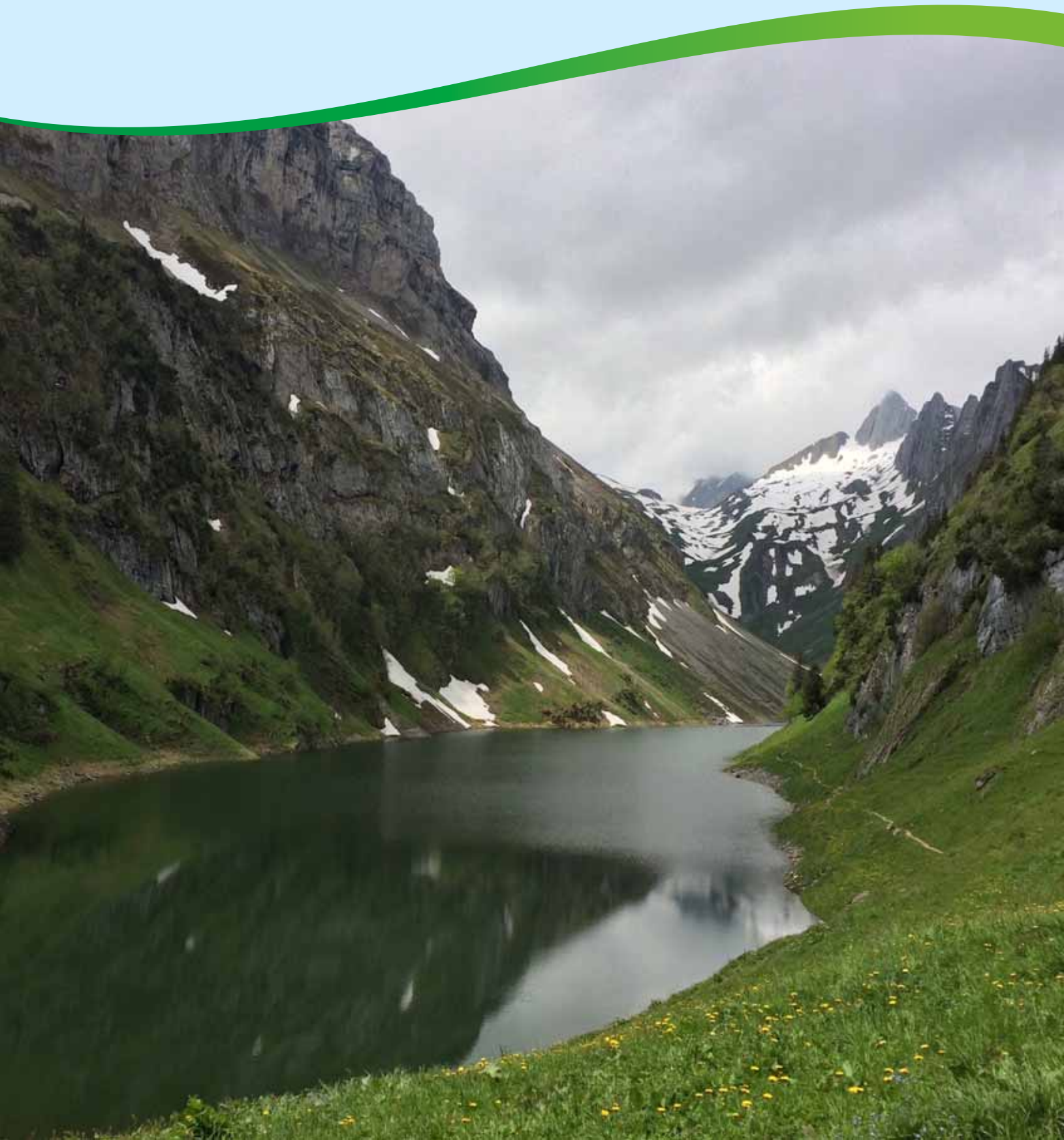


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# ROLE AND MANDATE OF THE MINISTRY





## Role and Mandate of the Ministry

### Role of the Ministry

The Ministry of Environment, Forest & Climate Change started functioning since the year 1985. The Ministry plans, promotes, coordinates and oversees environmental, ecological, forestry and wildlife programmes. Its main activities include protection of the environment; conservation of existing forests, wildlife, aquatic bodies and water resources, biodiversity and other resources particularly in eco-sensitive areas, adaptation to and mitigation from climate change, and survey of various areas for identification of new species of flora and fauna; afforestation and regeneration of degraded areas; prevention and control of pollution (air, water, noise and industrial pollution), management of hazardous substances and better environmental governance; ensuring welfare of animals; capacity building, training and research in classical and molecular taxonomy; and international cooperation in forestry and environment. The tasks are being fulfilled through Environmental Impact Assessment (EIA), eco-regeneration, assistance to organizations implementing environmental and forestry research, extension, education and training to augment the requisite manpower, collection and dissemination of environmental information and creation of awareness at the national level.

It is nodal Ministry for United Nations Environment Programme (UNEP), International Centre for Integrated Mountain

Development (ICIMOD) and Multilateral Environmental Agreements (MEAs). The Ministry also coordinates with multilateral bodies such as United Nations Convention to Combat Desertification (UNCCD), United Nations Framework Convention on Climate Change (UNFCCC), Convention on Biological Diversity (CBD). It is also focal point of the 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 as follows:

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

These objectives are well supported by a set of legislative and regulatory measures, aimed at 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-II & III.



## Mandate of the Ministry

The mandate of this Ministry is to ensure better environment management and preservation of biodiversity including wildlife thereby providing a thrust to Swacchh Bharat Abhiyan.

## Allocation of Business

As per Allocation of Business Rules, the Ministry is responsible for the following:

- (1) Environment and ecology, including environment in coastal waters, in mangroves and coral reefs but excluding marine environment on the high seas.
- (2) Environment research and development, education, training, information and awareness.
- (3) Environmental health.
- (4) Environmental Impact Assessment.
- (5) Forest Development Agency and Joint Forest Management Programme for conservation, management and afforestation.
- (6) Survey and exploration of natural resources particularly of forest, flora, fauna, ecosystems etc.
- (7) Biodiversity Conservation, including that of lakes and wetlands.
- (8) Conservation, development, management and abatement of pollution of rivers which shall include National River Conservation Directorate (excluding the river Ganga and its tributaries).
- (9) Wildlife conservation, preservation, protection planning, research, education, training and awareness including Project Tiger and Project Elephant.
- (10) International co-operation on issues concerning environment, forestry and wildlife.
- (11) Botanical Survey of India and Botanical Gardens.
- (12) Zoological Survey of India.
- (13) National Museum of Natural History.
- (14) Biosphere Reserve Programme.
- (15) National Forest Policy and Forestry Development in the country, including Social Forestry.
- (16) All matters relating to Forest and Forest Administration in the Union territories.
- (17) Indian Forest Service.
- (18) Wildlife preservation and protection of wild birds and animals.
- (19) Fundamental and applied research and training including higher education in forestry.
- (20) Padmaja Naidu Himalayan Zoological Park.
- (21) National Assistance to Forestry Development Schemes.
- (22) Indian Plywood Industries Research and Training Institute, Bengaluru.
- (23) Afforestation and Eco-Development which shall include National Afforestation and Eco-Development Board.
- (24) Bio-fuel plantations in forest, wastelands and environmental issues concerning bio-fuels.
- (25) Desert and Desertification.



- (26) Forest Survey of India.
- (27) Indian Institute of Biodiversity, Itanagar.
- (28) Central Pollution Control Board.
- (29) G.B. Pant Institute of Himalayan Environment & Development.
- (30) Wildlife Institute of India and Indian Board for Wildlife.
- (31) Indian Institute of Forest Management.
- (32) Central Zoo Authority including National Zoo Park.
- (33) Indian Council of Forestry Research & Education.
- (34) Andaman & Nicobar Islands Forest & Plantation Development Corporation Limited.
- (35) Prevention of cruelty to animals.
- (36) Matters relating to pounds and cattle trespass.
- (37) Gaushalas and Gausadans.
- (38) The Prevention of Cruelty to Animals Act, 1960 (59 of 1960).
- (39) The Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974).
- (40) The Water (Prevention and Control of Pollution) Cess Act, 1977 (36 of 1977).
- (41) The Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981).
- (42) The Indian Forest Act, 1927 (16 of 1927).
- (43) The Wild Life (Protection) Act, 1972 (53 of 1972)
- (44) The Forest (Conservation) Act, 1980 (69 of 1980).
- (45) The Environment (Protection) Act, 1986 (29 of 1986).
- (46) The Public Liability Insurance Act, 1991 (6 of 1991).
- (47) The National Green Tribunal Act, 2010

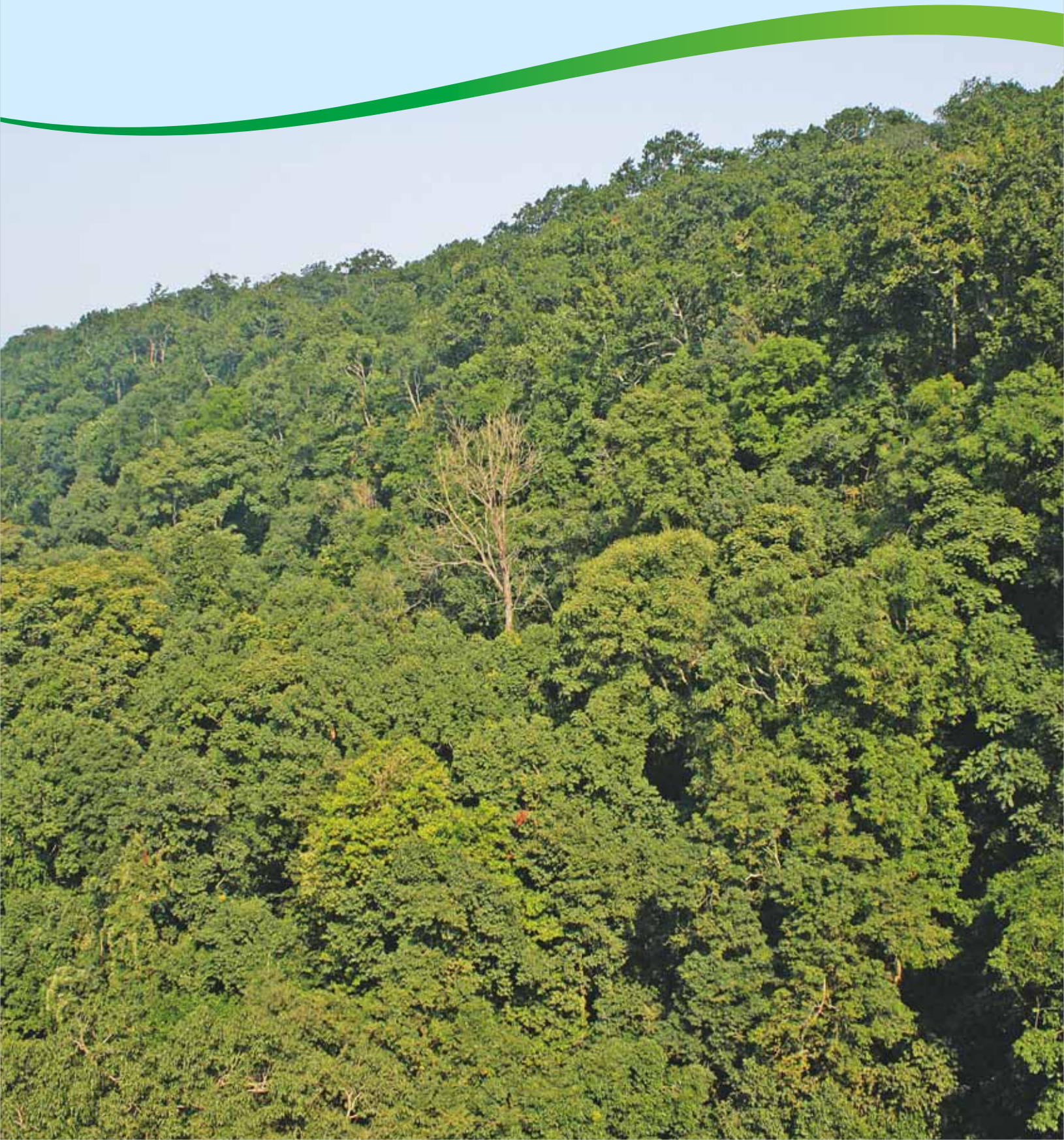
The responsibilities include overall policy in relation to forests, except all matters including legislation, relating to rights of forest dwelling Schedule Tribes on forest lands.



# CHAPTER-1

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## NATURAL RESOURCES – SURVEY AND EXPLORATION







## Botanical Survey of India

### Introduction

Botanical Survey of India (BSI) is the apex research organization under MoEF&CC for carrying out taxonomic and floristic studies on wild plant resources of the country through survey, documentation and conservation. During 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; multiplication and maintenance of EET plant species, wild ornamentals, etc., in Botanic Gardens and Orchidaria; documentation of traditional knowledge of plants and development of National Database on Herbarium (including type specimens) and live collections, plant distribution and nomenclature, botanical paintings/illustrations, plant uses, etc.

### Primary Objectives of Botanical Survey of India

- Exploration, inventorying and documentation of phytodiversity (incl. non-flowering plants) in general and protected areas, hotspots, fragile ecosystems and sacred groves in particular; publication of National, State & District Floras
- Identification of Red list species and species rich areas needing conservation; ex situ conservation of critically threatened taxa in botanical gardens.
- Survey and documentation of traditional knowledge associated with plants.
- Develop a National database of Indian plants,

including herbarium specimens, live specimens, botanical paintings/illustrations etc.

### Secondary Objectives of Botanical Survey of India

- 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 to BSI for study.
- Develop and maintain Botanical Gardens, Museum and Herbaria.
- Preparation of Seed, Pollen and Spore Atlas of Indian Plants.

### Activities undertaken

- So far BSI undertook 96 field tours under 114 projects (including 27 new projects) were undertaken for collection of plant specimens/materials under floristic, ethnobotanical and pharmacognostical studies on flowering and non-flowering plants covering 3 biodiversity hotspot, viz. the Himalaya (14 tours), the Indo-Burma (3 tours) and the Western Ghats-Sri Lanka (12 tours). This covers following bio-geographical regions: W. Himalaya, E. Himalaya, NE India, Arid – Semi Arid, Gangetic Plains, Deccan Peninsula, Western Ghats and Coastal Region covering Kerala coast (for Sea weed Survey) and Andaman Islands. This also covers 24 protected areas and 1 fragile ecosystem where 30 and 2





Fig. 1 A newly discovered genus of *Caryophyllaceae*

- field tours conducted respectively. Floristic Survey of 12 sacred groves spreading over four districts of Andhra Pradesh was completed and their flora is under documentation. In addition, 07 field tours for the collections of live germplasm of threatened, endemic and economically important species for their ex-situ conservation were undertaken in these areas. Besides, 15 Herbarium Consultation Tours for identification of critical specimens were conducted in different Herbaria, both within and outside BSI.
- Revisionary studies on family Bignoniaceae and 4 genera and 1 Subtribe of Poaceae under national flora and family Gesneriaceae, genus *Impatiens* (Balsaminaceae) and family Polypodiaceae under regional flora are being done. Simultaneously, state flora of Bihar, Jharkhand, Kerala, Sikkim and Uttarakhand are also continuing.
  - Documentation of ethnobotanical information from Dang, Gujarat was completed and Nayagarh, Malkangiri, Naupada, Boudh and Balasore districts of Odisha is going on.
  - Habitat analysis and population status of ca 300 RET species of Orchidaceae in E. Himal. is underway
  - 5000 herbarium specimens has been barcoded and digitized alongwith their label data.
  - Pollen and seed morphology of *Andrographis* and *Ficus*, nutlet morphology of Cyperaceae, pollinia of South Indian orchids and samples of angiosperms and Pteridophytes, liverworts, hornworts, Algae and Fungi were studied under SEM.
  - Among non-flowering plants, floristic studies on Pteridophytes, bryophytes, lichens, fungi (foliicolous and wood-



rotting) and algae (macro, micro algae and freshwater) are continuing.

## Progress/achievements

### Botanical Exploration & Inventorisation of Plant Diversity

#### Field tours and Herbarium consultation tours

86 field tours for collection of plant specimens/materials for floristic, ethnobotanical and pharmacognostical studies on flowering and non-flowering plants were undertaken by different regional centre and units of BSI covering following regions, including four biodiversity hotspot, viz. the Himalaya, the Indo-Burma, the Western Ghats-Sri Lanka and the Sundaland. These include 24 protected areas and 07 Sacred Groves. In addition, 07 tours for collections of live germplasm were also undertaken in these areas.

- **Western Himalaya:** Different parts of Uttarakhand
- **Eastern Himalaya:** Different parts of Arunachal Pradesh and Sikkim
- **Indo Burma:** Different parts of Assam, Mizoram, Manipur, Meghalaya, Nagaland and Andaman Isls.
- **Arid – Semi Arid:** Different parts of Haryana and Gujarat
- **Gangetic Plains:** Different parts of Uttar Pradesh, Bihar, Jharkhand, West Bengal and Orissa
- **Deccan Peninsula:** Different parts of Chattisgarh and Andhra Pradesh
- **Western Ghats:** Different parts of Maharashtra, Karnataka and Tamil Nadu

- **Coastal Region:** Coastal areas of Karnataka & Kerala
- **Sunda-Land (Nicobar Islands):** Great Nicobar Island, Nancowry group of Isls. incl. Trinket Island

Apart from that 28 herbarium consultation /study tours were also conducted for identification of specimens/authentication of identifications.

During these field tours, ca 16,603 (incl. 6,733 of non-flowering plants) specimens were collected, out of which ca 14,112 specimens were identified into ca 13,306 taxa (species, subspecies and varieties). This resulted into the discovery of 2 genera and 42 taxa as new to science; 39 taxa as new to India and 158 new distributional records for different geographic regions/states.

### Documentation of Plant Diversity

- **National Flora (Flora of India):** Taxonomic description 2644 taxa of flowering and non-flowering plants under 26 projects have been completed.
- **Regional/State Flora:** Taxonomic descriptions for more than 2500 taxa of flowering and non-flowering plants under 44 projects have been completed.
- **Flora of Protected Areas:** Taxonomic descriptions for 2528 taxa of flowering plants of 36 protected areas have been completed.

### Documentation of Knowledge Associated with Plants

- Various ethno-botanical uses, like healthcare, food, oil, fuel wood, timber, fodder & forage, socio-religious, rope-making, agricultural implements, biofencing, insecticide/ pesticide, piscicide, gum, beverage, musical instruments, etc., associated with plants from Dang district of Gujarat and Koraput, Jajpur, Deogarh and Ganjam districts of Odisha have been recorded. Besides, 282 botanical informations have been recorded and 220 specimens have been collected under, 'Ethnobotanical study of Lodha (a primitive tribal group) of WB and nutraceutical analysis of selected plant species.'

### Study of Pollen & Seed Morphology of Genus *Andrographis* by using Scanning Electron Microscopic studies (SEM Studies)

**Total Number of Photograph taken with SEM – 185.**

- **Pollen:** *Andrographis beddomei*, *A. elongata*, *A. glandulosa*, *A. longipedunculata*, *A. ovata*, *A. affinis*
- **Seeds:** *Andrographis longipedunculata*; *A. viscosula*; *A. stellulata*; *A. clarkeana*; *A. stenophylla*
- **Leaf surfaces:** *Andrographis paniculata*; *A. rotundifolia*; *A. alata*; *A. elongata*; *A. echioides*; *A. serphyllifolia*; *A. glandulosa*; *A. stenophylla*; *A. neesiana*; *A. stellulata*; *A. atropurpurea*; *A. explicata*; *A. lawsonii*; *A. lineata*; *A. lobelioides*; *A. macrobotrys*; *A. producta*; *A. rothii*

### Study of Nutlet Morphology of Family Cyperaceae by using SEM

**Total Number of Photograph taken with SEM – 10**

- *Fimbristylis kingii*; *F. subtrabeculata*; *Eleocharis palustris*; *E. sphacelata*; *E. fistulosa*; *E. atropurpurea*; *E. geniculata*; *E. retroflexa ssp. chaetaria*; *E. tetraquetra*; *E. plantaginea*.

### Study of Seed Morphology of *Ficus* by using SEM

**Total Number of Photograph taken with SEM – 14**

- *Ficus clavata*; *F. andamanica*; *F. hookeriana*; *F. fistulosa*; *F. subulata*; *F. cyrtophylla*

### Study of caryopsis in *Eragrostis*, *Sporobolus* & *Tripogon* of Poaceae using SEM

**Total Number of Photograph taken with SEM – 15**

- *Sporobolus africanus*, *S. capillaries*, *S. coromandelianus*, *S. diandrus*, *S. fertilis*, *S. festivus*, *S. fimbriatus*, *S. hajrae*; *S. humilis*; *S. ioclados*; *S. maderaspatanus*; *S. piliferus*; *S. spicatus*; *S. tenuissimus*; *S. wallichii*

### Study of pollinia of South Indian Orchids by using SEM

**Total Number of Photograph taken with SEM – 02**

- Collected 60 species of Orchid flower samples and preserved in FAA for SEM study and initiated SEM work for *Dendrobium herbaceum* and *Coelogyne flaccida*.



### SEM studies done in Northern Regional Centre, Dehradun

#### Study of Pollen grains, Surface hairs, Seed morphology, Leaf surface and Spore morphology

- Total 50 samples of Angiosperms and Pteridophytes were scanned in SEM Laboratory of BSI, Northern Regional Centre, Dehradun during the period

### SEM studies done in Central National Herbarium, Howrah

- 708 different plant samples/ specimens like spores, pollen, leaf surface, seed, root etc. (Algae, Fungi, Bryophytes, Pteridophytes and Angiosperms) have been studied in SEM Lab. of BSI, CNH.

### SEM studies done in Western Regional Centre, Pune

- During the period, Scientists of WRC, Pune made the use of SEM in the identification of seven species of Fungi and fourteen species of Pteridophytes.

### Studies on Nutraceutical Values of Wild Edible Plants

- Nutritive values, mineral estimation and antioxidant profile of 18 plant species have been carried out using parameters like proximate composition, mineral content and antioxidant activities.

### Status of Database preparation and Digitalisation of specimens

- Flora of India Vol. 1, 2, 3, 4, 5, 13 and 23 have been converted in the web format and can be accessed through a web portal already launched on NIC server.
- Around 300 publications comprising of nearly 1 lakh pages and all 52 back volumes of BSI journal were digitized and shall be available through BSI portal.
- Prepared database of around 10,000 records of monocot and dicot plants in web enabled format; work on additional 22,000 records pertaining to Lichens and Fungi Checklist is under way.
- Around 735 rare books comprising of 3 lakh pages have been converted in e-form and is stored in DVDs and HDDs. Shortly, it will be made available by web portal ([www.bsirarebooks.nic.in](http://www.bsirarebooks.nic.in)).
- e-flora portal ([www.efloraindia.nic.in](http://www.efloraindia.nic.in)) and digital resources of Rare Holdings were launched and can be accessed through [www.bsi.gov.in](http://www.bsi.gov.in).
- 20000 specimens have been digitized under e-governance project of MoEF&CC namely 'Photographic Digitization of 20000 Economic Herbarium Specimens of ISIM.'

### List of endangered species and measure taken for the ex-situ conservation:

- About 1,265 saplings, seeds, propagules belonging to 173 taxa of rare, threatened,



endemic and economic plant species, including wild relatives of cultivated plants, aquatic plants, orchids, palms, canes, bamboos, ferns and fern-allies, etc., were collected for introduction in AJC Bose Indian Botanic Garden, Howrah and associated botanic gardens of different Regional Centres of BSI. Apart from that, successfully artificially pollinated an IUCN red listed endangered species, *Lodoicea maldivica* (Double Coconut Palm) and is growing in large palm house of AJC Bose Indian Botanic Garden, Howrah. In addition to these, successfully started micro-propagation of threatened species like *Cymbidium tigrinum*, *Armadorum senapatianum* and *Rhododendron coxianum* in different regional centres of BSI.

### **Review of the work on 'Red listing of Orchids of Eastern Himalaya as per IUCN criteria' (Entire Sikkim, Darjeeling district of West Bengal and Arunachal Pradesh excl. Changlang and Tirap):**

- 550 specimens at BSHC (herbarium acronym of Sikkim Himalayan Regional Centre, Gangtok) were finalized in respect of their identity and geo-coordinates.
- Population of 100 taxa analyzed during field tours conducted in North and South districts of Sikkim.

### **Public Service rendered by BSI during the period**

- BSI disseminated scientific information to public and also assisted scientists, students and researchers in their pursuit of taxonomic research on plants. During the period 29,936 visitors, including scientists, students, teachers and VIPs, visited different botanic gardens, herbaria and museum of BSI. Queries on plant distribution, nomenclature, threatened and endemic taxa of different regions, etc., were attended; 1525 specimens of angiosperms, pteridophytes, bryophytes and fungi, received from students / scientists outside BSI were identified and about 285 images, plant materials, samples and seedlings were supplied to scientists and students outside BSI.

### **Revenue earnings by BSI during the period**

- BSI earned Rs. 86,49,184/- which includes Rs. 76,215/- towards identification charges of specimens/samples, Rs. 2,58,205/- towards sale of departmental publications Rs. 2,441/- towards photocopying of literature, Rs. 2,18,907/- towards guest house charges, Rs. 72,69,250/- towards Entry fee, Photography Charges and boating charges at AJCB Indian Botanic Garden, Howrah, Rs. 99,469/- towards entry fee at Yercaud garden, Rs. 6,78,274/- towards sale of old stores items & Jeeps and Rs. 46,423/- as charges for miscellaneous charges.



## Status of maintenance of botanical collections (herbarium maintenance)

The progress of the maintenance of of herbarium specimens in all regional centres are given in Table:

**Table-1** Progress of the maintenance of herbarium specimens in all regional centres

No. of Specimens mounted/labelled	23,336	No. of Specimens received on exchange	1,118
No. of old Specimens remounted	5,775	Type photographs received from Kew	9
No. of Specimens poisoned/fumigated	14,263	Specimens Received as gifts	89
Stitching/re-stitching	28,593	No. of Species identified	3220
Changing of Species/Genus cover	5,430	Herbarium sheets accessioned	20,402
No. of Specimens incorporated	30,691	Type specimens/Images received	20
No. of Specimens sent on loan	1,265	No. of loan specimens returned	3,212

## Zoological Survey of India

### Introduction and Objectives

The Zoological Survey of India (ZSI) is a premier research institution in the country, functioning under the Ministry of Environment, Forest and Climate Change (MoEFCC). ZSI, since its inception in 1916, has been undertaking survey, exploration and research leading to the advancement of our knowledge on the exceptionally rich faunal diversity of the country. Over the successive plan periods, the scientific activities and functions of ZSI have also expanded to the areas like the Environmental Impact Assessment with regard to fauna; survey of Conservation Areas; Status Survey of Endangered Species; Computerization of data on faunal resources; Environmental Information System (ENVIS) on faunal diversity; Identification and advisory services; Care and management of the National Designated Repository of 'type' and

voucher specimens; supporting enforcement of Wildlife (Protection) Act, 1972; establishment of marine aquaria and Museum for awareness on conservation etc. and acting as the custodian of the National Zoological Collections. ZSI Kolkata and its 16 Regional Centers.

### Objectives

The Zoological Survey of India (ZSI) was established in 1916 with the main objective of obtaining information on India fauna. These are:

- Exploration, survey and documentation of faunal resources of the country.
- Taxonomic studies on zoological materials collected during faunistic surveys.
- Inventorying/monitoring of endangered species of fauna in the country.
- Maintenance and development of National Zoological Collections.
- Publication of "Fauna of India" and Departmental Journals.



Fig. 2 Wild Buffalo & Rhino at Kaziranga National Park

### Activities undertaken and cumulative performance

- Zoological Survey of India surveyed and documented 52 protected areas.
- Have discovered 4,806 new species to science and > 3,000 species as new records to India.
- ZSI acts as a custodian of the National Zoological Collections: >04 million specimens belonging to 81,000 species, including about 10,000 species from neighbouring countries.
- Conducted taxonomic studies on faunal groups: Protozoa, Helminthes, Mollusca, Annelida, Cnidaria, Porifera (Sponges), Echinodermata, Insecta, Arachnida, Pisces (Fishes), Amphibia, Reptilia, Aves (Birds) and Mammals during the XIth Five Year Plan, including Tricho-taxonomic studies on Mammals and molecular studies on Freshwater turtles.
- Survey and research resulted in the publication of fauna-volume documents of

the States (including Union Territories) of Orissa, Lakshadweep, West Bengal, Meghalaya, Andhra Pradesh, Delhi, Tripura, Gujarat, Sikkim, Manipur, Bihar, including Jharkhand, Nagaland, Arunachal Pradesh, Mizoram, Madhya Pradesh including Chhattisgarh, Goa, Tamil Nadu, Uttarakhand, Uttar Pradesh, Maharashtra, Andaman and Nicobar Islands and Karnataka under the State Fauna Series, as many as, altogether, 71 volumes.

- Zoological Survey of India has hitherto published 1448 books / Journals, including 7 Animal Discoveries.

### Achievements/Progress

#### Faunal explorations and surveys

**Mountain Ecosystem:** Sangla Valley (Himachal Pradesh), Western Ghats (Kanyakumari, Tirunelveli, Virudhunagar, Theni and Dindigul Districts) (Tamil Nadu) and Western Ghats in Ratnagiri and Raigad districts (Maharashtra).

**Estuarine ecosystem:** Cauvery Estuary and Point Calimere (Tamil Nadu)





**Marine/Island ecosystem:** Andaman coast, West Bengal & Odisha coast, Digha, Frazergunj and Kakdwip (West Bengal).

**Grassland ecosystem:** Shola grassland ecosystems of Periyar Tiger Reserve (Kerala).

**Freshwater ecosystem:** Ropar Wetland (Punjab), Gobind Sagar Reservoir (Himachal Pradesh), Escape Reservoirs of Indira Gandhi Nahar Pariyojna (IGNP) Canal (Rajasthan), wetlands of Andhra Pradesh, Umda Sagar & Talpalli (Andhra Pradesh) and Bhoj Wetland (Madhya Pradesh).

**Desert Ecosystem:** Dry Grasslands of the Thar Desert and Kapurdi Lignite Mine of Barmer District (Rajasthan).

**Biosphere Reserve/ Conservation areas:** Gulf of Mannar Biosphere Reserve (Tamil Nadu) and Sundervan Biosphere Reserve (West Bengal).

**National Parks (5):** Mahatma Gandhi Marine National Park (Andaman & Nicobar Is.), Valley of Flower NP (Uttarakhand), Rajaji National Park (Uttarakhand) and Namdapha Tiger Reserve (Arunachal Pradesh), Jaldapara-Gorumara NP and Chilapata Reserve Forest (West Bengal)].

**Wildlife Sanctuaries (14):** Wayanad WLS (Kerala), Samaspur Bird Sanctuary (U.P), Nauradehi WLS (Madhya Pradesh), Sonanadi WLS (Uttarakhand), Talle Valley WLS (Arunachal Pradesh), Malvan Marine Sanctuary (Maharashtra), Govind WLS (Uttarakhand), Malabar WLS (Kerala), Thattekad Bird Sanctuary (Kerala), Sainj WLS (Himachal Pradesh) and Mehao WLS (Arunachal Pradesh). Hazaribagh WLS, Saranda WLS, Dalma WLS and Lawalong WLS (Jharkhand).

**States and Union territories:** Conducted Surveys in Odisha, Karnataka, Andhra Pradesh, Arunachal Pradesh, Himachal Pradesh, Madhya Pradesh, Gujarat, West Bengal, Uttarakhand, Maharashtra, Mizoram and Rajasthan.

**Status Survey of endangered species:** Great Indian Bustard in the grasslands of Pali, Jalore, Barmer, Jaisalmer and Bikaner districts; Western Hoolock Gibbon in Assam.

### Some Important Research studies undertaken

- Determination of the conservation values of the coral reefs of Andaman Islands (NCSCM, MoEFCC, Govt. of India). Reproductive biology of Scleractinian corals of Andaman and Nicobar Islands (Ministry of Environment, Forests and Climate Change, Govt of India)
- Diversity and distribution of Gorgonian Octocorals in and around the Andaman and Nicobar Island – A baseline study for the management of soft corals (SERB, Department of Science & Technology, Ministry of Science and Technology, Govt. of India)
- DNA Bar-coding on Sponges of Andaman and Nicobar Islands (Technical Collaboration with Central Agricultural Research Institute, ICAR, Port Blair)
- Ecological study on bird hazards at Airport in Andaman (INS-Utkrosh, C/o. Navy, Ministry of Defence, Government of India)
- Ecology and habitat modelling of wetland birds in the tsunami inundated wetlands of South Andaman (SERB, Department of

Science & Technology, Ministry of Science and Technology, Government of India).

- Foraging Ecology and habitat use of wading birds and shorebirds in the mangrove ecosystem of the Andaman Islands (MoEFCC, Government of India)
- Pteromalidae (Hymenoptera) of India funded by MoEFCC, New Delhi (AICOPTAX Project)
- Studies on the Faunal Diversity of Great Nicobar Biosphere Reserve (MoEFCC, Government of India)

### Research Activities

**Discoveries of New Taxa/ Species:** 1, 27, 282 of various groups of animals were collected.

Altogether 1452 species were identified out of them during the period under report.

**17 species new to science** (15 new species of Insects; one new species of Crab and one new species of Fish) were discovered and described; **52 species were added new to the fauna of India** (06 Sea anemone, 17 corals, 11 new Molluscs, 03 Insects, 04 Crabs, 01 Shrimp, 01 Annelid, 06 Ascidians and 03 fishes).

**Fauna of Protected Areas:** The details of number of species identified from Protected Areas are as given in Table-2.



**Fig. 3** Asiatic wild elephants herd at a protected area



**Table 2:** Group-wise number of species identified from Protected Areas

Protected Areas	Taxa/Species Identified/recorded	No. of species Identified
Chail WLS (Himachal Pradesh)	8 species of Arthropods, 3 species of fishes, 1 species of amphibia	12
Nauradehi WLS (Madhya Pradesh)	53 species of Arthropods and 1 species of mammal	54
Sonanadi WLS (Uttarakhand)	1 species of reptile, 17 species of fishes, 3 species of amphibian, 28 species of nematodes and 64 species of Arthropods	113
Malabar WLS (Kerala)	13 species of Arthropods	13
Samaspur Bird Sanctuary (U.P.)	10 species of Arthropods	10
Rajaji NP (Uttarakhand)	24 species of nematodes and 7 species of lepidoptera	31
Valley of Flower NP (Uttarakhand)	18 species of birds, 3 species of nematodes and 6 species of lepidoptera	27
Sunderban Biosphere Reserve (West Bengal)	2 species of fishes, 15 species of crustacea, 7 species of orthopterans, 1 species of stomatopod and 1 species of isopod	26
Thattekkad Bird Sanctuary (Kerala)	1 species of amphibian, 34 species Arthropods, 54 species of birds, 15 species of reptiles and 5 species of mammals	109
Sainj WLS (Himachal Pradesh)	1 species of earthworm	1
Bandhavgarh NP (Madhya Pradesh)	20 species of lepidoptera	20
Gulf of Mannar Biosphere Reserve (Tamil Nadu)	18 species of arthropods, 22 species of crustaceans, 45 species of molluscs, 4 species of echinoderms and 25 species of fishes.	114
Dharanghati WLS (Himachal Pradesh)	7 species of protozoans.	7
Pobitora WLS (Assam)	32 species of protozoans	32
Ghatigaon WLS (Madhya Pradesh)	33 species of Arthropods	33
Govind WLS (Uttarakhand)	16 species of nematodes	16
Talle Valley WLS (Arunachal Pradesh)	10 species of mammals and 70 species of birds	80
Veerangana Durgawati WLS (Madhya Pradesh)	2 species of odonates.	2
Singhori WLS (Madhya Pradesh)	3 species of odonates.	3
Kalakkad Mundenthurai Tiger Reserve (Tamil Nadu)	14 species of odonates and 24 species of blattids.	38
Nongkhyllem WLS (Meghalaya)	6 species of fishes	6
Bhitarkanika N.P. (Odisha)	1 species of mollusca.	1
<b>TOTAL</b>		<b>748</b>

**Publications (2015-16):****Records of Zoological Survey of India: 2**

- Vol.115: Part-1 and Part-2

**Occasional Papers: 8 volumes**

- Ichthyofauna of the Inland water bodies of Pondicherry
- An Annotated Checklist of the Snappers (Pisces: Perciformes: Lutjanidae) of India
- Studies on the Reptilian and Amphibians of the Loktak Lake, Keibul Lamjao National Park and its adjoining areas, Manipur
- Littoral Faunal Diversity of Great Nicobar Island
- Diversity of Reef associated Macrofauna of Rutland Island, Andaman and Nicobar Islands
- Trichotaxonomy of species of Lagomorpha.
- The Genus *Mesodorylaimus* Andrassy, 1959 (Nematoda: Dorylaimida) A Monographic Study
- On the fauna of Pteromalidae (Hymenoptera: Chalcidoidea) of South Western Ghats

**Special Publications: 3**

- The Type specimens in the National Zoological Collection: Phthiraptera
- The Type specimens in the National Zoological Collection: Thysanoptera
- Training manual on monitoring and reporting of Coral Reef ecosystem

**Memoirs: 1**

- A monograph on Indian Tenuipalpidae

(Acari: Prostigmata) with their Economic Importance and Keys to Genera and Species.

**Handbook/Pictorial Guides: 7**

- Pictorial Handbook on Dipteran Fauna of Himachal Pradesh
- Faviids of Andaman and Nicobar Islands
- Handbook on common Aquatic Coleoptera w.s.r. to family Gyrinidae, Noteridae, Dytiscidae and Hydrophilidae of India
- Rangle wale jeevo ki sachitra pustika (Bihar evang Jharkhand) [in Hindi]
- Pictorial Handbook on Damselflies and Dragonflies (Insecta: Odonata)
- Raptors of India
- Fascinating seaslugs and flatworms of Indian Seas

**State fauna Series: 2**

- Fauna of Uttar Pradesh. Part-I. Vertebrates
- Fauna of Uttar Pradesh. Part- II. Invertebrates

**Status Survey: 1**

- An identification manual. Schedule mammals of India (Indian Wildlife Protection Act, 1972)

**India Integrated Coastal Zone Management [ICZM] Project in India**

To conserve, protect and manage the coastal and marine environment, Ministry of Environment, Forests and Climate Change, [MoEF&CC] Government of India is implementing the ICZM Project with the World Bank assistance. For the implementation of the above project MoEF & CC has established a





Society of Integrated Coastal Management [SICOM] as nodal Body under the Society Registration Act, in Delhi.

The ICZM Project is being implemented as Pilot investments in the coastal States of Gujarat, Orissa and West Bengal. National activities are implemented through Society of Integrated Coastal Management (SICOM) along with monitoring of activities carried out by three selected States. The project has four implementing agencies - MoEF at the national level with lead responsibilities, and the Departments of Forests and Environment (DoFE) of the three participating states.

**National Component –I:** This component includes, Mapping delineation and demarcation of the hazard lines, and delineation of coastal sediment cells all along the mainland coast of India, Mapping, delineation and demarcation of

Environmentally Sensitive Areas (ESAs), Capacity building of the MoEF and the State Coastal Zone Management Authorities, and Nation-wide training program for coastal zone management, Setting up of a National Centre for Sustainable Coastal Management (NCSCM).

**i) Mapping of Hazard line**

**ii) Establishment of National Centre for Sustainable Coastal Management**

**iii) Mapping of ecological sensitive areas**

Under the ESA component, SICOM is implementing two projects 1) The Green Action for National Dandi Heritage Initiative (GANDHI) Memorial Project in Dandi village of Navsari District Gujarat, and 2) Vedaranyam village of Nagapattinam district of Tamil Nadu State.

– **Piloting ICZM approaches in Gujarat:** To conserve and protection of the marine ecosystem and improve the livelihood of



Fig.4 Coral transplantation in Gulf of Kachchh



Fig.5 Mangrove plantation in Gulf of Kachchh

the coastal communities, the Forest department has planted more than 15000 ha of mangroves through Community Based Organizations. 900 sq mt. of coral transplantation is completed. 104 Community Based Organization [CBO] and 476 Self Help Groups [SHGs] have engaged for coastal ecosystem conservation and management. Under this project, more than 1000 toilets are prepared in the coastal villages in integrated manner. Total 2000 ha of shelter belt plantation has completed in Gulf of Kachchh area.

SPMU Gujarat is preparing Integrated Coastal Management Plan for Gulf of Kachchh, the consultant has completed 50% of work. GEC has conducted 38 training Programmes, 6 Workshops, 6 exposure visits, 1812 village Level Session with CBO and SHG Meetings, 163 Village Level Session for SHG Formation, 103 entry Point Activities completed, 33 is ongoing and 17 under process.

- **Piloting ICZM approaches in Odisha:** includes pilot studies for Orissa coast. The component includes, capacity building of



**Fig. 6** Beautiful Coral (*Acropora cerealis*) (Dana, 1846)

the state level agencies and institutions; preparation of an ICZM plan for the coastal sediment cells in the stretches of Paradip-Dhamra and Gopalpur-Chilika; regional coastal process study, and priority investments. The project is catering capacity building in the area of coastal management and wetland research.

Under this project, the Fisheries & ARD Department has financed 600 SHGs covering 80 villages in both the stretches to provide alternate source of livelihood to coastal fishers. 99 solar dryers have been installed for producing hygienic dry fish. 10 Producer Groups of fishery SHG have been formed as a part of the convergence between ICZMP & OLM to carry forward the livelihood activity in a bigger scale. In order to provide an additional income to the women folk of the fisherman community, 40 SHGs have been engaged in coir activities.

- **Piloting ICZM approaches in West Bengal:** This component involves pilot ICZM studies for West Bengal. The project will support capacity building of the various agencies involved in coastal management and priority investments. This component mainly addresses the coastal zone management issues in three sectors of West Bengal namely, Sundarban, Haldia and Digha-Shankarpur. Under the project, livelihood improvements & marketing accesses in Sagar Island, ecotourism development, construction of sewerage Treatment Plant, development of drainage system and phytoremediation, beach cleaning and sanitation, solid waste management, livelihood generation



Fig.7 Construction of 11.23 Km Sewerage line for Digha

activities are carried out. Multipurpose cyclone shelters are constructed along the project area to reduce the cyclone impacts on coastal communities. 100% household electrification in Sagar Island has completed. 15.36 Km of drainage out of estimated 32.85 Km is completed and the entire work is expected to be completed by June 2017.

Public Health and Engineering Directorate (PHED), which is one of the PEAs under ICZMP is implementing Renovation of Sanitary Sewerage System for Digha which includes Construction of Sewerage Scheme and Construction of Sewage Treatment Plant of 6.7 MLD. Laying of Sewerage line of 11.23 Km is completed and 90% of the physical work of STP is completed.

Sundarban Infrastructure Development Corporation Limited (SIDCL), PEA under ICZMP is implementing Development of Eco-tourism at Sagar Island which holds annual Gangasagar Mela. The eo-tourism work includes construction of Nat Mandir, Dala Arcade, Eco Camp complex, Bus Terminus, Leach Pit Toilet, and Beach Shelters. Works are in progress and will be completed by end of May 2016.

## Phase-II of the Project:

Based on the success of the project the remaining ten coastal States /Union Territories namely, Daman & Diu, Maharashtra, Goa, Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Puducherry, Andaman & Nicobar Islands, and Lakshdweep Islands have requested Ministry of Environment and Forests to initiate the same project in their State as well. National Centre for Sustainable Coastal Management (NCSCM), Chennai has been assigned to coordinate with the remaining ten coastal States/Union territories for the purpose of preparing the Detailed Project Reports (DPRs) for the Phase-II of the ICZM Project. MoEF&CC through NCSCM has also prepared the Integrated Island Management Plans for the Lakshadweep Islands which shall be considered as DPRs for implementation of the Phase-II. The preparation of DPRs for above States/Union territories that have confirmed implementation of Phase-II is also affected due to paucity of fund.

The CCEA Note for the revised cost was approved in July 2015. In the revised CCEA provision has been made to undertake phase-II of the ICZM Project in ten coastal States/UTs. Rs. 5.00 Cr each for ten States /UTs has been provided for preparing pre project document (Total of Rs. 50 Cr). NCSCM is coordinating and assisting the State Government to prepare the Detailed Project Report (DPR). DPR from Tamil Nadu has been received and a detailed concept note from Kerala. further four other coastal states have informed their eagerness to implement the project Puducherry, Maharashtra, Goa, Karnataka. NCSCM is coordinating with these states in preparations of DPRs. the total project cost for these Rs. 7000 Cr.





**Fig. 8** Shri Prakash Javadekar, Minister of EF&CC & Shri Anwar Hussain Manju, Minister for Environment, Bangladesh inaugurating the side event on Climate Change Adaptation on Coastal Areas” in the CoP 21 on 9.12.2015

### Survey and Utilisation (SU) Division

Survey & Utilization Division deals with the matters related to State Forest Development Corporations, International Organizations like International Tropical Timber Organization, International Network for Bamboo & Rattan (INBAR) Trade Policy, Forest Survey of India, Sandalwood & Red Sanders related matters, Formulation of guidelines of international/ domestic trade in forest produce and regulation of export & import of forest produce as per the Export and Import (EXIM) policy, Minor Forest Produce, all matters relating to Andaman and Nicobar Islands Forest Plantation Development Corporation Limited, Forestry trade tariff and related issues for Bilateral/ Multilateral Trade Negotiations,

National Forestry Information System, Sustainable Forest Management Cell and C&I for SFM at National Level, Forest Certification of Natural Forests, Plantation and NTFP, Wood Based Industries, Permission for Industrial Estates including North Eastern States and NE Cell. SU Division is also a nodal division of Scheme i.e. strengthening of Forestry division of the Ministry.

The Division executes plan scheme “Strengthening of Forestry Division’ with five components under which the main works of the division related to above mandate are executed. These works component wise are described in detail along with the achievements during the year.





**Fig.9** Thick forest at Renukoot, Uttar Pradesh

## Forest Survey of India (FSI)

Forest Survey of India (FSI), an organization under Ministry of Environment, Forests & Climate Change Govt. of India is engaged in the assessment of the country's Forest resources on a regular interval. Establishment on June 1, 1981, the Forest Survey of India succeeded the "Preinvestment Survey of Forest Resources" (PISFR), a project initiated in 1965 by Government of India with the sponsorship of FAO and UNDP. The main objective of PISFR was to ascertain the availability of raw material for establishment of wood based industries in selected areas of the country. In its report in 1976, the National Commission on Agriculture (NCA) recommended the creation of a National Forest Survey Organization for collection of reliable data through countrywide comprehensive forest resources survey at regular intervals. Consequently, PISFR was reorganized into FSI in June 1981. After a

critical review of activities the mandate of FSI was refined in 1986 in order to make it more relevant to the rapidly changing needs and aspirations of the country.

### Major activities

**The major activities of FSI are:**

Biennial Forest Cover Assessment using Remote Sensing technology, Inventory of Forest and Trees Outside Forests (Rural & Urban areas), Data Processing, Methodology Design for carrying out various types of survey & inventory, Training and Extension, and Projects and Consultancies

### Forests Cover Mapping & Tree Cover

Forest Survey of India (FSI) is involved in forest cover assessment of the country on biennial basis by interpretation of satellite data on a two-year cycle and presents the information in the form of 'India State of Forest

Report'. So far 14 cycles of forest cover assessment have been completed since 1987 till year 2015. Work for the 15th cycle is under progress. In addition to forest cover, assessment of tree cover of the country is also being carried out using the Trees Outside Forests (TOF) inventory data. There is an increase of 3,775 sq km in the forest cover and 1,306 sq km in tree cover of the country as compared to 2013 assessment.

### TOF inventory

Inventory of forests and Trees Outside Forests (TOF) is the second major activity of FSI. FSI has been following a new sampling design for National Forest Inventory (NFI) since 2002. The country has been divided into 14 physiographic zones and 60 districts randomly selected from these zones on probability proportional to size for detailed inventory in two years cycle. About 7,000 sample plots are laid in forest areas distributed over the country in each cycle for field inventory. The outcome of this inventory is estimation of growing stock according to species and diameter class wise at national levels. 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. About 10,000 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. The outcome of the TOF inventory is estimation of growing stock in TOF areas, estimation of production of wood from TOF and tree cover.

India State of Forest Report-2015 (ISFR\_2015) has been published in December

2015. In this report chapters on 'Tree cover', 'Growing stock', and "Important Characteristics of India's Forest on different forest types groups", are based on the field inventory of forests. These chapters gives information about tree cover, species and diameter wise growing stock, carbon stock estimates and information on various important characteristics of India's forest on parameters such as soil depth classes, humus, soil organic carbon, soil erosion, forest vegetation, crop composition, important tree species in forest type groups, forest fires, injuries to crops, biotic influence etc.

There is an increase of 110.34 m.cum in total growing stock of the country as compared to last assessments as reported in ISFR2013. Out of this, the increase inside forest is 21.69 m.cum. and that outside forest is 88.66 m.cum..

The data collection work for ISFR 2017 is under progress. The inventory of forest and TOF in selected 30 districts for 2015-16 is under progress and likely to be completed by March 2016.

### Pilot study for modifying National Forest Inventory (NFI) Design:

Proposed NFI is a new generation of national forest inventory system geared for providing comprehensive information to meet above requirements. Idea is essentially to meet information requirements of sustainable forest management including those under Green India Mission and CAMPA.

### Objective:

In order to generate information for changing requirements of-



- Support to States in Sustainable Forest Management;
- Inventory of NTFP and other new variables;
- Monitoring of Change in Forest characteristics;
- Inclusion of climate change indicators;
- Significant improvement of precision at the state / regional level etc.

To meet the requirement of new NFI design a Pilot study was conducted in four districts by zonal offices covering different types of terrain to test its suitability.

On the basis of pilot study the proposed National Level Continuous Forest Inventory System has been conceived to form a basis for making continuing policy and planning decisions, including the role of forests as an ecosystem (the “conservation view”) and its role as resource provider (the “utilization view”), and this holds for all levels of forestry from the local to the global.

## Training

About 185 forestry personnel have been trained in different courses since April 2015 to December 2015.

## Recent initiative/achievements

### Estimation of carbon stock in India's forest

FSI has been estimating the carbon stock in the India's forest as per the methodology of 'Good Practices Guidance' (GPG) developed by Inter-governmental panel on Climate Change (IPCC). For estimation of emission factors for

different strata, data of National Forest Inventory (NFI) has been used. Biomass equations/factors developed through a special study conducted by FSI. GIS techniques were used for synthesizing the data and to estimate carbon stock under different carbon pools.

In the present assessment ISFR-2015 total carbon stock in forest is estimated to be 7,044 million tones. There is an increase of 103 million tones in the carbon stock of country as compared to the last assessment. (i.e. between year 2011 to 2013).

### Inventory of TOF in Haryana and Uttarakhand

Three projects on Inventory of Trees Outside Forests (TOF) in Haryana, Uttarakhand and Tamil Nadu were undertaken by FSI. The field work in Haryana and Uttarakhand was carried out by state forest departments. The field work of Tamil Nadu state was done by FSI. The data processing and report writing was done by FSI and final report of all these three projects have been submitted to state forest department respectively. After the approval the report will be published.

### National Forest Information System (NFIS)

In order to evolve a uniform monitoring system for monitoring of the activities implemented in various states under centrally sponsored schemes like Green India Mission, CAMPA, NAP, a comprehensive monitoring mechanism has been devised. After studying the monitoring procedures followed by the SFDs and deriving strength from the expertise that FSI has in remote sensing and GIS based forest resource survey and experience in



ground surveys, this mechanism has been formed. The 'National Forestry Information System' scheme with FSI as nodal agency has been initiated recently.

Under NFIS, around 20,000 plantation patches under different CSS will be monitored every year. The monitoring will involve both ground based survey and use of high resolution satellite data. In the initial year say up to 3 years, the component of ground survey will be more whereas after 4th year the component of remote sensing will be more and once the canopy of the trees is developed fully and discernable through satellite, the monitoring of plantation will be done fully using remote sensing data.

Pilot Study by FSI in 14 districts spread over the entire country has been carried out and the results of the study are expected by March-April 2016.

### Real Time Monitoring of Forest Fires

Forest fires are a recurrent phenomenon in India during fire season which is from February to June. The exercise on real time monitoring of forest fires was initiated in 2004 by FSI. The high temporal MODIS (Moderate Resolution Imaging Spectro-Radiometer) sensor, which is



**Fig.10** Forest fire is a recurrent phenomenon

on-board Terra and Aqua satellite, has been used to identify fire points on real time basis. The satellite systems which have a six hour revisit period over an area, helps in capturing the forest fires at the nascent stage based on the temperature thresholds. The fire alerts received from MODIS sensor are processed for pure forest fire signals using FSI forest cover layer, other ancillary and ground information. The fire signals are sent to the registered users as SMS alerts reporting the number of fires in their respective district or state. The fire signals are also sent to the state forest fire nodal officer as KML, which is a Google earth compatible file. The file in addition to the positional coordinate carries the toposheet number, state, district, of each fire point, thus enabling the user to identify the fire point on the Google earth as well as on the toposheet. During the current fire season of year 2015, a total of 15,937 forest fires have been reported across the country. The highest number of fires have been reported in the state of Mizoram (2,468), followed by Assam (1,656) and Odisha (1,467). As compared to fires reported in 2014 (19,054), a decline of 3,117 in the number of fires incidences have been reported in 2015. The forest fire archival data since 2004 for each state and district is available in the FSI.

Based the Forest fire points processed during the fire season 2014, a Forest Fire Point Occurrences Density Map of the India was created and the same was sent to the State Nodal Officers for mitigation of forest fires..

### Burnt area assessment of Maharashtra

Forest Survey of India further made an attempt to carry out burnt area assessment of





the country for the fire season 2015 using AWiFS (Advanced Wide Field Sensor) having a spatial resolution of 56 m and temporal resolution of 5 days. The AWiFS data downloaded through ftp facility were georectified using the exiting FSI corrected images. The burnt area assessment was carried using Digital Image Processing of satellite data and in-house developed methodology with the help of ancillary data. The burnt scar as observed on the image are delineated and extracted for further classification into three severity classes- Severely Burnt, Moderately Burnt and Low Burnt. State-wise area estimation under these categories is under progress.

### **Inventory and Monitoring of Biosphere Reserves in India, using Remote Sensing and GIS Technology**

FSI has taken up a project to study the temporal change in land use and dynamics over the expenses of three Biosphere Reserves (BRs): viz. Pachmarhi in Madhya Pradesh, Achanakmar Amarkantak in M.P/Chhattisgarh and Nokrek in Meghalaya. It is envisaged to study the impact of BR management to develop the test RS & GIS based approach on assessment and valuation of ecosystem services in a selected Biosphere Reserve of the Himalayan region, and make recommendations for effective management of BR focusing on redefining zones and boundaries. Temporal change analysis for land use and land cover is to be done over 5 years' period since they were declared Biosphere Reserves. The project is almost completed and report writing is under progress.

### **Assessment of Forest Cover with in Recorded Forest Area**

The States/UTs Forests Departments (SFDs) are the custodians of the records, data and maps of the recorded forest areas (which includes Reserved, Protected and Unclassed Forests). The forest cover of the country is assessed irrespective of ownership, legal status and land use. The major portion of the forest cover, however, falls within the recorded forests. The assessment of area of the forest cover within the recorded forests is only possible with the geocoded boundaries of the RFA provided by the SFDs. This information provides qualitative and quantitative attributes for better and effective forest management.

Only 12 States/ UTs have provided usable geocoded boundaries of RFA which has been used for analysis and calculation of forest Cover in the present ISFR. These States/UTs are Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tamil Nadu, Telangana, Uttarakhand and Andaman Nicobar Islands.

### **Assessment of forest cover within and outside Green-wash area**

Despite non-availability of geo-coded boundaries of States/UTs RFAs, FSI succeeded to give forest cover within and outside the green-wash area in the last ISFR. The green-wash areas as shown in Survey of India topographic sheets represent the forest areas at the time of survey carried out to prepare such topographic sheets. This green wash area by and large corresponds to recorded forest area of the country. Thus in the absence of digitized boundaries of the RFA, green wash areas have been taken as proxy to RFA. As FSI does not have geo-coded boundaries of RFAs

for all the states/UTs, forest cover within and outside green wash areas has been given separately for all the states/UTs.

#### Important Characteristics of Different Forest Type Groups

The concept of 'forest health' is very important for its management. The healthy forest ecosystem should have many characteristics such as physical environment and biotic resources to support productive forests during seral stages; a functional equilibrium between supply and demand of water, nutrients, light, growing space etc.; a diversity of developmental stages and cover types and stand structures that provide habitat for many native species. Indian Forests are managed keeping ecosystem perspective in view.

FSI has carried out forest type mapping of the country and brought out 'Atlas Forest Types of India' in the year 2011 containing forest type maps according to Champion & Seth classification (1968) of the country. Under this exercise, maps were generated at 1:50,000 scale for 178 out of 200 forest types described by the authors..

In addition, during National forest Inventory, besides actual tree measurements, information on various other important parameters such as forest area under different intensity of regeneration, incidence of fire, injuries to crops, grazing, soil information, humus, biotic influence etc are also being collected.

Using above two information, it has been attempted to analyse important characteristics of forest in different forest types in the present ISFR. This Chapter provides information about various characteristics of India's forests in different forest types groups describing forest

enabling conditions, forest vegetations and disturbances in forest which gives an account of forest health under different forest type groups.

#### National and State wise Forest Cover information in different patch size classes

The national and state wise forest cover information in different patch size, no. of patches, area and their percentage has been given first time. This information is vital as it tells about the fragmentations status in the forest. As per the report, 9 patches of size more than 10,000 Sq.km have 39 percent of Forest cover.

#### e-Green Watch

Compensatory Afforestation Fund Management and Planning Authority (CAMPA) is the National Advisory Council for monitoring, technical assistance and evaluation of compensatory afforestation and other forestry activities funded by CAMPA fund. Therefore, MoEF & CC developed a work based Web-GIS application for monitoring of different activities funded under CAMPA.

It is designed and developed as a web-based, role-based workflow applications and integrated information system which shall enable automating of various functions and activities related to monitoring and transparency in the use of CAMPA funds and various works sanctioned in the Annual Plan of Operations (State CAMPA) approved by the State Authorities. State government uploads the polygons under following categories:

- Compensatory Afforestation Land (CA Land)
- Diverted Land (DL)



- Other Plantation Work (OPW)
- Plantation Work (PW)
- Assets

At present there are 24 States and one UTs linked to the e-Green Watch Portal. Under this programme, SFDs upload polygons under above mentioned categories. FSI monitors these polygons online and gives remarks after downloading and viewing the polygons on Google Earth images. It is followed by monthly report submitted to the MoEF & CC on regular basis.[Website: [www.egreenwatch.nic.in](http://www.egreenwatch.nic.in)]

### Decision Support System

Decision support System (DSS) is Web-GIS based application which has been developed to provide qualitative and quantitative information with respect to Forest area. DSS was launched in November, 2014 by Hon'ble minister of state (I/C), MoEF & CC. It enables decision maker to take a well informed decision based on the information generated by the system. This system helps in a big way for taking decisions with respect to proposals under Forest Conservation Act.

It uses different spatial layers for providing information on different issues related to a Forest and Wild life areas. Geospatial Data used in the DSS Application includes State and District boundary Layer, Protected Area (PA), Tiger Reserves (TR), Tiger corridors, Forest Cover Map (FCM), Forest Type Map (FTM), Biological Richness (BR), Landscape Integrity (LI), Net Present Value, Hydrological Layer, Forest Cover Map Time Series Layer, Recorded Forest area and Recorded Forest Administrative Boundary. This application is running since last year. All state PCCFs and MoEF&CC have been provided with the User id

and password to access and use the application. [Website: [www.fsigeoportal.gov.in/dss](http://www.fsigeoportal.gov.in/dss)].

### Forest Cover Mapping of Tiger Reserves falling in Shivalik Gangetic plain Landscape

Tiger Reserves (TRs) are important protected area that are notified as such under section 38 V of the Wildlife (Protection) Act 1972 (vide Amendment of 2006). The expression "Tiger Reserve" includes-Core and Buffer. Core is a critical tiger habitat area of National Park and sanctuaries, where it has been established, on the basis of scientific and objective criteria. There are 48 Tiger Reserves (TRs) in the country.

At the behest of National Tiger Conservation Authority (NTCA), FSI took up this project in 2013 to assess the status, density and change in forest cover of three Tiger Reserves in 'Shivalik Gangetic Plain Landscape'.

The present study is on the status & density changes of Forest Cover in core and buffer of tiger reserves, area up to 10km from the boundary of Tiger Reserve and Status of the Forest Cover change in forest corridors and carbon sequestered since last 20 years in Tiger Reserves falling in Shivalik Gangetic Plains viz. Corbett Tiger Reserve, Dudhwa Tiger Reserve, Valmiki Tiger Reserve.

The temporal changes over a period of 20 years beginning from 1990 onwards till 2010 were studied using RS and GIS techniques. In addition, the study also includes carbon sequestration estimation of said TRs.

The three Tiger Reserves are separated from each other by agricultural land and habitations in between. The study is being





**Fig. 11** Tiger (*Panthera Tigris*) our National Animal

carried out as a decadal assessment in two phases: Phase I: 1990 – 2000 and Phase II: 2000 – 2010. The satellite data of IRS 1C/1D, P6 LISS III and Landsat was used for digital image interpretation at a scale of 1:50,000. The final output revealed the net change in the forest cover classes based on canopy density classes adopted by FSI (VDF, MDF, OF and Scrub) for the period of 1990, 2000 and 2010 and also carbon sequestered for each Tiger Reserve.

The output of the study shows an increase in the forest cover in the core and buffer area of Corbett Tiger Reserve during the period of 1990-2000. However, there is a little decrease in the forest cover in Core and Buffer area during 2000-2010.

Tiger reserve has been ravaged by floods in Ram Ganga & Kosi River during this period causing loss of standing matured crops. Additionally, there has been rotational felling in

the buffer area of the reserve. Carbon stock of the Corbett reserve has also followed the same pattern.

In Dudhwa Tiger reserve, positive changes have been observed in the forest cover. It corresponds with increase of carbon stock over the period of 1990 to 2000 and has continued in second decade of the study in the reserve.

In Valmiki Tiger Reserve forest cover and carbon stock has gone down for the study period due to change in the river course of Gandak.

### Progress of Activities Undertaken

A statement showing Regional Office wise physical targets and achievements for monitoring of approved project under FCA, 1980 and EPA, 1986 for the for the period 01.04.2015 to 31.12.2015.

The details of some of the important activities undertaken during the year are as follows:-





- A “Training of Trainers” on web portal for online submission and monitoring of forest clearances was organized by the Regional Office Headquarter (ROHQ) Division of the Ministry from 7th to 10th September, 2015 with the help of Forest Research Institute, Dehradun and National Informatics Centre, New Delhi.
- Officials of ten Regional Offices, who were trained during the Training of Trainers in September 2015, imparted training to various user agencies and officials of the respective State Forest Departments with the help of Forest Research Institute, Dehradun and National Informatics Centre, New Delhi
- To facilitate informed, objective and predictable decisions on forest clearance proposals, a GIS based Decision Support System (DSS) has been made operational in all ten Regional Offices of this Ministry.

### **Forest Certification’ of Timber, Non-Timber Forest Products’**

Forest Certification has emerged as a voluntary market-driven mechanism in support of Sustainable Forest Management (SFM). Certification initiatives rely on consumers exercising purchasing choice in favour of products labelled as originating from forests certified to have been sustainably managed. Certification and Eco-labelling 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. In the year 2015-16, the budget allocation in the scheme was only Rs. 1.00 lakh, therefore no major activities

has been carried out.

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

Non-Timber Forest Products (NTFPs) have tremendous potential and role in the economic, social, cultural and traditional life style of millions of forest dependent people throughout the length and breadth of the world. The subsistence and the livelihood of the tribal and local people largely depends on NTFPs. Due to low budget allocation in the scheme for the year 2015-16 no major activities has been carried out.

### **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 necessary regulation of export and import of forest produce as per the Foreign Trade Policy as well as the applied Tariff rates. The Division also deals with the issue of 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 and other wood products etc.

### **International Tropical Timber Organization (ITTO)**

- The International Tropical Timber Agreement (ITTA) was negotiated under United Nation Conference for Trade and Development (UNCTAD’s) auspices to provide an effective framework for

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**RESEARCH ADVANCES IN PANEL PRODUCTS & COMPOSITES**

**BAMBOO STRIP LAMINATES**

- Ideal substitution for Solid Wood
- Strength Properties comparable to Teak Wood & conforms to International Standards

Fig. 12 Samples of bamboo strip laminates installed by IPIRTI at MoEF&CC, Indira Paryavaran Bhawan, New Delhi

cooperation and consultation among countries producing and consuming tropical timber;

- The ITTA, 1994 was renegotiated under the auspices of UNCTAD, Geneva, Switzerland to formulate a new Agreement, ITTA, 2006 which entered into force definitively or provisionally on or after 1st February, 2008 or any date within six months thereafter. 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.
- At Present, the ITTO has 72 members divided into two category: Producer Countries (34 members) and Consumer Countries (38 members). India is a founder member (producer Country Category) of ITTO which aims for conserving tropical

forest and assisting countries to develop economically in the field of forestry.

- In the current year 2015-16, the Government of India sanctioned the annual contribution of US \$ 1,14,434 to ITTO for the calendar year 2015.

### International Network of Bamboo and Rattan (INBAR)

The International Network for Bamboo and Rattan (INBAR) is an intergovernmental organization established in 1997. INBAR is dedicated to improving the social, economic, and environmental benefits of bamboo and rattan. INBAR plays a unique role in finding and demonstrating innovative ways of using bamboo and rattan to protect the environment and biodiversity, alleviate poverty, and facilitates fairer pro-poor trade. INBAR



connects a global network of partners from the government, private, and non-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. As a member of INBAR, India has to pay annual contribution to INBAR which is made every year. During the year 2015-16, Government of India sanctioned annual contribution of US \$ 12,000 for the calendar year 2015 to INBAR..

### **Andaman & Nicobar Islands Forest and Plantation Development Corporation Ltd.**

Andaman & Nicobar Islands Forest & 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. During the year 2001-02, the Hon'ble Supreme Court of India vide its order dated 10.10.2001 and 07.05.2002 imposed various restrictions on felling and sale of timber from naturally grown trees in Andaman & Nicobar Islands. Due to this, even the obligatory expenses of the Corporation, like the payment of salaries, wages etc. were possible only due to the sanction of interest bearing loans every year from the Govt. of India since 2003-04.

The Ministry prepared a Cabinet Note for revival plan for ANIFPDCL, Port Blair through transfer of ownership from Ministry of Environment & Forests to Andaman & Nicobar Administration with effect from 1st April, 2014. The above Draft Cabinet Note was approved by Hon'ble MEF and the same was circulated to all

concerned Ministries/Departments to furnish their comments. However, later on the Andaman & Nicobar Administration did not agree to the revival proposal of the ANIFPDCL, Port Blair contained in the Cabinet note largely in the light of orders of Hon'ble Calcutta High Court and instead suggested for closure of the Corporation. Therefore, the Ministry with the approval of Hon'ble MEF requested the Andaman and Nicobar Administration to submit the detailed proposal for closure of the Corporation. Accordingly, Chief Secretary Andaman and Nicobar Administration vide its letter dated 4th June, 2014 forwarded a closure plan of ANIFPDCL in a phased manner over 5 years beginning from 2014-15 for forestry and Red Oil Palm Projects and one year Rubber Projects, Katchal.

The closure plan was examined and Ministry and Andaman and Nicobar Administration was requested to revise the plan to ensure closure in one go instead of phased closure over a period of 5 year as per observation of Cabinet Secretariat. The closure plan in one go by 31.03.2016 was received for an amount of Rs. 685.00 crore (inclusive of loan and interest of Rs. 221.49 crore). A meeting was held on 08.06.2015 under the Chairmanship of Hon'ble MEF&CC to discuss closure plan. In pursuance of the decision of the meeting of Committee of Secretaries (CoS), a meeting was held on 28.07.2015 in the Ministry on 28th July, 2015 under the Chairmanship of Secretary (E, F&CC) to discuss issues related to ANIFPDCL, Port Blair. The matter of revival/closure of ANIFPDCL, Port Blair is under examination in the Ministry.

## CHAPTER-2

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# CONSERVATION







## Biodiversity Conservation

### Introduction & objectives

The Convention on Biological Diversity (CBD) is one of the key agreements adopted during the Earth Summit held in Rio de Janeiro in 1992. The objectives of the CBD are: conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits arising out of the use of genetic resources. Pursuant to the ratification of the CBD by India on 18 February 1994, several steps were initiated to meet the commitments under the Convention, and to realize the opportunities offered by the Convention. These efforts were aimed at bringing the legislative, administrative and policy regimes in tune with the three-fold objectives of the CBD. India enacted the Biological Diversity (BD) Act in 2002 to give effect to the provision of this Convention. India has also prepared a National Biodiversity Action Plan (NBAP) in 2008, and an Addendum to NBAP in 2014 with 20 national targets on biodiversity.

The Nagoya Protocol on access and benefit sharing (ABS) adopted under the aegis of CBD in 2010, is aimed at fair and equitable sharing of benefits arising from the utilization of genetic resources. India signed the Protocol on 11th May 2011, and ratified it on 9th October, 2012. Following hosting of eleventh Conference of Parties (CoP-11) to the CBD by India in Hyderabad in October 2012, during India's Presidency of CoP, India facilitated ratifications by requisite number of Parties to the CBD's Nagoya Protocol on ABS for its entry into force on 12th October 2014. The Nagoya Protocol on ABS is being implemented at the

national level inter alia through the Biological Diversity Act.

The BD Act is implemented through a three-tier institutional mechanism: National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs). The NBA is an autonomous body that performs facilitative, regulatory and advisory functions for the Government on biodiversity related issues.

### Activities undertaken

#### Convention on Biological Diversity (CBD) and related matters

- During the period, India participated in the following important international meetings relating to biodiversity:
- Fifth Meeting of the Multidisciplinary Expert Panel (MEP) of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) held in Bonn, Germany from 13-16 April 2015.
- First meeting of the Bureau of CoP to the CBD, held in Montreal from 27-28 April 2015.
- Regional Workshop to facilitate the description of ecologically or biologically significant marine areas (EBSAs) in the North-West Indian Ocean and adjacent Gulf areas from 20-25 April 2015, preceded by a training session on EBSAs on 19 April 2015, both held in Dubai, UAE.
- A bilateral exchange meeting on the Centre for Biodiversity Policy and Law (CEBPOL) in Norway from 15-19 June 2015.
- 22nd Governing Board of the Global Biodiversity Information Facility (GBIF)



Fig. 13 Mud puddling of butterflies

- and associated events held in Madagascar from 4-11 October, 2015.
- Sixth meeting of IPBES MEP held in Bonn, Germany from 8-12 October 2015.
  - Nineteenth meeting of the CBD's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-19) from 2-5 November 2016, and the Ninth meeting of Working Group on Article 8j (WG8j-9) from 4-7 November 2015, both in Montreal, Canada.
  - India hosted the following important international meetings relating to biodiversity during 2015-16.
    - CBD's Subregional capacity building workshop on financial reporting and resource mobilization for South Asia in New Delhi from 16-18 September 2015.
    - Capacity Building Forum of IPBES held in Dehradun from 19-22 October 2015.
    - CBD's Capacity building workshop for South, Central and West Asia on achieving Aichi Biodiversity Targets 11 and 12 in New Delhi from 7-10 December, 2015.
    - CBD's Expert Group meeting on full assessment of funding necessary and available for implementation of the Convention for the period July 2018 to June 2022, held in New Delhi on 17-18 February 2016
    - For participating in the meetings of the CBD and IPBES, country positions were prepared through a consultative process, which were put forth at these negotiation meetings.



- During the period, work related to the implementation of decisions of the CoP to the CBD was continued, including through making submissions to the CBD Secretariat. India also continued to contribute to the IPBES work programme and deliverables including through participation of Indian experts in the meetings.
- In accordance with the requirements under the Nagoya Protocol on ABS, India published information relating to an ABS agreement entered into by NBA, on the ABS Clearing House of the CBD Secretariat on 1st October 2015, thus constituting the first Internationally Recognised Certificate of Compliance.
- A long-drawn exercise of augmenting the list of normally traded commodities to be exempted from the purview of the BD Act through a notification to be issued under Section 40 was completed following consultations with stakeholders over the last three years. The draft notification will be issued following the due process.
- Activities to strengthen the institutional capacity of NBA, SBBs and constitution of BMCs, as well as preparation of Peoples Biodiversity Registers (PBRs) were continued during the year, including by providing special grant to NBA for SBBs and PBRs, and by developing project proposals.
- Two projects on biodiversity have been developed seeking grants from biodiversity portfolio of sixth cycle of the Global Environment Facility (GEF). The project on 'Securing livelihoods, Conservation, Sustainable Use and Restoration of high range Himalayan Ecosystems (SECURE-

Himalayas)' has been approved by the GEF Council in 2015. The project on "Mainstreaming Biodiversity into production sectors and development and finance planning" has been submitted for consideration of approval.

A project proposal was developed on 'Capacity Development of Statutory Institutions for Effective Implementation of the Access and Benefit Sharing (ABS) Mechanism in India' under Indo-German Biodiversity Programme for Euro 3 million, which was approved in the 2015 Indo-German negotiations on development cooperation. The project will be implemented at the national level with NBA and in three pilot states of Maharashtra, Tamil Nadu and Uttarakhand with the respective State Biodiversity Boards.

The Ministry joined UNDP managed global initiative on Biodiversity Finance Initiative (BIOFIN) in 2015. The initiative is hosted by NBA, and technical assistance is being provided by the Wildlife Institute of India and National Institute of Public Finance and Policy in implementation of BIOFIN. The first National Stakeholder Consultation on BIOFIN-India was held in New Delhi on 14-15 January 2016.

- International Day for Biological Diversity (IDB) was celebrated all over the country on 22nd May, 2015. The theme for year 2015-16 was 'Biodiversity for Sustainable Development'. A Message from the Minister of Environment, Forest & Climate Change was posted on the official websites of the Ministry, its organizations and Centres of Excellence and on social media. The national event was held in Srinagar, Jammu & Kashmir on this occasion,



wherein inter alia a brochure on BIOFIN-India project was released. Several SBBs and other organizations also celebrated the IDB on 22nd May 2015.

### Biological Diversity Act, 2002 and National Biodiversity Authority

- Four meetings of the Authority were held during 2015-16, wherein decisions have been taken on important policy and legal issues. Four meetings of the Expert Committee on Access and Benefit Sharing have been held, wherein over 250 applications were considered. The recommendations of this Committee have been considered by the Authority.
- Benefit sharing agreements were executed by over 200 applicants with NBA, which is construed as an approval for undertaking various activities enshrined in Sections 3,4,6 and 20 of the BD Act.
- During the State Environment Ministers' Conference organised by the Ministry in New Delhi on 6-7th April 2015, a session on Biodiversity was organized, wherein progress on implementation of BD Act was reviewed.
- The Tenth National Meeting of SBBs was organized on 25-26 August 2015 in the Ministry. The meeting, inter alia, reviewed the progress made on resolutions adopted in the Environment & Forest Ministers' Conference held in April 2015, on issues relating to formation of BMCs at the local level, documentation of PBRs, implementation of ABS mechanism, notification on threatened species and



Fig. 14 Chinkara (*Gazella benettii*) also known as Indian Gazelle





- updating the State Biodiversity Action Plans.
- An Expert Committee has been constituted by NBA to work out modalities and frame comprehensive policy to utilize the benefit sharing amount received through the auction of Red Sanders wood. The Expert Committee has met six times and discussed the various issues related to benefit sharing from Red Sanders wood.
  - NBA has constituted a Technical Committee to review/evaluate the proposals and reports of research studies to be carried out under the CEBPOL programme.
  - An Expert Committee on BMCs has been reconstituted to revise the existing guidelines for BMCs. Further, three regional consultations were held with different stakeholders including SBBs/BMCs to seek inputs for revision of the guidelines.
  - An Expert Committee, which has been constituted to revise the existing agreement formats, met on 18th August, 2015 at Chennai, and on 12th June, 2015 at Bengaluru.
  - A meeting of the Core Expert Group on Designated Repositories was held in the Ministry on 05 October, 2015 to review the functioning of existing national repositories designated under Section 39 of the Biological Diversity Act and to develop their specific mandates as well as working guidelines.
  - In order to create awareness amongst public about the BD Act, 2002, NBA published a half-page poster about the provisions of the Act in newspapers throughout India on its Foundation Day on 1 October, 2015.
  - Under the ongoing UNEP-GEF ABS Project on Strengthening the Implementation of the Biological Diversity Act and Rules with Focus on its Access and Benefit Sharing Provisions, various activities were carried out, which include.
    - Identification of biodiversity with potential for ABS and their valuation in selected ecosystems such as forest, agriculture and wetlands.
    - Development of tools, methodologies, guidelines, frameworks for implementing ABS provisions of the Biological Diversity Act.
    - Piloting ABS agreements.
    - Implementation of policy and regulatory frameworks relating to ABS provisions at national level and thereby contribute to international ABS policy issues.
    - Capacity Building for strengthening implementation of the ABS provisions of the BD Act.
    - Increase public awareness and education programmes.
  - The Project Steering Committee of the UNEP-GEF project met on 6th October 2015 in the Ministry to review the progress made under the project.

## Performance / Achievements

### First Internationally Recognised Certificate of Compliance (IRCC) issued under Nagoya Protocol

Nagoya Protocol on ABS requires Parties to issue a permit or its equivalent at the time of access as evidence that access to genetic resources was based on prior informed consent and that mutually agreed terms were established. The Protocol further requires that Parties make information on the permit or its equivalent available to the ABS Clearing House for it to constitute an Internationally Recognised Certificate of Compliance (IRCC). The IRCC of compliance is a major innovation of the Nagoya Protocol, and one of the cornerstones of the ABS system. As a major step forward towards operationalisation of the Nagoya Protocol and the global Aichi biodiversity target 16, India became the first and so far the only country to publish information relating to an ABS agreement on the ABS Clearing House of the CBD Secretariat on 1st October 2015, thus constituting the first IRCC under the Nagoya Protocol.

Government of India's commitment and leadership towards implementation of the Nagoya Protocol by publishing the information to constitute the first IRCC has been acknowledged by the CBD Secretariat

### Hosting of CBD's meetings

Even though India is no longer the President of CoP, but recognizing India's contribution and commitment to biodiversity, at the request of the Secretariat of the CBD, this Ministry hosted two meetings of CBD during

the year, namely: (i) Sub-regional capacity building workshop on financial reporting and resource mobilization for South Asia, held in New Delhi from 16-18 September 2015; and (ii) Sub-regional capacity building workshop on achieving Aichi Biodiversity Targets 11 and 12 for financial reporting and resource mobilization for South, Central and West Asia, held in New Delhi from 7th to 10th December, 2015. The workshop held in September 2015 was the first in a series of capacity building workshops being organized by the CBD Secretariat to enhance the capacity of participants to apply pertinent methodologies, frameworks and tools relating to biodiversity related assessments. Eight countries of the South Asia region and CBD Secretariat, Montreal participated in this meeting.

The sub-regional workshop held in December 2015 was the second in a series of capacity building workshops being organized by the CBD Secretariat to collect and share information and data on the status of Aichi Biodiversity Targets 11 and 12; identify priority actions for achieving these targets and explore opportunities for advancing these actions through financial support from national budgets and from bilateral and multilateral sources; and share experiences, assessments, case studies, identified priority actions and other relevant information on these targets. Seventeen countries from the region were represented in this workshop.

### Record number of agreements signed by NBA

During the year, 297 applications (second

highest so far) have been received by NBA so far from different stakeholders seeking approval to access biological resources and/ or associated knowledge. The number of applications cleared by the Authority during 2015-16 is 162 (second highest so far). The number of agreements signed by NBA was 58, which is the highest so far.

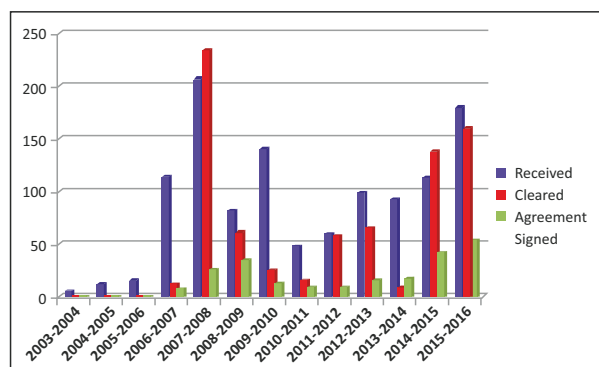


Fig. 15 Number of agreements signed by NBA

### Revision of Notification on Normally Traded Commodities under Section 40 of the BD Act

Section 40 of the BD Act provides for the Central Government to exempt through issuing a notification biological resources normally traded as commodities. The first notification thus issued on 26 October 2009 contains 190 species. The long-drawn exercise of augmenting this list and revising the Notification by incorporating relevant details was completed after consultations with stakeholders over more than three years. Further action for issue of the revised notification is underway.

### Benefit Sharing received through ABS mechanism

NBA has received a sum of about Rs 18 crores as benefit sharing component during

2015-16 (highest so far) including from the auction of Red Sanders wood.

### Operationalisation of Centre for Biodiversity Policy and Law (CEBPOL)

The Government of India in collaboration with the Norwegian Government has established a “Centre for Biodiversity Policy and Law (CEBPOL)” in the National Biodiversity Authority (NBA), Chennai, to develop professional expertise in biodiversity policies and laws and develop capacity building. The Centre aims at contributing to strengthening the implementation of India's Biological Diversity Act. During the year, several activities were taken up under CEBPOL. Progress made on some of these is as follows:

- Based on Norway’s work on Nature Index (NI) that provides an overview of the state and development of biodiversity in the major ecosystems and thereby helps measure progress towards the goal of halting the loss of biodiversity, it has been decided to pilot NI in India to address with site-specific biodiversity management issues. Towards this, an inception meeting was organized on 15th September 2015 in the Ministry, following which it was decided that NI would be piloted in the Chilka wetland in Odisha and the Great Himalayan National Park in Himachal Pradesh to test the Nature Index tool for biodiversity conservation in India. A workshop on Nature Index was organised in Bhubaneshwar on 28-29 January 2016.
- Fridtjof Nansen Institute (FNI), Norway prepared a report titled ‘The state of technology transfer obligations in global environmental governance and law: biodiversity conservation and sustainable

use', which examines technology transfer as a tool for conservation and sustainable use of biodiversity. The report was reviewed by a Technical Committee and is awaiting publication.

- A report on 'The Nagoya Protocol on access to genetic resources and benefit sharing: User-country measures and implementation in India' was prepared jointly by FNI and CEBPOL, which reviews the ABS user-measure provisions of the Nagoya Protocol and the situations as regards national implementation so far. It also outlines India's status in implementing these user obligations, and notes some future challenges. The report is the first example of co-production of publications between CEBPOL and FNI. The report has been reviewed by the Technical Committee and is awaiting publication.
- The Project Steering Committee of CEBPOL met on 27 January 2016 in Bhubaneswar, and reviewed the progress made under the project.

### Release of Second edition of the Compendium of BD Act, Rules and Notifications

During the tenth National Meeting of the State Biodiversity Boards held on 25-26 August 2015 in New Delhi, the Secretary, MoEFCC released the second edition of the Compendium of BD Act, Rules and Notifications brought out by the NBA. During the closing session on 26th August, 2015, the Minister announced Call for nominations for India Biodiversity Awards 2016 which is a collaborative initiative between the Ministry and UNDP-India. He also released information

brochures on BIOFIN in Marathi and Hindi, and a pamphlet on Achievements of NBA in 2014-15.

### Progress/ Achievements (for ongoing programmes/schemes/projects)

- India continues to participate actively in CBD meetings. India has also hosted two CBD workshops at the request of CBD Secretariat. India also continues to contribute to work programme of IPBES. At the request of IPBES, India also hosted IPBES Capacity Building Forum meeting.
- India is actively involved in the implementation of the Nagoya Protocol. Towards operationalisation of the Protocol, India became the first and so far the only country to have submitted Internationally Recognised Certificate of Compliance.
- 33rd Authority meeting held on 17th April, 2015.
- 34th Authority meeting held on 29th June, 2015.
- 35th Authority meeting held on 13th October, 2015.
- 36th Authority meeting held on 6th January, 2016.
- Supported to the tune of Rs.1.23 crores to State Biodiversity Boards to celebrate the International Day for Biological Diversity 2015.
- SBBs have been set up in all 29 States. So far, 37,769 BMCs have been constituted.
- So far 2,485 PBRs have been documented
- So far the species which are on the verge of extinction has been notified in the 16 States and 2 UTs.





- So far, 207 agreements have been entered between NBA and applicants for accessing biological resources and associated knowledge for undertaking various activities. During the year, record numbers of ABS agreements (58) were signed.

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

Biological Diversity Act, 2002 and Biological Diversity Rules, 2004.

### **Responsibilities of National Biodiversity Authority**

The Biological Diversity Act 2002 came into force in 2003. The Act extends to the whole of India. The objectives of the Act are conservation, sustainable utilization and fair and equitable sharing of benefits arising out of the use of biological resources and associated knowledge. The Act is being implemented through a three-tiered institutional structures (NBA at National level, State Biodiversity Boards at State level and Biodiversity Management Committees at local level)

The NBA is a body corporate established in accordance with the provisions of Section 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. The main objectives of NBA are:

- To regulate access to biological resources of the country to conserve and sustainable use of biological diversity;

- To respect and protect the knowledge of local communities related to biodiversity;
- To secure sharing of benefits with the local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources;
- Conservation and development of area of importance from the view point of biological diversity by declaring them as biological diversity heritage sites;
- Protection and rehabilitation of threatened species; involvement of institutions of state government in the broad scheme of implementation of the Biological Diversity Act through constitution of committees.

### **Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP)**

#### **Introduction**

The externally aided project entitled, 'Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP)' is being implemented as a centrally sponsored scheme. The project has four landscape located at Askot, Uttarakhand; Little Rann of Kachchh, Gujarat, Satpura, Madhya Pradesh and Maharashtra and Agasthyamalai, Tamil Nadu and Kerala; and three field learning centre at Gir, Gujarat; Kalakad Mundanthurai Tiger Reserve, Tamil Nadu and Periyar Tiger Reserve, Kerala. A capacity building centre for the project is at Wildlife Institute of India, Dehradun.

The BCRLIP is a blended GEF and IDA activity using a Specific Investment Loan instrument aimed at strengthening biodiversity



**Fig. 16** Emerald Dove (*Chalcophaps indica*) breeds in tropical & sub-tropical parts of India

conservation and improving rural livelihoods at landscape sites. The Project was launched in July 2011 for a duration of six years. The total outlay of the project is US\$ 31.02 million (around Rupees 139.59 crore).

### Objective

The Project objective is to develop and promote new models of conservation at the landscape through enhanced capacity and institution building for mainstreaming biodiversity conservation outcomes. This would involve the demonstration and scaling up of landscape conservation approaches by improving tools and techniques and knowledge and capacity developing and supporting multi-stakeholder partnerships for mainstreaming biodiversity conservation objectives, improving rural livelihoods,

enhancing learning and replicating successful participatory conservation models at the landscape scale.

The project has four components: (i) Demonstration of Landscapes Conservation Approaches in two Pilot Sites, i.e., landscapes mentioned above; (ii) Strengthening knowledge Management and National Capacity for replication of successful models of Conservation in Additional Landscapes Sites; (iii) Scaling up and Replication of Successful Models of Conservation in Additional Landscapes Sites; and (iv) National Coordination for Landscape Conservation.

### Activities Undertaken

- Periyar Tiger Reserve, Field Learning Centre, Kerala



Fig. 17 Wild Ass at Wild Ass Sanctuary, Little Rann of Kachchh

Organized the following workshops:

- Workshop on Conservation and Management of Western Ghats Natural Heritage sites – February 2015,
- Workshop on Human Wildlife Interface – March 2015
- Green India Mission–Landscape level familiarization workshop at Thekkady– September 2015.
- Satpura Landscape, Madhya Pradesh.
  - National Level Workshop on ‘Managing crop Damage by Animals’ was organized in Bhopal on 14th -15th February, 2015.
  - Selection of cluster of villages in all the functional units of MPFD present in Satpura landscape to capture diversity.
- Little Rann of Kachchh, Landscape, Gujarat
  - More than 200 micro-plans are ready and Entry Point Activities have already

started in several villages around Wild Ass Sanctuary.

- Gir, Field Learning Centre, Gujarat
- Wildlife Institute of India, Dehradun
  - During June, 2015 an expedition in Chipla Kedar, Pithoragarh District was conducted for primary data collection of the caterpillar fungus which could help in conservation strategies including participatory resource management and conservation awareness among local communities.
  - One field visit for designing of curricula for consultative workshop in Periyar and KMTR learning centers from 19th September to 29th September, 2015.

### Progress/ Achievement

- Organized a two day National Consultation Workshop on ‘Human-Wildlife Conflict’ on 18-19 May, 2015 in New Delhi.



- Organized a workshop on ‘Finalization of Annual Plan of Operation for the financial years 2016-17 and 2017-18’ on 21-22, January, 2016 at Sasan-Gir, Gujarat.
- Askot Landscape
  - 85 Microplans were completed until December 2015.
  - Scientific reports generated through a two year long research exercise covering mammals, birds, insects, fish and vegetation.
  - The Uttarakhand Government announced Hamara Ped Humara Dhan Yojna, BCRLIP Society distributed 30000 Plants of Akhrot to the villagers without any cost.
  - The BCRLIP Society distributed 30000 Plants of Kagji Akhrot and the beneficiaries earned Rs. 400.00 per plant. The total benefits are Rs. 12000000.00 (Rs. One crore twenty Lac only).
  - Two major medicinal plant nurseries one at munshiyari and another at in Dharchula were established.
- Agasthiyarmalai landscape, Tamilnadu.
  - 17.10.2015 - Organized the IInd phase of the Workshop "Landscape Management approach for Biodiversity Conservation and Human well being" at the Interpretation Centre, Papanasam.
  - 19.12.2015 conducted orientation training for Field Level Staff and VFC beneficiaries regarding "Biodiversity Conservation and Rural Livelihood Improvement " at Forest Extension Centre, Srivilliputhur in Agasthyamalai, Tamilnadu.
  - Micro planning is nearing completion for 20 villages in Agasthiyarmalai, Tamilnadu.
- Kalakad Mundanthurai Tiger Reserve, Tamilnadu
  - Organized the following workshop:
    - Orientation Workshop for BCRLIP in Agasthiyarmalai Landscape on 17.04.2015
    - A workshop for deployment of the real time mobile monitoring of patrolling teams and Anti poaching camps of KMTR through “Vana Suvadu” on 11-12/06/2015.
- Satpura Landscape, Madhya Pradesh
  - Selection of cluster of villages in all the functional units of Madhya Pradesh Forest Department present in Satpura landscape to capture diversity and Collaboration.
  - Organized National Level Launch-cum-Training workshop at Panchmani (17-19 Nov, 2015).
  - Organised small workshops and village level meetings throughout the project area.
- Little Rann of Kachchh, Gujarat
  - 75 Microplans in Little Rann of Kachchh, Gujarat are under implementation so far.
- Gir, Field Learning Centre, Gujarat
  - Lion Estimation Orientation Process, Techniques, Individual identification developed.
  - Workshop with the stakeholder for the making of Wild Ass Management plan.
  - 2nd workshop At Adesar with Stake holders.
  - 3rd workshop at Halvad with LRK Stakeholders.





Fig. 18 Workshop on Finalization of Annual Plan of Operation for the financial years 2016-17 and 2017-18.

- Web site Development for BCRLIP.
- Wildlife Institute of India, Dehradun
  - For facilitating Studies on Biological indicators 94 camera traps and other associated items procured in by Wildlife Institute of India, Dehradun.
  - Prepared nine reports on institutional methodological framework.
  - Organized the following workshops:
    - One local level 1-day consultative workshop for improvement in the proposed curricula for core training courses.
    - One training workshop for middle level officers on ‘Landscape Management Approach for Biodiversity Conservation and Human well being’ at Chhindwara, Madhya Pradesh in November, 2015.
    - A training programme on ‘Landscape Management Approach for Biodiversity Conservation and Human well being’ in Periyar Tiger Reserve and KMTR for range officers and front line professional.

## Conservation and Management of Mangroves & Coral Reefs

### Introduction

The Ministry of Environment, Forest & Climate Change accords high priority to the conservation and management of mangroves and coral reefs in the Country. 100% Central Assistance (up to 2014-15 and from 2015-16 onwards in 50:50 Centre and State share) is extended to all the Coastal States/Union Territories, who so request, for implementation of their approved Management Action Plans (MAPs) which comprise ‘Core’ and ‘Ancillary’ activities. Besides, the Ministry also supports R&D activities with emphasis on targeted research on mangrove and coral biodiversity, its management and various aspects of pollution in these areas. The Government has identified 38 mangrove and 4 coral reef sites throughout the Country for intensive conservation and management of mangroves and coral reefs. List of identified sites is at Table-3.

**Table-3.** List of identified mangrove sites in India

State/Union Territories	Mangrove Sites
West Bengal Orissa	1. Sunderbans 2. Bhaitarkanika 3. Mahanadi 4. Subernarekha 5. Devi 6. Dhamra 7. Mangrove Genetic Resources Centre 8. Chilka
Andhra Pradesh	9. Coringa 10. East Godavari 11. Krishna
Tamil Nadu	12. Pichavaram 13. Muthupet 14. Ramnad 15. Pulicat 16. Kazhuveli
Andaman & Nicobar	17. North 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 1. Dumas-Ubhrat
<b>Coral Reef Sites</b>	
Gujarat	1. Gulf of Kutch
Tamil Nadu	2. Gulf of Mannar
Andaman & Nicobar	3. Andaman and Nicobar Coral Reef
Lakshadweep	4. Lakshadweep Coral Reef



## Mangroves

The mangrove cover in the Country is 4740 km<sup>2</sup>. 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 coastal States/UTs. India is home to some of the best mangroves in the world. West Bengal has the maximum mangrove cover in the country, followed by Gujarat and Andaman & Nicobar Islands. However, not all coastal areas are suitable for mangrove plantation as mangroves require an appropriate mix of saline and freshwater, and soft substrate like mudflats to enable it to grow and perpetuate. The Ministry provides financial assistance to the State Forest Departments for all identified mangrove areas for conservation and management. Besides, the Ministry also supports R&D activities with emphasis on targeted research on mangrove biodiversity, its management and various aspects of pollution in the identified areas.

## Coral Reefs

The Indian reef area is estimated to be 2383.87 km<sup>2</sup>. Coral reefs are the skeletons of stony coral polyps cemented together. Coral reefs form the most dynamic ecosystem, providing shelter and nourishment to marine flora and fauna.

They are the protectors of the coastlines and

the coastal populations mostly depend on the coral reef ecosystems wherever they are present. The term 'coral' has been used to describe a variety of invertebrate animals of the Phylum Cnidaria including hard and soft corals. However, 'coral' is most often used as the common name for hard corals of the Order Scleractinia. The four major coral reefs areas identified for intensive conservation & management in India are:

- i) Gulf of Mannar;
- ii) Gulf of Kachchh;
- iii) Lakshadweep; and
- iv) Andaman and Nicobar Islands.

The emphasis is more 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 for all the four identified coral reef areas for conservation and management of coral and associates. Besides, the Ministry also supports R&D activities with emphasis on targeted research on coral biodiversity, its management and various aspects of pollution in these areas.

## Objectives

- Conservation and management of mangroves and coral reefs;
- Eco-restoration and afforestation in potential and also in degraded coastal areas;
- Maintenance of genetic diversity especially of threatened and endemic species;
- Creation of awareness on importance of these ecosystems leading to their conservation; and



Fig. 19 Gorgonian Melithaea Caledonica Grasshoff

- Sanctioning of approved annual MAPs of identified Mangrove and Coral Reef sites

### Progress/Achievements

- 14 approved Management Action Plans (MAPs) have been serviced.
- Serviced ongoing research projects – 22
- Organized one field visit for monitoring of the progress of mangrove & coral reef sites in Gulf of Mannar, Tamil Nadu.
- Programme Advisory Committee (PAC) to support the research in mangrove and coral reef areas constituted.
- About 112 km<sup>2</sup> mangrove area has been increased due to initiatives taken by the Ministry.

- One PAC meeting to review the progress Organized.

### Biosphere Reserves

#### Introduction and Objective

The Indian National Man and Biosphere (MAB) Committee identifies and recommends potential sites for designation as Biosphere Reserves, following the UNESCO's guidelines and criteria. There are 18 designated Biosphere Reserves (BRs). Out of 18 Biosphere Reserves, 9 Biosphere Reserves have been included in the World Network of Biosphere Reserves of UNESCO. Main objectives are:

- To conserve the diversity and integrity of plants animals within natural ecosystems;





- To safeguard genetic diversity of species on which their continuing evolution depends;
- To provide facilities for education and training;
- To provide areas for multi-faceted research and monitoring and
- To ensure sustainable use of natural resources through most appropriate technology for improvement of economic well being of the local people

### Progress/ Achievements

- Review Report of Nanda Devi Biosphere Reserve has been sent to UNESCO.
- Nomination form in respect of Agasthiarmalai Biosphere Reserve for its inclusion in the World Network of Biosphere Reserve has been forwarded to UNESCO and is under consideration.
- 7 number of Management Action Plan (MAP) submitted by the BR have been scrutinized and the fund have been released.

- So far Rs. 3.91 cr. (52%) have been released to the 7 Biosphere Reserve sites.

### Biodiversity Conservation Scheme relating to Biosafety

### Genetic Engineering Approval Committee (GEAC)

Under the Biodiversity Conservation scheme, there are two main subcomponents namely biodiversity and biosafety. The biodiversity component includes activities relating to Convention on Biological Diversity (CBD) and support to National Biodiversity Authority (NBA). The biosafety component includes activities relating to Genetic Engineering Appraisal Committee/ Cartagena Protocol on Biosafety / Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress.

The Ministry of Environment, Forests & Climate Change (MoEFCC), under the Environment (Protection) Act, 1986 has notified the “Rules for the Manufacture, Use,



Fig.20 Khangchendzonga Biosphere Reserve (KBR)-Sikkim

Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells, 1989" (Rules, 1989) The rules also cover application of hazardous microorganisms which may not be genetically modified. Hazardous microorganisms include those which are pathogenic to animals as well as plants.

### Cartagena Biosafety Protocol (CBP)

The CPB was negotiated under the aegis of the Convention on Biological Diversity (CBD) and adopted on 29th January 2000. India is a party to the Protocol. The Protocol has come into force on 11th September 2003. As of date 170 countries are Parties to the Protocol.

The main objective of the Protocol is to ensure safe transfer, handling and use of living modified organisms (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.

### Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress (Supplementary Protocol) to the CPB

The Supplementary Protocol on Liability and Redress is a new international treaty adopted in the fifth meeting of the Conference of the Parties serving as the Meeting of the Parties (COP MOP) to the CPB at Nagoya, Japan on October 15, 2010 after six years of intense negotiations. Ratification of the Supplementary Protocol was approved by the Cabinet on 29.10.2014, pursuant to which India has ratified the same on 19.12.2014. The

scheme helps in strengthening the biosafety management systems and awareness in India.

### Genetic Engineering Appraisal Committee (GEAC)

All GMOs and products thereof are regulated under Rules 1989 of EPA, 1986. Activities undertaken for implementation of Rules 1989 since inception till December 31, 2015 include:

- Convene monthly GEAC meetings as per schedule for review of applications pertaining to GM technology. So far 126 meetings of the GEAC have been convened.
- Status of GEAC approvals is as given below:
  - Bt cotton, the first GM crop was approved in April 2002. As of date, the GEAC has approved environmental release of Bt cotton expressing six events,
  - Approvals for confined field trials of several GM crops for generation of biosafety data both from the private and public sector institutions. These include transgenic maize, rice, tomato, potato, castor, rubber, cotton, brinjal, mustard, groundnut, sorghum, wheat, watermelon, papaya, sugarcane, banana, pigeon pea, chickpea, Artemisia.
  - 20 recombinant pharmaceuticals
  - Import of GM soybean oil.
  - Moratorium was issued on Bt brinjal Event EE-1 on the basis of public consultations held at seven locations.
- Formulation of biosafety guidelines for environmental and health safety assessment and updating the same to



harmonize with international norms prescribed by the Organization for Economic Co-operation and Development (OECD), CODEX Alimentarius Commission and International Plant Protection Convention (IPPC) is a continuous process. The biosafety guidelines prescribed by the GEAC include the following:

- Recombinant DNA Safety Guidelines, 1990 & 1994
- Revised Guidelines for Research in Transgenic Plants and Guidelines for Toxicity and Allergenicity Evaluation, 1998
- Guidelines and SOPs for the conduct of Confined Field Trials of Transgenic Plant, 2008
- Guidelines for the Safety Assessment of GM Foods, 2008
- Protocol for Safety Assessment of Genetically Engineered Plants / crops, 2008.
- GEAC has adopted the 'event based approval' mechanism wherein a new procedure for commercial release of Bt cotton hybrids expressing approved events has been put in place.
- Biology documents for five crops namely cotton brinjal, rice, okra and maize have been completed.
- Ex-ante socio-economic study on Bt brinjal was conducted through National Council Agriculture Policy (NCAP). Report submitted to GEAC.
- Streamlining of the biosafety management system in India through review of existing policies, development of biosafety guidelines, capacity building etc have been initiated. These include:
  - Preparation of ERA guidelines for environmental risk assessment of GM crops is in progress.
  - Strengthening the monitoring mechanism of confined field trials of regulated GM plants is in progress.
  - Finalizing the 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.
  - Biology documents for eight more crops such as chickpea, pigeon pea, sorghum, papaya, mustard, tomato, rubber and potato is under preparation.
  - Development of GEAC website has been completed. The overall structure of the website has been approved and the audit process prior to launching of the website has been completed.
  - Extensive capacity building activities for enhancing awareness on biosafety related issues have been initiated. These include:
    - Training of trainers for efficient management of field trials of GM crops at 19 State Agriculture Universities have been completed.
    - Electronic 'Biosafety Newsletter' has been introduced to enhance awareness on biotechnology and biosafety related issues at the national and global

level. The online version is available on the GEAC website (<http://moef.nic.in/divisions/csurv/geac/information.html>)

- Two reports of the Technical Expert Committee (TEC) constituted by the Supreme Court were examined. The Union of India filed a counter affidavit in respect to each of recommendations made in the two reports of T EC. The matter is also pending final decision of the Supreme Court.

### Cartagena Biosafety Protocol

- The CPB has come into force on September 11, 2003. The COP-MOP currently meets every two years in conjunction with the regular meetings of the COP to the CBD. Seven meetings of the COP-MOP have been held so far. The Seventh meeting of COP-MOP-7 was held at Pyeongchang, Republic of Korea from September 29 to October 03, 2014.
- As a follow-up to the COP-MOP decisions, several initiatives including capacity building and awareness programs to facilitate compliance have been undertaken. Several consultative meetings of experts and stakeholders have been convened prior to each COP-MOP meeting to finalize the country position and negotiating briefs.

### Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress

- Pursuant to the signing of the Supplementary Protocol on October, 11, 2011, a study to probe the legal implication of ratification and to identify legislative amendments required in the domestic law was undertaken.

- Based on the outcome of the study, a Cabinet Note seeking approval for ratification on the Supplementary Protocol was submitted and approval received on 29.10.2014. India is now the 28th country to ratify the Supplementary Protocol. Currently, 33 countries have ratified the Supplementary Protocol. The Protocol will enter into force on the ninetieth day after the date of deposit of the 40th instrument of ratification, acceptance, approval or accession.

### Capacity building

- The project has 8 components. It begins with a stocktaking assessment (Component 1), where updated information is consolidated to refine the project design and to assist in priority setting of project activities to ensure that all project outcomes are achieved. Component 2 aims to strengthen the legal and regulatory framework, whilst Component 3 will enhance institutional capabilities. Component 4 is designed to develop human resources and raising public awareness is undertaken under Component 5. Project management and Project monitoring and evaluation form Component 6 and 7. Component 8 provides for promotion of regional cooperation, networking and sharing of experience. Several of the project activities are in progress.
- The Project Management and Monitoring Committee (PMMC) was constituted on February 2013, to address day to day procurement and project implementation issues. The PCU has been established at Biotech Consortium India Limited (BCIL) on August 2013, for a period of four years. To





initiate the project activities in a planned manner, implementation plans were prepared for each of the four thrust areas i.e. RARM, SECs, HTPI and PA. Till date seven meetings of the PMMC have been convened to review project progress. The mid-term review of the project was completed by the UNEP Task-Manager during September, 2013. Three meetings of the Steering Committee have been convened so far.

### Achievements

- GEAC has convened 6 meetings during April 2015 to March 2016. The GEAC has considered about 87 applications for conduct of confined field trials.
- GEAC has approved 64 new applications for conduct of field trials crops subject to NOC from State Governments. The GM Crops include Cotton (9), Rice (33), Maize (10), Brinjal (3), Mustard (3), Chickpea (2), potato (3) and sugarcane (1).
- The application for environmental release of transgenic mustard submitted by Department of Genetics, Delhi University, South Campus is also under review by the GEAC.
- In compliance of Article 33 of the Cartagena Protocol on Biosafety, India submitted the third National Report on implementation on the scheduled date of October 31, 2015.
- Preparations for the eighth meeting of the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP 8) which will be held from 4- 17 December, 2016 at Cancun, Quintana Roo, Mexico has been initiated.

### Progress made in the Phase II UNEP-GEF Capacity Building Project on Biosafety

The Phase II Capacity Building Project on Biosafety has made significant progress. The Project Coordination Unit (PCU) at M/s. Biotech Consortium India Limited and several national and international consultants have been engaged for implementation of activities in respect of four thrust areas i.e. RARM, SECs, HTPI and PA. Other activities include:

- Biology Documents of eight crops like Sorghum, Mustard, Rubber, Tomato, Potato, Papaya, Chickpea and Pigeonpea have been prepared through a consultative process
- Base Paper on Crops and Traits under development has been prepared through a comprehensive survey
- An Expert Committee under the Chairmanship of Prof. C.R.Babu has been constituted for formulation of Environmental Risk Assessment (ERA) Guidelines. This Committee has met on 7 occasions and has finalized the Draft ERA Guidelines, User's Guide and Risk Analysis Framework which was further deliberated in the consultative meeting held at MoEF&CC on February 26th 2016. The same is under finalization.
- A study tour to Office of Gene Technology Regulator (OGTR), Canberra, Australia by Indian Regulators has been completed for understanding international best practices
- Two training workshops for around 150 personnel on conduct of confined field trials has been completed in Hyderabad and New Delhi

- A Monitoring manual and Tool for Trainers on conduct of confined field trials has been prepared
- Training workshop for 70 members on ERA of GE Plants has been completed
- A stocktaking assessment of 9 national institutions for accessing their capabilities for detection of Living Modified Organisms has been completed
- A Network of four referral labs for detection of LMOs has been established subsequent to assessment of existing infrastructure and institutional capacities
- Four Institutions like NBPGR, DFTCML, PBTI and EIA-Kochi have been strengthened for their LMO detection facilities through infrastructure support and for up gradation of their existing facilities.
- 25 scientists were provided Phase-I training on detection of LMOs in Punjab Biotechnology Incubator (PBTI), Mohali, India
- 8 scientists were provided with advanced hands-on-training in detection of LMOs in Intertek-ScanBi Diagnostics, Sweden
- 15 scientists were provided hands-on-training on detection of LMOs in India through International faculty from Intertek-Scanbi Diagnostic, Sweden
- A survey involving more than 20000 farmers has been completed for documenting the Identity Preservation strategies being followed in Basmati Rice
- 120 Customs officers from all parts of the country are provided with hands on training in detection of LMOs and on verification of documentation requirements for transboundary movement of LMOs and in use of Biosafety Clearing House (BCH)
- 60 Plant Quarantine officers are provided with hands on training in detection of LMOs and for on-site verification of LMOs and use of BCH
- Model Questionnaire for socio-economic assessment and their validation for drafting guidelines and methodologies for cost benefit analysis is under finalization
- Risk Communication strategy has been developed for effective communication by various stakeholders. Two training workshops at Hyderabad and New Delhi has been organized for 80 participants on enhancing effective risk communication
- Translation of Cartagena Protocol on Biosafety and Nagoya Kaula Lumpur Supplementary Protocol on Liability and Redress into Hindi has been completed for wider dissemination
- Series of 9 biosafety workshops for 350 Media Professionals has been organized in different parts of the country.
- Quiz Program for school children on issues related to biosafety have been conducted and aired in Radio
- Interviews with renowned experts on biosafety in Hindi language has been aired in APNA Radio and various Community Radio Programs
- Phase-II Biosafety Project website in BCH has been prepared and outreach materials developed under the project are updated on the website
- Biosafety Resource Kit consisting of five



booklets on FAQs, Regulatory Framework, Information Sources, Confined Field Trials etc. have been developed for wider distribution and dissemination among various stakeholders in the country

- A Biosafety Newsletter is being published on a Quarterly basis and is distributed to more than 10000 readers
- Various outreach materials for school children; farmers etc. are being developed and would be translated into 8 regional languages for wider distribution and for creating awareness among various stakeholders.
- Preparation for the Regional Workshop for Risk Communication on impact of LMOs and Regional Conference for information sharing to be held at Hyderabad during April 4-8, 2016 is in progress.

### **GEF-Gol-UNDP project entitled 'Mainstreaming Conservation and Sustainable Use of Medicinal Plants Diversity in Three Indian States'**

Over 6,000 species of diverse medicinal plants (MPs) are found in India and are the primary source of health care for a majority of the population. However, 70 percent of medicinal plants sourced from natural areas are collected through destructive practices. Therefore, conserving medicinal plants is vital not only for the ecosystem health of the country, but also for its 4,635 ethnic communities.

This project aimed to promote long-term conservation and sustainable use of medicinal plants by mainstreaming it into forest management policy and practice at the

national level and in three Indian states of Arunachal Pradesh, Chhattisgarh and Uttarakhand.

### **Activities taken**

- Terminal Evaluation of the project undertaken by a group of experts.
- A draft national strategy that addresses conservation, cultivation and the sustainable use of medicinal plants prepared.
- Revised national JFM guidelines with a stronger focus on conservation & sustainable use of MAPs prepared.
- Long term strategy for threat assessment and monitoring the conservation status of medicinal plants in India prepared. Threat status of 46 indigenous medicinal plant species assessed as per the IUCN Red List of Threatened Species.
- Registration of Uttarakhand's Tejpat (*Cinnamomum tamala*) under the Geographical Indications of Goods (Registration & Protection) Act, 1999 is in advance stages.
- Develop medicinal plant conservation and sustainable management strategies for Arunachal Pradesh, Chhattisgarh & Uttarakhand.
- Pilot demonstration sites established on both government and community owned and managed lands for the in-situ and ex-situ conservation and sustainable management of MAPs.

### **Progress/Achievements**

- The Terminal Evaluation of the project was conducted by a group of six experts. The Terminal Evaluation Expert Group

adjudged project implementation and achievement of envisaged results of the project as highly satisfactory.

- Framework of existing laws and policies examined for addressing conservation, cultivation and sustainable use of medicinal plants and associated traditional knowledge. Based on the recommendations of the study Arunachal Pradesh State Government is probably the first State in India to notify a Medicinal Plants Conservation and Sustainable Use policy.
- Inter-sectoral strategy on conservation and sustainable use of medicinal plants prepared. Strategies and action plans prepared for mainstreaming medicinal and aromatic plants in the three project states.
- Long-term strategy for rapid threat assessment in monitoring conservation status of medicinal plants in India prepared. Threat status of 46 indigenous medicinal plant species update in the IUCN Red List of Threatened Species.
- Twenty Medicinal Plants Conservation and Development Areas (MPCDAs) covering 24047 hectares established. Sustainable harvesting practices for 11 species developed, field tested for 7 species and market linkages established for three species.

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

Taxonomy is a key science as it deals with the classification of all living and extinct organisms and 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 man-power to replace the retiring specialists. 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.

The AICOPTAX has a sole mission - "Enhancement of country's capabilities for inventorizing, monitoring, conserving, and utilizing biodiversity as well as for establishing leadership in the field of taxonomy at regional and global levels". AICOPTAX is an active programme channelised 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 Ministry. It has the following objectives:

- survey, collection, and maintenance of collections of taxonomic groups including microbes for which no information is available and of unexplored and under-explored areas;
- training in India and abroad to develop taxonomic expertise on various groups;
- undertaken bio-systematic research for the groups which require modern tools for refinement of taxonomy especially of economically important groups;
- Maintain taxonomic data banks;
- creation of higher Centres of learning and establishment of chairs in taxonomy; and also exploring the possibility of institution





- of Indian and foreign associateships for in-service as well as pre-service scientists;
- to promote field biological studies in colleges located in/near areas rich in biodiversity;
- to train school and college teachers and local communities in parataxonomy skills;
- to prepare manuals and other education materials to create awareness on the role of taxonomy in conservation and sustainable utilization of biodiversity among the public.
- to promote awareness and to provide parataxonomic skills among local communities.

### Progress/Achievements

- Thirty four research projects have been approved by the Apex Committee on Research in Environment and is being implemented through the respective Coordinating Centres and corresponding Collaborating Units.
- Executive summary of the ongoing research projects and project outcomes on submission of FTR have been decided to be uploaded on the Ministry's web-site for wider publicity.

### Assistance to Botanic Gardens

The scheme on Assistance to Botanic Gardens was initiated in 1992 to augment facilities for ex-situ conservation of rare, endangered threatened and endemic plants. The objectives of the scheme include Ex-situ conservation of indigenous; particularly RET species and their multiplication; Establishment of seed banks, arboreta and mist propagation facilities; Promotion of education and public

awareness in respect of above said plants; and Reintroduction and rehabilitation of said plants in natural habitats in collaboration with State Forest Department on project basis.

### Activities undertaken

One time financial assistance is provided to identified Botanic Gardens and centre of Ex-situ Conservation for improvement of their infrastructural facilities to facilitate ex-situ conservation of rare endangered, threatened endemic plants. Under the scheme, **370** projects have been supported. Various organizations maintain botanic gardens and Centre of ex-situ Conservation which include **15** Lead Botanic Gardens. This is gradually helping in facilitating ex-situ Conservation of rare endemic plants. A detailed guideline has been issued for guidance of proponents.

### Progress/Achievements

In current financial year funds have been released to three Lead Botanic Garden i.e. Shivaji University Kolhapur, Maharashtra, BSI Regional Botanical Garden at Coimbatore and Shillong, and one Small Garden, thereby ensuring the ensuring the ex situ conservation of nearly 110 RET plant species. In addition to this monitoring and evaluation of 12 existing and 14 new Botanic Garden has also been undertaken by Botanical Survey of India. Besides this a development of dedicated website for Assistance to Botanic Garden Scheme involving all the Lead and Small Botanic Garden is under process, which will be made to general access by December 2016.

An allocation of Rs. 1,50,00,000/- has been made..

## Forest Conservation

### Objectives

The mandate of the Forest Conservation Division is to regulate the diversion of forest land for non-forestry purposes through effective implementation of the Forest (Conservation) Act, 1980.

The proposals seeking PRIOR approval of the Central Government for diversion of forest land for non-forestry purposes are examined at different levels as per procedure defined under the Forest (Conservation) Rules, 2003 including the Forest Advisory Committee (FAC) or the State Advisory Committee. The Ministry keeping in view recommendations of the FAC/SAG 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.

### Initiatives Taken to streamline Process of Grant of Forest Clearances

- Launched a web portal for online submission and monitoring the status of forest clearance proposals.
- Launched a GIS based decision support system to facilitate informed decisions on forest clearance proposals.
- Delegated the Powers to Regional Empowered Committees (RECs) constituted at each Regional Office to finally dispose of proposals involving diversion of 5 to 40 hectares of forest land (except the proposals relating to mining, regularisation of encroachments and hydel projects) and all proposals involving diversion of forest land for linear projects irrespective of area of forest land involved.
- Accorded general approval under the Forest (Conservation) Act, 1980 (FC Act) for diversion of forest land required for construction and widening of two lane roads by the BRO / other agencies and widening of link roads, between Border roads and National Highways/State Highways/Other State Roads in the area falling within 100 kilometres aerial distance from the line of actual control (LAC).
- Accorded general approval under the FC Act for diversion of forest land required for creation of border security related infrastructure such as, Border Roads, Fencing, Border Outposts, Floodlights, Surveillance Infrastructure, and Power Infrastructure, within five kilometers aerial distance from the International Border by paramilitary organizations of the Ministry of Home Affairs (MHA), such as BSF and SSB from funds provided by the MHA.
- Accorded general approval under the FC Act for diversion of forest land required for construction of two lane roads within 117 left wing extremism (LWE) affected districts, irrespective of area of forest land involved.
- Delegated the powers to competent authority in the State Govt. to issue permission for tree felling and commencement of work for a period of one



- year of linear projects without waiting for final approval under the FC Act , once compensatory levies have been realised and land for compensatory afforestation, wherever required, has been transferred and mutated in favour of the State Forest Department.
- Notified the rules to provide for simplified procedure for seeking approval under the FC Act for renewal of mining leases falling due with 10 years of grant of Stage-I FC. In such cases, instead of initiating a de-novo proposal, State may seek FO.in letter form by giving status of compliance to conditions stipulated in the earlier approval and compliance to guidelines/ statues which came into force after grant of the earlier approval.
  - Extended the period of validity of approval accorded under the FC Act for diversion of forest land within mining leases to a period co-terminus with the period of mining lease in accordance with the Mines and Mineral (Development and Regulation) Act, 1957, as amended.
  - Issued guidelines stipulating simplified procedure to obtain Forest Clearance for execution of mining leases having forest land in part or in full.
  - In cases of existing mining leases having forest land in part or in full where forest clearance for a part of forest land has only been obtained, accorded general approval under Section 2 (iii) of the FC Act for the remaining area of the forest land falling within such mining leases. The general approval entitles such lessees to retain such forest land in the mining lease.
  - Introduced the Compensatory Afforestation Fund Bill, 2015 in Parliament to ensure expeditious and transparent utilization of compensatory levies realised in lieu of forest land diverted for non-forest purpose, which [presently is of the order of about Rs. 40,000 crores.
  - Issued guidelines to exempt transmission lines of all capacities from providing non-forest land for compensatory afforestation.
  - Issued guidelines to the effect that in case of proposals seeking forest clearance for prospecting, forest land which experience permanent change in the land use due to prospecting activity shall only be considered for the purpose of the compensatory afforestation and the NPV. Such proposals have been exempted from the requirement of FRA certificate. It has also been clarified that site inspection from Regional Office in case of these proposals will be insisted only if the actual area of the forest land proposed to be utilized for construction of new roads/paths and for drilling of bore holes/sample collection pits etc. is more than 100 hectares.
  - Rationalized the guidelines for diversion of forest land for entry / exit of patrol pumps/fuel stations to make in compatible with the guidelines issued by the Ministry of Road Transport and Highways, keeping in view the passengers safety.
  - Advised the States/ UTs to not to impose additional conditions over and above the conditions stipulated in the Forest Clearance accorded by the MoEFCC.
  - Advised States/ UTs to identify in advance compact/ sizeable blocks of non-forest

land or revenue forest land free from encumbrance/ encroachment which are suitable for creation of compensatory afforestation (CA) and also from management point of view. States/UTs have also been advised that the land available in the Ind bank may be made available to user agencies on realization of appropriate fee/land cost.

- Advised the States/ UTs that in cases where land proposed to be utilised for CA is proposed to be acquired by the project proponent himself through outright purchase from the individual owners, at the time of submission of application for grant of Stage-I approval under the FC Act, uploading/submission of a copy of letter from each of present owners of the land identified for CA stating their willingness to sell the land to the user agency for its transfer and mutation in favour of the State Forest Department for creation of CA will only be sufficient. States/ UTs have also been advised that in cases where the non-forest land or revenue forest land proposed to be utilised for CA is to be provided by the State Government, uploading/submission of a copy of the letter from concerned competent authority in the State Government stating that land identified for CA will be transferred and mutated in favour of the State Forest Department for creation of CA immediately on receipt of Sage-I approval under the FC Act for diversion of forest land required by the project proponent will be sufficient.
- Advised the States/ UTs that investigations and surveys carried out in connection with development projects such as transmission lines, hydro–electric projects, seismic surveys, exploration for oil drilling, mining etc. in wildlife sanctuaries, national parks and sample plots demarcated by the Forest Department will not attract the provisions of the FC Act as long as these surveys do not involve any clearing of forest or cutting of trees, and operations are restricted to clearing of bushes and lopping of tree branches for purpose of sighting.
- Advised the States/ UTs that to expedite processing of Forest clearance proposals, once boundary of forest land proposed to be diverted is firmed up/finalized, the user agency, if it so desires, may provide, in advance, a copy of map of the forests land proposed to be diverted to the concerned Divisional Forest Officer and request him to undertake enumeration of tree available on the forest land proposed to be diverted. The concerned Divisional Forest Officer, in such cases, without waiting for receipt of the proposal, may after realizing appropriate fee, as the State Government may stipulate in this regard, authorize concerned officers having jurisdiction over the forest land proposed to be diverted to enumerate, in advice, trees available on the forest land proposed to be diverted.
- Advised the States/ UTs that to minimize delay in actual utilization of the forest land for the purpose for which it is diverted, the State Governments or the Union Territory Administration may initiate procedural formalities such as, enumeration/valuation; preparation of estimates/schemes for extraction; inviting and finalization of bids,





wherever required, for selection of agencies to be engaged for extraction of timber and other forest produce from the forest land to be diverted for non-forest purpose; and raising of demand note for realization of extraction cost from the user agency etc immediately on receipt of stage-I approval under the FC Act for diversion of forest land for non-forest purpose. It has however, been clarified in the said letter that actual handing over of the forest land to the user agency and felling/ extraction of timber and other forest produce therefrom, except in case of linear project for which a separate guidelines has been issued by this Ministry vide letter of even number dated 8th August, 2014; shall be undertaken only after final approval under the afore-mentioned Act for diversion of such forest land is accorded by the Central Government.

- Advised the States/ UTs that wherever re-diversion or change in approved land use of the forest land for the same project becomes essential, State Government should seek the prior permission of the Central Government giving details of the earlier approval and the proposed activity details in letter form rather than initiating a fresh proposal, as is provided in para 2.1 (iv) of guidelines issued under the FC Act. It has however, also been clarified in the said letter that in case re-diversion of whole or a part of the forest land diverted for non-forest purpose for execution of a project, becomes essential for execution of a project other than the project for which such forest land was originally diverted, State Government should seek prior permission of the Central

Government under the FC Act by initiating a fresh proposal.

- Advised the States/ UTs that temporary work in forest land which does not involve breaking up or clearing of forest land or portion thereof, or assigning by way of lease or otherwise to the firm, person or organization using such forest land temporarily; and does not create any right on such forest land of such firm, person or organization, will not require prior approval of Central Government under the FC Act. It has also been stated in the said letter that State Governments and Union Territory Administrations may authorize Officer of an appropriate rank, preferably the Divisional Forests Officer having jurisdiction over the forest land proposed to be utilised temporarily, to accord permission for such temporary activities.
- Issued guidelines to the effect that in further modification of the Ministry of Environment, Forests and Climate Change's letter dated 3rd August 2009, proposals seeking prior approval of the Central Government under the FC Act for diversion of plantations which were notified as "forest" on a day less than 75 years prior to the 13th day of December 2005 and are located in villages having no recorded population of Scheduled Tribes, as per the Census-2001 and the Census-2011, are exempted from the requirement of initiation and completion of process for recognition and vesting of forest rights of Scheduled Tribes and Other Traditional Forest Dwellers as stipulated in clause (a), read with clause (d) and clause (g) in

second para of the Ministry's said letter dated 3rd August 2009.

- Extended the general approval under the FC Act for underground laying of optical fibre cables, telephone lines and drinking water supply pipelines along the roads within existing right of way not falling in National Parks and Wildlife Sanctuaries, without felling of trees, where the maximum size of the trench is not more than 2.00 meter depth and 1.00 meter width to the underground laying of CNG/ PNG pipelines also.
- Accorded general approval under the FC Act for underground laying of optical fibre cables, telephone lines, drinking water supply pipeline and CNG/ PNG pipelines along the petroleum pipelines within existing right of way not falling in National Parks and Wildlife Sanctuaries, without felling of trees, where the maximum size of the trench is not more than 2.00 meter depth and 1.00 meter width.

## Achievements

Implementation of the FC Act has successfully reduced the average annual rate of diversion of forest land for non-forest purposes from 1.65 lakh hectares per annum during the 25 years period from 1951-52 to 1975-76 prior to enactment of the Act during which 4.135 million hectares of forest land was diverted for non-forest purposes without any mitigative measures. During the year 2015-16 till end of January Central Government accorded approvals under the FC Act, 1980 for diversion of 21,179 hectares of forest land for non-forest purposes with adequate mitigative measures.

## Forest Establishment (FE)

The Forest Establishment Division is handling the establishment matters relating to the Indian Council of Forestry Research and Education (ICFRE) an autonomous organisation under the Ministry of Environment & Forests, and its Institutes/Centers, Forest Survey of India (FSI) and its Regional Centers, National Zoological Park (NZP); Wildlife Crime Control Bureau (WCCB) and its Regional Offices, Indira Gandhi National Forest Academy (IGNFA); Directorate of Forest Education (DFE), three Central Academies and one Ranger College, Forest Departments all the Union Territories of India (except Andaman & Nicobar Forest Plantation Development Corporation), general references relating to frontline staff of State Forest Departments including court cases, RTI applications and Parliament Matters concerning the above.

## Strengthening of Forests Division

### Introduction

The Government of India had set up five Regional Offices of the Ministry of Environment and Forests vide Resolution No. 37-3/85-FP dated 07/04/1986 at Bangalore, Bhopal, Bhubaneswar, Lucknow and Shillong with a Headquarter unit at New Delhi to monitor and evaluate ongoing forestry development projects and schemes with special emphasis on conservation of forest land and to advise the State/ Union Territory Governments in preparation of proposals involving diversion of forest land for non-forestry purposes under the provisions of the Forest (Conservation) Act, 1980. Subsequently, through Resolution No. 17-3/88-PC dated 12/05/1988 the sixth Regional Office was set up at Chandigarh. In view of the increasing work relating to all



**Table-4** State-wise details of total forest land diverted under FC Act, 1980 during financial year 2015-16 (as on 31.01.2016)

Sl. No.	State/UT	In principle		Final	
		No. of Cases	Area Diverted (in ha.)	No. of Cases	Area Diverted (in ha.)
1	Andaman and Nicobar	0	0.00	0	0.00
2	Andhra Pradesh	26	164.85	8	2260.76
3	Arunachal Pradesh	7	4834.21	1	1.95
4	Assam	1	29.86	0	0.00
5	Bihar	13	218.84	3	7.46
6	Chandigarh	0	0.00	0	0.00
7	Chhattisgarh	5	68.10	10	2011.52
8	Dadar & Nagar Haveli	0	0.00	0	0.00
9	Daman and Diu	0	0.00	0	0.00
10	Delhi	0	0.00	1	12.00
11	Goa	2	0.29	0	0.00
12	Gujarat	44	333.04	22	299.69
13	Haryana	148	166.98	113	123.81
14	Himachal Pradesh	23	172.78	3	144.82
15	Jammu and Kashmir	0	0.00	0	0.00
16	Jharkhand	8	269.81	4	185.87
17	Karnataka	17	142.09	9	219.16
18	Kerala	0	0.00	0	0.00
19	Lakshdweep	0	0.00	0	0.00
20	Madhya Pradesh	16	2108.03	31	2367.74
21	Maharashtra	10	233.72	5	579.76
22	Manipur	2	14.20	2	61.60
23	Meghalaya	0	0.00	0	0.00
24	Mizoram	0	0.00	0	0.00
25	Nagaland	0	0.00	0	0.00
26	Odisha	19	449.53	7	467.78
27	Puducherry	0	0.00	0	0.00
28	Punjab	162	98.73	51	25.83
29	Rajasthan	7	52.36	2	78.12
30	Sikkim	3	0.00	1	6.72
31	Tamil Nadu	3	24.21	1	457.25
32	Telangana	10	93.66	2	1894.02
33	Tripura	0	0.00	1	15.25
34	Uttar Pradesh	77	55.46	2	159.56
35	Uttarakhand	232	145.97	0	0.00
36	West Bengal	3	121.24	0	0.00
	<b>TOTAL</b>	<b>838</b>	<b>9797.96</b>	<b>279</b>	<b>11380.67</b>

aspects of environmental management including pollution control and environmental management of projects and activities in the country, Government has decided to establish four Regional Offices with their Headquarter at Chennai, Dehradun, Nagpur and Ranchi with a Headquarters unit as part of the Secretariat in the Ministry of Environment and Forests at New Delhi to facilitate more frequent inspections and in-depth scrutiny and appraisal of the proposals. The detailed mandate of the Regional Offices is as under:

### **Forest (Conservation) Act (FCA) related functions:**

- To assist the State/ Union Territory Governments in preparation of the proposals involving diversion of forests land for non-forestry purposes under the provisions of Forest (Conservation) Act, 1980 for expeditious processing and disposal of such cases;
- To undertake physical inspection of sites in cases of diversion of forestland involving an area of more than 100 hectares and in other cases as may be required;
- To monitor the implementation of conditions and safeguards stipulated by Central Government in the proposal approved under Forest (Conservation) Act, 1980;
- The Ministry on 10th October, 2014 has notified the Forest (Conservation) Second Amendment Rules, 2014 to provide for inter-alia constitution of Regional Empowered Committee (REC) at each of its Regional Office and delegation of power to these RECs to finally dispose of proposals, other than those related to mining, regularization of encroachment and hydel

projects, involving diversion of upto 40 hectares of forest land, and all proposals related to linear projects such as roads, railway lines etc. irrespective of the area of forest land;

- Uploading on the websites the Stage-I (In-principle), Stage-II (Final) approvals, the site inspection/ monitoring reports, Agenda and Minutes of the SAG meetings held..

### **Working Plan related functions:**

- To assist the State/ Union Territories in the preparation of management/ working plans for working of forest under their control within the framework of guidelines issued by Central Government from time to time;
- Monitoring the implementation of the management/working plans.

### **Monitoring of other schemes:**

- To monitor and evaluate all ongoing forestry development projects and scheme with specific emphasis on conservation of forests;
- Monitoring the utilization of CAMPA funds;
- Monitoring of centrally sponsored schemes.

### **Activities undertaken**

The Heads of the Regional Offices are empowered to grant approval for diversion of forest land for non-forestry purposes up to the extent of 5 hectare (except mining and regularization of encroachments), process cases between 5 hectare and 40 hectares in consultation with the State Advisory Group and undertake physical inspection of sites in cases of diversion of forest lands to non-forestry





purposes involving an area of more than 100 hectares. A statement showing Regional Office wise physical targets and achievements for

monitoring of approved project under FCA, 1980 and EPA, 1986 for the for the period 01.04.2015 to 31.12.2015 is given in **Table-5**.

**Table-5.** Regional Office wise physical targets and achievements for monitoring of approved project under FCA, 1980 and EPA, 1986 for the for the period 01.04.2015 to 31.12.2015

Regional Office	FCA 1980		EPA 1986	
	Target	Achievement (as on 31.12.2015)	Target	Achievement (as on 31.12.2015)
Bhopal	120	70	120	94
Bangalore	180	95	80	58
Bhubaneswar	100	43	120	72
Chennai	40	16	240	160
Chandigarh	230	81	280	148
Dehradun	120	13	50	44
Lucknow	160	79	240	190
Nagpur	120	-	60	63
Ranchi	120	-	50	8
Shillong	80	46	110	33
<b>Total</b>	<b>1270</b>	<b>443</b>	<b>1350</b>	<b>870</b>

Forest Clearance under the Forest (Conservation) Act, 1980 accorded by ten Regional Offices for the period from 01.04.2015 to 31.12.2015. The details are as given in Table- 6.

**Table-6** Forest Clearance under the Forest (Conservation) Act, 1980 accorded by ten Regional Offices for the period from 01.04.2015 to 31.12.2015

Regional Office	Stage-I	Area diverted (in ha.)	Stage-II	Area diverted (in ha.)
RO Bhopal	36	542.011	61	823.583
RO Bangalore	30	364.051	18	30.1016
RO Bhubaneswar	23	381.523	5	12.685
RO Chennai	19	153.527	18	127.204
RO Chandigarh	229	608.713	202	495.737
RO Dehradun	103	408.354	126	526.101
RO Lucknow	33	454.538	25	719.525
RO Nagpur	36	713.405	21	213.328
RO Ranchi	26	880.937	10	76.5242
RO Shiillong	14	152.256	14	216.065
<b>Total</b>	<b>549</b>	<b>4659.31</b>	<b>500</b>	<b>3240.85</b>

## Other Activities undertaken

The details of some of the important activities undertaken/ meetings held during 2015-16 are as follows:

- A “Training of Trainers” on web portal for online submission and monitoring of forest clearances was organized by the Regional Office Headquarter (ROHQ) Division of the Ministry from 7th to 10th September, 2015 with the help of Forest Research Institute, Dehradun and National Informatics Centre, New Delhi.
- Officials of ten Regional Offices, who were trained during the Training of Trainers in September 2015, imparted training to various user agencies and officials of the respective State Forest Departments with the help of Forest Research Institute, Dehradun and National Informatics Centre, New Delhi.

## Forest Policy

However, Forest Policy Division is Nodal Division for coordination of the USAID|India “Forest PLUS Program” signed under the Partnership Agreement between the Government of India (Department of Economic Affairs) and United States of America for the Sustainable Forests and Climate adaptation Project in 2010. USAID’s contribution is 27 million US\$ and Government of India’s contribution is 9 m US\$. The program focus on REDD+ and enhanced carbon sequestration through afforestation, conservation & sustainable management of forests, enhancing climate resilience, capacity building, scientific/technical exchange programmes etc. The Forest PLUS Program is being implemented in

the four states i.e. Madhya Pradesh, Himachal Pradesh, Karnataka and Sikkim.

## Brief Introduction and Objectives

Forest Policy Division of Ministry of Environment & Forests (MoEF) deals with the National Forest Policy, 1988, Indian Forest Act, 1927 and its amendments including policy matters and legislative matters of other Ministries and State Governments related to forests. In addition Forest Policy Division deals with forest related Climate Change, Biodiversity, REDD+, etc. in Forestry Wing of MoEF and acts as a National Focal Division for the Forestry International Cooperation on United Nations forum on Forestry (UNFF), Asia Pacific Forestry Commission (APFC), Asia Pacific Forest Invasive Species Network (APFISN), Committee on Forestry of FAO (COFO) and Centre for International Forestry Research (CIFOR).

## Brief and Objective:

- I. **Indian Forest Act, 1927:** The Indian Forest Act, 1927 (IFA) (16 of 1927), provides the legal framework for the protection and management of forest, transit of forest produce and timber, and the duty leviable on timber and other forest produce. IFA is an umbrella Act, which provides the basic architecture for the management of forests in the country including providing mechanism to ensure notification of reserved, protected and village forests, protection of forest resources, forest biodiversity & wildlife of the country.
- II. **The National Forest Policy, 1988:** National Forest Policy aims to have a minimum of one third of the total land area of the



country under forest or tree cover and in the hills/mountainous regions, the aim is to maintain two third of the area under such cover in order to prevent erosion and land degradation and to ensure the stability of the fragile eco system.

**III. USAID|India Forest Plus Program:** The Forest Policy Division is nodal division for USAID|India Project “Partnership for Land Use Science (Forest-Plus) Project 2011-2015”. The program intends to focus on reducing emissions from deforestation and forest degradation and enhanced sequestration through afforestation, conservation and sustainable management of forests. The Forest-Plus program contributes to the overall Assistance Objective of the Clean Energy and Environment Office i.e. ‘accelerating transition to a high performing, low emissions, and climate resilient economy’, by taking REDD+ actions to scale and enhancing climate resilient, GHG mitigation planning and programs. This will be achieved by working on two components 1) Sustainable Landscapes and 2) Low Carbon Development Strategies. The Forest-PLUS program will address sectoral barriers, build human and institutional capacity, develop and deploy improved scientific methods for carbon inventory and reference baselines, provide support to the GOI to develop a low carbon development strategy for India, and actively engage stakeholders and create an enabling environment for REDD+ implementation in India. The Forest-PLUS program will work with the Ministry of Environment & Forests at the federal level to support implementation of national

policies and programs and will contribute to MoEF’s efforts to establish and implement programs through collaboration with the new REDD+ Cell. The program will also look for active engagement with communities and local governments.

**IV. Forest Policy Division is the Nodal Division for UNFF, COFO and APFC, brief and objective of these international forums are as under:**

- (a) UNFF: United Nations Forum on Forests (UNFF) was established by the United Nations Economic and Social Council (ECOSOC) in October 2000 as part of a new international arrangement on forestry, to carry on the work of building on the Intergovernmental Panel of Forests (IPF) and the Intergovernmental Forum on Forests (IFF) set up by the United Nations conference on Environmental and Development (UNCED). The main objective of the UNFF is to promote the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end. UNFF provides the inter-governmental forum for integrating and holistic global dialogue on forest policies. India is a Member States of UNFF. Member States of UNFF have designated UNFF National Focal Points. DIG (Forest Policy) is the National Focal Point for UNFF from India.
- (b) COFO: The Committee on Forestry (COFO) is the highest FAO Forestry statutory body. The biennial sessions of COFO bring together heads of forest services and other senior government officials to identify

emerging policy and technical issues, to seek solutions and to advise FAO and others on appropriate action. India is a member state of the COFO and has regularly been sending a delegation to attend the COFO sessions in past. DIG (Forest Policy) is the National Focal Point for COFO from India.

(c) APFC: The Asia Pacific Forestry Commission (APFC) was created in 1949, is one of six FAO Regional Forestry Commissions that covers the world's major geographic regions. The APFC, a forum for advising and taking action on key forestry issues, focuses on issues pertinent to Asia Pacific, a region characterized by its diversity and rapid changes. Its activities are also shaped by shifts in international forestry paradigms, priorities and practices. The Asia-Pacific Forestry Commission's main sessions held once every two years, bring together leading forestry officials from across the Asia Pacific region to consider current forestry issues and discuss options for regional cooperation. APFC is currently comprised of 33 member countries, representing most of the forested area of the region. DIG (Forest Policy) is the National Focal Point for APFC from India.

### Activities undertaken

FP Division does not have any financial targets and therefore, performance in respect of financial and physical achievement cannot be quantified. However, brief on the activities undertaken so far on the subject matter pertaining to Forest Policy Division during the financial year 2015-16 is as under:

- Guidelines on Liberalizing Felling and Transit Regime for Tree Species Grown on

Non-Forest/ Private land were issued to the Chief Secretaries of all States/UTs and the Division is actively pursuing the matter with State/UT Governments. The Guidelines are also available at the MoEF&CC website at <http://envfor.nic.in>.

- The Ministry has been proactively involved in facilitating the Ministry of Tribal Affairs being Nodal Ministry for the implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 commonly known as Forest Rights Act, 2006.
- Comments of the Ministry were communicated to the Ministry of Home Affairs on the matters related to the amendment of Andhra Pradesh Forest Act, 1927.
- Comments submitted on the Report of High Level Committee on Socio-economic, Health and Education status of Tribal Communities in India to the M/o Tribal Affairs.
- In order to pursue the comprehensive amendments to the Indian Forest Act, 1927 for bringing clarity and harmonization with FRA and PESA, a Note for the Cabinet for withdrawal of the Indian Forest (Amendment) Bill, 2012 was sent to the Cabinet Secretariat. The Cabinet Secretariat approved the proposal in the meeting of the Cabinet held on 05.12.2014. A Notice was sent in the Rajya Sabha during the Winter Session of Parliament in 2015. The proposal was laid on the Table of the House to withdraw the Bill on 23.12.2015. Accordingly the Bill has been withdrawn in the Rajya Sabha.





- The Ministry has initiated the review of the National Forest Policy, 1988. The principal aim of Forest Policy is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all lifeforms, human, animal and plant. The Policy has already completed more than 25 years. During the intervening period important changes in the forestry and other related sectors have taken place as stated under.

- Emphasis on Community Participation (JFM Guidelines)
- Panchayats (Extension to Scheduled areas) Act, 1996 (PESA, 1996)
- National Biological Diversity Act, 2002 and Rules, 2004
- National Environment Policy 2006
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA, 2006)
- The Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA)
- Adoption of Sustainable Development Goals (SDGs)

In view of the above a need to review the Policy was felt and the same has been initiated. A Core Group under the Chairmanship of DGF & SS is working on the review of National Forest Policy. The Indian Institute of Forest Management (IIFM), Bhopal has been assigned the responsibility to assist the Ministry in the process of review and revision of the National Forest Policy through wider

consultative process and accordingly IIFM has conducted numerous Workshops in the different parts of the Country.

- The Ministry has organised a National Level Conference of the Environment and Forest Ministers' of States/UTs on 6-7 April, 2015 in New Delhi. The Forest Policy Division coordinated the matter in forestry wing for the issue related to forests and wild life.
- The process for formulating Guidelines for Public Participation in Afforestation of Degraded Forests have been initiated in the Division to improve productivity and quality of forests.
- Country's views submitted on the International Arrangements of Forests Post 2015 to the Permanent Missions of India to the United Nations at New York, USA for onward submission to the United Nations Forum on Forests (UNFF).
- Submitted the Voluntary Country Reports to the 11th Session of the United Nations Forum on Forests (UNFF 11) to the Permanent Missions of India to the United Nations at New York, USA.
- The Division jointly with TERI has organised a National Level Workshop on Enhancing income of Forest Dependent Communities through establishing MSP of MFP on 18.01.2016 at Ganga Auditorium, IPB, MOEF&CC, New Delhi.
- Submitted the views and inputs on Sustainable Development Goals (SDGs)- Post 2015 on the forestry related goals.
- Activities under Forest PLUS Programme:-  
The Forest PLUS programme are being implemented in the states of Himachal

Pradesh, Madhya Pradesh, Karnataka and Sikkim. The activities and progress reports are obtained from the respective states. The program also focus on capacity building on the institutions and concerned officials under the technical exchange training programme of Forest PLUS programme. In the current year, technical exchange study tour/training on relevant fields/ topics under Forest PLUS Programme were conducted for the foresters, scientists, experts and concerned officials from the Ministry, Forestry Institutions (ICFRE, IIFM,FSI, IGNTA etc.) and officials from four states where the programme being implemented. The technical trainings/ workshops conducted under the Forest PLUS programme include following:-

- A team of delegations participated in the study tour on “Forest Landscape restoration” under Forest PLUS Technical Exchange Programme held in USA from 11-24 October, 2015.
  - A team of delegations participated in the study tour on “Moving on from experimental approaches to advancing national systems for measuring and monitoring forest degradation across Asia” under Forest PLUS Technical Exchange Programme held in Bangkok from 16-18 June, 2015.
  - A team of delegations participated in the study tour on “ REDD+, Forest Livelihoods and Participatory Processes” under Forest PLUS Technical Exchange Programme held in Bangkok from 16-29 August, 2015.
  - A team of delegations participated in the study tour on “ Synthetic Aperture Radar (SAR) and LiDAR models for measuring and mapping forest carbon” under Forest PLUS Technical Exchange Programme held in USA from 4-23 July, 2015.
- The Ministry of Environment, Forest and Climate Change has recently launched two schemes viz. School Nursery Yojana and Nagar Van Udyan Yojana which are being implemented across the country for creating awareness on environment, plants and biodiversity amongst the people and school children. The schemes are not huge in terms of budget allocation but the basic intent is to connect people with nature and their immediate environment. School Nursery Yojana aims to involve students whereas with increasing urbanization there has been a felt need for green spaces in urban areas. The details of these two schemes are as under:
    - **The School Nursery Yojana:** This scheme was launched by Hon’ble Minister for Environment, Forest and Climate Change on 10th August, 2015, in an event attended by approximate 3000 school children from various schools of Delhi, Faridabad and Gurgaon. Launch of the scheme was of a great success. It aims at involving school students in raising plant nurseries to bring them closer to natural environment, help them understand the natural processes of germination and feel the joy of watching saplings grow.



### Objectives:

- To connect young students with plant, create sense of belonging and oneness with nature, sensitivity towards plants and living environment.
- To make students learn and appreciate the natural process of growing saplings.
- To grow saplings of various plants for herbal medicinal, ornamental, shrubs, trees and potted plants etc. for planting in their neighbourhood, take care and watch them grow.
- To identify and learn the various benefits of trees and plants.
- To provide students observe their neighbouring trees, collect seeds for use in nurseries.
- To encourage students to use plants grown by them for distribution to visiting dignitaries and public on suitable occasions.

Under the scheme 1000 schools across the country will be selected for the first year and a provision of 2.5 Crores in the first year has been kept for the Scheme. As of now proposals on the Scheme have been received from 8 States involving 581 Schools which are under process for release of grant.

- **Nagar Vana-Udyan Yojana- “Ek Kadam Hariyali Ki Or” (A Programme for Climate Smart Green Cities)**

**Vision:** To create at least one **CITY FOREST** in each City having Municipal Corporation/ Class I Cities for providing wholesome healthy living environment, and contributing to growth of Smart, Clean, Green and Healthy Cities.

### Objectives:

- To create 200 City Forests in the Country. A City Forest will be developed in each City with Municipal Council (see list at Annexure).
- To create awareness on plants and biodiversity.
- Conservation education on important flora and fauna of the region including threat perception.
- Ecological rejuvenation of the cities- Forests the green lungs will contribute to Environmental improvement of cities by pollution mitigation, cleaner air, noise reduction, water harvesting and reduction of heat islands effect.
- In-situ Biodiversity conservation.
- Health benefits to citizens.
- Making cities climate resilient.

A provision of Rs. 50 Crores has been kept for the first year for implementation of the Scheme. As of now the proposals under the scheme have been received from 6 States involving 32 Nagar Van Yojana Schemes which are under process for release of grant.

- Forest Policy Division processed the following Foreign visits on International Cooperation on Forestry
- Indian Delegation participated in the 11th Session of United Nations Forum on Forests (UNFF) held in USA from 4-15 May, 2015.
- Participated in the 11th meeting of Asia Pacific Forestry Commission (APFC) Executive Committee and APFC Partners Roundtable Meeting held in Bangkok from 5-6 August, 2015.

## Forest Protection

### Intensification of Forest Management Scheme (IFMS)

#### Introduction

The Centrally Sponsored 'Intensification of Forest Management Scheme' (IFMS) aims at strengthening forest protection machinery of the State/UT Governments and providing support for area-specific forest management interventions. Annual Work Plans (AWP) received from the states and UTs are scrutinized and approved by the Screening Committee and funds are released as per the availability under appropriate budget head. The financial assistance is provided on cost share basis – All the North Eastern States and special categories States, namely, Jammu & Kashmir, Himachal Pradesh and Uttarakhand share 10% of the cost while the rest of the States share 40% of the cost. As per the revised funding pattern, 100% of the funds are

provided by the Central Government in case of Union territories.

The major component 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 Forest

In order to ensure balance among the various components a maximum limit of 50% and a minimum of 15% have been fixed for components (ii) and (iii) respectively.



Fig. 21 Moyar River, one of the tributary of Bhavani River, Tamil Nadu





## Outcome of the Scheme

The scheme has contributed significantly in reducing the menace of forest fires that affect all the states and UTs of the country. Creation of fire lines, their maintenance, construction of watch towers, purchase of fire fighting equipments, deployment of forest protection squads, incentives to local communities etc are some of the activities taken up in the states in this regard. A forest fire alert system using MODIS satellite data has been put in place with support from National Remote Sensing Centre, Hyderabad and Forest Survey of India, Dehradun.

Strengthening the State/UT Forest Departments by way of creating infrastructure such as field offices, forest check posts, residential facilities for frontline staff,

construction of roads and patrolling paths is also an important focus of this scheme. The Scheme has also helped the State Forest Departments in introduction of modern technology including use of GPS, DGPS, GIS, PDA and other modern communication technologies for survey and field surveillance and reporting. The Scheme also provides for field vehicles, arms and ammunitions which are equally important to increase the effectiveness of the field functionaries of the Forest Department. Introduction of advanced technology is helping in bridging the backlog in preparation of working plans.

The Physical achievement as per progress reports received from the various States / UT Governments for key Forest Protection activities are as under:

**Table-7** Physical and Financial Achievement under IFMS

S. No.	Components	Unit	Achievements 2014-15	
			Financial (Rs Lakhs)	Physical
1	Creation and maintenance of firelines	Km	1209.62	49538.95
2	Fire watch towers	Nos	124.75	23
3	Boundary Pillars	Nos	596.01	20825
4	Buildings	Nos	1407.88	149
5	Roads	Kms	0.00	0.00
6	Water storage structure	Nos.	209.19	180
7	Fire watchers	Mandays	789.85	425709

## Implementing agencies along with detail of responsibilities

Implementation of the Scheme is being done as per the MOU signed between the Centre and State. State Forest Department headed by Principal Chief Conservator of Forests is the implementing agency for the

Scheme. The main responsibilities of the implementing agencies is to submit Annual Work Plan proposal for sanction to the Screening Committee under the Scheme, supervise and implement the scheme as per the operational guidelines, conduct monitoring and evaluation and submit reports as required under the Scheme

guidelines from time to time. The State Government is also required to furnish Utilization Certificate and progress report at the end of the financial year.

Under the Central Sector component of the scheme, the Forest Protection Division of the Ministry of Environment & Forests would implement the works of monitoring, evaluation and other such works which are spread over more than one state/Union Territory.

The Implementing agencies are also expected to plan and implement the scheme keeping in view that the activities proposed to be executed under the scheme is able to improve the status of protections of the target forest area.

Funds for the scheme are directly transferred to the State Governments for implementation.

### Plan Outlay and Budget Details of the Scheme in the XII Five Year Plan

The proposed allocation under the Scheme for the XII Five Year Plan period is Rs 1200 Cr.

### Performance of the Scheme

The Annual Plan allocation for the year is Rs 4950.00 lakhs. State wise allocation of the budget is as given in Table-9.

### Monitoring and Evaluation

The Division has carried out third party evaluation of the Scheme through Forest Survey of India, Dehradun for the works undertaken in the XIth Five Year Plan period covering all states and UTs. A sampling intensity of 20% was adopted for carrying out the third party evaluation exercise. The independent

evaluation has concluded that the scheme has significantly contributed to protection and conservation of forests indicating continuance of the scheme.

### Forest Fire Vulnerability Mapping

The Ministry through Forest Survey of India, Dehradun has initiated the exercise of preparation of Forest Fire Vulnerability Map for the forests areas of the country. This map has been shared with the States which will help in better management, improved preparedness and timely intervention by State Forest Department in controlling forest fire and reducing damage arising out of it.

The Near Real Time Forest Fire Information system is also being executed by FSI wherein fire spots within the forest areas in the country is being shared with respective State Forest Departments by email/ SMS. This information sharing has improved fire management by providing credible alerts to the field users across the country.

### Crisis Management Plan

The Forest Protection Division is co-ordinates preparation and implementation of Forest Fire Crisis Management Plans by the State Forest Departments. The aim of the CMP is to improve co-ordination between various wings in the Government for quick and effective response to any emergency created due to forest fire. The plan includes mechanism for co-ordination among various agencies, preparedness plan and as well as evaluation of the plan after fire season. This exercise is ongoing and expected that the forest departments are able to provide adequate resources for forest fire control. A draft National Forest Fire Disaster Management Plan



**Table 8** State wise performance under IFMS

(Expenditure upto 29th February, 2016; Rs. in Lakhs)

S.	State	Amount sanctioned (Including Flexi Funds)		Annual Work Programme (AWP) (Including Flexi Funds) 2015-16				
		2015-16		Total	1st installment (Net release) 80% of Central Share	2nd installment (Net release) remaining 20% of Central Share	SC/SP components	Grand Total (Release in 2015-16)
		Central share 50%	State share 50%					
1	Andhra Pradesh	262.02	262.02	524.04	-	-	-	0.00
2	Bihar	73.86	73.86	147.72	59.09	-	-	59.09
3	Chhattisgarh	269.99	179.99	449.98	120.75	-	-	120.75
4	Gujarat	271.41	271.41	542.82	179.99	-	-	179.99
5	Goa	No AWP	-	-	-	-	-	0.00
6	Haryana	97.32	97.32	194.64	77.86	-	-	77.86
7	H.P*	245.670	27.300	272.97	187.00	-	115.16	302.16
8	J & K*	281.07	31.23	312.30	193.93	-	-	193.93
9	Jharkhand	153.07	153.07	306.14	71.62	-	12	83.62
10	Karnataka	285.24	285.24	570.48	228.19	-	-	228.19
11	Kerala	155.760	155.760	311.52	86.00	-	-	86.00
12	M.P	350.00	350.00	700.00	280.00	140	-	420.00
13	Maharashtra	372.77	372.77	745.54	298.22	-	-	298.22
14	Odisha	170.00	170.00	340.00	136.00	-	-	136.00
15	Punjab	109.13	109.13	218.26	77.00	-	-	77.00
16	Rajasthan	193.48	193.48	386.96	112.54	-	-	112.54
17	Tamil Nadu	321.34	321.34	642.68	203.02	-	-	203.02
18	Telangana	239.10	239.10	478.20	0.00	-	-	0.00
19	U.P.	162.90	162.90	325.80	156.15	-	-	156.15
20	Uttarakhand*	399.40	44.38	443.78	284.01	-	72.82	356.83
21	West Bengal	186.83	124.55	311.38	0.00	-	-	0.00
	<b>Total</b>	<b>4600.36</b>	<b>3444.86</b>	<b>8225.21</b>	<b>2751.37</b>	<b>140.00</b>	<b>199.98</b>	<b>3091.35</b>
	<b>North Eastern States</b>	<b>90%</b>	<b>10%</b>					
22	Assam	405.14	45.02	450.16	-	-	-	0
23	Arunachal Pradesh	170.14	18.9	189.04	85.07	-	-	85.07
24	Manipur	240.76	26.75	267.51	192.61	48.15	-	240.76
25	Meghalaya	225.32	25.03	250.35	180.26	-	-	180.26
26	Mizoram	153.17	17.02	170.19	122.54	30.63	-	153.17
27	Nagaland	153.25	17.03	170.28	122.6	-	-	122.6
28	Sikkim	393.73	65.13	458.86	0	150	-	150
29	Tripura	170.640	18.950	189.59	113.06	34.13	-	147.19
	<b>Total</b>	<b>1912.15</b>	<b>233.83</b>	<b>2145.98</b>	<b>816.14</b>	<b>262.91</b>	<b>0</b>	<b>1079.05</b>
	<b>Union Territories</b>							
30	A & N Islands	35	35	70	28.00	-	-	28.00
31	Chandigarh	53.36	-	53.36	-	-	-	-
32	D&N Haveli	No AWP	-	0	-	-	-	0.00
33	Daman & Diu	No AWP	-	0	-	-	-	0.00
34	Lakshadweep	No AWP	-	0	-	-	-	0.00
35	Delhi	No AWP	-	0	-	-	-	0.00
36	Puducherry	No AWP	-	0	-	-	-	0.00
	<b>Total</b>	<b>88.36</b>	<b>35.00</b>	<b>123.36</b>	<b>28.00</b>			<b>28.00</b>
	<b>Grand total</b>	<b>6600.87</b>	<b>3713.69</b>	<b>10494.55</b>	<b>3595.51</b>	<b>402.91</b>	<b>199.98</b>	<b>4198.40</b>

Note: Funds have not been released to states where complete proposals have not been received.

\* In case of Special category states, the cost sharing pattern is 90% (Central) and 10% (State)

has been prepared and circulated to the States/UTs for their comments.

## Wildlife Conservation

### Integrated Development of Wildlife Habitats

The Protected Area network in India comprises of 730 Protected Areas (103 National Parks, 535 Wildlife Sanctuaries, 66 Conservation Reserves and 26 Community Reserves). Apart from providing support to Protected Areas (National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves) the Scheme has also the following components – ‘Protection of wildlife outside the Protected Areas’ and ‘Recovery programmes for saving critically endangered species and habitats’.

#### Objectives

- To assist the States/UTs in the development and management of protected areas networks, protection of wildlife inside & outside Protected Areas.
- to create facilities for better protection and management of PAs/high value biodiversity formations.
- to provide financial and assistance for eco-development, training, capacity building & research studies.
- to provide for the voluntary relocation of villages falling within the PAs to outside area and settlement of rights.
- to support Conservation Reserves & Community Reserves, Protection outside PAs, Recovery programmes for critically endangered species.

The main objective of the scheme are:

**Pattern of funding:** The funding of the ‘Integrated Development of Wildlife Habitats’ schemes, which forms a part of the National Development Agenda, is shared 60:40 basis between the Centre and the States (90:10 for the 8 North-Eastern and 3 Himalayan States).

### Wildlife Crime Control Bureau (WCCB)

Wildlife Crime Control Bureau is a statutory multi-disciplinary body established by the Government of India under the Ministry of Environment, Forest and Climate Change, to combat organized wildlife crime in the country. The Bureau has its headquarter in New Delhi and five regional offices at Delhi, Kolkata, Mumbai, Chennai and Jabalpur; three sub-regional offices at Guwahati, Amritsar and Cochin; and five border units at Ramanathapuram, Gorakhpur, Motihari, Nathula and Moreh. It is mandated under Section 38 (Z) of the Wild Life (Protection) Act, 1972, to collect and collate intelligence related to organized wildlife crime activities and to disseminate the same to State and other enforcement agencies for immediate action so as to apprehend the criminals; to establish a centralized wildlife crime data bank; co-ordinate actions by various agencies in connection with the enforcement of the provisions of the Act; assist foreign authorities and international organization concerned to facilitate co-ordination and universal action for wildlife crime control; capacity building of the wildlife crime enforcement agencies for scientific and professional investigation into wildlife crimes and assist State Governments to ensure success in prosecutions related to wildlife crimes; and advise the Government of India on issues relating to wildlife crimes having





Fig. 22 Indian One Horned Rhinoceros

national and international ramifications, relevant policy and laws.

### Central Zoo Authority

The main objective of the Central Zoo Authority is to enforce minimum standards and norms for upkeep and healthcare of animals in the Indian Zoos and to control the Mushrooming of ill-conceived, ill planned zoos, to monitor and evaluate the existing zoos and to suggest ways and means for the improvement of zoos in the country so that they can be transferred into potent centers for ex-situ conservation of endangered wild fauna.

### Activities undertaken

– Under the Central component of Compensatory Afforestation Fund Management and Planning Authority (CAMPA) funds, Ministry started a

programme since the year 2015 for augmenting the fodder and water resources within the forests, so that sufficient supply is available to the wildlife within the forests itself. Rs. 5 crore has been allocated initially for the purpose.

- For the effective management of wild animals and to mitigate the damage to crop by wild animals the proposals of State Government of Uttarakhand for declaring Wild boar; Himachal Pradesh for declaring Monkeys and Bihar for declaring Nilgai and Wild boar, as vermin (Section 62 of the Wildlife (Protection) Act, 1972) were considered by the Ministry and Gazette declaring Nilgai and Wild pig as vermin in the State of Bihar and Wild pig as vermin in the State of Uttarakhand have been notified vide S.O. 3318(E) dated 01.12.2015 and S.O. 374(E) dated 03.02.2016 respectively.

- Declaration of Eco-sensitive Zones: So far 477 proposals on eco-sensitive zones have been received from the State/UT Governments. In addition, proposal for 105 National Parks and Sanctuaries in Andaman and Nicobar Islands have also been received.
- National Wildlife Action Plan: The Committee under the chairmanship of Shri J.C. Kala, Ex- DGF and Secretary to the Government of India has reviewed the implementation of National Wildlife Action Plan, 2002-2016 and has drafted the National Wildlife Action Plan (2017-2031). The draft Action Plan has also been hosted on the official website of the MoEF&CC for seeking comments from stakeholders.
- Implementation of CITES in India: The Indian delegates attended the 66th meeting of the Standing Committee (SC66) of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) which was held from 11 to 15th January 2015 at Geneva, Switzerland.
- Shark workshops for supporting implementation of new shark listing in CITES Appendix-II: The 2nd CITES listed shark and Manta Ray workshop was organized by India on 15-16 December 2015 at Kochi, Kerala for the west coastal states of India with the support of Government of Kerala, Wildlife Trust of India and UNDP, where alternative livelihoods of fisherman in view of CITES listing of sharks and manta rays was discussed.
- Based on the Cabinet Decision, the Director General of Forests and Special Secretary, Ministry of Environment, Forests and Climate Change has signed the agreement between UNESCO and Government of India for establishing a “Centre for World Natural Heritage Management and Training for the Asia and Pacific Region” as a Category 2 Centre under the auspicious of UNESCO at the Wildlife Institute of India, Dehradun, on 2nd September 2015 in the presence of Hon’ble Minister (Independent Charge), Environment, Forests and Climate Change.
- Endorsement of London Declaration and Kasane Statement on illegal wildlife trade: Hon’ble Prime Minister Narendra Modi and Hon’ble Prime Minister David Cameron met in London on 12-13 November 2015 and issued a joint statement on wildlife conservation. They resolved to work together to combat the illegal wildlife trade and to improve protection for both captive and wild Asian elephants. India endorsed the London Declaration and Kasane Statement on Illegal Wildlife Trade.
- India has signed a Memoranda of Understanding (MOU) Conservation of Migratory Birds of Prey in Africa and Eurasia, also called the ‘**Raptor MOU**’ with the Convention on Conservation of Migratory Species (CMS) on 7.3.2016. With signing of this MOU, India became the 56th signatory to the MOU.
- GOI-UNDP-GEF Project: The Ministry is implementing the Government of India-United Nations Development programme-Global Environment Facility Project titled ‘Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the Sindhudurg Coast, Maharashtra’ and ‘Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the East Godavari



- River Estuarine Ecosystem (EGREE), Andhra Pradesh' (EGREE Project).
- GEF-UNDP- GoI 'India High Range Mountain Landscape Project': The project aims to put in place a collaborative governance framework and know-how for management of multiple use Munnar Landscape. The project will attempt a paradigm shift from current sector based planning to an integrated approach for management of multiple use mountain landscapes to deliver global environmental benefits. The project covers 3,100 sq.km spread across three districts of Kerala viz. Idukki, Ernakulam and Thrissur.
  - Two days training programme conducted for police and forest officials.
  - Sensitization programmes conducted for other agencies like BGFs, CIFS, Coast Guard, DRI, Customs, Police, Forests and Judiciary etc.
  - Sensitization programmes conducted for Panchayati Raj Institutions.
  - Wildlife criminals apprehended
  - Wildlife criminals dossiers prepared.
  - CITES and EXIM Policy violation detected at exit points.
  - Alerts/Advisories/Actionable inputs issued.
  - Integration of WCCB with Customs clearance on Single Windows platform

### Activities undertaken

- Wildlife Crime Offences detected and crime complaints filed.
- Special enforcement or preventive drive conducted as joint operations with other agencies.

### Progress/ Achievements (Wildlife Crime Control Bureau)

Tabular statement of progress/achievements made by Wildlife Crime Control Bureau is given in Table-10.

**Table-9** Progress/achievements made by Wildlife Crime Control Bureau during 2015-16

Sl. No.	Activities	Achievements (up to December 2015)
1	Wildlife Crime Offences detected	26
2.	Wildlife Crime Offences detected and crime complaints filed	15
3.	Joint operations (Special enforcement or preventive drive) with other agencies.	36
4.	Two days training programme conducted for police and forest officials	14
5.	Sensitization programmes conducted for other agencies	41
6.	Sensitization programmes conducted for Panchayati Raj Institutions	26
7.	Wildlife criminals apprehended	67
8.	Wildlife criminals dossiers prepared Panchayati Raj Institutions	191
9.	Wildlife(P) Act 1972/ CITES and Exim Policy violation detected at exit points	126
10.	Alerts/Advisories/Actionable inputs issued	52

Table-10 State-wise details of the Protected Area Network of the country

S.No.	States/UTs	No of NPs	No. of WLS	No. of Cons Res	No. of Comm Res	No. of PAs
1	Andhra Pradesh	6	21			27
2	Arunachal Pradesh	2	11			13
3	Assam	5	18			23
4	Bihar	1	12			13
5	Chhattisgarh	3	11			14
6	Goa	1	6			7
7	Gujarat	4	23	1		28
8	Haryana	2	8	3		13
9	Himachal Pradesh	5	32	3		40
10	Jammu & Kashmir	4	15	33		52
11	Jharkhand	1	11			12
12	Karnataka	5	27	8	1	41
13	Kerala	6	17		1	24
14	Madhya Pradesh	9	25			34
15	Maharashtra	6	37	2		45
16	Manipur	1	3			4
17	Meghalaya	2	3		22	27
18	Mizoram	2	8			10
19	Nagaland	1	3			4
20	Orissa	2	18			20
21	Punjab	0	13	1	2	16
22	Rajasthan	5	25	10		40
23	Sikkim	1	7			8
24	Tamil Nadu	5	29	1		35
25	Tripura	2	4			6
26	Uttar Pradesh	1	23			24
27	Uttarakhand	6	7	4		17
28	West Bengal	6	15			21
29	Andaman & Nicobar	9	96			105
30	Chandigarh	0	2			2
31	Dadra & Nagar Haveli	0	1			1
32	Daman & Diu	0	1			1
33	Delhi	0	1			1
34	Lakshadweep	0	1			1
35	Pondicherry	0	1			1
	India	103	535	66	26	730

Source: National Wildlife Database Cell, Wildlife Institute of India





## Project Elephant

### Introduction

Project Elephant (PE) was launched by the Government of India in the year 1991-92 as a Centrally Sponsored Scheme with the 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. Under the scheme, 100% financial assistance is provided to the concerned State Government for undertaking various activities for scientific management of elephant habitats. Presently the Project is being implemented in 22 States/UTs, viz. Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Odisha, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal, Rajasthan, Andaman & Nicobar, Bihar, Punjab, Gujarat and Haryana (where an elephant rescue centre has been set up supported by Project Elephant). There are 29 notified and 2 proposed Elephant Reserve in the country (Khasi Hills Elephant Reserve in Meghalaya and Lemru Elephant Reserve in Chhattisgarh).

### Important Initiatives taken

- 18 elephant range states are supported with Rs 10.84 Crores under the Centrally Sponsored Scheme 'Project Elephant' from April, 2015 to 31st December, 2015.



Fig. 23 Wild Tusker

- Dandeli Elephant Reserve (2321.12 Sq. Kms) has been notified on 26.03.2015 and area of Mysore Elephant Reserve has been increased by 1331.94 Sq. Kms by including Bhadra Wildlife Sanctuary within Mysore Elephant Reserve. These two Elephant Reserves are located in Karnataka.
- 1st Dialogue on Trans-border Conservation of Elephants between India and Bangladesh has been organised on 19-20 August, 2015 at Kolkata.
- A workshop on Human Elephant Conflict was organized on 12.06.2015 at Wokha Nagaland.

- A meeting of the Inter State Committee on Conservation of Elephants (Eastern Region) was held on 24.06.2015 at Baripada, Odisha.
- 1st meeting of the Inter State Committee on Conservation of Elephants (NE Region) was held on 21.08.2015 at Kolkata, West Bengal.
- Hon'ble Minister, EFCC inaugurated a photo exhibition on elephants of Bedi Brothers on 2.09.2015 at India Habitat Centre, New Delhi.
- On the initiative of the Project Elephant three states with largest captive population, namely Kerala, West Bengal and Odisha has constituted state and district level captive elephant welfare committees. A proposal on these lines is being processed by the Government of Assam.
- Participated in the Elephant Task programme and distribution of Balipara Wildlife Awards on 5th -6th November, 2015 at Guwahati, Assam.
- An International Symposium on Health and Ecology of Asian Elephants was organized on 19th -20th, November, 2015 at Delhi.
- Inspector General of Forests & Director (Project Elephant) participated in the 2nd Thematic meeting on Human-Wildlife Conflicts on 11-15 December, 2015 at Sundarbans, Bangladesh.

## Budget allocation and progress of expenditure alongwith comparison

**Table-11** Amount spent by Project Elephant Range States under Centrally Sponsored Scheme for the year 2015-16 (Upto 31st December, 2015)

(Rs. in lakhs)			
Sl. No.	Head (Central Sector)	Allocation	Expenditure
1.	2406.02.110.15.02.01 -Salaries	25,00,000	9,24,807
2.	2406.02.110.15.02.11 -DTE	7,00,000	4,67,703
3.	2406.02.110.15.02.12 -FTE	3,00,000	1,01,567
4.	2406.02.110.15.02.13 -OE	10,00,000	4,76,230
5.	2406.02.110.15.02.20 –OAE	28,00,000	21,91,290
6.	2406.02.110.15.02.28 -PS	10,00,000	4,28,000
7.	2406.02.110.15.02.50 -OC	3,00,000	3,00,000
	<b>Total</b>	<b>86,00,000</b>	<b>48,89,597</b>



## Project Tiger / National Tiger Conservation Authority (NTCA)

### Introduction

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

### Progress / Achievements

- **Implementation of online filing of Annual Plan of Operation (APO) :** To ensure automation, timely submission and uniformity in submission of APOs, the National Tiger Conservation Authority (NTCA) along with the NIC is in process of finalizing a portal to file APOs online.
- **Security audit of tiger reserves:** A framework has been developed by the NTCA in consultation with security and investigative agencies to assess security apparatus at tiger reserves with an aim to identify gaps and formulate strategies to address the same.
- **CA|TS:** The Conservation Assured Tiger Standards (CA|TS) is a management evaluation tool which is being implemented in tiger occupied areas outside tiger reserves to improve quality of management interventions in these areas and finally lead to certification. This is similar to the Management Effectiveness Evaluation of Tiger Reserves (MEETR) which is done within territorial jurisdiction of tiger reserves.
- **Economic Evaluation:** Economic Evaluation of 6 tiger reserves has already been conducted which has demonstrated in monetary terms the value of preserving



Fig. 24 Tiger at Ranthambhore National Park, Rajasthan

tiger reserves, especially in context of combating climate change through carbon sequestration. It is being initiated for 10 more tiger reserves.

- **Performance Audit:** To assess the impact of raising, arming and deploying the Special Tiger Protection Force (STPF) and electronic surveillance in conservation of the tiger, a performance audit of these two initiatives shall be carried out.
- **Commencement of project on development of SMART green infrastructure taking 3 representative landscapes:** The NTCA along with the Wildlife Institute of India, Dehradun shall develop a template for designing mitigating strategies for linear infrastructure like roads taking into account three representative landscapes from across India.
- **Group of MPs constituted to look into various aspects of tiger conservation:** A group of MPs shall start work on various facets of tiger conservation in India and suggest changes / improvements whenever required.
- **Documentation and publication of best practices:** Best practices from tiger reserves across India shall be published.
- **Issue of guidelines on tiger safari:** In pursuance of normative guidelines issued by this Authority in 2012, operative guidelines to establish and run tiger safaris shall be issued.
- **Extension of UAVs to other tiger bearing landscapes shall be undertaken:** Trial of Unmanned Aerial Vehicle for monitoring done in the Panna Tiger Reserve (Madhya

Pradesh), in collaboration with the Wildlife Institute of India. In-principle approval of the competent authority, for extending this in 13 tiger reserves covering all tiger landscapes has been obtained.

- **Training programme on “Mainstreaming Biodiversity in Road and Rail Transportation Projects for promoting Smart Green Infrastructure”:** To sensitize stakeholders in the field of road ecology a three day training programme was organized at the Wildlife Institute of India, Dehradun.

## Animal Welfare

### The Animal Welfare Board of India (AWBI)

The mandate of the Animal Welfare Division is to prevent the infliction of unnecessary pain or suffering on animals, in terms of the provision of the Prevention of Cruelty to Animals (PCA) Act, 1960. General Animal Welfare covers the welfare of individual animals, mainly domesticated animals, as also wild animals in captivity, through Animal Welfare Board of India (AWBI), Chennai, Tamil Nadu.

The following Central Sector schemes are being implemented by the Animal Welfare Board of India.

- (a) AWBI Plan Scheme
- (b) Scheme for Shelter Houses for looking after the animals.
- (c) Scheme for Birth Control and Immunization of Stray Dogs
- (d) Scheme for Provision of Ambulance Services to Animals in Distress.



(e) Scheme for Relief to Animals during Natural Calamities and Unforeseen Circumstances.

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

The Committee for Purpose of Control and Supervision of Experiments on Animals (CPCSEA) was established under Chapter 4, Section 15 (1) of the Prevention of Cruelty to Animals Act, 1960. CPCSEA is a statutory Committee, which is duty bound to take all such measures as may be necessary to ensure that animals are not subjected to unnecessary pain or suffering before, during or after performance of experiments on them. For this purpose, the Committee formulated the “Breeding of and Experiments on Animals (Control & Supervision) Rules, 1998”

(amended in 2001 & 2006) to regulate the experimentation on animals.

### 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. The mandate of NIAW covers the need to improve animal welfare through education, research and public outreach. The institute has been operational since January, 2006.



Fig. 25 Binturong (Bearcat), assessed as Vulnerable on IUCN Red List

## Animal Welfare Board of India (AWBI)

- **Free Mobile Animal Clinic** - The Board is providing free, on the spot veterinary treatment to sick and injured animals belonging to poor people through its Mobile Animal Clinic (MAC) programme operating from the Headquarters at Chennai. The Veterinary Surgeon of the Board visits the pre-determined localities in the city where the animal population is concentrated to treat the animals free of charge during forenoons as per a fixed schedule. During the year 2015-16, 745 animals were treated / rescued by AWBI Mobile Clinic in Chennai.
- **Registration of Performing Animals** - Under Rule 3 of the Performing Animals (Registration) Rules, 2001, the Board is the prescribed authority to issue registration certificates. During the year viz. 2015-16 (upto 20.12.15) 883 Films/Ad films were granted registration certificates and 1015 have been granted pre-shoot permission for using animals in their films.  
A total of 152 Hon'y. Animal Welfare Officers (HAWOs) were nominated to carry out animal welfare activities and awareness on animal welfare.
- **Issue of Colony Animal Care Taker ID** - The Board has taken steps to encourage the animal welfare activists in the Country to be kind and compassion towards the animals. In this connection, the Board has issued 839 colony animal care taker ID to the citizens of the Country to carry out the

fundamental duties of the citizen as prescribed under the Constitution of India.

- **Humane Education** - During the year 2015-16, the Board conducted the humane education training programmes in collaboration with National Institute of Animal Welfare.
- **Publications of AWBI** - The Board brings out publications like Animal Citizen (English), Jeev Sarathi (Hindi) and AWBI monthly Newsletter (English/Hindi) and other booklets/Rules pertaining to Animal Welfare.
- **Cruelty Matters and Action Taken** - The Board has received 115 complaints regarding cruelty to animals from various parts of the country upto 20th December, 2015 and the same was informed to the concerned State Governments and District Collectors/Magistrates/District Superintendent of police for taking suitable action.

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

- Registration of 38 establishments and constitutions of their Institutional Animals Ethics Committees (IAECs).
- 287 project proposals relating to experimentation on large animals examined by CPCSEA.
- 116 Research Protocols on large animals approved.
- 9 Large Animal House Facilities registered.



- Registration of 280 establishments renewed.
- Institutional Animals Ethics Committees (IAECs) of 176 establishments reconstituted.
- CPCSEA also supported Conferences and Workshops to promote awareness on Ethics to be ensured during experiments on animals at Chennai, Lucknow, Bangalore, Mumbai, Delhi and Puducherry.
- 6 Training programmes for selection of Nominees of CPCSEA conducted at NIAW. 60 candidates were trained before their induction into the IAECs of various establishments.

### National Institute of Animal Welfare (NIAW)

Impart training and education on diversified subjects in animal welfare including animal management, behaviour and ethics with a purpose to foster knowledge to personnel working with animals in the State Veterinary Departments, Municipal Corporations, Forensic Laboratories, Forestry Departments, Laboratories dealing with animal experimentation, sanctuaries, animal houses/ shelters, pharmaceuticals, diagnostic laboratories, members/ nominees of Animal Welfare Board of India (AWBI), CPCSEA, Socially Aware Nominees, SPCAs, Institutional Animal Ethics Committee (IAEC) members, Animal Welfare Organizations (AWOs), NGOs registered with AWBI, Students graduating in Veterinary and Animal Sciences, Fisheries Science, B.Pharmacy, Wild Life Sciences, Biological Sciences etc.

### Progress/Achievements

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

- In order to timely and transparent disposal of work of CPCSEA, the **Website of CPCSEA** has been launched on 24th April, 2015 by Shri Prakash Javadekar, Hon'ble Minister for State (I/C) Environment, Forest and Climate Change on the occasion of 'World Laboratory Animals Day'. This initiative will impact in **Digital India Programme of the Government of India** with a vision to transform India into a digitally empowered society. The application of registration is being accepted online. As on December, 2015, 24 cases of registration have been processed online.

Release of sticker on Animal Welfare, captioned:

"WE DON'T SMOKE, WE DON'T DRIVE, WE DON'T WEAR MAKE-UP OR PERFUME, WE DON'T DRINK. WE DON'T DROP BOMBS, WE DON'T TAKE DRUGS, JUST BECAUSE HUMANS DO IT, and WHY SHOULD WE SUFFER THROUGH EXPERIMENTATION"

During the year 26 in-campus training imparted to 517 participants and 01 off-campus short term course for laboratory technicians has been conducted at CSIR-CDRI, Lucknow.

## **CHAPTER-3**

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# **ENVIRONMENTAL IMPACT ASSESSMENT**





### Environmental Impact Assessment

EIA Notification, 2006 and CRZ Notification, 2011 have been amended from time to time to further streamline the clearance process. The amendments have also been done to address emerging concerns stemming from the need to integrate environmental concerns into the developmental process for achieving the goal of sustainable development. While according EC to development project(s), necessary conditions, environmental safeguard and measures are stipulated for their effective implementation during the construction and operation of the project. The safeguard measures are intended to minimize adverse impacts, inter alia, on (i) air quality, (ii) water quality, (iii) land degradation, (iv) bio-diversity, and (v) wildlife habitat. In addition, measures like rainwater harvesting, water conservation, greenbelt and plantation; wildlife conservation plan, etc. are also required to be implemented in the project.

### Environmental Clearance to Developmental Projects

As per the provisions of the EIA Notification 2006, several meetings of various sectoral Expert Appraisal Committees were convened during the year for appraisal of category “A” projects from sectors of Industry, New Construction and Industrial Estate, Infrastructure – II (Miscellaneous projects and CRZ); Non-Coal Mining, Coal Mining, River valley and Hydroelectric Projects; Thermal Projects and Nuclear Projects. As part of appraisal process, wherever required, 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 (EC) has been accorded to 508 projects (between April 2015 to Jan, 2016). The graphical representation of EC granted in current financial year and last 4 years is depicted in the following Fig.-26 and Fig. 27.

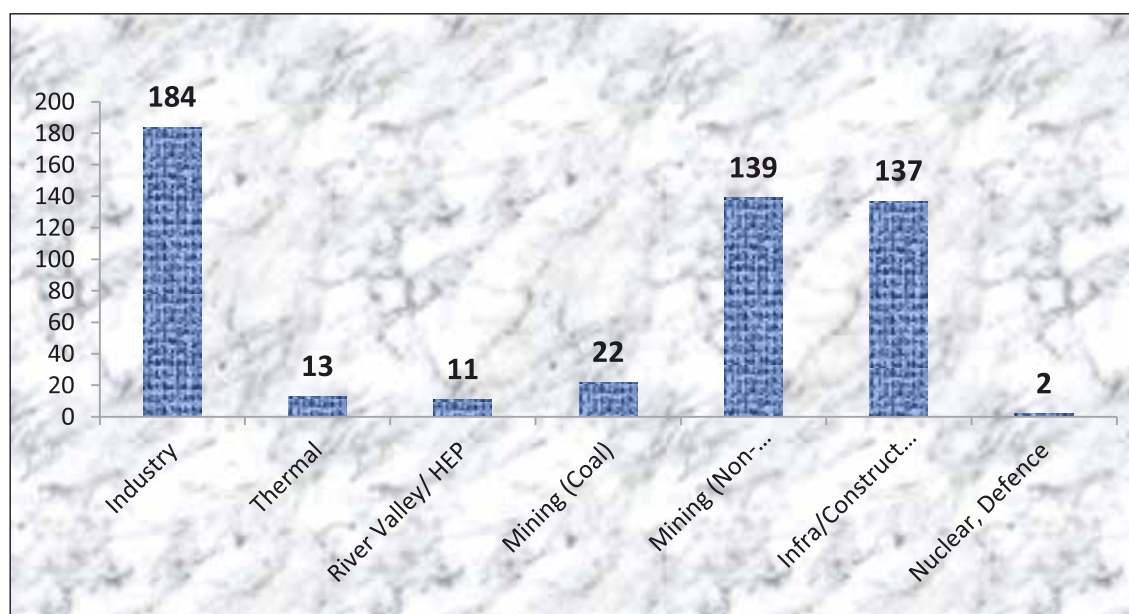
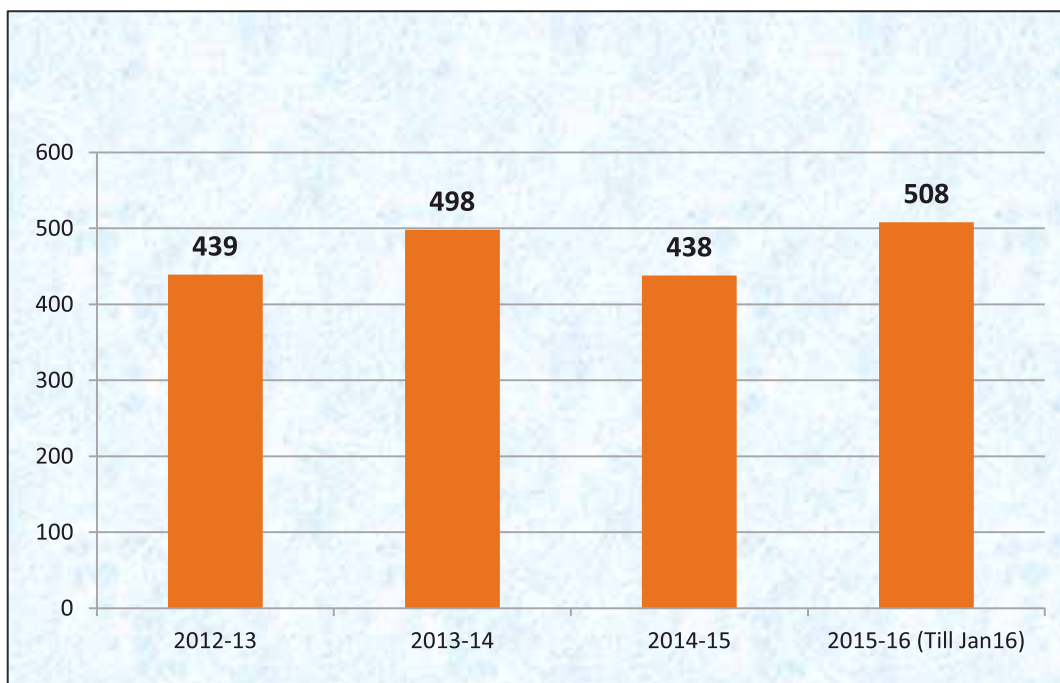


Fig. 26 Environmental Clearance (April 2015 - Jan 2016) Total- 508



**Fig. 27** Environmental Clearance granted in various sectors during last 4 years

### Constitution of State Environment Impact Assessment Authorities (SEIAA)

The ministry has so far constituted thirty (30) state/UT level environment impact assessment authorities (SEIAA) under sub section (3) of section 3 of the Environment (Protection) Act 1986 for approval of EC of category B projects and activities which have been appraised by SEACs. In 2015, SEIAA/SEAC have been reconstituted in Chhattisgarh on 4.2.2015, Delhi on 1.4.2015, Kerala on 19.3.2015, Meghalaya on 5.8.2015, Tamil Nadu on 12.8.2015, Haryana 21.8.2015, Arunachal Pradesh on 15.12.2015, Odisha on 15.12.2015, Puducherry on 15.12.2015 and Jammu & Kashmir on 28.2.2016. Reconstitution of SEIAA/SEAC in Chandigarh is in process.

### Post Project Monitoring of Environment Clearance Conditions

Clearances under EIA Notification, 2006 are granted by MoEFCC for Category 'A' projects and by State Level Impact Assessment Authorities (SEIAAs) / UT IAAs for Category 'B' projects. Similarly, clearances under CRZ Notification, 2011 are also granted by MoEFCC or the respective SEIAAs as the case may be after the project has been recommended by the concerned Coastal Zone Management Authority. While granting environmental clearances under both these Notifications, various conditions and environmental safeguards are stipulated which are required to be implemented by the project proponent during various stages of project cycle.



Fig. 28 Barheaded Goose, breeds in Central Asia

The objectives of Post-Project Clearance Monitoring are:

- to ensure that actions have been taken to incorporate the environmental safeguards during the project cycle in accordance with the conditions stipulated in the Environmental Clearance letter; and
- to take appropriate corrective measures to check adverse impact on environment during operation of the respective projects.

Monitoring of projects with respect to conditions stipulated in the environmental clearance issued EIA Notification, 2006 and Coastal Regulation Zone (CRZ), 2011 is carried out through the ten 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.

Based on the observations made during field visit, necessary follow up action is taken with the project proponents in respect of monitored projects to ensure an effective compliance to EC conditions. The monitoring cell in the Ministry examines the monitoring reports submitted by Regional Offices. In cases of major non-compliance, further follow up action is taken for effecting compliance including issue of show cause notice followed by directions under Environment (Protection) Act, 1986 on case to case basis.



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

The environmental appraisal of development projects is undertaken as per the provisions of EIA Notification 2006 based on EIA/EMP reports prepared by the project proponents with the assistance of their consultants. Good quality EIA reports are prerequisite for appropriate decision making. As of now, only consultants accredited with QCI/NABET are allowed to prepare EIA/EMP reports and present the cases before EACs/SEAC. As on date there are 172 accredited EIA Consultant Organizations.

Also the process of finalization of draft notification no. S.O. 2773(e) dated Oct. 7, 2015 for preparation and presentation of Environment Impact Assessment (EIA) REPORT AND ENVIRONMENT MANAGEMENT PLAN (EMP) is under process.

### Achievements

- Mandated online submission in States for

applications for Terms of reference (TORs) and Environment Clearance (EC) vide order dated 02.07.2015 to increase transparency and facilitate expeditious decision making process.

- Standardization of Terms of Reference (ToR): An amendment to EIA Notification, 2006 vide Notification S.O.No. 996 (E) dated 10.04.2015 was issued regarding Standard Terms of Reference to enable the project proponent to commence preparation of an EIA report after successful online submission and registration of the application.
- New Notifications for environmentally sustainable minor mineral mining with special emphasis on sand mining: An amendment to EIA Notification 2006 vide Notification S.O.No. 141 (E) dated 15.01.2016 was issued.
- An amendment to EIA Notification 2006 vide Notification S.O.No. 190(E) dated 20.01.2016 was issued for for constitution of District Level Environment Impact Assessment Authority and District Environment Expert Appraisal Committee



Fig. 29 Reed Frog, *Raorchestes ochlandrae* collected at Malabar Wildlife Sanctuary





Fig. 30 Red Fox (*Vulpes bengalensis*) know as Indian fox

- at the district level headed by District Magistrate or District Collector and Executive Engineer, Irrigation respectively for mining of minor minerals including sand mining for mine lease area upto 5 ha. For individual lease and 25 ha. in cluster.
- An amendment to EIA Notification 2006 vide Notification S.O.No. 1142(E) dated 17.04.2015 was issued Incorporating 'Bio-Medical Waste Treatment Facilities' as an activity in the Schedule to EIA Notification, 2006.
  - An amendment to EIA Notification 2006 Vide Notification S.O.No. 1141(E) dated 29.04.2015 and S.O.No. 2571(E) dated 31.08.2015 was issued regarding extension of validity of environment clearance from 5 years to 7 years, and further renewable by 3 years.
  - An amendment to EIA Notification 2006 Vide Notification S.O.No. 1834(E) dated

06.07.2015 was issued Regarding Thermal Power Plants Schedule, column 4 regarding capacity.

- An amendment to EIA Notification 2006 vide Notification S.O.No. 2572(E) dated 14.09.2015 was issued regarding public hearing exemption for existing pellet plants which were required to take environmental clearance subsequent to the orders of Hon'ble NGT.

### Implementing organisations along with details of responsibilities:

The State Level Environment Impact Assessment Authorities (SEIAAs) have been constituted under the Environment (Protection) Act 1986 to appraise and accord environmental clearance to the projects/activities requiring prior environment clearance, which have been categorized Category 'B' projects in the schedule under the EIA Notification 2006

## CHAPTER-4

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# CONTROL OF POLLUTION







## Control of Pollution

### Control of Air Pollution

- The National Air Quality Index (AQI) has been launched by Hon'ble Prime Minister on April 06, 2015. AQI is a tool loaded in the web portal of Central Pollution Control Board (CPCB) for public information on the status of ambient air quality of selected cities considering eight pollutants i.e. Sulphur Dioxide, Nitrogen Dioxide, Lead, Ozone, PM10, PM2.5, Carbon Monoxide and Ammonia for short term (upto 24 hourly) norms as prescribed in the National Ambient Air Quality Standards (NAAQS-2009). The afore-said air pollutants are monitored by Continuous Ambient Air Quality Monitoring Stations (CAAQMs) by CPCB and State Pollution Control Boards. There are six AQI categories, namely Good, Satisfactory, Moderately Polluted, Poor, Very Poor, and Severe. Each of these categories is decided based on ambient concentration values of air pollutants and their likely health impacts. The National AQI is a significant tool helping the country in Decision Supporting System as a part of e-Governance measures.
- CPCB started disseminating the Air Quality Index (AQI) for 10 cities based on the data CAAQM stations. At present, 22 cities are connected to the web-based system of National AQI. They are Agra, Ahmadabad, Bangaluru, Chandrapur, Chennai, Delhi, Faridabad, Gaya, Gurgaon, Haldia, Hyderabad, Jaipur, Jodhpur, Kanpur, Lucknow, Mumbai, Muzaffarpur, Navi Mumbai, Panchkula, Patna, Pune and Varanasi.
- A decreasing trend has been observed in SO<sub>2</sub> levels in cities like Delhi, may be due to

various interventions that have taken place in recent years such as reduction of sulphur in diesel, use of cleaner fuel such as CNG in Delhi & Mumbai and LPG in Hyderabad, Lucknow, Bangalore, etc. Other measures include implementation of Bharat Stage-IV emission norms for new passenger cars and Bharat Stage – III for two Wheelers in metro cities commensurate with improved fuel quality. There has been a change in domestic fuel used in kitchen: coal to LPG and CNG which may have contributed to reduction in ambient levels of SO<sub>2</sub>. Fluctuating trends have been observed in NO<sub>2</sub> and PM<sub>10</sub> levels. Various measures such as implementation of Bharat Stage-III/IV norms etc have been taken to mitigate ambient NO<sub>2</sub> and PM<sub>10</sub> levels but at the same time number of vehicles and DG sets have increased exponentially. Decision has also been taken to implement BS – IV by April, 2017 across the country and BS – VI by April, 2020.

### Development of Environmental Standards

- 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. 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, Govt. of India.
- All the notified Standards have been loaded

on the website of this Ministry which could be downloaded (Rules & Regulations → Environment Protection → Acts & Rules → Environmental Standards). During the year, Standards in respect of following category of industries have been evolved and are being finalized for notification:

- Effluent & Emission Standards for Paint Industry;
- Effluent & Emission Standards Man-Made Fibre Industry;
- Effluent & Emission Standards for Coffee Processing Industry;
- Emission Standards for Brick Kiln Industry;
- Effluent Standards for Slaughter House;
- Effluent Standards for Textile Industry;
- Effluent Standards for Sewage Treatment Plants;
- Standards for Bathing Water Quality;
- Effluent & Emission Standards for Fertilizer Industry,
- Effluent & Emission Standards Automobile Service Station, Bus Depot and Workshop

The source specific environmental standards for industry/processes which have been notified or are in the process of notification during the year are as below:

#### **Effluent & Emission Standards**

- Thermal Power Plants (notified on 07.12.2015)
- Common Effluent treatment Plants (notified on 01.01.2016)
- Sugar industry (notified on 14.01.2016)
- Cement Plants with Co-processing (submitted to MoL&J for legal vetting)

- Diesel and LPG/ CNG gensets (up to 1000KVA) (submitted to MoL&J for legal vetting)
- Petrol and LPG/ CNG gensets (up to 19 KW) (submitted to MoL&J for legal vetting)
- Dedicated LPG/ CNG gensets (up to 800KW) (submitted to MoL&J for legal vetting)

### **National Ambient Noise Monitoring Network (NANMN) Programme**

- As per section 5.2.8 (IV) of National Environment Policy (NEP)-2006, Ambient Noise is included as environmental quality parameter and to monitor in specified urban areas regularly. Road map declared during 2010 by Hon'ble Minister of Environment & Forests regarding setting up a systematic national noise monitoring network covering 25 cities to monitor sound levels. CPCB decided to install Automatic Real time Noise Monitoring System as large number of stations can be handled easily using this technology
- Central Pollution Control Board in association with State Pollution Control Board has laid down National Ambient Noise Monitoring Network in 09 metropolitan cities and installed 35 no. of Noise Monitoring System in Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad (five stations in each) during 2010-11. The Strengthening of Network has been carried out by adding 35 more stations in the same 07 metropolitan cities during 2014-15. Thus the monitoring network has been extended to 70 Nos. of stations. Category wise details of existing noise monitoring status is provided in Table 13.





**Table 12:** Category wise details of Existing Noise Monitoring

Area/Category /Zone	No. of Stations	Cities covered
Silence	17	Chennai (2), Hyderabad(2), Kolkata(2), Delhi(4), Mumbai (2), Bangaluru(2)&Lucknow(3)
Residential	16	Bangaluru(3), Chennai (3),Delhi(2), Hyderabad(2), Kolkata(3), Mumbai (1), &Lucknow(2)
Commercial	25	Bangaluru(3), Chennai (4), Hyderabad(4), Kolkata(3), Delhi(4), Mumbai (4) &Lucknow(3)
Industrial	12	Bangaluru(2), Chennai (1), Hyderabad(2), Kolkata(2), Mumbai (3) &Lucknow(2)
<b>Total</b>	<b>70</b>	

Note: Figures in brackets indicate the no. of locations

### Assistance for Abatement of Pollution

- The scheme “Assistance for Abatement of Pollution” is being implemented by the Ministry of Environment and Forests since Seventh Five Year Plan (1990-1995). The scheme had an allocation of Rs 45 crore in the XI Five Year Plan (including Policy & law and Environmental Health Cell scheme). The scheme of Assistance for Abatement of Pollution is a Centrally Sponsored Scheme.
- During this year (2015-16), an allocation of Rs. 3.73 crore in the BE was made for providing financial assistance to the on-going/new projects. The assistance has been extended to four State Pollution Control Boards/ Pollution Control Committees during the current financial year.
- The approved XII FYP is Rs. 60 crore for the scheme of Assistance for Abatement of Pollution.

### Auto Fuel Policy

- The Expert Committee on “Auto Fuel Vision

& Policy 2025” has been constituted by Ministry of Petroleum & Natural Gas in December 19, 2013 under the chairmanship of Shri Saumitra Choudhuri, Member Planning Commission. MoEFCC was also one of the members in this committee. The committee has submitted its recommendations in May 2014. The recommendations are still to be approved by the cabinet.

- Upon pursuance with this Ministry, MoRTH on 27.11.2015 issued Draft Notifications issued for advancing the implementation time lines to 2019 for BS- V and 2021 for BS-VI for comments of stakeholders. Finally, a group of Ministers comprising Hon’ble Union Ministers, Shri Nitin Gadkari, Hon’ble Union Minister of Road, Transport and Highway, Shri Anant G Geete, Hon’ble Minister of Heavy Industries and Public Enterprises, Shri Dharmendra Pradhan, Hon’ble Minister of State (I/c) Petroleum & Natural Gas and Shri Prakash Javadekar, Hon’ble Minister of State (I/c) Environment, Forest and Climate Change



**Fig. 31** Tailpipes of Cars and trucks are the major source of vehicular pollution

met on 6th January, 2016 at Transport Bhawan in New Delhi and this group of Ministers decided that BS-VI mass emission standards to be implemented by 01.04.2020, skipping the implementation of BS-V emission norms. On 12.1.2016, MoRTH convened a meeting to discuss the fuel quality and supplying the same by April, 2020 for leapfrogging to BS-VI emission norms in the country where MoEF&CC welcome the decision and urged the MoRT&H for issuance of notification accordingly.

### **Revision and implementation of Guidelines for Evaluation and Recognition of Environmental Laboratories under E(P) Act, 1986**

In order to simplify the procedure, it has been decided by the Ministry to discontinue the joint inspection and grant the recognition to the environmental laboratories subject to fulfilling the criteria which include such as that all Environmental Laboratories (Private/NGOs) Government /Autonomous/Public sector

undertaking /Educational Institutes/ State/ Central Pollution Control Board Laboratories should have either ISO 17025 (NABL Accreditation) or ISO 9001 along with OHSAS 18001 (Occupational Health and Safety Management System) Certification before submission of application for consideration of recognition under Environmental (Protection) Act, 1986 duly authenticated by State Pollution Control Board. The applicant is required to submit an undertaking that all activities of laboratory in totality are being carried out as per ISO 17025 (NABL Accreditation) or ISO 9001 along with OHSAS 18001 (Occupational Health and Safety Management System).

During the year 2015-16, Twenty nine (29) Private Laboratories and Fifteen (15) Government laboratories have been recommended for recognition under E(P) Act, 1986.

### **Environmental Health**

The Ministry had initiated environmental epidemiological studies in different areas of indoor and outdoor pollution so as to identify



and develop programmes to create data base and suggest environmental mitigation measures. Continued research in health effects of ambient air pollution is necessary to evaluate changing trends and to suggest corrective measures.

An Apex Committee was constituted on 1st June 2012 to address Environment and Health related issues. The 2nd Apex Committee had the Meeting on 29th May, 2015 for screening/evaluation of Project Proposals on Environment Health. The six (6) project proposals have been screened for financial assistance.

### Scheme of Common Effluent Treatment Plants (CETPs)

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

The salient features of the revised scheme are as follows:

- The Central subsidy has been enhanced from 25% to 50% of the project cost.
- All the three levels of treatment, primary, secondary and tertiary are to

be covered for assistance. Progressive technologies like Zero Liquid Discharge 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.
- During this year (2015-16), an allocation of Rs. 12.50 crore in the BE was made for providing financial assistance to the ongoing CETP projects. Financial assistance was provided for the ongoing projects of CETPs at Palsana and new Palsana, Surat, Gujarat. 45 MLD CETP at New Palsana has been completed and commissioned.
- The approved outlay for XII Five Year Plan for the scheme of CETPs is Rs. 100 crore.

### Taj Protection Mission

- In pursuance of the Hon'ble Supreme Court's Order, projects for environmental protection of World Heritage Site of Taj Mahal were initiated and funded by the Ministry. The Planning Commission approved Rs. 600 crore on a 50:50 cost sharing basis with the State Government to implement various schemes in the Taj Trapezium Zone for environmental protection of the Taj Mahal. In the first phase during the IX Five Year Plan, 10 projects were approved by the Government and implemented by the State Government of Uttar Pradesh.
- At present, only a token of Rs. one lakh is available under the scheme.
- The U.P Govt. was requested to submit fresh proposals to seek provision of more funds during the XII FYP from the Planning Commission. However, till date no



Fig. 32 35 MLD Bawana Common Effluent Treatment Plant in Delhi

comprehensive proposal has been received from the Government of U. P.

- The TTZ Authority has been extended up to 31.12.2016 to monitor progress of the implementation of various schemes for protection of the Taj Mahal and programmes for protection and improvement of the environment in the TTZ area.

## Central Pollution Control Board (CPCB)

### Introduction

Under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Central Government constituted the `Central Board for the Prevention and Control of Water Pollution` on September 23, 1974. The name of the Central Board was amended to Central Pollution Control Board (CPCB) under the Water (Prevention & Control of Pollution) Amendment Act, 1988 (No. 53 of 1988). The Central Pollution Control Board has been entrusted with the responsibilities of Air Pollution Control since May, 1981 under the Provision of the Air (Prevention & Control of

Pollution) Act, 1981. The enactment of the Environment (Protection) Act, 1986, which is umbrella legislation for enforcement of measures for protection of environment and several notifications of rules under the Act widened the scope of activities of the Central Board. The major functions and responsibilities of CPCB inter-alia include:

- **Identification Of Polluted River Stretches -** CPCB is monitoring 445 rivers in 29 States and 6 Union Territories in the country and identified 302 polluted river stretches on 275 rivers.
- **Priority Wise Polluted River Stretches -** Among the 302 polluted river stretches – 34 are in Priority Class – I, 17 in Priority Class – II, 36 in Priority Class – III, 57 in Priority Class – IV and 158 are in Priority Class – V. The polluted riverine lengths have been estimated. The total polluted riverine length is 12,363 Km.
- **CPCB's Activities on Ganga Rejuvenation -** Activities executed under NGRBA Project are summarized as follows:





- Compliance verification of grossly polluting industries.
- Performance evaluation of Sewage Treatment Plants.
- Intensive water quality monitoring in polluted stretches
- Periodic pollution assessment of major drains falling into River Ganga.
- Groundwater monitoring in adjacent districts of River Ganga.
- Installation of Real Time Water Quality Monitoring Stations (RTWQMS)

### Continuous Ambient Air Quality Monitoring Station (CAAQMS) by CPCB

The Ambient Air Quality monitors 8 parameter out of 12 as notified in NAAQS 2009 namely SO<sub>2</sub>, NO<sub>2</sub>, NH<sub>3</sub>, O<sub>3</sub>, CO, Benzene, PM<sub>10</sub> & PM<sub>2.5</sub>. The Air Quality index also being generated from 41 Stations as on today i.e. 22.02.2016. The data is live on the website of CPCB.

### National Air Quality Index

Hon'ble Prime Minister launched National Air Quality Index (AQI) on 6th April, 2015 to monitor air quality in major urban cities across the country on a real-time basis and to enhance public awareness for taking needed actions.

There are six AQI categories, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe. The AQI will consider eight pollutants (PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, NH<sub>3</sub>, and Pb).

Under the current measurement of air quality, 8 parameters are kept for calculating AQI. Total 36 Continuous Ambient Air Quality Monitoring Stations all over the country are connected with NAQI. The AQI Display has been increased from the initial 10 cities to 19 cities in India.

AQI Bulletin containing the data for each city is published every day at 4:00 pm for

further easy understanding of the citizens.

### Real-Time Emission and Effluent Monitoring Systems

During the year CPCB made it mandatory to all 17 Categories of Industries and GPIs to install real-time emission and effluent monitoring systems,

### Standards, Guidelines Undertaken by CPCB

The Environmental Standards for Dye and Dye Intermediate Industries got approved and are under notification stage.

Environmental Standards for Paint Industry got approved and are under notification stage:

- Preparation of Comprehensive Industry Document and the Status of Pesticide Industry:
  - Dry visit in 14 units and in-depth study in 07 units was carried out for preparation of Comprehensive Industry Document for Pesticide Industry.
  - The Study for revision of emission standards for carbon disulphide (CS<sub>2</sub>) and hydrogen sulphide (H<sub>2</sub>S) has been completed.
  - The Study for Revision of Environmental Standards for Pharmaceutical Sector is in process
  - The Study for Development of Environmental Standard for Automobile Manufacturing Industries has been completed:
  - Inventorization of Railway sidings and Guidelines for their Environmental Management.
- The study on Inventorization of Railway sidings and development of guidelines for their environmental management has been completed.

The study for revision of environmental standards for Steel rolling mills has completed:

- Revision of Emission Standards for Brick Kilns has been completed:
- Revision of Effluent Standards for Common Effluent Treatment Plants has been completed
- The Study for Development of Environmental Guidelines & Improved Design for Clamp Kilns has been completed
- The Study for development of Environmental Guidelines for Plywood Industries has been completed
- The study for Environmental Guidelines for Poultry Farms has been completed:
- The study for guidelines for control of fugitive emission in Integrated Iron & Steel Plant” has been completed.
- Guidelines on techno-economic feasibility of implementation of zero liquid discharge (ZLD) for ‘5’ Sectors towards ZLD in Ganga basin states prepared
- Study On Development Of Environmentally Sound Management Of End Of Life Vehicles (Elvs) In India has been undertaken
- Study for National Guidelines On Odour Monitoring And Management In Urban Municipal Solid Waste Landfill Site has been under taken

### **Categorization of Industrial Sectors under Red, Orange, Green and White Category**

A ‘Working Group’ comprising of the members from CPCB, APPCB, TNPCB, WBPCB, PPCB, MPPCB and Maharashtra PCB was constituted to revisit the criteria of categorization of industrial sectors. The Working Group has developed the criteria of categorization of industrial sectors based on

the Pollution Index which is a function of the emissions (air pollutants), effluents (water pollutants), hazardous wastes generated and consumption of resources. For this purpose the references are taken from the the Water (Prevention and Control of Pollution ) Cess (Amendment) Act, 2003, Standards so far prescribed for various pollutants under Environment (Protection) Act , 1986 and Doon Valley Notification, 1989 issued by MoEF&CC. Accordingly, following criteria on ‘Range of Pollution Index ‘for the purpose of categorization of industrial sectors is finalized.

- Industrial Sectors having Pollution Index score of 60 and above – Red category
- Industrial Sectors having Pollution Index score of 41 to 59 –Orange category
- Industrial Sectors having Pollution Index score of 21 to 40 –Green category
- Industrial Sectors having Pollution Index score incl.& upto 20 –White category

The newly introduced White category of industries pertains to those industrial sectors which are practically non-polluting. The salient features of the ‘Re-categorization’ Exercise are as follows :

- Due importance has been given to relative pollution potential of the industrial sectors based on scientific criteria . Further, wherever possible, splitting of the industrial sectors is also considered based on the use of raw materials , manufacturing process adopted and in-turn pollutants expected to be generated.
- The Red category of industrial sectors would be 60.
- The Orange category of industrial sectors would be 83.
- The Green category of industrial sectors would be 63.



- Newly introduced White category contains 36 industrial sectors which are practically non-polluting.
- There shall be no necessity of obtaining the Consent to Operate” for White category of industries. Intimation to concerned SPCB / PCC shall suffice.
- No Red category of industries shall normally be permitted in the ecologically fragile area / protected area.

### Comprehensive Environmental Pollution Index

The concept of CEPI (Comprehensive Environmental Pollution Index) was introduced for comprehensive environmental assessment of industrial clusters during 2009-10. CPCB in collaboration with Indian Institute of Technology (IIT), Delhi had carried out comprehensive environmental assessment of 88 prominent industrial clusters during 2009-10 based on this concept. Out of identified 88 prominent industrial clusters, 43 industrial clusters in 16 States having CEPI score of 70 and

above are identified as Critically Polluted Industrial Clusters.

The present methodology on evaluation of CEPI score has been a matter of discussion at various occasions including during the national level conferences as well as regular meetings with SPCBs and other stake-holders. It was realized that Factors B2, B3, C1 and C3 of the existing CEPI concept require reliable health impact studies on human-being , flora and fauna. Further, these health studies require huge funds and time consuming as well as complex due to difficulty in finding truly representative data.

The outlines of the revised CEPI criteria are as follows:

- The revised Comprehensive Environmental Pollution Index (CEPI) is based on Sources of pollution , real time observed values of the pollutants in the ambient air, surface water and ground water in & around the industrial cluster and health related statistics.
- Revised CEPI will comprise of following components:

Table 13: Proposed revised Components for CEPI

Component	Weightage
Scale of industrial activity	20
Scale of exceedance of Environmental Quality ( Level of exposure)	50
Health related statistics	10
Compliance status of industries	20
<b>Total</b>	<b>100</b>

### Progress/Achievements of Various Activities

#### Assessment of Pollution

- Air Quality Index (AQI) for dissemination of Air Quality data was launched in April, 2015. AQI is being disseminated for 23

cities at CPCB website presently and planned to increase to all forty six million plus cities and state capitals in future.

- CPCB has initiated integration of CAAQM stations operated by CPCB, SPCBs and PCCs in to network. This real time data is provided to all stake holders and placed in

public domain for taking corrective measures in time. As on date CPCB network has been extended to cover 39 stations located in 23 cities of 10 states.

- 21 ambient air quality monitoring stations were operationalized during 2015-16 (No. of Operating stations has been increased from 591 stations in 248 cities 28 states and 5 UTs during 2014-15 to 612 stations in 254 cities 29 states and 5 UTs 2015-16).

## National Ambient Air Quality Monitoring Programme (NAMP)

**Progress with previous year-** 21 ambient air quality monitoring stations were operationalized during 2015-16 (No. of Operating stations has been increased from 591 stations in 248 cities 28 states and 5 UTs during 2014-15 to 612 stations in 254 cities 29 states and 5 UTs 2015-16).

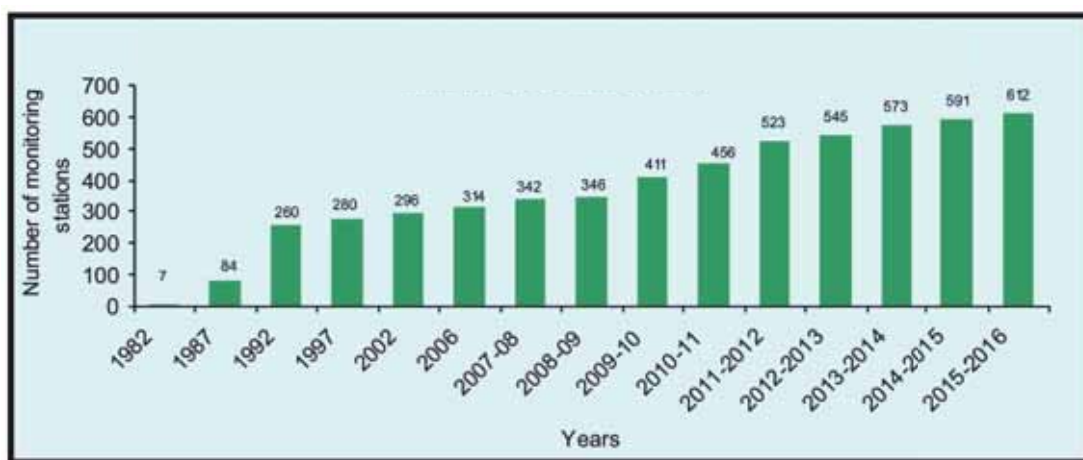


Fig. 33 Growth of operating ambient air quality monitoring stations under NAMP in India (till 31st January 2016)

## National Ambient Noise Monitoring Network (NANMN) Programme

Noise is generated from a variety of indoor and outdoor sources such as industries, transport

vehicles, construction activities, generator sets, fire crackers. Under the Environment (Protection) Act, 1986 Noise Pollution (Regulation and Control) Rules, 2000 notified by MoEF was last amended in January 2010.

Table-14 Category wise details of Existing Noise Monitoring

Area/Category /Zone	No. of Stations	Cities covered
Silence	17	Chennai (2), Hyderabad(2), Kolkata(2), Delhi(4), Mumbai (2), Bangaluru(2)&Lucknow(3)
Residential	16	Bangaluru(3), Chennai (3),Delhi(2), Hyderabad(2), Kolkata(3), Mumbai (1), &Lucknow(2)
Commercial	25	Bangaluru(3), Chennai (4), Hyderabad(4), Kolkata(3), Delhi(4), Mumbai (4) &Lucknow(3)
Industrial	12	Bangaluru(2), Chennai (1), Hyderabad(2), Kolkata(2), Mumbai (3) &Lucknow(2)
<b>Total</b>	<b>70</b>	

Note: Figures in brackets indicate the no. of locations



## Hazardous Substances Management (HSM)

### Brief Introduction and objectives

The Hazardous Substances Management Division (HSMD) is the nodal point within the Ministry for management of chemical emergencies and hazardous substances. The main objective of the programme is to promote safe management and use of hazardous substances including hazardous chemicals and hazardous wastes, in order to avoid damage to health and environment. The Division is also the nodal point for the following International Conventions/Agreements viz. (a) Basel Convention on Control of transboundary movement of Hazardous waste and their

disposal; (b) Rotterdam Convention on Prior Informed Consent Procedure for certain Chemicals and Pesticides in International trade; (c) Stockholm Convention on Persistent Organic Pollutants; (d) Strategic Approach to International Chemicals Management; and (e) Minamata Convention on Mercury.

In addition, the Division also administers the Public Liability Insurance Act, 1991 and rules framed thereunder. The activities of the Division are carried out under three main thrust areas viz., Chemical Safety; Hazardous Wastes Management and Solid Waste Management.

### Chemical safety

The Ministry of Environment, Forest and



Fig. 34 Hazardous Waste Collection for disposal & recycling

Climate Change notified the Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) (CAEPPR) Rules, 1996 for ensuring chemical safety in the Country. These rules delineate the criteria for identification of Major Accident Hazard (MAH) unit. As per the rules, Central Crisis Group, State Crisis Groups, District Crisis Groups and Local Crisis Groups at Central, State, District and Local level are required to be set up for the management of accidents due to handling of hazardous chemicals listed in the rules. An Off-Site emergency plan for a district having MAH unit(s) is required to be in place so as to mitigate the impact of chemical accidents. As per the information received from various States and Union Territories, there are 1,861 MAH units in the Country, located in 303 districts.

A sub-scheme titled "Industrial Pocket wise Hazard Analysis" has been in operation since the Eighth Five Year Plan. The Ministry provides financial assistance for preparation of Off-Site emergency plans, hazard analysis and rapid safety audit reports, to identified agencies for preparation of Off-Site Emergency Plans for 41 districts in the country having MAH units. Reports have been received and these Off-Site emergency plans including hazard analysis and rapid safety reports are under finalisation.

### **Hazardous Waste Management – Activities undertaken**

- **National Inventory of Hazardous Wastes:** As per information provided by the Central Pollution Control Board (CPCB), there are about 41,523 industries in the country

generating about 7.90 million tonnes of hazardous waste annually, out of which landfillable waste is about 3.32 million tonnes (42.02%), incinerable waste is about 0.60 million tonnes (7.60%) and recyclable hazardous waste is about 3.98 million tonnes (50.38%).

The Ministry has also initiated a project on GIS Based National Hazardous Waste Information System. It is a web based system, which has been developed to provide status of hazardous waste management in the Country. The database available on the web is required to be regularly updated by all State Pollution Control Boards to ensure updated status at all times. Through NHWIS till now survey of 33,000 hazardous waste industries and MIS date entry of about 27,500 hazardous waste industries has been completed. The system in its present form will provide MIS module for data updation by industries, Regional Offices and SPCBs, Web based GIS tool for analysis of hazardous waste with respect to generation, disposal and recycling; and GIS based disposal vehicle monitoring system for disposal of hazardous waste.

The system is now proposed to be upgraded with respect to following:

- mapping of the balance 7000 hazardous waste industries will be taken up in the next phase.
- information will be upgraded with respect to E-waste, Biomedical waste, Municipal Solid Waste, Battery waste, Plastic waste and Hazardous waste so as to make it an integrated platform for various kind of wastes.



- data availability at national and state level will be synchronized.
- information with respect to Consent to Establish (CTE), Consent to Operate (CTO), and Authorization will be updated for online processing of such applications.
- **Treatment, Storage and Disposal Facilities (TSDFs) for Hazardous Wastes:** At present, 38 TSDFs include 17 Integrated TSDF, 13 Exclusive Common Secure Landfills and 8 Exclusive Common Incinerators are available in 10, 9 and 4 States/UT respectively. These States /UT contribute about 97.8% of total landfillable and 88.19% of total incinerable hazardous wastes generation in the country respectively. During 2013-14, financial assistance has been provided for setting up of two ongoing/new projects of TSDFs for hazardous wastes across the country.
- **E-Waste Management:** The Ministry has notified E-waste (Management and Handling) Rules, 2011. These rules have come into force from 1st May, 2012. These rules apply to e-waste generated from IT and telecommunication equipment and consumer electrical and electronics namely Television Sets (including LCD & LED), Refrigerators, Washing Machines and Air-conditioners. These rules empower the concerned state agencies to control, supervise and regulate relevant activities connected with e-waste management such as collection, segregation, dismantling and recycling..

The concept of Extended Producer Responsibility (EPR) has been enshrined in

these Rules. Accordingly, producers are required to set up collection systems and meet the cost involved in the environmentally sound management of e-waste generated from the 'end of life' of their own products. Besides, threshold limits, which are accepted globally, have been prescribed for six hazardous substances used in manufacture of electrical and electronics components. Producers are expected to achieve reduction in use of the hazardous substances (RoHS) to the prescribed limit within a period of two years from the date of commencement of these rules.

These rules are the main instrument to ensure environmentally sound management of e-waste. Under these rules EPR authorizations have been granted to 128 Producers which are spread in 11 states. 134 collection centres are set-up in 19 States.

The amendment to the rules have been notified on 10th June 2015 and draft e-waste (Management) Rules, 2015 is under finalization. Salient features of Draft e-waste (Management) Rules, 2015 are as given below:

- Stakeholders to be covered under the rules is being expanded to manufacturer, dealer, refurbisher and Producer Responsibility Organization (PRO) and e-waste exchange to address leakage of e-waste to informal sector at any stage of the chain;
- Applicability of the Rules is now being extended to components, consumables





Fig. 35 A view of evergreen forest, Himachal Pradesh

- and spare parts of EEE which makes the product operational;
- Compact Fluorescent Lamp (CFL) are proposed to be covered under the Rules by inclusion in Schedule I;
  - Exemption to Micro and Small industry sector as defined in MSME Developmental Act, 2006 is being removed;
  - Enabling provision is being made for setting up of Producer Responsibility organization,(PRO) by producers and e-waste exchange by private sector or on PPP mode to ensure efficient channelization of e-waste;
  - Setting up of collection centers shall now be Producers responsibility and stand alone collection centres are not permitted;
  - Bulk Consumer is being redefined in terms of turnover and the number of employees and they need to file annual returns now;
  - Authorization from SPCBs for EPR by Producers is being replaced with Authorization by CPCB.
  - Simplification in registration/ authorization for collection, dismantling and recycling wherein Registration and Authorization is being combined as one document of Authorization for recyclers and dismantlers;





## Solid Waste Management

- **Municipal solid waste management including plastic waste management:** As per information, municipal areas in the country generates 1,33,760 metric tonnes per day of municipal solid waste (MSW), of which only 91,152 TPD waste is collected and 25,884 TPD treated. The Ministry has notified the Municipal Solid Wastes (Management and Handling) Rules, 2000 for management of the municipal solid waste. These Rules, inter-alia, provide for mechanisms to be set up by the Municipal Authority for management of the waste within their jurisdiction. However, the Municipal Authorities are facing difficulties in implementation of these Rules. The matter was discussed with stakeholders and it has been decided to amend the existing rules on the Municipal Solid Waste. The Ministry published the draft (Municipal Solid Waste (Management and Handling) Rules, 2013 inviting comments/ suggestion from the public. The Comments/ suggestions received were analyzed for the finalization of the new rules on the municipal solid waste. The emphasis is on management of the waste through a sustainable business model which includes segregation of municipal solid waste at source, door to door collection by involving waste collectors, processing of segregated waste in to useful products such as methane, compost, etc.

As per information available, municipal areas in the country generate 1,33,760 tonnes per day (TPD) of plastic waste, of which only 9,250 TPD waste is collected

and recycled. The Plastic Waste (Management and Handling) Rules, 2011 have been notified for the management of plastic waste in the country. The Rules, inter-alia provides for waste management systems to be established by the municipal authorities. The municipal authorities have been made responsible for setting up, operationalisation and coordination of the waste management system and for ensuring safe collection, storage, segregation, transportation, processing and disposal of plastic waste. The Ministry regularly provides financial assistance to create awareness on the various provisions of these Rules.

## Bio-Medical waste management

- As per the information received from SPCBs and PCCs of Union Territories, about 4.16 tons of biomedical waste is generated per day. There are 190 Common Bio-Medical Waste Treatment and Disposal Facilities (CBMWTDFs) in operation and 29 CBMWTDFs are under construction. The waste is required to be managed as per the Biomedical Waste (Management and Handling) Rules, 1998, as amended by the Ministry.

The Ministry initiated the process of amending existing Rules in 2011 and notified the draft Bio-Medical Waste (Management & Handling) Rules, 2011 for public comments. The comments/ suggestions received in the Ministry were compiled and analyzed in consultation with various stakeholders such as Union Ministry of Health and Family Welfare,

SPCBs/PCCs of Union Territories, representatives of health care establishments, operators of common biomedical waste treatment and storage facilities and civil societies. The activities related to finalization of these Rules particularly redefining the categories of bio-medical waste, standards for technologies for biomedical waste treatment including incineration were undertaken during the year 2014-15. The discussions with Central Pollution Control Board and other stakeholders were held on these issues. The Rules are being finalized and may be notified in supersession of the existing Rules on Bio-Medical Waste Management.

## Plastic Waste Management

The Ministry had notified the Plastic Waste (Management and Handling) Rules, 2011 to regulate the manufacture and usage of plastic carry bags and to manage plastic waste. The quantum of plastic waste generation in the country is estimated to be 15,342.6 tons per day. Out of which 9205 tons is recycled and remaining 6137 tons remains uncollected and littered. The rules is being amended and is under finalization.

## Fly ash utilization

Electricity generation in the country is and would remain predominantly coal based in the near future. The Indian coal is has high ash content of the order of 30 -45%, generating



**Fig. 36** Hon'ble Minister Shri Prakash Javadekar, MoEF&CC interacting with CBRI ENVIS Centre on Fly Ash utilization at New Delhi



large quantity of fly ash at coal/lignite based thermal power stations in the country. The management of fly ash has thus been a matter of concern in view of requirement of large area of land for its disposal because of its potential of causing pollution of air and water. To address environmental problem of fly ash disposal, the Ministry of Environment, Forest and Climate Change (MoEF&CC) issued Notification on fly ash utilization in 1999 prescribing therein the targets for fly ash utilization for Coal/Lignite power based Thermal Power Stations with an aim to achieve 100% utilization in a phased manner. The targets of 1999 were further revised in 2003 and 2009.

The objectives of the notification are to protect environment, conserve the top soil, and prevent dumping of fly ash from Thermal Power Stations on land and to promote utilization of ash in the manufacture of building materials and construction activity. The implementation of this Notification has resulted in steady increase in the utilization of fly ash. The fly ash utilization in the country has been increased from 13.51 % to 57.63% in the year 2013-14. However, the utilization has not reached to 100%.

To review the status of implementation of the fly ash notification in the country a meeting of Monitoring Committee, constituted in pursuance of the provisions contained Fly ash Utilization Notification was held in June 2014. During the meeting stakeholder such as Ministry of urban Development, State Urban Development Department, Central Public Works Department, National Highways Authority of Indian, etc. were asked to ensure utilization of fly ash / fly ash products in construction projects.

To further improve the utilisation of the fly ash, the Ministry is in the process of amending the provisions of the notification with aim to expand the scope of utilizing the fly ash in various activities / schemes. Draft amendment was published vide S.O 1396 (E) dated 25.05.2015 inviting public comments and suggestions. The suggestions / objections received on the draft amendment have been examined by the Ministry and is under finalisation.

### Externally Aided Project

The Ministry is executing the World Bank aided “Capacity Building for Industrial Pollution Management Project” under the sub-head “Environmental Protection and Monitoring” as Pollution Abatement (Externally Aided Programme) Scheme.

The project which commenced on 13.10.2010 was originally for the duration of five years with closing date as 30th September ,2015. The total cost of the project is USD 63.98 million with 85% as financial assistance from the World Bank and 15% contribution by the MoEF&CC, Government of Andhra Pradesh, Government of Telangana & Government of West Bengal. The project closing date has now been extended upto 15th September, 2017. The objective of the Project is to establish a National Programme for the Rehabilitation of Polluted sites (NPRPS) as policy for remediation of contaminated sites and to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites.

Due to slow progress, Hooghly hazardous waste site in West Bengal has been proposed to

be dropped from the project. Following new activities have been introduced as part of restructuring from the saving that are available due to dropping of other activities

- National Action Plan on Industrial Chemicals
- Engaging technical/academic institutions to build their specialized capacity on remediation which in turn will serve as Center of Excellence on remediation for the future training and capacity building of SPCBs and other Stakeholders.
- Development of Standards for soil and ground water
- National Waste Management Information System – Phase II
- Capacity Building of North Eastern States in terms of infrastructure
- Training and Capacity Building including infrastructure development of Other States with higher number of contaminated sites
- Strengthening of Hazardous Substance Management Division in the Ministry in terms of manpower and infrastructure

### Progress/Achievements

- Web-Based GIS Emergency Planning and Response System has developed with the assistance of NICS, New Delhi through NIC and launched.
- The notification of revised Draft Municipal Waste (Management and Handling) Rules, 2015 have been published for public comments. Comments received have been

considered as admissible and amendment of the rule has been finalized based on outcome of stakeholders consultation.

- The notification of Draft Hazardous Wastes (Management, Handling and Transboundary Movement) Fifth Amendment Rules, 2015 have been published for public comments. Comments received have been considered as admissible and amendment of the rule has been finalized based on outcome of stakeholders consultation.
- Draft E-Waste (Management and Handling) Rules, 2015 has been published and finalised based on comments received and stakeholders consultation.
- Finalization of the draft revision of Biomedical Waste (Management and Handling) Rules, 2015 accomplished. Comments received have been considered as admissible and amendment of the rule has been finalized based on outcome of stakeholders consultation.
- Draft Plastic Waste (Management and Handling) Rules, 2015 was revised and finalized.
- The status of implementation of Fly Ash Notification was reviewed. The Ministry has decided to amend the notification to include more options for the fly ash utilization and bring clarity in respect of mechanisms for monitoring implementation of the notification.
- Financial assistance of Rs 60.00 Lakhs as first installment was released to the Central Pollution Control Board for disposal of 10





tonnes of hazardous waste lying in premises of erstwhile Union Carbide of India Limited at Bhopal, as a trial basis, in compliance to the Order of the Hon'ble Supreme court.

## International Conventions

### Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal:

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22nd March, 1989 by the Conference of Plenipotentiaries in Basel, Switzerland. The Convention entered into force on 5 May 1992. The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. Its scope of application covers a wide range of wastes defined as "hazardous wastes" based on their origin and/or composition and their characteristics (Article 1 and Annexes I, III, VIII and IX), as well as two types of wastes defined as "other wastes" (household waste and incinerator ash; Article 1 and Annex II). India deposited its instrument of ratification on June, 1992. As on date there are 180 Parties to the Convention.

### Rotterdam Convention on the prior informed consent procedure for certain Hazardous Chemicals and Pesticides in International Trade:

The Rotterdam Convention on the prior informed consent procedure for certain Hazardous Chemicals and Pesticides in International Trade entered into force on 24th

February 2004. India acceded to the convention on 24th May 2005 and it became operative on 23rd August 2005. During the interim period, over 170 countries identified 265 departments/institutes as Designated National Authorities (DNAs) to act on their behalf in the performance of the administrative functions required by the Convention. The Designated National Authorities (DNAs) for India are in Ministry of Chemicals and Fertilizers, Ministry of Agriculture and Cooperation. The Official Contact Points (OCPs) are designated in Ministry of Environment, Forests and Climate Change. There are 47 chemicals listed in Annex III to this Convention, which include 33 pesticides and 14 industrial chemicals that have been banned or severely restricted for health or environmental reasons by two or more Parties and which the Conference of the Parties (COPs) has decided to subject to the Prior Informed consent (PIC) procedure.

### Stockholm Convention on Persistent Organic Pollutants:

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from POPs. The Convention sought initially 12 chemicals, for restriction or elimination of the production and release. Now, the Convention covers 23 chemicals. The Convention was adopted in May, 2001 and came into force on 17th May, 2004. India ratified the Convention on 13th January, 2006 which came in to force on 12th April, 2006. As per Article 7 of the Convention, Parties to the Convention were required to develop a National Implementation Plan (NIP) to demonstrate how their

obligations to the Convention would be implemented and NIP has been developed through Global Environment Facility (GEF) funding. Ministry of Environment, Forests and Climate Change serves as the focal point for GEF and Stockholm Convention in the country. Designated national authorities are in Ministry of Agriculture and Cooperation and Ministry of Chemicals and Petrochemicals. India has ratified 12 initially listed chemicals.

### **Minamata Convention on Mercury:**

In February 2009, the Governing Council of UNEP adopted Decision 25/5 on the development of a global legally binding instrument on mercury. At the Conference of Plenipotentiaries held from 9th-11th October 2013 in Minamata and Kumamoto, Japan, the “Minamata Convention on Mercury”, a global treaty to protect human health and the environment from the adverse effects of mercury, was formally adopted and opened for signature by States and regional economic integration organizations. The Convention has till now received nine ratification and 128 signatures. India has signed the Convention on 30th September 2014.

### **Strategic Approach to International Chemicals Management:**

In February 2006, over 190 countries including India acceded to the Strategic Approach to International Chemicals Management (SAICM), an international policy framework to foster sound management of chemicals. Initial activities under SAICM

included development or updating of national chemicals profiles, strengthening of institutions, and mainstreaming sound management of chemicals in national strategies. Towards this end, India initiated the preparation of the National Chemicals Management Profile to assess India’s infrastructure and capacity for management of chemicals. Other actions taken by the Ministry were: (i) initiated studies of inventorisation of lead, cadmium, mercury and arsenic in paints, distemper and pigments in the country, (ii) initiated discussions with leading national laboratories, (iii) notified the E-Waste (Management and Handling) Rules, 2012 for the management of electronic waste, and (iv) finalized the draft Dangerous Goods (Classification, Packaging and Labelling) Rules, 2013 in the line of Globally Harmonized System.

## **Development and Promotion of Clean Technology and Waste Minimization strategies**

### **Introduction and Objectives**

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 and Waste Minimization Strategies.
- Development of Tools and Techniques for Pollution Prevention.
- Formulation of Sustainable Development Strategies.



Fig. 37 Red Avadavat at Okhla bird sanctuary

## Achievements

Under the grant-in-aid Scheme on Development and Promotion of Clean technology and Waste Minimization strategies 20 projects continued during year 2015-2016 and the progress of 7 projects was monitored through Monitoring Committees, followed by two workshop and field visits.

### Details of the Completed Project

#### Modification & Designing of Fly ash composites in Building Materials for energy Conservation & shielding Application

The main objective of the proposal is to develop infrared reflective coatings by utilizing waste material (fly ash) as substrate coated with an IR reflective material and development

of fly-ash composites for EMI shielding applications.

Important findings of this project are as follows:

- Electromagnetic foam incorporated with fly ash, ferrofluid and activated charcoal
- Flyash as filler in multiphase composite with MWCNT and ferrofluid for shielding electromagnetic radiation in X-band and Ku-band
- Control of oil spill in Marine Environment using modified composites
- Utilization of flyash as an IR reflective material in paints and development of NIR reflective coatings
- Solar Reflective Index of Powder samples.



## CHAPTER-5

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# CONSERVATION OF WATER BODIES







## Conservation of Water Bodies

The National River Conservation Directorate, functioning under the Ministry of Environment, Forest & Climate Change is providing financial assistance to the State Governments for conservation of rivers, lakes and wetlands under the Centrally Sponsored Schemes of 'National River Conservation Plan (NRCP)' and 'National Plan for Conservation of Aquatic Eco-systems (NPCA)'.

### National River Conservation Plan

#### Introduction

The river conservation programme was initiated with the launching of the Ganga Action Plan (GAP) in 1985. The Ganga Action Plan was expanded to cover other rivers under National River Conservation Plan (NRCP) in the year 1995. The objective of NRCP is to improve the water quality of rivers, which are major water sources in the country, through implementation of pollution abatement works in various towns along identified polluted stretches of rivers on cost sharing basis between the Central & State Governments.

The pollution abatement works taken up under the NRCP include:

- Interception and diversion works/ laying of sewerage system to capture raw sewage flowing into the rivers through open drains and diverting them for treatment.
- Setting up of Sewage Treatment Plants (STPs) for treating the diverted sewage.
- Construction of Low Cost Sanitation Toilets to prevent open defecation on river banks.
- Construction of Electric Crematoria and Improved Wood Crematoria to conserve the use of wood.
- River Front Development works, such as improvement of bathing ghats.
- Public participation & awareness and capacity building, etc.

Presently NRCP (excluding Ganga and its tributaries) has covered polluted stretches of 31 rivers in 75 towns spread over 14 States at a sanctioned cost of Rs.4517.82 crore (Annexure-I). An amount of Rs.1941.86 crore has been released to various State Governments for implementation of various pollution abatement schemes and a treatment capacity of 2373 million litres per day (mld) has been created so far under NRCP (excluding Ganga and its tributaries). The 31 rivers covered under the programme are given in Table-15.

**Table-15** List of Rivers covered under the NRCP programme

S. No	River	S. No	River	S. No	River	S. No.	River
1	Adyar	10	Krishna	19	Panchganga	28	Tamrabarani
2	Beas	11	Mahanadi	20	Rani Chu	29	Vaigai
3	Bhadra	12	Mandovi	21	Sabarmati	30	Vennar
4	Brahmani	13	Mindhola	22	Satluj	31	Wainganga
5	Cauvery	14	Mula Mutha	23	Subarnarekha		
6	Cooum	15	Musi	24	Tapti		
7	Diphu & Dhansiri	16	Narmada	25	Tapi		
8	Ghaggar	17	Pennar	26	Tunga		
9	Godavari	18	Pamba	27	Tungabadra		

As per amendment to the Government of India (Allocation of Business) Rules, 1961 notified vide Gazette Notification SO No. 1986(E) dated 31st July, 2014, the work relating to Ganga and its tributaries had been allotted to Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD&GR). Accordingly the rivers namely Ganga, Yamuna, Gomti, Damodar, Mahananda, Chambal, Bebar, Khan, Kshipra, Betwa, Ramganga and Mandakini have been shifted to MoWR, RD & GR along with the National Mission for Clean Ganga(NMCG).

### National River Conservation Plan (Non-Externally Aided Projects)

- **Pollution Abatement of River Satluj & Beas** : 12 projects amounting to Rs.502 crore in 11 towns of Punjab for pollution abatement of rivers Satluj and Beas are under implementation from 2010 onwards with envisaged STP capacity of 187 mld . At present physical progress under these projects is around 80% & STP capacity of 173 mld has already been created.
- **Pollution Abatement of River Ghaggar** : 4 projects for the towns of Lehragaga, Khanauri, Moonak and Patran in Punjab costing of Rs.57.10 crore stand sanctioned in June, 2013 under NRCP. Under the sanctioned projects, STPs having total treatment capacity of 15 mld will be created. The projects are under implementation & at present the physical progress is around 35%.
- **Sabarmati River Conservation Project Phase-II at Ahmedabad**: Sabarmati River Conservation Project Phase-II at Ahmedabad, Gujarat has been sanctioned in October, 2014 at a cost of Rs.444.44 crore. Laying of new sewers, strengthening/rehabilitation of the existing

sewerage system, construction of sewage pumping stations and 4 nos. STPs having a total treatment capacity of 210.5 mld is envisaged under the project. The project is under implementation & planned to be completed within a span of 4 years from the date of sanction.

- **Pollution Abatement of River Mindhola at Surat, Gujarat** : The project proposal for ‘Conservation of river Mindhola at Surat’ costing Rs.262.13 crore was sanctioned in August, 2012 under which works relating to sewerage networks, sewage pumping stations along with creation of sewage treatment capacity of 53 mld are envisaged. Project is under implementation and physical progress of about 60% has been achieved so far.

### National River Conservation Plan (Externally Aided Projects)

- **Pollution Abatement of River Mula-Mutha at Pune**: The Mula Mutha river at Pune is one of the 302 polluted river stretches of the country identified by Central Pollution Control Board. The major reasons for pollution of Mula Mutha are discharge of untreated domestic waste water into the river due to inadequate sewerage system (including pumping stations) & sewage treatment capacity in the town as well as open defecation on the river banks.

The project of “Pollution abatement of River Mula- Mutha at Pune under NRCP”, has been sanctioned in January, 2016 at a cost of Rs.990.26 crore. Loan assistance of 19.064 billion yen is being provided by Japan International Cooperation Agency (JICA) for the project. The project cost will be shared between Govt. of India and State Government/Pune Municipal Corporation (PMC), the implementing agency for the



project, in 85:15 ratio respectively.

The major components proposed under the project include construction of 11 new Sewage Treatment Plants (STPs) which will result in creation of additional treatment capacity of 396 mld (over & above the existing treatment capacity of 477 mld), laying of 113.6 kms. of sewer lines and renovation/rehabilitation of 4 existing intermediate pumping stations. On completion of the project, the total STP capacity available in Pune would be 873 mld, which would be sufficient to cater to sewage generation for the year 2027. The new STPs would be designed for effluent quality of BOD<10 mg/l, TSS<10 mg/l along with removal of fecal coliform and nutrients (nitrogen & phosphorus). The project also includes installation of Central Supervisory Control and Data Acquisition (SCADA) system for centralized monitoring of functioning of STPs, construction of 24 units of community toilet facilities in slum and fringe areas, public participation and awareness programme, GIS mapping of sewerage facilities for better asset management, etc.

The project will have significant direct beneficial impact in terms of reduction of pollution load in the river and improvement in its water quality, besides collateral benefits like use of tertiary treated effluent for irrigation. The project will also improve the aesthetics & sanitation in the town. Biogas (methane) from STPs will be used to generate electricity. To that extent, this will not only be a non-conventional energy source but will also provide benefits in terms of reducing green house gas emissions (methane is a green house gas)

## National River Conservation Plan (North Eastern States)

- Under NRCP, 7 projects were sanctioned for conservation and pollution abatement of river Rani Chu in Sikkim at a cost of Rs. 181.09 crore in 3 towns of Gangtok, Ranipool and Singtam. The works sanctioned under the projects pertain to interception & diversion of sewage, sewage treatment plants, rehabilitation of sewer mains, low-cost sanitation, river front development and improved wood crematoria. Sewage treatment capacity of 20.06 mld is envisaged to be created in these towns. Works on 4 projects have been completed and 8 mld STP capacity has been created so far.
- For pollution abatement of rivers Diphu and Dhansiri at Dimapur, Nagaland, works have been sanctioned under NRCP at an estimated cost of Rs.82.80 crore. The works envisaged under the project pertain to construction of sewage treatment plants (25.43 mld), allied sewerage works, low-cost sanitation, afforestation, etc.

## Measures for improved implementation

Several measures have been taken to improve implementation of projects under NRCP, which include; (i) Signing of Tripartite Memorandum of Agreements (MoAs) with the State Governments/Urban Local Bodies, (ii) Independent Appraisal of Detailed Project Reports by reputed professional/ academic institutions, (iii) Third Party Inspection for projects.

## National Plan for Conservation of Aquatic Eco-Systems (NPCA)

For conservation of lakes and wetlands,

Ministry of Environment, Forest and Climate Change was earlier implementing two separate Centrally Sponsored Schemes, namely the 'National Wetlands Conservation Programme' (NWCP) and the 'National Lake Conservation Plan' (NLCP).

To avoid overlap and promote better synergies, NLCP has been merged with the scheme of NWCP, into one integrated scheme of National Plan for Conservation of Aquatic Eco-systems (NPCA). The scheme aims at holistic conservation and restoration of lakes and wetlands for achieving the desired water quality enhancement, besides improvement in biodiversity and ecosystem through an integrated and multidisciplinary approach and a common regulatory framework. The scheme would contribute to reduction of pollution loads in lakes and wise use of wetland resources and their services. NPCA is presently operational on cost sharing between Central Government and respective State Governments.

### Conservation of Lakes

So far under NLCP/NPCA, a total of 46 projects for conservation of 63 lakes have been

sanctioned in 14 States at a total cost of Rs.1096.09 crore (Annexure-II) for undertaking works like providing sewerage system and sewage treatment plants, interception and diversion of sewage, desilting, catchment area treatment, storm water management etc. Conservation works for 33 lakes have been completed.

Major projects presently under implementation include Dal lake in Jammu & Kashmir, Shivpuri & Sindh Sagar Lakes in Madhya Pradesh, twin lakes at Mokokchung in Nagaland (NE region), Annasagar, Pushkar and Pichola lakes in Rajasthan, Ramgarh Tal & Laxmital in Uttar Pradesh. During 2015-16 (till 31/1/2016), an amount of Rs. 34.02 crore has been released for conservation of lakes under NPCA.

### Conservation of Wetlands

Wetlands are lifelines for a very large number of people and an important source of fresh water to mankind. They provide a host of ecosystem services to humanity, in addition to being host to rich biodiversity. However, due to anthropogenic activities, wetlands are getting degraded. Major pressures on wetlands



Fig. 38 Loktak lake is the largest freshwater lake in North-East India





include fragmentation of hydrological regimes, siltation from degraded catchments, pollution, spread of invasive, species and over-harvesting of resources.

To control degradation and conserve wetlands, the National Wetland Conservation Programme (NWCP) was initiated in 1987 and financial assistance is being provided to the State Governments for implementing action plans for conservation and management of identified wetlands. So far, Rs. 146.09 crore has been provided to 22 States for conservation and management of the 82 identified wetlands, out of the total of 115 identified wetlands (Annexure-III). During the year 2015-16, Management Action Plans of 25 wetlands were approved and financial assistance of Rs.7.54 crore was provided to the concerned State Governments (till 31.01.2016).

### Ramsar Convention

As a commitment for conserving potential wetlands, India became signatory to the Ramsar Convention in 1982. As per this convention, India is committed for International Cooperation and to take national action for conservation and wise use of wetlands. At present there are 26 Ramsar sites in India (**Annexure-V**).

India participated in 12th Meeting of CoP Ramsar Convention held in Uruguay from June, 2015. National Report on the implementation of the Ramsar Convention on wetlands for 12th meeting of CoP of Ramsar was finalized and sent to Ramsar Secretariat.

### The Wetlands (Conservation and Management) Rules 2010

To implement the objectives of the convention, a regulatory mechanism was put in

place through Wetlands (Conservation and Management) Rules in December, 2010 vide GSR-951(E).

The Ministry has initiated the process of revising the existing wetland rules for more effective conservation & management of wetlands in the country and to enable a greater role and ownership by State Governments in management of wetlands, particularly as water and land are State subjects. The State Wetland Authorities are envisaged to be entrusted the role of management and regulation of wetlands within their jurisdiction.

### World Wetland Day

Each year, World Wetland Day is celebrated on 2nd February for increasing awareness and spreading need for conservation and wise-use of wetlands all over the world. This day was celebrated at national level at Nalsarovar wetland, Gujarat during 2015 by the Ministry in collaboration with the Government of Gujarat. The stakeholders of the wetland were invited to participate in the celebration. Prize distribution was held for various competitions held on the eve of WWD on various environmental themes. In 2016, the World Wetland Day with the theme '**Wetlands for our future: Sustainable Livelihoods**' was celebrated at Sunderban Wetlands in collaboration with the Government of West Bengal.

### Progress

Sewage Treatment Capacity of 117 mld was targeted to be created under NRCP during the year 2015-16 against which, 77 mld has been created so far during the year.

Against the target of completion of 2 lakes, rejuvenation/ conservation works has been completed in 3 lakes during 2015-16.

## CHAPTER-6

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# 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 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, and 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;
- 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 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 Programme, Scheme, Project

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. Support to Regional Centres (RCs)
  - ii. Monitoring and Evaluation (M&E)
  - iii. Communication
- (c) Eco Development Forces (EDF) Scheme

### (a) National Afforestation Programme (NAP) Scheme

#### Introduction and Objectives

National Afforestation Programme (NAP) is a major Afforestation scheme of the NAEB in the Government of India. Launched in 2000-02, the scheme has acquired a Pan India ambit over the last nine years of its implementation and was being implemented by 28 states of the country through a twin institutional set up of Forest Development Agencies (FDAs) at the forest division level and Joint Forest Management Committees (JFMCs) at the village level. 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. The programme is now implemented through a three tier system of



State Forests Development Agency (SFDA) at the state level, Forest Development Agency (FDAs) at the district/forest division level and Joint Forest Management Committees (JFMCs) at the village level. 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

- 28 SFDA Projects have been operationalised in the country at an expenditure of Rs. 3612.43 crore to treat an area of 21.35 lakh hectares since inception of the NAP scheme.
- During the year 2015-16 till 31.12.2015, Rs.67.31 lakhs has been released under the NAP scheme. An advance area of 35186 ha has been sanctioned for afforestation.
- **Up scaling the afforestation efforts:** So far NAP has been contributing around 15 to 17% annually to afforestation efforts in the country and it is proposed to upscale the afforestation to the tune of 2.5 lakh ha. during the year 2016-17 subject to the availability of budget.

- **Augmentation of people's participation:** Around 42,000 villages/JFMCs have been associated with NAP at present. Efforts are initiated for atleast 25% increase in the number of additional villages/JFMCs to be covered under the scheme.
- **Proposed change in the release of funds:** So far the funds under NAP have been released in two installments of 50% each. Keeping in view of the nature of afforestation activities, an initiative has been taken up to increase the first installment to 80% having been pursued with Ministry of Finance
- **Inventory of plantations of NAP using IT systems and web based monitoring:** An initiatives in co-ordination with FSI for web based monitoring of plantations have been taken up and the programme states have been asked to submit geo-coordinates in the form of polygon data of all the plantation taken up during last 3 years so as to enable FSI to carry out dynamic monitoring of status of them.
- **Water and Fodder availability:** An advisory to the States for emphatic utilization of the flexi-fund under NAP for augmentation of *water and fodder availability*.

### National Afforestation and Eco-Development Board (NAEB) Scheme

The major component of the scheme are:-

- i. Support to Regional Centres (RCs)
- ii. Monitoring and Evaluation (M&E)
- iii. Communication

The budget cut exercised by the Ministry during December, 2014 at Revised Estimates (RE) stage resulted in non-availability of budget under concerned head-support to Regional Centres of NAEB. No funds have been allocated in Budget Estimates (BE) during the Current Financial Year 2015-16 also





## Monitoring and Evaluation (M&E)

It is proposed to undertake evaluations of the ongoing projects and scheme of NAEB in order to assess achievement against the set objectives, as well as evaluating strengths and weaknesses of various technologies used so that appropriate amendment in the current schemes of NAEB could be made for greater efficiency

## Communication, Publication & Awareness

New technology and methodologies of participatory management, eco-development and regeneration of degraded forests are being progressively developed. In order to share such experiences and technologies widely, NAEB documents such information, brings out publications, and also documents success stories.

During 2015-16 an amount of Rs.4.00 lakhs (RE) has been provided as the outlay for various items under Communication. It is proposed to significantly scale-up this activity during 2016-2017 through preparation and implementation of a structured Media Plan for tree planting on non-forest lands by private individuals and institutions.

## Eco-Development Forces (EDF) Scheme

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, 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.

Six ETF battalions are being supported under the EDF Scheme in the States of Uttarakhand, Rajasthan, Jammu & Kashmir and Assam. Budget Estimate for the scheme during 2014-15 is Rs. 13.50 crores and the same has been reimbursed to the Ministry of Defence.

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.

## Implementing Organizations along with details

The scheme is being implemented through the Ministry of Defence, Directorate General of Territorial Army, New Delhi.

## National Mission for a Green India

The objectives under the five sub-missions of Green India Mission (GIM) are (a) enhancing quality of forest cover and improving ecosystem services, (b) ecosystem restoration and increase in forest cover, (c) enhancing tree cover in urban and peri-urban areas, (d) agro-forestry and social-forestry, and (e) restoration of wetlands. The objectives also include one cross-cutting intervention, i.e., improvement of livelihood of forest dependent community.

# CHAPTER-7

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## RESEARCH







## Research in Environment

### Introduction

The Ministry of Environment, Forest & Climate Change is classified as a 'Scientific Ministry' under the Government of India. Since its inception in 1985, the Ministry has been funding research through grant-in-aid projects to many research institutions in different areas under the broad ambit of environment protection and management. The Ministry has taken a number of new initiatives to strengthen scientific research in the area of environmental sciences. The overall objective of the R&D Scheme of the Ministry is "to promote basic and applied research in various facets of ecology and environment".

### Environmental Research Programme (EnvRP)

Environment Research Programme (EnvRP) 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 carry out 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.

Projects are supported in the identified thrust area of environment research.

Under the Environment Research Programme (EnvRP), during the financial year 03 meetings of the Programme Advisory Committee (PAC) were held to consider the new/revised proposals and also the proposal for which comments of peer reviewers received to review/ monitor the progress of ongoing/completed projects. Total 136 proposals were considered by the Programme Advisory Committee (PAC). Progress of 04 ongoing projects were reviewed and monitored. 09 projects have been sanctioned during the period.

### Ecosystems Research Programme (EcRP)

Ecosystem Research Programme is an interdisciplinary programme of research which emphasizes ecological approach for studying the relationship between man and environment. The Ecosystem Research Programme (EcRP) deals with "green issues" relating to ecology, conservation of natural resources, Eastern and Western Ghats, aquatic and terrestrial ecosystems, mountain ecosystems, tropical rainforests, wetlands, mangroves and coral reefs, biosphere reserves, biodiversity and the study of inter-relationships between humans and environment and seeks to generate scientific knowledge needed to manage natural resources wisely.

During the current financial year upto 31st December, 2015, 04 meetings of the Ecosystem Research Programme (EcRP) committee were



**Fig. 39** Himalayan Tahr, listed as near threatened by IUCN

held where progress of 29 ongoing projects was reviewed and mid-term corrections were suggested on case to case basis. During the year 2015-2016, the Committee also appraised 120 new/revised/peer reviewers proposals received under Ecosystem Research Programme (EcRP), out of this, 06 new projects were sanctioned and 12 projects were completed.

### **Research Programme in Socio-Economic issues of Environment (RPSE)**

This programme supports research on environmental and ecological economics, socio-economic issues arising out of extant as well as new contemplated legislation(s), tribal, rural, urban issues vis-à-vis legislation, role of

gram panchayats and civil society in the implementation of environmental legislation etc.

During the year, 2 meetings of the Programme Advisory Committee (PAC) were held and a total of 36 proposals were appraised. Progress of 02 ongoing projects were reviewed and monitored. One project has been approved during the period (Annexure -IV).

### **Progress/Achievements**

- Trees are the major components of forests and most of these are facing reproductive stress due to continuous habitat modification. Consequently, many native species of trees are threatened and are





declining in their population size in nature. In a major initiative, MoEFCC initiated an All India Coordinated Research Project on Reproductive Biology of RET Tree Species. The main approach was to integrate ecology and reproductive biology in order to identify the reproductive constraints which affect regeneration and survival of threatened tree species in India.

The network project identified 32 tree species that are naturally distributed across Himalaya, Western and Eastern Ghats and Aravalli. The species investigated were - *Acer caesium*; *Aesculus indica*; *Anogeissus sericea* var. *sericea*; *A. sericea* var. *nummularia*; *Aquillaria malaccensis*; *Betula utilis*; *Buxus wallichiana*; *Calophyllum apetalum*; *Cenarium strictum*; *Cinnamomum sulphuratum*; *Dipterocarpus indicus*; *Engelhardia spicata*; *Eriolaena lushingtonii*; *Eugenia densifera*; *Garcinia imberti*; *Gymnocladus assamicus*; *Hildegardia populifolia*; *Ilex khasiana*; *Illicium griffthii*; *Pittosporum eriocarpum*; *Pterospermum reticulatum*; *Quercus baloot*; *Salix babylonica*; *Salvadora oleoides*; *Shorea roxburghii*; *Syzygium alternifolium*; *Tecomella undulata*; *Ulmus villosa*; *Ulmus wallichiana*; *Vateria macrocarpa*; *Wrightia tomentosa* and *Zanthoxylum armatum*. The study has demonstrated that a majority of the trees investigated are self-incompatible, obligate outbreeders and rely on animal pollinators for pollination success. The dioecious taxa are wind-pollinated and thus always suffer

from the vagaries of climatic variation that directly influence the pollination success. Even those trees that exhibit self-compatibility have the tendency to set greater amount of fruits through pollinator-mediated outcrossing than selfing. Some of the species even require a vector for successful selfing. Thus, inbreeding depression is a major issue to set healthy seeds in these trees. However, smaller population sizes of trees are unable to attract sufficient pollinators. Among the key reproductive constraints identified include pollination and pollinator limitation, inbreeding depression, embryonal or seed sterility, high predation of flowers/fruits and seed recalcitrance. As outcrossing is an essential requirement fruit/seed set, maintenance of heterogeneity among the conspecifics appears to be a crucial issue for conservation. Low density of trees within a population and paucity of safe establishment sites are the key ecological impediments in reproductive success and continuity of natural recruitment.

The study has provided crucial leads on various aspects of reproductive biology and the essential requirements of habitat, so that the threatened trees may be suitably recovered. In future endeavours on ensuring sustenance of populations and reintroduction of the species, assessment of genetic diversity of the threatened trees would also be important. Thus, it is envisaged that micropropagation and molecular studies should be integrated with

reproductive biological studies for the effective protection and management of these tree species and for the plantation activities in other ecologically suitable areas.

### Declaring Ecologically Sensitive Zones (ESZs) around Protected Areas in the country

The National Environment Policy, 2006 defines Eco-Sensitive Zones as areas/zones, 'with identified environmental resources having incomparable values which require special attention for their conservation'. The purpose of declaring Eco-sensitive Zone (ESZ) is to create some kind of "Shock Absorber" for specialized Ecosystems such as Protected Areas which include National Parks and Wildlife Sanctuaries. The ESZs act as transition zones for areas requiring high protection to

areas where development may be permitted.

The Ministry of Environment, Forests and Climate Change notifies Eco-sensitive Zones under Section 3 of the Environment (Protection) Act, 1986, wherein, inter alia certain identified projects/activities are regulated/ prohibited as the case may be. Rule 5(1) of the Environment (Protection) Rules, 1986, stipulates, inter alia factors which may be taken into consideration while prohibiting or restricting the location of industries and the carrying on of processes and operations within such ESZs.

The Ministry of Environment, Forest and Climate Change has notified 152 draft and 29 final ESZ Notifications. The status of the notifications issued by the Ministry as on 29.02.2016 is given below:

**Table : 16** Draft ESZ Notifications issued (as on 29.02.2016)

Sl.N.	States/UTs	Final notification Issued	Date of notification
1.	Andhra Pradesh	Eturnagaram WLS,	27.07.2015
2.		Parnahita WLS	17.11.2014
3.		Pakhal WLS	01.06.2015
4.		Mrugavani WLS	31.08.2015
5.		Great Indian Bustard Rollapadau WLS	20.11.2015
6.		Lankamalleshwra WLS	07.12.2015
7.		Manjeera Crocodile WLS,	09.11.2015
8.		Kesu Brahmananda Reddy NP	18.12.2015
9.		Rajiv Gandhi NP, Andhra Pradesh	10.02.2016
10.		Kambalakonda WLS, Andhra Pradesh	15.01.2016
11.		Nelapattu WLS, Andhra Pradesh	15.01.2016
12.	Telangana	Pocharam WLS	23.11.2015
13.		Mahavir Harina Vanasthali NP,	23.11.2015
14.	Arunachal Pradesh	Tale Valley WLS	17.09.2015



Sl.N.	States/UTs	Final notification Issued	Date of notification
15.		Mehao WLS	30.12.2015
16.		Kane WLS	17.09.2015
17.		Kamlang WLS	26.11.2015
18.		Namdapha Tiger Reserve NP, WLS	08.12.2015
19.		Daying Ering WLS	16.11.2015
20.	<b>Assam</b>	Bherjan Borajan WLS	04.12.2015
21.		Nameri NP	09.12.2015
22.		LaoKhaowa and Burchachapori WLS	20.11.2015
23.		Rajiv Gandhi Orang WLS	22.09.2015
24.	<b>Bihar</b>	Pant (Rajgir) WLS,	17.09.2015
25.		Baraila Lake Salim Ali Jubba Sahni WLS	31.08.2015
26.		Vikramshila Gangetic Dolphin WLS	20.11.2015
27.		Udaipur WLS	30.12.2015
28.	<b>Chandigarh</b>	Sukhna WLS, Chandigarh	02.09.2015
29.		City Bird WLS	27.07.2015
30.	<b>Chhattisgarh</b>	Barnawapara WLS, Chattisgarh	14.01.2016
31.		Tamor Pingla WLS, Chattisgarh	18.01.2016
32.		Pamed WLS, Chattisgarh	25.02.2016
33.	<b>Gujarat</b>	Hingolghadh Nature Reserve WLS	18.12.2015
34.		Barda WLS	02.11.2015
35.		Porbandar WLS	20.11.2015
36.		Gaga Great indian Bustard WLS	09.12.2015
37.		Nalsarovar WLS	07.12.2015
38.		Shoolpaneshwar WLS	30.07.2015
39.		Velavadar Black Buck NP, Gujarat	18.01.2016
40.	<b>Himachal Pradesh</b>	Daranghati WLS	17.09.2015
41.		Chail WLS	20.11.2015
42.		Bandli WLS	17.07.2015
43.		Majathal WLS	09.12.2015
44.		Simbalbalbara NP and WLS	09.12.2015
45.		Pong Dam WLS	16.11.2015
46.		Lippa-Asarang WLS	26.11.2015
47.		Shimal Water Catchment WLS	09.12.2015

Sl.N.	States/UTs	Final notification Issued	Date of notification
48.		Dhauladhar WLS	22.12.2015
49.	<b>Haryana</b>	Bir Shikargarh WLS	26.05.2015
50.		Khol Hi Raitan WLS	25.05.2015
51.		Kalesar and Kalesar WLS	17.09.2015
52.		Bhindawas WLS	09.06.2015
53.		Nahar WLS	01.06.2015
54.		Khaparwas WLS	17.07.2015
55.		Chilchila	30.12.2015
56.		<b>Jharkhand</b>	Hazaribagh WLS
57.	Palamau Tiger Reserve WLS, Jharkahnd		30.11.2015
58.	<b>Karnataka</b>	Attiveri WLS	09.12.2015
59.		Mookambika WLS	19.10.2015
60.		Sharavathi Valley WLS	29.12.2015
61.		Daroji Bear WLS	22.09.2015
62.		Arabithittu WLS	07.12.2015
63.		Brahmagiri WLS	23.11.2015
64.		Ghataprabha WLS	07.12.2015
65.		Gudavi WLS, Karnataka	07.01.2016
66.		Rangayyandurga 4 Horned Antelope Sanctuary	13.01.2016
67.		Ranebennur Blackbuck WLS, Karnataka	13.01.2016
68.		Gudekote Sloth Bear Sanctuary, Karnataka	13.01.2016
69.		Kudremukh NP Karnataka	15.01.2016
70.		Bhimgad WLS, Karnataka	18.01.2016
71.		Someshwara WLS, Karnataka	25.02.2016
72.		Talacauvery WLS, Karnataka	25.02.2016
73.		Pushpagiri WLS, Karnataka	25.02.2016
74.	<b>Kerala</b>	Choolannur Pea Fowl Sanctuary	07.12.2015
75.		Eravikulam national Park	12.11.2015
76.		Shendurney WLS, Kerala	18.01.2016
77.		Malabar WLS, Kerala	18.01.2016
78.		Thattekkad WLS, Kerala	25.02.2016
79.		Silent valley NP, Kerala	25.02.2016





Sl.N.	States/UTs	Final notification Issued	Date of notification
80.	<b>Madhya Pradesh</b>	Son Gharial WLS	30.06.2015
81.		Ghatigoan Hurna WLS	05.10.2015
82.		Gandhi Sagar WLS	15.09.2015
83.	<b>Maharashtra</b>	kalsubai Harishchandragad WLS	06.11.2015
84.		Gangewadi New Great Indian Bustard WLS	02.11.2015
85.		Umred karandla WLS	17.09.2015
86.		Phasand WLS	30.11.2015
87.		Bhamragad WLS	23.11.2015
88.		Melghat Tiger Reserve	30.06.2015
89.		Karnala WLS	17.06.2015
90.		Yedshi Ramling Ghat	23.11.2015
91.		Nagzira , New Nagzira , Koka , Navegaon and Navegaon WLS	11.04.2015
92.		Gautala Autramghat WLS	12.06.2015
93.		Dyanganga WLS	20.11.2015
94.		Painganga WLS	01.06.2015
95.		Anerdam WLS	23.11.2015
96.		Lonar WLS	20.11.2015
97.		Sagareshwar WLS	20.11.2015
98.		Tadoba NP and Andhari WLS	10.04.2015
99.		Jaikawadi WLS, Maharashtra	06.01.2016
100.		Tipeshwar WLS, Maharashtra	18.01.2016
101.	Sanjay Gandhi National Park, Maharashtra	25.01.2016	
102.	<b>Manipur</b>	Keibul Lamjao NP	09.12.2015
103.		Bunning WLS	30.11.2015
104.		Kailam WLS	31.08.2015
105.		Zeilad WLS	22.09.2015
106.		Yangoupokpi Lakch WLS	02.09.2015
107.	<b>Meghalaya</b>	Nokrek NP	20.11.2015
108.		Nongkhyllem WLS	18.12.2015
109.		Narpuh, East Jantia Hills, Jowa	20.11.2015
110.	<b>Odisha</b>	Chandaka Dampara WLS	01.05.2015

Sl.N.	States/UTs	Final notification Issued	Date of notification
111.		Sunabeda WLS	27.11.2015
112.		Balukhanda-Konark WLS	20.11.2015
113.		Debrigarh WLS	10.12.2015
114.		Kotagarh WLS	26.11.2015
115.	<b>Punjab</b>	Bir Motibagh WLS	02.06.2015
116.		Bir Bhadason WLS	20.05.2015
117.		Bir Gurdialpur WLS	22.06.2015
118.		Bir Bhunerheri WLS	30.06.2015
119.		kathlaur Kushalia WLS	30.06.2015
120.		Bir Aishwan WLS	16.06.2015
121.		Abohar WLS	22.05.2015
122.		Bir Dosanjh WLS	12.05.2015
123.		Tekhni Rehmpur WLS	30.07.2015
124.		Nangal WLS	16.11.2015
125.		Jhajjar bachauali WLS	13.11.2015
126.		Bir mehas WLS	31.08.2015
127.		Harika Lake WLS	16.11.2015
128.	<b>Rajasthan</b>	Nahargarh WLS	23.09.2015
129.		Shergarh WLS	19.10.2015
130.		Bassi WLS	12.10.2015
131.		Sitamata WLS	19.10.2015
132.		Sajjangarh WLS	13.10.2015
133.		Bondh Baretha WLS	31.08.2015
134.		Phulwari ki Nal WLS	31.08.2015
135.		Todgarh Raoli WLS	17.09.2015
136.		Ramsagar WLS	19.10.2015
137.		Van Vihar WLS	22.09.2015
138.		Keoladeo WLS	13.10.2015
139.		Bensrodgarh WLS	20.11.2015
140.		Jaismund WLS	05.10.2015
141.		Mount Abu WLS	13.11.2015
142.		Kesarbagh WLS, Rajasthan	19.01.2016



Sl.N.	States/UTs	Final notification Issued	Date of notification
143.	Tripura	Gumuti WLS	27.11.2015
144.		Rowa WLS	26.11.2015
145.	Uttar Pradesh	Kaimur WLS	22.09.2015
146.		Bakhira WLS	22.12.2015
147.		Lakh Bahosi Bird Sanctuary	22.12.2015
148.		Samaspur WLS, Uttar Pradesh	25.02.2016
149.		Nawabganj Bird Sanctuary, Uttar Pradesh	27.01.2016
150.		Sandi Bird Sanctuary, Uttar Pradesh	20.01.2016
151.	Uttarakhand	Valley of flowers NP	27.11.2015
152.		Nandhar, Uttarakhand	18.01.2016

Table : 17 Final ESZ Notifications issued (as on 29.02.2016)

Sl.N.	States/UTs	Final notification Issued	Date of notification
1.	Andhra Pradesh	Pulicat lake Bird sanctuary	26.06.2015
2.	Bihar	kaimur WLS	30.12.2015
3.	Dadra and Nagar Haveli WLS	Dadra and Nagar Haveli WLS	04.09.2015
4.	Goa	Cotigoan WLS	24.02.2015
5.		Netravali WLS	17.02.2015
6.		Bhagwan Mahavir NP	23.01.2015
7.		Madei WLS	25.02.2015
8.		Bondla WLS	25.02.2015
9.		Dr. Salim Ali WLS	24.02.2015
10.	Gujarat	Marine National Park and Marine WLS	06.09.2013
11.		Girnar WLS	26.05.2013
12.		Narayan Sarovar ESZ WLS	26.05.2013
13.		Purna WLS	26.05.2013
14.		Vansda NP	26.05.2013
15.		Thol WLS	09.02.2015
16.	Haryana	Sultanpur NP	27.01.2010
17.	Jharkhand	Dalma WLS	29.03.2012
18.	Karnataka	Bandipur NP	26.05.2013
19.		Bhitarkanika NP	16.06.2015
20.	Odisha	Kapilash WLS	17.06.2015

Sl.N.	States/UTs	Final notification Issued	Date of notification
21.	Sikkim	Khangchendzonga NP	14.10.2014
22.		Kitam WLS	14.10.2014
23.		Kyongnosla Alpine Sanctuary WLS	14.10.2014
24.		Shingaba WLS	14.10.2014
25.		Maenam WLS	14.10.2014
26.		Fambonglho WLS	14.10.2014
27.		Barsey WLS	14.10.2014
28.		Pangolakha WLS	14.10.2014
29.	Uttar Pradesh	Okhla Bird Sanctuary WLS	20.08.2015

## Declaring Eco-sensitive areas in Western Ghats

The Western Ghats is a global biodiversity hotspot and a treasure trove of biological diversity harbouring many endemic species of flowering plants, fishes, amphibians, reptiles, birds, mammals and invertebrates. It is also the origin of Godavari, Krishna, Cauvery and a number of other rivers of Peninsular India, upon which much of the economy of the region is dependent. Therefore, there is a need to conserve and protect the unique biodiversity of Western Ghats, while allowing for sustainable and inclusive development of the region. The concept of Ecologically Sensitive Area provides a mechanism to conserve biological diversity of an area while allowing for sustainable development to take place.

The Hon'ble Minister of State (Independent Charge), Environment, Forest and Climate Change, Shri Prakash Javadekar held meetings with the State Environment and Forests Ministers of the Western Ghats region viz. Gujarat, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu on 7th July 2015 in New Delhi and Members of Parliament of Western

Ghats region on 3rd August 2015 to review the progress of physical demarcation of Ecologically Sensitive Area in Western Ghats and to discuss the further course of action for protection and conservation of Western Ghats.

It was resolved in both the meetings to reassure the local people that nothing substantial will change within the ESA as far as their livelihoods and day to day activities are concerned. There would be no dislocation of people living within the ESA. As such no fresh regulations have been proposed on existing land use, agriculture, plantation and continued occupation of land in possession of the local people.

The Ministry has since issued a fresh notification on 4th September, 2015 in supersession of the earlier draft notification issued in 10th March, 2014 declaring Ecologically Sensitive Area in the Western Ghats. The fresh draft notification has been issued to dispel the apprehensions and concerns raised by the stakeholders and further clarify the concept of Ecologically Sensitive Area.





## National Natural Resource Management System (NNRMS)

The National Natural Resources Management System (NNRMS) Scheme of the Ministry is part of an umbrella scheme of the erstwhile Planning Commission-Planning Committee-National Natural Resources Management System (PC-NNRMS) and is in operation since, 1985.

The main objective of PC-NNRMS is utilization of remote sensing technology for inventorization, assessment and monitoring of country's natural resources.

### Achievements

During the year under NNRMS programme, the following projects supported by the Ministry:

- (i) Monitoring of Arsenic in Ground Water of Ballia District, Uttar Pradesh Using Remote Sensing and GIS Techniques;
- (ii) Application of RS & GIS for Integrated Management of Hasdeo River Watershed (A Tributary of Mahanadi River) in Chhattisgarh

- (iii) Application of Remote Sensing for Integral Land use, Water and Energy Management in Rural Areas: Exploring Energy Plantation Opportunities
- (iv) Study of SI-fluxes and Nutrient inputs across the Vellar River Basin in the East Coast of Indian and Assessment of their impacts on Coastal Resources-A Geo-Biotechnical Approach
- (v) Biodiversity Assessment of Central Gujarat using Geospatial and Conventional Approach with Emphasis on Conservation of important Threatened Taxa
- (vi) Forest Encroachment in Karnataka-A two Decadal analysis using RS and GIS under the guidance of Dr. R.K.Somashekar, Professor, Deptt. of Environmental Sciences, Bangalore University, Bangalore, Karnataka
- (vii) Desertification Status Mapping of India": under the guidance of Dr. A.S. Rajawat, Project Director & Head, Geo-Science Division, Department of Space, Space



Fig. 40 Leopard at Nagarhole National Park, Karnataka

Application Centre, Ambawadi Vistar P.O. Ahmedabad

- (viii) Assessing & Monitoring Climate Change Effects on Tree Line species in Garhwal Himalaya” by Dr. Sabyasachi Dasgupta, HNB Garhwal University, Srinagar (Garhwal) Uttarakhand
- (ix) Soil and water quality appraisal in the salt affected land Forms of Nagapattinam District, Tamil Nadu using Remote Sensing and GIS Technics” under the Guidance of Dr. D. Jayanthi, Assistant Professor Water Technology Centre, Tamil Nadu Agricultural University, Coimbatore

## **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 attempts to execute its mandate through the Headquarters located at Kosi-Katarmal, Almora (Uttarakhand), and five regional Units located at Mohal - Kullu (Himachal Pradesh), Srinagar-Garhwal (Uttarakhand), Pangthang (Sikkim), Itanagar (Arunachal Pradesh) and Mountain division (MoEF&CC, New Delhi). 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) Environment Assessment and Management (EAM), (3) Environmental Governance and Policy (EGP), (4) Biodiversity Conservation and Management (BCM), (5) Ecosystem Services (ES), (6) Climate Change (CC), (7) Socio-economic Development (SED), (8) Biotechnological Applications (BTA), (9) Environmental Physiology (EP), (10) Knowledge Products and Capacity Building (KCB). Research, demonstration and dissemination are underlying elements of all project activities geared towards development of environment-friendly technology packages. In addition GBPIHED also provides guidelines to the ministry with policy implications.

The major achievements with wide range implications include the following:

- The Institute organized various consultative meetings, workshops and celebrated important days such as International Biological Diversity Day (May 22), Environment Day (June 5), Annual day (September 10), Wildlife Week (October 1-7), Mountain Day (December 12), etc. for awareness generation on various environmental issues.
- The Institute organized three days Biodiversity awareness campaign during 20–22 May 2015 for raising awareness about biodiversity in three watersheds (i.e., Hat-Kalika, Chandak-Aunla Ghat, and Kharangdang-Himkhola) of Kailash Sacred Landscape (KSL) in India part (i.e., Pithoragarh District in Uttarakhand State).
- The Institute organized second meet of Himalayan Young Researchers' Forum at Kosi-Katarmal during September 15-17, 2015.



- The Institute organized, 5 popular lectures by eminent personalities on the topical issues of Himalayan environment and Development.
- Himalayan peoples' representatives meet for policy advocacy on sustainable development of the Indian Himalayan Region was organized during September 10, 2015 at Kosi-Katarmal, Almora.
- Himalayan Legislators' Meet in collaboration with GLOBE-India was organized on October 8, 2015 at Itanagar, Arunachal Pradesh.
- Himalayan students' nature awareness campaign for facilitating development of a culture of creative nature based learning were organized at Nature Interpretation Center of the Institute during May 20-22, 2015.
- Capacity building trainings on Himalayan farmers' livelihoods enhancement drive for empowering communities through new opportunities and skill building were organized by the Rural Technology Centre (RTC) at Kosi (Almora).
- HSDF organized the 1st Regional Meet of HSDF on Aug 4, 2015 at Dehradun for three northwestern Himalayan states; the Meet was inaugurated by Sri Harish Rawat, Hon'ble Chief Minister of Uttarakhand.
- The Second Regional Consultation of Multi-Stakeholders Himalayan Sustainable Development Forum (HSDF) was organized on October 5, 2015 at NIED&PR-NERC, Guwahati, Assam.
- The Institute participated and showcased different research and developmental activities in the India-ICIMOD Week entitled "Partnership for Sustainable Mountain Development" at MoEF&CC New

Delhi during December 11-15, 2015.

- National Mission on Himalayan Studies (NMHS) has been launched by MoEF&CC, New Delhi and Project Management Unit (PMU) has been setup at G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora.

## Research and Development Achievements

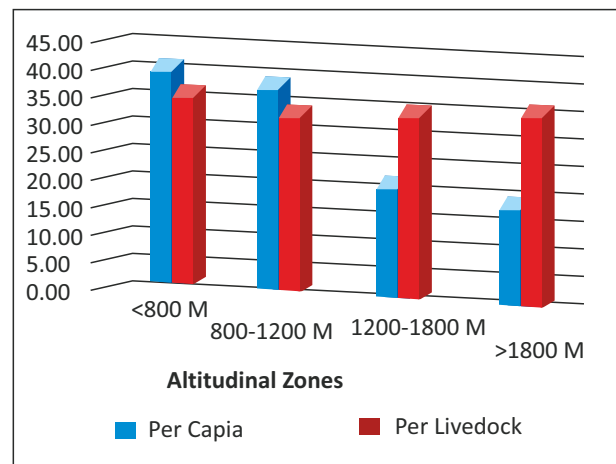
### Group 1: Socio Economic Development (SED) and Knowledge Product and Capacity Building (KCB)

The group includes two themes: (i) Socio Economic Development (SED) which focuses on activities, such as livelihood enhancement, sustainable tourism, entrepreneurship and self employment, and socio-economic and cultural implications, migration, etc; and (ii) Knowledge Product and Capacity Building targeting on activities such as awareness generation and promotion of hill specific technologies for income generation and natural resource management. The highlights of the R&D work include

- To promote ecotourism for biodiversity conservation and sustainable livelihood in the Indian Himalayan Region, studies have been carried out across the IHR, i.e., Himachal Pradesh (the Great Himalayan National Park), Uttarakhand (Kausani, Jageswar and Tehri Dam project site), Sikkim (Fambhonglho wildlife Sanctuary, Tsomgu, Baba Mandir, Nathula) and Arunachal Pradesh (Apatani Plateau, Tawang and Bomdilla).
- To build the capacity of mountain communities for use and management of natural resources a three step

methodologies have been developed. These includes, (a) Technology exploration and documentations; (b) Technology demonstrations and dissemination; and (c) Human resource development. During the year, a total of 41 simple and cost-effective technologies were introduced, demonstrated, tested/modified and maintained at the RTC (HQs), Triyuginarayan (Garhwal Unit) and Pangthang (Sikkim Unit) with a view to replicate and/ or disseminate to user groups on large scale for livelihood enhancement. During the year, a total of 26 training and awareness programmes were organized for different user groups.

- The Institute has adopted 6 disaster affected villages in Kedar valley (Kaviltha, Khonu, Sirsi, Badasu, Toshi and Triyuginarayan) for empowering human resource in the field of diversified land based livelihood enhancement options through improving agro-horticultural productivity, fodder biomass production, off-seasonal vegetable cultivation, bioprospecting of agro-wild bioresources and medicinal plants cultivation, etc.
- Initiated development of "Nanda Van" at Almora for restoration of ecological balance in the degraded & fragile ecosystem by application of live demonstration of hill specific technology



**Fig. 41.** Water consumption per capita and per livestock (l/day) in four altitudinal zone of Kosi watershed

packages. The initiative is being implemented in partnership with the Nagar Palika, Almora, which has offered about 1.2 ha land to the Institute for this activity.

### Group 2: Watershed Processes and Management (WPM), Environment Assessment and Management (EAM) & Environment Governance and Policy (EGP)

Watershed Process and Management (WPM), Environment Assessment and Management (EAM) & Environment Governance and Policy (EGP) are three major thematic thrusts of this group. Through its WPM theme, group focuses on studies of ecosystem processes operational at the



**Fig. 42.** (A-C). GLORIA TR in Chaudhans Valley; A. KHA summit region; B. Quadrat cluster in North summit of KHA region; and C. 1m<sup>2</sup> quadrat - S31 of KHA summit





watershed level with the involvement of user groups to address upstream-downstream linkages. Environmental Assessment and Management (EAM) theme is targeting on activities such as hill specific Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), valuation of ecosystem services, climate change impacts, disaster mitigation and management, and environmental management of urban areas, etc. The group will focus on collection, documentation and analysis of the policies of Himalayan region through newly created theme 'Environment Governance and Policy (EGP)'. Achievements of this group include the following:

- To address the issue of ecological, social and policy implications of changing water resource scenario in Indian Himalayan region, the Institute has conducted survey in 101 villages (731 households) in four different altitudinal zones of Kosi watershed.
- To understand the geodynamics changes and glacial chemistry of Himalayan glaciers, study was carried out in Gangotri Glacier system. The results reveals that the variable rate of recession of the snout of Gangotri glacier is possibly due to excessive forcing of melt water from the tributary glaciers (Raktverna and Chaturangi).
- Strategic Environmental Assessment (SEA) of Hydropower Projects in the Himalayan Region were carried out. It was found that all 37 hydroelectric projects in Sutlej and Ranganadi basin spread within the 10 km buffer. Biodiversity assessment around Ranganandi HEP exhibited a total 172 plant species (55 trees, 42 shrubs, 19 climbers,

56 herbs) that are used, directly or indirectly, by the natives.

### **Group 3: Biodiversity Conservation & Management (BCM), Ecosystem Services (ES) and Climate Change (CC)**

The group includes three thematic areas (i) Biodiversity Conservation and Management (BCM), (ii) Ecosystem Services, and (iii) Climate Change. The aim is to ensure long term conservation of sensitive Himalayan biodiversity elements and ensure sustainable use of bio-resources for improvement in the rural economy of the Indian Himalayan Region. In addition, the group through newly created theme targeting on quantification of ecosystem services in the Himalayan region particularly towards changing climate scenario. The Highlights of the R&D work carried out under this group are as follows:

- Towards understanding the biodiversity patterns and processes under changing resource use and climate scenario in Indian Himalayan region, studies were conducted in Kanawar Wildlife Sanctuary, Himachal Pradesh; Chaudhans Valley and the Hat-Kalika sub-watershed of East Ramganga catchment in district Pithoragarh, Uttarakhand; Khanchendzonga Biosphere Reserve (Yuksom-Black Kabru transect) in Sikkim and Pine Groove Forest in Ziro valley of Lower Subansiri District in Arunachal Pradesh. Dataset on the status, changing patterns and processes of biodiversity components as well as their conservation and socio-economic values were generated.
- Under the Kailash Sacred Landscape Conservation and Development Initiative project the Institute has established formal

implementation partnership with Uttarakhand State Biodiversity Board (UKBB), Uttarakhand Forest Department (UKFD) and Himalayan Gram Vikas Samiti (HGVS) for implementation of activities of project Component 3-Access and Benefit Sharing, Component 2- Managing Ecosystem for Sustaining Services and Component 4- Long-term Conservation and Environmental monitoring, and community mobilization.

#### Group 4: Biotechnological Applications (BTA) and Environmental Physiology (EP)



**Fig. 43.** In vitro propagation of *Nardostachys jatamansi* and genetic uniformity between in vitro propagated plants and wild plants

The group includes two thematic areas (i) Biotechnological Applications (BTA) and (ii) Environmental Physiology. The group is focusing on the conservation and sustainable use of threatened and high value plant and microbial diversity for the welfare of human being through biotechnological and physiological approaches. Highlights of the R&D work carried out under this group are as follows:

- Towards promoting conservation and sustainable utilization of Himalayan plants, focus was made on to develop propagation protocols of threatened and high value species i.e. *Nardostachys jatamansi*, *Zanthoxylum armatum*, *Berginia strechii*, etc. Propagation protocols of these species were developed and regenerates were analysed for genetic fidelity using RAPD and ISSR marker.

- Towards understanding the biosynthetic pathway of podophyllotoxin, biotechnological approaches were used in the different *Podophyllum* species (*P. peltatum*, *P. hexandrum* and *P. sikkimensis*). Higher level of expression of two key genes (pinoresinol lariciresinol reductase- PLR and Secoisolariciresinol dehydrogenase- SDH) was observed in the rhizome of *P. peltatum* and *P. hexandrum* as compared with the leaves.



- Towards investigating the ecological resilience of the extremophiles from Himalaya, a psychrotolerant bacterial strain of *Serratia marcescens*, originally isolated from a glacial site in Indian Himalayan Region (IHR), has been investigated for laccase production under different culture conditions and the production of laccase was found more consistent toward alkaline pH. Laccase enzyme was partially purified using gel filtration chromatography. The molecular mass of laccase was determined ~53 kDa on native PAGE (Figure 6A). Among nitrogen sources, organic sources were found to act as inhibitors ( $P < 0.01$ ), and among the in-organic sources only sodium nitrate enhanced the laccase production. Low molecular weight organic solvents significantly ( $P < 0.01$ ) enhanced laccase production up to 24 h of incubation with a decline in later incubation period. The bacterium exhibited cold active and dark red pigment at low temperature. Production of laccase by the psychrotolerant bacterium in wide range of temperature and pH is likely to have inference in biotechnological processes.

## Forestry Research

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

#### Introduction

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, education and extension covering all aspects of forestry. The Council

deals with 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.

#### Activities undertaken

- ICFRE has conducted Cumulative EIA studies for various hydropower projects and has completed more than 20 individual Reclamation and Rehabilitation (R&R) Plans of category A, B and C for the mines in Bellary, Chitradurga and Tumkur Districts of Karnataka.
- The Sustainable Land and Ecosystem Management (SLEM) Programme has successfully been completed with the organization of a workshop in Delhi on 17 June 2014 and a short documentary on SLEM project in India prepared by ICFRE was released by the Hon'ble Minister.
- Prepared National Action Programme (NAP) to Combat Desertification in alignment with 10 years strategy of UNCCD.
- ICFRE has come up with a number of publications including Climate Change Mitigation and Adaptation in Forestry Sector in India, ICFRE State of Knowledge Series –II - Advances in Mycorrhiza and Useful Microbes in Forestry, Sustainable land & ecosystem management – some best practices from India, Poplars for Prosperity, Strides in Forestry Research and ICFRE Brochure.
- Forest Research Institute (FRI), Dehradun had taken up the problems in the salt-affected soils of northern plains (Punjab, Haryana and Uttar Pradesh). It also

- conducted the ecological restoration of coal mine areas in Northern Coalfield Ltd., Singrauli at Nighai and Krishanshila by adopting physical (leveling, top soil spread, mulching etc.) and biological (species selection and their planting) techniques.
- Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore introduced new international germplasm of Eucalyptus mallee species from Australia and Leucaena accessions from USA.
  - IFGTB, Coimbatore released a bio-control agent, 'Tricho-K' for control of soil borne diseases such as root rot and stem wilt and a biopesticide 'Ento Fight Nasa for effective control of defoliators of Tectona grandis and Ailanthus excels.
  - One lakh quality seedlings of Casuarina have been raised by IFGTB for distribution to the farmers affected by cyclone Thane.
  - Under Chemical modification of Eucalyptus hybrid oil and development of fragrant products, IWST, Bengaluru has developed 12 different blends using Eucalyptus hybrid oil.
  - Tropical Forest Research Institute (TFRI), Jabalpur conducted studies, evaluation, documentation etc on variation in structure and composition of vegetation in preservation plots of Bhimashankar.
  - Rain Forest Research Institute (RFRI), Jorhat conducted ecological studies on butterflies along altitudinal gradients in different forest ecosystems of the Eastern Himalaya (Arunachal Pradesh) and recorded 393 species including 'rare' and 'very rare' species, endemic species and based on that species distribution maps have been prepared on a GIS platform.
  - Arid Forest Research Institute (AFRI), Jodhpur isolated and mass multiplied Trichoderma viride strains for bio-control of khejri mortality. The institute has also surveyed 226 villages to document socio-economic impact of khejri mortality in Rajasthan for generation of awareness on khejri mortality and its management.
  - Himalayan Forest Research Institute (HFRI), Shimla conducted survey and mapping of Ashtavarga Group of medicinal and aromatic plants (MAPs) in Himachal Pradesh. A nursery developed near Shimla maintains the germplasm of these Ashtavarga plant species. A pamphlet on Ashtavarga was published in Hindi.
  - Institute of Forest Productivity (IFP), Ranchi initiated introduction of selected genotypes of karanj, kusum and bamboo as tree components in agroforestry models in lateritic belt of eastern India.
  - IFP, Ranchi conducted evaluation of Dalbergia sissoo Roxb. Clones for suitability in large scale clonal forestry in Gangetic plains and Chotanagpur Plateau.
  - Institute of Forest Biodiversity (IFB), Hyderabad initiated establishment and evaluation of multilocational trials of Melia azedarach L. and Melia dubia Cav and established progeny trial of M.dubia in Guduluru in TamilNadu.
  - An Integrated Community Based Forest Management Project in Bihar i.e "Samudai Adharit Samanvit Van Prabandhan Evam Sanrakshan Yojana (SASVPESY)" of Bihar State sponsored by Planning Commission (NITI Aayog) Govt. of India was concluded.





- Under Bamboo Technology Support Group (BTSG)-ICFRE (National Bamboo Mission), training workshops on 'National Bamboo Database for the Division Level Users (DFOs) were organised in Bengaluru, Ranchi and Dehradun. National level seminars and crafts mela were organised in Manali and Dehradun under BTSG-ICFRE.

### Progress/Achievements

- ICFRE, Dehradun organized one day workshop on 'Alignment of National Action Programme on Combating Desertification with 10 year strategy of United Nations Convention to Combat Desertification (UNCCD)' on 22 April 2015 at ICFRE, Dehradun.
- Inception Workshop on ICFRE-ICIMOD Project on REDD+ in North-Eastern Himalayas was conducted at ICFRE, Dehradun on 28-29 January, 2016.
- ICFRE, Dehradun has conducted cumulative environmental impact studies of hydroelectric projects in Yamuna, Tons basin in Uttarkhand and Sutlej river basin in Himachal Pradesh. During 2015-16, the Council has completed 15 individual Reclamation and Rehabilitation (R&R) Plans of category 'C' for the mines in Bellary, Chitradurga and Tumkur Districts. Carrying capacity study of Saranda region in West Singhbhum District, Jharkhand to suggest permissible limit of Iron Ore Production entrusted by MoEF&CC, New Delhi and environmental auditing of 20 Open Cast Mines of Coal India Ltd. (CIL) are in progress.
- Various activities including imparting trainings, organizing expositions,

distribution of seedlings and various products helpful in protection/conservation of plants along with literature, etc. were conducted through 26 Van Vigyan Kendras (VVKs) established in different states of the country with the active participation of concerned State Forest Departments and nine Demo Villages involving different local agencies (NGOs etc.) were continued. ICFRE also entered into an MoU for establishment of a new VVK at Mahilong, Ranchi. Networking activities of VVKs with KVKs of ICAR such as organizing workshops, trainings etc. were also conducted at various KVK sites in different zones of the country.

- ICFRE is regularly publishing books, newsletters, bulletins, booklets, brochures, pamphlets besides numbers of research papers in various Indian and foreign journals. ICFRE has come up with a number of publications including "Sustainable Land & Ecosystem Management – *Some Best Practices from India*", *ICFRE State of Knowledge Series -II Advances in Mycorrhiza and Useful Microbes in Forestry*", "*Strides in Forestry Research*", "*Elucidation of the sixth National Report*", "*ICFRE Brochure*" etc.

### Forest Research Institute (FRI), Dehradun

#### Research

- Developed commercially acceptable natural dyes from fungal resources.
- Developed a bio-pesticide for management of major defoliators of poplar.
- Reclamation of 10 ha of coal mine degraded land and biodiversity development at NCL, Singrauli as model

restoration program was undertaken.

- Standardised the leaf bioassay method of poplar genotypes screening for resistance against toxins of the pathogens namely, *Alternaria*, *Bipolaris*, *Curvularia*, *Rhizoctonia spp.*
- Developed technique for plywood preparation using combinations of paper-mulberry and poplar. A modular plant for ammonia plasticization of wood was developed.
- An ultrasonic technique developed for defect detection in logs was modified for application in standing trees.
- Impact of different aged plantations raised on overburden dumps of Coal vis-a-vis soil quality assessment in Singrauli was assessed.
- Estimation of soil physico-chemical properties in Greening Punjab Mission project of FRI.
- Site specific enrichment techniques in MPCA's of Uttarakhand for **Aconitum**



**Fig.44** *E.tereticornis* x *E.grandis* hybrid clone showing superior performance compared to the adjacent ruling clone at TNPL campus at 20 months of age.

**hetrophyllum, Picrorrhiza kurrooa and Nardostachys jatamansi** have been developed.

- Preparation of DPR of Forestry Interventions for Ganga is in progress. Various consultation meetings have been held for the States of Uttarakhand, Uttar Pradesh and Bihar.

### Extension

- Awareness programmes conducted for development of agroforestry models with *Melia composita*, *Embllica officinalis* and medicinal plants at Naukragrang, Haridwar and Handesra, Mohali.
- Two training programmes (5 days each) on handmade paper manufacturing from Lantana were conducted under DST project.
- Organized a training-cum-workshop on 'Essential oils, perfumery and aroma therapy' at FRI in collaboration with FFDC, Kanoj.
- Interventions were made for the conservation of the heritage Vat Vriksha at Jyotisar, Kurukshtra.

### Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore

#### Research

- Under the Eucalyptus hybridization programme, successful intersectional hybrids (*Exsertaria* x *Transversia*) were developed and tested within states of Tamil Nadu, Kerala, Andhra Pradesh and Karnataka. The combination of *E. tereticornis* x *E. grandis* shows very good naturalization under Inland, Coastal and Riverine conditions.
- A novel cost effective water culture technique was developed for rooting Eucalyptus hybrids (*Eucalyptus camaldulensis* x *Eucalyptus tereticornis* and



*Eucalyptus camaldulensis* x *Eucalyptus tereticornis*) for mass production of quality planting stock.

- Insecticidal properties against papaya mealybug, *P. marginatus* were characterized based on ethno- botanical records of *Melia dubia*, *Pongamia pinnata*, *Aristolochia bracteata*, *Adhatoda vasica* and *Vitex negundo*. Management of mealy bug was achieved by introducing a new product “Crawl Clean” which is cost effective, eco friendly and results in increase in productivity.
- The institute has made an attempt to reclaim the barren laterite lands in Kasargod District (Kerala) using beneficial microbes. Beneficial microbes such as AM fungi, Phosphobacterium and Azospirillum were cultured and were inoculated in the seedlings of *Switenea macrophylla*, *Ailanthus tryphysa*, *Holoptelia integrifolia* and *Butea monosperma*. Upon inoculation, these seedlings were grown in laterite soils as potting media. The improved seedlings were planted in barren laterite lands for studying their out planting performance. The seedlings shown good growth and survival performance in the field conditions though they were planted in summer months. New leaves and branches appeared in the planted seedlings with minimum water regime.
- Windbreak Agroforestry system was established in one ha area with selected superior phenotypes (Clones) of *Casuarina* to protect banana crop from wind damage in in Coimbatore district.
- Spread of Gall insect (*Leptocybe invasa*) attack on different *Eucalyptus* clones in Tamilnadu has been mapped.
- Techniques for rapidly generating transgenic roots on non-transgenic shoots have been developed that has potential

application in development of plant varieties tolerant to draught, salt and flooding stress.

### Extension

- The institute has so far released 25 clones of *Casuarina* and *Eucalyptus* with different superior characters like fast growth, wind-hardiness, drought tolerance, insect attack tolerance and ability to grow in sodic soils.
- In order to introduce new fast growing clones in their farm forestry programme, the Papers – APPM Limited company has entered into a License Agreement with IFGTB to commercially propagate five clones of *Casuarina* (CJ 7, CJ 9, CJ 10, CH 1 and CH 2) developed by the institute and supply to farmers at subsidized cost.
- IFGTB has organized training programme on ‘Agroforestry models – establishment and management’ and ‘Bio-prospecting –Role of State Forest Departments need to play’.
- Liquid biofertilizer and biocontrol agents products like N fixer (12 litres), Tricho K (18 litres) and Trichoderma (21 litres) were mass produced and distributed to various stakeholders like paper industries and farmers by institute.

### Institute of Wood Science and Technology (IWST), Bengaluru

#### Research

- Thermal modification of *Melia dubia* wood using hot *Pongamia* oil was carried out in the temperature range 170-220 0C. Performance of heat treated wood was compared with hot *Pongamia pinnata* oil treated wood. Initial results indicate inadequacy of heat treatment in providing termite resistance to wood. Thermally modified wood was more prone to decay as compared to untreated wood.

- In order to develop nanocellulose filled starch based composites, nanocellulose has been synthesized by TEMPO mediated oxidation method and characterized. The synthesized nanocellulose was blended with starch and the starch was thermoplasticized. The Scanning Electron Imaging (SEM) analysis revealed uniform distribution of nano-cellulose in the Thermo Plastic Starch (TPS).
- Under the project on evaluation of performance of wood preservative, Steam Volatile Creosote (SVC) was distilled and applied to wood surface of eight selected tree species by different method of applications and at various concentrations and kept for standardization to know its effectiveness.
- In order to develop fragrant products, Eucalyptus hybrid oil has been chemically modified by oxidation reactions with potassium permanganate and potassium dichromate in p-toluene sulphonic acid.
- To develop coccinellids based biocontrol programme, the potential of the Australian ladybird beetle *Cryptolaemus montrouzieri* against *Nipaecoccus viridis* and *Ferrisia virgata* infesting sandalwood has been established in field condition.
- Demo plots have been established of Sandalwood in Mohali, Roper, Mathewada (Ludhiana) and Bhatoli (Talwada) and Bamboo in Bhatoli and Talwada.
- To develop process (protocol) for the artificial induction of agarwood, isolated 70 fungal isolates from soil samples from Karnataka (30) and Assam (40) and established inductification upto genus. Pure cultures of 20 isolates were maintained under aseptic condition for artificial agarwood induction in *Aquilaria malaccensis*.

## Extension

- A training workshop on “Advancements in wood products and utilization” and “Wood Identification and Wood Protection ” were conducted.
- The institute & Sandalwood Society of India jointly organized “Sandalwood Growers Meeting at IWST, Bengaluru wherein about 250 farmers participated.
- IWST has filed a provisional patent on “new composition of soap”..

## Tropical Forest Research Institute (TFRI), Jabalpur

### Research

- Investigation into behavioural management of sal borer and prospective compounds responsible for kairomonal and pheromonal behaviour is underway.
- Value-added products such as sauce, squash, jam, sharbat, murabba have been prepared from Kusum (*Schleichera oleosa*) fruits.
- Silvi-agri-lac model with *Flaminigia semialata*, Arhar and Lac was standardized at the Onsite Research Plot in TFRI, Jabalpur.
- Progeny trial of *Pterocarpus marsupium* was undertaken at Raipur and Chhindwara.
- Germplasm bank of *Litsea glutinosa* was established at TFRI, Jabalpur.
- Micro-cutting propagation protocol of *Bambusa nutans* and *Bambusa vulgaris* was developed.
- Techniques for germination, collection and maintenance of maximum viability of four important tropical species *Bridelia retusa*, *Sterculia urens*, *Boswellia serrata* and *Saraca indica* were carried out and maturation indices were determined.
- Nursery technique of *Buchanania lanzan*





was standardized using a mini-polyhouse under shade netted nursery as well as using sunken bed with an overlaying metallic grill in the open conditions. .

- Under chemo-profiling of *Uraria picta*, *Solanum indicum* and *Solanum xanthocarpus*, quantification of active ingredients like Caffeic acid and Lupeol were carried out in different parts of *Solanum indicum*, *Solanum Xanthocarpus* and *Uraria picta* respectively.

### Extension

- Five days training programme for frontline staffs of state forest department, NGOs, SHGs and farmers were organised at Koraput, Odisha and two days training programme for officers and staffs of Steel Authority of India (SAIL) on Carbon Sequestration through afforestation at Rourkela were organised.
- Two days National Workshop on Biodiversity Act, 2002-Constraints and Opportunities for Scientific Community was organised.

### Rain Forest Research Institute (RFRI), Jorhat

#### Research

- Field surveys were conducted in various districts of Assam and Meghalaya to collect adhesive (binder) plant samples for agarbatti preparations. Samples from more than 23 plant species are recorded for adhesive properties; of which bark, leaf, and flower, seed of ten plant species were found suitable, either alone or in combinations to use as adhesive material for agarbatti preparation.
- Field studies on the diversity of soil-borne entomopathogenic fungi in different land use system of north-east India and their utility for the management of major

defoliators of *Gmelina arborea* Roxb. and *Aquilaria malaccensis* Lamk were conducted.

- Studies on soil profile attributes under Forest and Jhum land areas of some selected sites of Nagaland state were conducted.

### Extension

- Hon'ble Minister of State for Environment, Forest & Climate Change, Government of India visited RFRI, Jorhat on 16 November, 2015 and participated in a Farmers Meet organised by the institute.
- A 'Field Demonstration cum Awareness Programme' on eco-friendly management of pest and disease problems of *Gmelina arborea* was conducted at Medicinal and Aromatic Plant Garden, Panbari, Golaghat (Assam) of Assam Forest Department..

### Arid Forest Research Institute (AFRI), Jodhpur

#### Research

- Under enhancing fodder productivity through silvi-pastoral system on degraded land of India, *C. mopane* and *S. nudiflora* proved to be ideal species for salty waste lands with appreciably high mean survival after five years of establishment. Plantations trial on salt affected soil was converted to silvi-pastoral trial by introduction of non-salt tolerant grass on soil slope structure in *C. mopane* plantation.
- Various value added products viz. pickle, Murabba, squash, dehydrated juice of *Cordia gharaf* fruits, *Grewia tenax* fruits and *Leptadenia reticulata* pods have been prepared in an effort to tap the potential of some selected indigenous lesser known wild edible plants for food and nutrition in

arid and semi-arid region.

- Standardization of non destructive harvesting practices of *Commiphora wightii* oleogum resin has been done.

### Extension

- One week refresher training course on “Integrated approach for sustainable development of Fragile Desert Ecosystem” was organized.
- The institute participated in Kharif Kishan Sammellan at Jodhpur, organized by Krishi Vigyan Kendra (KVK), Central Arid Zone Research Institute, Jodhpur on 20th July, 2015. Developed technologies & Research activities of the institute were displayed in the Sammellan and a lecture was also delivered to create awareness on environmental issues, importance of trees and raising of trees along with agriculture.

### Himalayan Forest Research Institute (HFRI), Shimla

#### Research

- Twenty one populations of Banj Oak (*Quercus leucotrichophora*) in the states of Himachal Pradesh and Uttarakhand were identified to study the genetic diversity in the species and also to understand its pertinence towards Genetic Conservation. The genetic structure of entire population is being developed for all the populations.
- The data recorded on morphometric traits for different populations of Neoza Pine (*Pinus gerardiana*) was analyzed. Observations recorded for the cone and seed characters when analyzed, it was seen that the populations have significant differences for these traits. The data so obtained shall be included for final analysis so as to find out the genetic diversity in the populations.

### Extension

- Training programmes on “Cultivation of Medicinal Plants” under the Scheme “Training of Other Stakeholders” and Cultivation of Atish, Ban Kakri, Chora and other High Valued Temperate Medicinal Plants were organized by the institute.
- The institute also observed World day to combat desertification (WCCD) and Earth Day.

### Institute of Forest Productivity, Ranchi

#### Research

- Evaluation of *Dalbergia sissoo* Roxb. Clones for suitability in large scale clonal forestry in Gangetic plains and Chotanagpur Plateau has been done.
- Collection, conservation and evaluation of *Melia dubia* germplasm from North Bengal, Odisha Hills and other parts of India for identification and release of superior clones are being done.

### Extension

- Three days exposure of farmers visit was organized at Institute of Forest Productivity, Ranchi under "Agriculture, greening, training capacity building and income generation programme" for the farmers and forest-based communities of Neturia Block, Purulia, West Bengal was organised.

### Institute of Forest Biodiversity (IFB), Hyderabad

#### Research

- The studies on successional trends and productivity of Sriharikota (SHAR) and Pulicat Lake ecosystems for conservation of biodiversity are in progress.
- Measurement of Vegetation and biomass parameters under Vegetation Carbon Pool Assessment (VCP) has been done.



Fig. 45 Swamp Deer at Kanha National Park, Madhya Pradesh

### Extension

- The institute organized a training programme on Cultivation of Medicinal Plants in Agroforestry at IFB, Hyderabad and one onsite training for farmers at Vallur Kamareddy, Nizamabad.

### Indian Plywood Industries Research and Training Institute (IPIRTI), Bengaluru

#### Introduction

At the Initiative of Indian Plywood Industry and with participation of CSIR, the present IPIRTI had a humble beginning in 1962 as a co-operative research laboratory. Its primary objective was for the growth and development of Plywood and Panel Industry in India which was at its infant stage. IPIRTI has been instrumental in the growth of the Plywood and Panel Industry in India right from its infant

stage. At present the Plywood and Wood Panel industry in India stands parallel to its counterparts in developed countries in terms of Quality Product manufacture.

### Wildlife Institute of India (WII), Dehradun

#### Introduction

Wildlife Institute of India (WII) was established in 1986 as an autonomous institute of the Ministry of Environment, Forest & Climate Change, Government of India. The Institute has emerged as a premier training and research institution in the field of wildlife and protected area management in South and South East Asia. Its mandates are to generate quality information and knowledge products in wildlife science through research and mainstream it in capacity building programmes for various target groups and provide advisory support to Central and State Governments.

## Research Projects

During the reporting period, 5 research projects were completed and 2 projects were ongoing, which were funded through Grant-in-Aid. Two externally funded research projects were completed and 12 were ongoing during the reporting period. The Institute worked on the following important research activities during the reporting period:

- Biodiversity Conservation and Rural Livelihood Improvement Project (BCLRIP)
- Satellite Tracking of Amur falcons *Falco amurensis* from Nagaland, India

## Biodiversity Conservation and Rural Livelihood Improvement Project

India has been experimenting with participatory approaches for managing biodiversity conservation and has achieved global recognition through programme, such as Joint Forest Management and Ecodevelopment. Biodiversity Conservation and Rural Livelihood Improvement Project (BCLRIP), funded by World Bank assisted project of Ministry of Environment, Forest & Climate Change. It is being implemented in partnership with concerned State Forest Departments. WII is one of the implementing partners in this project for enhancing capacities of the project implementers and as a knowledge management centre on landscape approach to biodiversity conservation.

- During 2015-16, many initiatives have been undertaken for carrying forward this project. During the first three quarters of the year, one local level 1-day consultative workshop for improvement in the proposed curricula for core training courses was organized at Wildlife Institute of India, Dehradun.
- In October 2015, a core training programme on “Landscape Management

Approach for Biodiversity Conservation and Human Well-being” was organized in Periyar Tiger Reserve and Kalakkad Mundanthurai Tiger Reserve for Range Officers and frontline professional of other lines departments in which 35 officers participated. Subsequently, another core training programme for middle level officers was organized at Chhindwara, Madhya Pradesh in November 2015 in which 64 officers participated.

- The second phase of ongoing studies on ‘Biological Indicator and Ecological Mapping for Implementing Landscape Approach’ has been approved and is being undertaken in Askot Landscape.
- In June 2015, an expedition in Chipla Kedar, Pithoragarh District was conducted for primary data collection of the caterpillar fungus which could help in conservation strategies including participatory resource management and conservation awareness among local communities in Uttarakhand, as part of the study.
- For facilitating this study, 94 camera traps and other associated items have been procured.
- The printing of various reports under phase I of the study is under way.

## Satellite Tracking of Amur falcons *Falco amurensis* from Nagaland, India

The two Amur falcons satellite tagged in November 2013, “Naga” and “Pangti” returned to Nagaland on their southbound migration for the third consecutive year, which has set a record of continuous tracking of the species. Thousands of falcons were observed roosting at the two major Amur falcon roost sites, Pangti village, Wokha district and Yaongyimchen Community Area, Longleng district in





Nagaland. This year again, no hunting of the falcons by local people was reported during the period. A large number of Amur were also reported roosting in the adjoining areas in Manipur State specifically in the Tamenglong and Senapati districts. As per reports local people there have also started protecting the falcons. The satellite tracking of Amur falcons, a joint initiative of Wildlife Institute of India, Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India and Nagaland State Forest Department in Collaboration with Convention of Migratory Species – Raptors, MoU, Birdlife International – Hungary and Hungarian Museum of Natural History has created a lot of awareness among local people in the State and elsewhere and helped in people actively protecting the Falcons.

The local people of Yaongyimchen village declared a large area of their community forest where Amur falcons roost as a Community Conservation Reserve. A “Letter of Appreciation” from the Convention of Migratory Species – Raptors, MoU acknowledging the efforts by the local people was handed to the community leader by Dr. V.B. Mathur, Director, WII and Dr. S.K. Khanduri, IG(WL), MoEFCC handed over a map showing the migratory routes of two Amur falcon satellite tagged to the community leader Mr. Nuklu Phom of Yaongyimchen Village, Longleng district in Nagaland in November 2015. This was followed by a visit of Shri Prakash Javadekar, the Hon’ble Union Minister Environment, Forest and Climate Change, Government of India to the roosting site. He likened the Pangti area to be called a “Natural University” the center of learning as to how local communities have taken it upon themselves to protect Amur falcons. Recognizing that the satellite tagging initiative has helped generate a lot of awareness he informed that four to five Amur falcons will be

satellite tagged from other roosting sites in Nagaland next year and the birds will be named after the villages.

### Academic and Training

During the year following Courses and Training Programmes were organized:

- **XXXVI P.G. Diploma Course in Advanced Wildlife Management concluded, September 1, 2014 to June 30, 2015.**
- **XXXVII Post Graduate Diploma in Advanced Wildlife Management commenced, Dehradun, 1 September 2015 to 30 June 2016.**
- **XXXI Certificate Course in Wildlife Management concluded, November 1, 2015 to January 31, 2016.**

### Workshops, Seminars, Meetings and Other Activities

- Vertical Integration Training in Tiger Reserve Management for the officers of different tiger reserves in India, Dehradun, June 8-20, 2015.
- Two-day Training Workshop for Indian Forest Service Officers on "Management Effectiveness Evaluation of Protected Areas", Dehradun, 27-28 July, 2015.
- Workshop on “Master Planning for Zoo Education”, Ahmedabad, 27-30 July, 2015.
- 6th Asia Regional Conservation Forum, Bangkok, 10-12 August, 2015.
- Celebration of Librarian’s Day, Dehra Dun, 12 August, 2015.
- First Authors Meeting for the IPBES Regional Assessment on Biodiversity and Ecosystem Services for the Asia-Pacific, United Nations University (UNU), Tokyo, Japan, 17–21 August 2015.
- XI Internal Annual Research Seminar, 30 August 2015 and XXIX Annual Research Seminar of WII, Dehradun, 3-4 September 2015.
- “Himalaya Day” celebration at the Wildlife Institute of India, Dehradun, 9 September 2015.

## CHAPTER-8

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# EDUCATION AND AWARENESS





## Environmental Education, Awareness and Training

### Introduction

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.

The major programmes undertaken to achieve the overall objectives of the scheme are as follows:

### National Green Corps (NGC) Programme

During financial year 2015-16, due to shortage of funds only 15500 Eco-clubs of previous year i.e 2014-15 were financially supported.

Also in order to strengthen monitoring mechanism of NGC programme, MoEFCC is in process to establish Management Information system (MIS) which will open up vistas in sharing and accessing the information on NGC among all stakeholders. The MIS reporting and monitoring would be interactive and creative in ensuring NGC mobility and services.



Fig. 46. Compost pit digging by Govt. Middle School, Tenyiphe-1, Dimapur Dist, Nagaland

## National Environment Awareness Campaign (NEAC)

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.

The phenomenal response that NEAC has received has made the network of participating agencies more than 16000 across the country.

During financial year 2015-16, 6760 participating agencies of previous year i.e 2014-15 were financially supported. More details of the scheme are available on the website.

## Seminars/Symposia/Workshops /Conferences

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 programme 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.

During financial year 2015-16, 11 organisations of previous year i.e 2014-15 were financially supported.

## National Nature Camping Programme

National Nature Camping Programme is an initiative of the Ministry of Environment and Forests in environment education which is aimed at creating greater awareness, understanding and empathy of children with and for the environment. Through this initiative it is hoped that every child who goes through middle school (classes VI to VIII) will get at least one opportunity for a 2-3 day camping experience during these years.

During financial year 2015-16, due to shortage of funds only 40 nature camps of previous year i.e 2014-15 were financially supported.

The financial assistance not exceeding Rs. 2000/- (Rs. two thousand only) per student for a camp of 2 nights - 3 days duration (maximum five number of camps) is provided under this programme.



## GLOBE

**Global learning and Observations to Benefit the Environment (GLOBE)** is a hands on international environmental science and education programme that brings students, teachers and scientists together to study the global environment. MoEFCC and US Government signed an agreement on 25th day of August 2000 to implement the GLOBE programme in India. Indian Environmental Society is an implementing agency for GLOBE in India. The goals of GLOBE are to enhance the environmental awareness of individuals throughout the world, to contribute to scientific understanding of the Earth and to help all students reach higher levels of achievement in science and mathematics. There are four domains of the hands-on activities. Each is detailed as follows:

- Atmosphere – The students will be collecting the daily measurements of cloud

cover and cloud type, maximum/minimum and current temperature, precipitation and its pH.

- Hydrosphere – The students will do weekly measurements of water transparency, temperature, pH, alkalinity and conductivity.
- Pedosphere – The students will expose a soil profile, take soil samples, and analyse them to determine the characteristics of various soil layers.
- Biosphere – the student will monitor change in a local land biology study site and observe other quantitative land cover samples site where they will identify the dominant and subdominant species of vegetation.

GLOBE India has organized Youth Conference On Earth Science & Climate Change on the Occasion of World Wetland Day -2015



Fig. 47. Polyps of coral (*Tubastrea micrantha* Ehrenberg)



Fig. 48 Starfish- *Fromia monilis* (Perrier, 1869) at Great Nicobar.

during February 1- 2, 2015. Organized Delhi Youth Science Congress During February 27-28, 2015. in which various Schools Participated & put up their exhibitions on topic related to Water Quality, Education for sustainable Development, New technological options for a better living & various other GLOBE protocols. Conference of

Global Citizen Science Congress was organized to mark and celebrate Global Citizen Science Congress., Students from Thailand & Taiwan along with India Participated in the Conference. Organized Conference on Environment and Science Communication during October 16, 2015. International Earth Day was celebrated on 22-23, April, 2015. During the celebration various activities such as Poster making competition, Slogan writing competition, Tree plantation & Protocol study of Soil & Hydrology were carried out.

Regional Meeting of the GLOBE Country Coordinators of Asia – Pacific

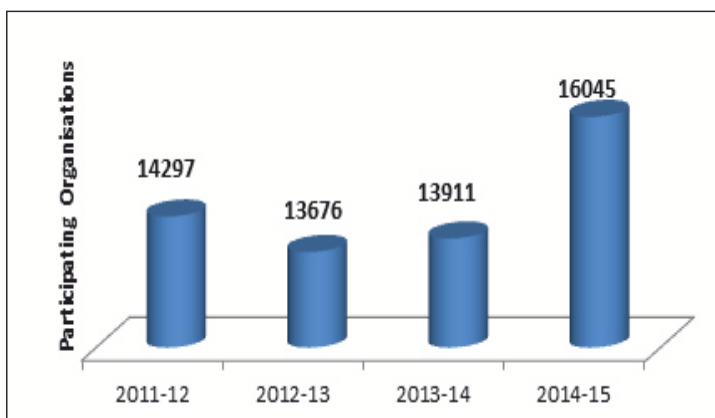


Fig. 49 Bar graph showing no. of participating organisations supported under NEAC since 2011-12 to 2014-15



Region was attended by Country Coordinator from Ministry held during 13-17 January 2016 at Mae Fah Luang University, Chiang Rai in Thailand.

The number of participating organisations in NEAC from 2011-12 to 2014-15 ( no new activities were supported in FY 2015-16 due to

shortage of funds)

### Budget Allocation and progress of expenditure alongwith comparison

The budget allocation of the scheme for the year was Rs 40.88 cr. The progress of expenditure from 2012-13 to 2015-16 (as on 31.12.2015).

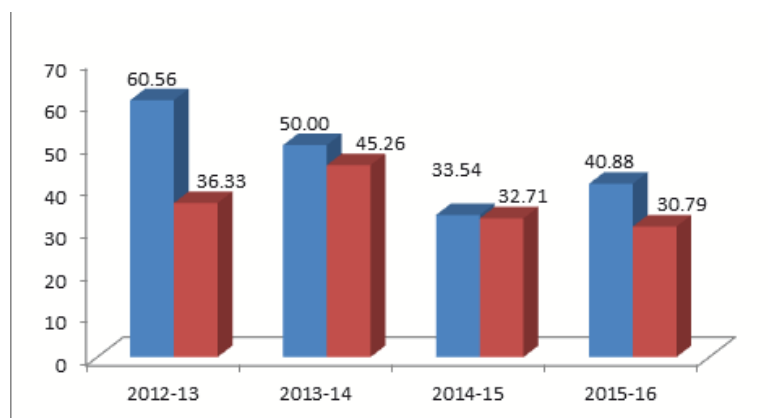


Fig. 50 Allocation vs Expenditure incurred

## National Museum of Natural History

### Introduction

The National Museum of Natural History (NMNH), New Delhi is an institution devoted to Environmental Education (EE) and was opened to the public in 1978 on June 5 on the occasion of World Environment Day. The Museum undertakes environment education through the means of Exhibition programmes and Educational activities. Even though the primary target audience of the Museum is school

students, it has developed programmes for other categories of people as well. The NMNH is the pioneer Museum which has initiated several specialized programmes to cater to the needs of Persons with Disabilities. The Museum also undertakes many outreach programmes such as Temporary Exhibitions, Mobile Exhibitions and a large number of Nature Camps. It also arranges many local and National level competitions leading to Young Environmentalist of the Year Award (YEYA).



## CHAPTER-9

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# 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 objective, 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 established in different areas. Out of 10 CoE's, 8 are in operation.

The main objectives of the CoEs:

- (i) To create awareness among various sections of the population of the country regarding environmental issues, with a view to encourage and enhance public participation.
- (ii) To enhance and strengthen the country's human, scientific, technological, organizational, institutional and resource capabilities.
- (iii) To encourage and support universities/ institutions/ NGOs to undertake activities to develop or strengthen the capabilities and capacities of the identified units, so that they may contribute to the process of sustainable development.
- (iv) To enhance the efficiency of existing universities/ institutions and NGOs for devising national sustainable development strategies in partnership with the Ministry of Environment and Forests.
- (v) To undertake cutting edge research and to provide inputs for policy decisions in the Ministry.

(vi) To build capacities and capabilities of the supported organizations/ universities/ institutions/ NGOs to sustain activities of the CoE even after the cessation of financial assistance from the MoEF.

(vii) To carry out specific jobs as per the project assigned by MoEF with respect their mandate.

(viii) To carry out activity based work allotted by MoEF for prioritizing the above objectives given above from (i) to (vii).

## Centre for Environment Education (CEE), Ahmedabad

The Centre for Environment Education (CEE) in India was established in August 1984 as a Centre of Excellence supported by the Ministry. International Day for Biological Diversity 2015 was celebrated by CEE Himalaya at 13 different locations across the Indian Himalayan Region, at Kullu (Himachal Pradesh), Uttarkashi (Uttarakhand) and Balrampur (Uttar Pradesh), involving more than 300 school children, 65 teachers, local NGOs and the community members.

As part of the Indian Himalayas Climate Adaptation Programme of the Swiss Agency for Development and Cooperation, a three-day media workshop on "Adaptation to Climate Change in the Indian Himalayas" was organized in Srinagar from April 6-8, 2015, by CEE Himalaya and The Third Pole. The Centre has also carried out activities in the field of Education for Children; Education in Schools; Engaging Youth by developing a manual of Green Stories, which is a compilation of 100 case studies engaged in NEAC and NGC programme.

Teacher trainings in areas such as biodiversity conservation, including the North East, Western Ghats; marine issues across India have been conducted.

Technology such as Gyansetu (e-tablet), CEE Ka Biscope (ICT) and Paryavaran Sathi (Mobile Phone technology) were made use. The Centre has made all its efforts to reach out the communities through education, communication and training in issues, Urban (transport; citizens' action and awareness; habitat, and industrial pollution ) and Rural (sustainable agriculture, livestock, sustainable livelihoods) and conducted training in improved waste and resource managements. CEE continued to support the MoEF & CC in information servicing as one of its ENVIS Centres. A separate ENVIS Portal on EE&C is also under construction.

### C.P.R. Environmental Education Centre (CPREEC)

C.P.R. Environmental Education Centre (CPREEC), Chennai as a Centre of Excellence was established jointly by the Ministry of Environment, Forest and Climate Change and the C.P. Ramaswami Aiyar Foundation .The Centre has been a pioneer in environmental education efforts in South India and has conducted a variety of programmes to spread awareness and interest among the masses. It strives to increase awareness and knowledge of key target groups (school children, local communities, woman etc.) about the various aspects of environment. The centre has restored seven acre sacred grove at Mangala

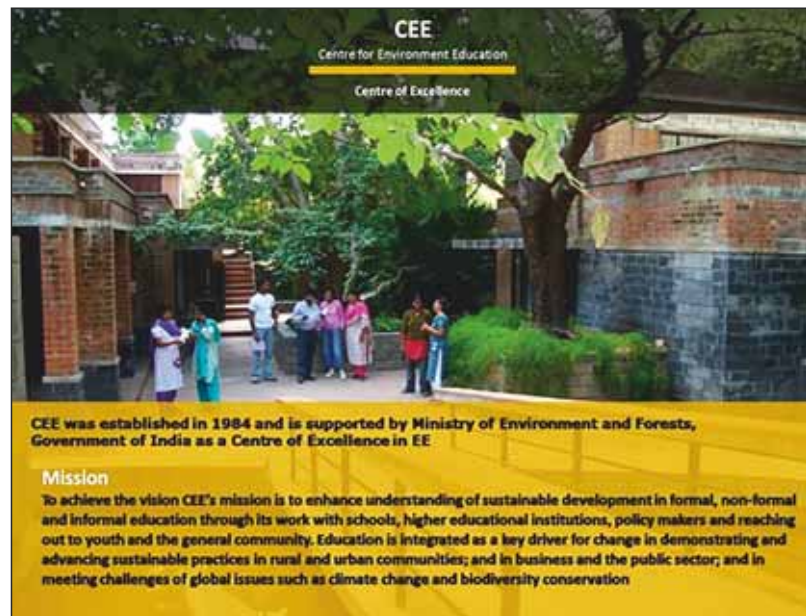


Fig.51 Centre of Excellence, Centre for Environment Education (CEE), Ahmedabad

Theertham, Rameswaram and maintained herbal medicinal garden at Thambatti in Nilgiris. It has organized 30 workshops / training programmes for teachers on Sustainability Education in Schools in Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, Kerala, Odisha and Union Territories of Goa, Puducherry and Andaman & Nicobar Islands. Workshop on E-waste Management was organized at Madurai in Tamil Nadu and five workshops for teachers on Go Vegetarian Outreach program were conducted. 70 orientation programmes for students on Sustainability Education focusing on water and sustainability and biodiversity and 70 school programmes on Go Vegetarian Outreach program were conducted.

### Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru

The Centre for Ecological Sciences at the Indian Institute of Science, Bangalore founded in 1983 with the support of Ministry of





Fig. 52 Saplings for distribution

Environment, Forest and Climate Change offers exciting opportunities for research in a variety of areas in ecology. These include Animal Behaviour, Evolutionary Biology and Sociobiology, Community and Habitat Ecology, Molecular Genetics and Conservation Biology, Large Mammal and Forest Ecology, and Climate Change. The projects consist of theoretical, laboratory and field-based research with the different approaches being used in a complementary manner. Over the past 30 years and more the centre has instilled a

tradition of rigorous enquiry in diverse areas of ecology, evolution and behavior. The extensive research work of the centre has resulted in addition of more than 100 species into medicinal plants herbarium. The digital library of Indian medicinal plants has been further strengthened with the addition of more than 500 high quality plant images and an Ethno-medicinal Plants Demonstration Garden has been established. The Centre has done Pharmacology Studies on Medicinal Plants, two hundred and fifty wild Indian medicinal plant species have been shortlisted for mapping their geographical distribution. The centre has carried out 2-Day Capsule course on Medicinal Plants Conservation for IFS probationers and also conducted two Training programmes on Herbarium Technique and Plant Identification were conducted for MD Ayurveda students of Government Ayurveda College, Bangalore. Threat Assessment and Sustainable Management of Medicinal Plants has been carried out.



Fig. 53 Friends of Trees during a Plantation Ceremony

## Centre for Mining Environment (CME), Indian School of Mines, Dhanbad

A unique centre of its kind, Centre of Mining Environment (CME) was established in 1987 at the Indian School of Mines, Dhanbad under the sponsorship of Ministry of environment and Forests, Government of India, with the following objectives: 1. To impart training to in-service field personnel Environmental Science and Technology with particular reference to Environmental Management in Mining Areas; 2. To carry out Research in the field of Mining Environment; 3. Initiation of Regular Academic Programmes in Environmental Science and Engineering; 4. To undertake Consultancy and Testing work to help Mining and Mineral Industries in the neighbouring areas in solving environmental pollution problems.

The Centre has organized more than 115 training programmes with the training of about 1250 in-service personnel and other stakeholders and offers regular training of 1-2-4-6-13 weeks duration as per the requirements of the industry. The Centre has completed 73 Research & Development and 165 consultancy projects by establishing linkages with various national and international organizations in the areas of Air and Water Pollution Control, Wastewater Management, Acid Mine Drainage, Mine Fire, Mine Planning, Reclamation of Mining Degraded Lands, Tailings Management, Solid Waste Management, Noise Abatement, Green Belt Development, Environmental Management Capacity Building of Coal as well as Non-coal Sectors under World Bank aided projects of

Coal India Ltd., Ministry of Environment and Forests, Government of India, Ministry of Mines, Afghanistan and Ministry of Mines, Nigeria.

The Centre has completed number of Demonstration Projects such as, Water Sustainability through Augmentation of Pumped Out Mine Water from - Underground Coal Mines in India; Re-vegetation of Ash Pond and Washery Reject Site at Tata Steel, Jamadoba; Development of Eco-Park at Mine Goaf Area Site at Tata Steel, Jamadoba; Eco-Restoration of Mine Dump; Rain Water Harvesting at ISM Campus. The Centre has developed various Standards/Guidelines of Mine Subsidence, EMPs of Mining Projects, Environmental Standards for Mining Areas, and Use of Dust Suppression Chemicals for Mining Areas.

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

### Introduction

The Salim Ali Centre for Ornithology and Natural History (SACON) was formally inaugurated on 5th June 1990. Located at Anaikatty, 24 kms northwest of Coimbatore, SACON is a national centre for studies in Ornithology and Natural History. The centre was named befittingly after Dr. Salim Ali in appreciation of his life long services to India's bird life and conservation of natural resources. Apart from developing and conducting regular postgraduate courses in Ornithology and Natural History, SACON also designs and conducts research in ornithology covering all aspects of biodiversity and natural history. It





**Fig. 54** Cattle egrets (*Bubulcus ibis*) rapidly expanded in Colonies

has seven field research stations at various parts of the country. Research activities are conducted by five research divisions, namely conservation ecology, Ecotoxicology, Environmental impact assessment, Landscape ecology and Restoration ecology. Within the divisions there are research programmes in: Avian ecology and endangered bird conservation, Man and biodiversity conservation, Wetlands conservation,

Environmental contamination and biodiversity, Environmental Impact Assessment, Modelling and simulation and Nature Education Sálim Ali Centre for Ornithology and Natural History (SACON) Carried out 280 Research projects, Consultancies and Publications. 850 Papers in scientific journals, Conferences, Newsletters, Technical reports, Books etc were published.



**Fig. 55** Black-winged Stilt in Satellite wetland whit elbis feeding in a wet land near Kanha National Park

## Centre for Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi, Delhi

The Centre works towards strengthening awareness, research and training in priority areas of environmental management of degraded ecosystems and closely coordinates with the other departments of SES, viz. Department of Environmental Biology and Centre for Interdisciplinary Studies of Mountain & Hill Environment (CISMHE) on issues of biodiversity conservation, habitat loss, pollution and rehabilitation of displaced people due to developmental activities. The Centre has carried out ecological restoration of mined out areas – The Barren Overburden Dumps (OBDs) in Coal fields of Bharat Coalfields Ltd. (BCCL) and Central Coalfields Ltd. (CCL) have been ecologically restored to their natural state of ecosystems i.e. ecosystems existed before mining under the management of invasive alien species, the Jhirna Valley of 500 ha in Corbett Tiger Reserve has been made free from Lantana by Cut Root-stock Method. Degraded grasslands in the flood plains of Ramganga and Sitabari Valley have been restored and these restored grasslands now harbor rich wildlife. The Centre is also monitoring 10 year old restored tropical moist forest on the limestone mined out area of SAIL at Puranapani (near Rourkela), Odisha. The centre has made extensive study on the changing flora and ecology of Delhi and described about 1200 species. As 100 species have been described for the New Flora of Delhi during 2015. One workshop was conducted on the Management of Lantana and other invasive

weeds at CTR for field workers of Uttarakhand Forest Department. About 45 field level workers took the training.

## Madras School of Economics (MSE), Chennai

### Introduction

The Centre of Excellence in Environmental Economics, Madras School of Economics (CoE-MSE), Chennai was set up under the 'Centres of Excellence' (CoE) Plan Scheme of the Ministry on the basis of a Memorandum of Understanding (MoU) entered into between the Ministry of Environment and Forests and Madras School of Economics in 2002. Its objective is to address issues of national importance with focus on economic aspects of the environment.

### Progress made during the year

During 2015-16, the Centre had completed the following tasks assigned during previous years:

- Concept paper clearly identifying India's stand on the environmental goods agreement that some fourteen WTO members have launched in the forum of plurilateral negotiation.
- "Trade and Environment: India's Exports of Textile and Textile Products and Environmental Requirements" –The study attempted to understand the structural adjustment problems facing the industry, the global supply chain and the environmental compliance requirements, in order to create an enabling policy environment for the growth of the textile industry.



## Foundation for Revitalisation of Local Health Traditions (FRLHT), Bengaluru

### Introduction

The Centre of Excellence on Medicinal Plants and Traditional Knowledge at FRLHT, Bangalore supported by MoEF&CC was initiated during 2002-03 to bring to focus various issues related to the medicinal plant resources of the country including the traditional knowledge associated with these resources. The Centre in the course of its activities has created a National Bio-cultural herbarium of medicinal plants and an Ethno-medicinal garden, both of which have rich collections of medicinal plants.

The Centre also engages in the following key activities related to Medicinal Plant resources and associated traditional knowledge:

Pharmacognostic studies on the diverse plant raw drug entities in use, Capacity building programmes and Training courses

supplemented by Training modules and learning material for different stakeholder groups linked to medicinal plants, GIS based distribution mapping of wild medicinal plants to contribute to the improved management of medicinal plant resources including conservation action, Development of computer media based well-referenced educational products on medicinal plants used in the codified systems of Indian medicine, and Threat assessment of medicinal plants and ground truthing of the status of high priority medicinal plant populations.

The sustained efforts of the Centre have resulted in drawing focus to various issues related to medicinal plants in the conservation sector in the country. The Centre has also drawn attention to the issues related to botanical raw drugs in foreign trade and emphasized upon the need to improve the existing HS (Harmonized System) Coding System under which data in respect of botanical raw drugs in foreign trade is being maintained.



Fig. 56 Rudrakshi, medicinally and culturally significant

## CHAPTER-10

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# AWARDS AND FELLOWSHIPS







## Indira Gandhi Paryavaran Puraskar (IGPP)

### Introduction

The Indira Gandhi Paryavaran Puraskar was instituted by the Ministry of Environment and Forests in the year 1987. Any citizen/organization of India engaged in scientific/field work for the cause of protection of environment is eligible for this award. The award is given annually and it consists of two prizes of ₹ 5,00,000/- each under organization category, and three prizes of ₹ 5,00,000/- ₹ 3,00,000/- and Rs, 2,00,000/- under individual category. Along with the cash prize, each awardee is given a Silver Lotus Trophy, Scroll and Citation. The award is given annually and an advertisement inviting nominations for IGPP is released every year on 15th of July in national dailies with regional coverage. The composition of the Prize Committee is as follows (i) Vice –President of India (Chairman) (ii) Speaker of Lok Sabha (iii) Minister for Environment, Forest & Climate Change (iv) 3 Expert Members selected by the Prime Minister's Office (v) Secretary, Environment, Forest & Climate Change (Member Secretary).

While selecting the awardees, the term 'environment' is interpreted in the broadest sense possible and comprising of work relating to 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 and creating awareness of environmental issues.

### Present Status

Advertisement for inviting nominations for IGPP-2013, under both Individual and Organisation Categories, were issued on 15 July, 2013. More than 100 nominations have been received for IGPP-2013 and various activities as per the regulations applicable for IGPP-2013 are under process.

Advertisement for inviting nominations for IGPP-2014, under both Individual and Organisation Categories, were issued on 15 July, 2014. More than 70 nominations have been received for IGPP-2014 and various activities as per the regulations applicable for IGPP-2014 are under process.

## Indira Priyadarshini Vriksha Mitra (IPVM) Awards

### Introduction

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.

## CHAPTER-11

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# ENVIRONMENTAL INFORMATION





## Environmental Information System (ENVIS)

Environmental Information System (ENVIS), by providing scientific, technical and semi-technical information on various environmental issues since its inception in 1982-83 (Sixth Plan), has served the interests of environmental management at all levels of Government as well as decision-making aimed at environmental protection and its improvement for sustaining good quality of life of all living beings. With a Focal Point in the Ministry, it is essentially a decentralized system of Centres mandated to develop a distributed network of subject-specific databases. It is targeted to develop and strengthen ENVIS as a comprehensive web-enabled, content-based, interactive, disaggregated information network on environment through a distributed database concept so that ENVIS network as a whole can deliver on its short and long-term objectives. The network presently consists of 69 Centres, of which 29 Centres which deal with “State of the Environment and Related Issues” are hosted by State Governments/ UT Administrations, and remaining 40 Centres which are hosted by various eminent organisations/ institutes have a thematic mandate.

### Review of Performance

- ENVIS Centres successfully undertook the mandated tasks of database development (descriptive information and numerical data), creating information products, maintaining and upgrading an ENVIS website on NIC platform, and dissemination of stored information through newsletters, reports, reprints,

special thematic publications, news digests, abstracting services, etc.

- ENVIS Focal Point and its partners together responded to more than 41,000 queries till December 31, 2015 on various subject-areas of environment and its associated fields and provided substantive information to users as far as possible.
- Audit and upgrading of 32 ENVIS Centres’ websites in pursuance of Web Security Guidelines issued by Indian Computer Emergency Response Team (CERT-In) is in process.
- ENVIS Portal (<http://www.envis.nic.in>) runs in parallel with the Digital India Objective which works on improving the digital literacy on Environment sector and deliver services digitally all over the country. The digitization of valuable data covering the broad spectrum of subjects on Environment will serve as an asset in generating feature rich repository of information.
- National Remote Sensing Agency (NRSC), ISRO, Hyderabad conducted workshops to demonstrate the various resources available on the Bhuvan portal for land use mapping, urban planning, resource mapping, etc. The features of Bhuvan portal are amenable for use by State and Thematic ENVIS Centers for further dissemination of information. In order to provide the hands on training to all the ENVIS Centre for using Bhuvan web services and creation of dynamic maps using ENVIS data, three training programs were conducted at National Remote Sensing Centre (NRSC), ISRO, Balanagar, Hyderabad, National Remote Sensing



Centre (NRSC), ISRO, Jodhpur and North Eastern Space Applications Centre (NESAC), Shillong.

- In order to further strengthen the quality of information in ENVIS it is decided to conduct quarterly Brainstorming meetings of ENVIS Centres. The first such meeting of Delhi Based ENVIS Centres was held on 12th January, 2016 at MoEF&CC.
- A new State ENVIS Centre on “Status of Environment and related issues” at the Department of Environment & Forest, Itanagar, Arunachal Pradesh has been established this year.
- The India State-Level Basic Environmental Information Database (ISBEID) with 17 modules and GIS interface has been developed in association with National Informatics Centre (NIC), to assist State/ UT Centres to collect, compile and disseminate information.

### Launch of ENVIS Portal and Inauguration of National Interaction-cum-Evaluation Workshop (17-19 February, 2016) for ENVIS Centres at New Delhi

Shri Prakash Javadekar, Minister of State (Independent Charge), Environment, Forest and Climate Change launched the Environment Information System (ENVIS) portal at the Inaugural function of the National Interaction-cum-Evaluation Workshop for ENVIS Centres at The Ashok, New Delhi on 17th February, 2016. Speaking after launching the ENVIS Portal, the Minister said that the government’s endeavour has been to take care of nature and ensure sustainable development. The Minister said that the challenge before ENVIS is to find out new ways to reach out to people and how to popularise science and sustainable practices. Shri Javadekar emphasised the need to continuously upgrade each ENVIS centre.



Fig.57 Hon'ble MoS(I/C) Shri Prakash Javadekar launching ENVIS Portal of MoEF&CC





The Minister also distributed the award of the best State ENVIS centre to Forests, Environment & Wildlife Management Department, Sikkim and the award for the best Thematic ENVIS Centre to Indian Institute of Science, Bengaluru. Shri Javadekar also released knowledge products of ENVIS Centres including – an ENVIS Bulletin on ‘Ecology and Management of Grassland Habitats in India’ by WII ENVIS Centre, a book on ‘State at a Glance: Jammu & Kashmir’ Vol(1) 3, 2015 by GB Pant ENVIS Centre, a book on ‘Ecological Traditions of India - Gujarat - Vol. XI’ by CPREEC ENVIS Centre and a Compendium on "Environment in the Indian Parliament: 2011-2015" (CD format) by WWF ENVIS Centre. The Minister also released mobile applications, including an ENVIS App (2.2 Version) on medicinal plants by neighbourhood App (0.4.0 version) on common medicinal plants of Bengaluru City by FRLHT ENVIS Centre, economic algal material, important fungi and their applications, important bacteria and their applications - Android App by ENVIS Centre, Kalyani University.

## National Interaction cum Evaluation Workshop for ENVIS Centres 2015-16

In addition to Scientific Advisory Committee (which offers mid course corrections to Scheme) and online Monitoring and Evaluation System by EI Division on day-to-day basis, third-Party Evaluation of the ENVIS Scheme as a whole and Performance of ENVIS Centres on an annual basis is done through **National and Regional Evaluation Workshops by separate Independent Expert Committees for State/ UT and Thematic Centres**. Regional and National Workshops is organized in alternate years.

In this workshop, there are 10 independent experts from different regions of India evaluating websites of ENVIS centres online, in three different parallel sessions where each Centre is given 40 minutes for online presentation. This Workshop would evaluate and assess the functioning of the 69 ENVIS Centers not only to consider their continuance



Fig.58 Participants of National Evaluation Workshop 2015-16 at MoEF&CC, Indira Paryavaran Bhawan, New Delhi.

based on their performance, but also to provide them the necessary guidance and training in performing their activities to meet the objectives of the ENVIS scheme and also help in decision support system of the Ministry.

### The Science Express Climate Action Special (SECAS)

The Science Express Climate Action Special (SECAS) train was flagged off on 15 October 2015 from Delhi Safdarjung Railway Station by Shri Prakash Javadekar, Hon'ble Minister of Environment, Forest and Climate Change along with various other Central Ministries. In order to spread awareness among the local people and educate the school children on issues of Climate Change, ENVIS Centres based in Delhi, Uttarakhand, West Bengal, Odisha, Chhattisgarh and Tamil Nadu conducted various activities showcasing their ENVIS activities.

### Statistical Cell

The Ministry of Environment, Forest & Climate Change created a Statistical Cell with the objective to develop an efficient and centralised statistical database on

environment, forest & climate change with the assistance of various Environmental Centres, under the 'ENVIS' Scheme. Secondly to Liaison with State/UT Governments and UT Administrations, and where necessary, to strengthen the processes of data collection, validation, processing and interpretation of statistical data, with the assistance of ENVIS Centres and Centre for excellence.

This Ministry has decided to prepare the state of Environment Report (SoER) of national/states/metropolitical cities and other hotspots under the State of Environment Reporting (SoER) Scheme. This report, hence forth would be a departure from the past practices. Now it would be comprehensive document, intended for use by policy-makers, planners, regulators, and researchers. It would be a more structured analytical tool.

Earlier, State agencies used to prepare the Report, but to enhance its intrinsic value, it was decided to prepare it by an independent agency alongwith expert institutions of high repute, with the active involvement of planners and policy makers so that its utility increases. The list of few Experts Institutions



**Fig.59** In Workshop on State of Environment Report Sikkim, July 2015 inaugurated by Shri Tshering Wangdi Lepcha, Minister of Environment, Sikkim



has already been drawn up which needs to be extended. However, the involvement of the State Government and its Planning Department/Board would be vital. The environmental issues should be taken in planning process by the respective States as the stakeholders are planning departments and environment departments. SoER Reporting will be a continuous and rigorous process. The Report would be reviewed after two years for additionality and improvement. There is a need to make it an online tool in planning process so that impacts on the environment may be analyzed well in time.

Process for preparation of the State of Environment Report 2015 (National) has already been completed and the task has been assigned to the Development Alternative, New Delhi in October, 2015. Preparation of the SoER for the state of Telangana, Andhra Pradesh, Mizoram, Sikkim has already started and first instalment of grant has already been released to the agency. SoER for the State of Lakshadweep, Punjab and Tamil Nadu has already completed and Nagaland, Meghalaya, Tripura, Assam, J&K, are in the pipeline.

The statistical cell has also already initiated work for development of National Green Accounting, Development of Environmental Statistics & Indicators and Interaction with National and International organisation etc. The statistical advisor is the nodal officer in the ministry. Statistical studies related to Agriculture and River Yamuna basin etc. are in the pipeline.

## Non-Governmental Organisation (NGO) Cell

A Non –Governmental Organisation (NGO) Cell has been set up in the Ministry to handle various matters relating to NGO's work in diverse field of environment. The basic functions of the Cell are:

- Collection and dissemination of information to various NGOs.
- Liaison with the NITI AAYOG and other Government Ministries to create a database of various NGOs working in the field of environment and the associated areas. Besides replying to Parliament Questions, the NGO Cell also handles RTI applications.
- Shri Prakash Javadekar, Hon'ble Minister (Independent Charge) Environment, Forest & Climate Change on 6th October, 2015 released the 10th edition of Directory of Environmental NGO's in India-2015, at a function organized by the MoEF&CC at Indira Paryavaran Bhawan, New Delhi.

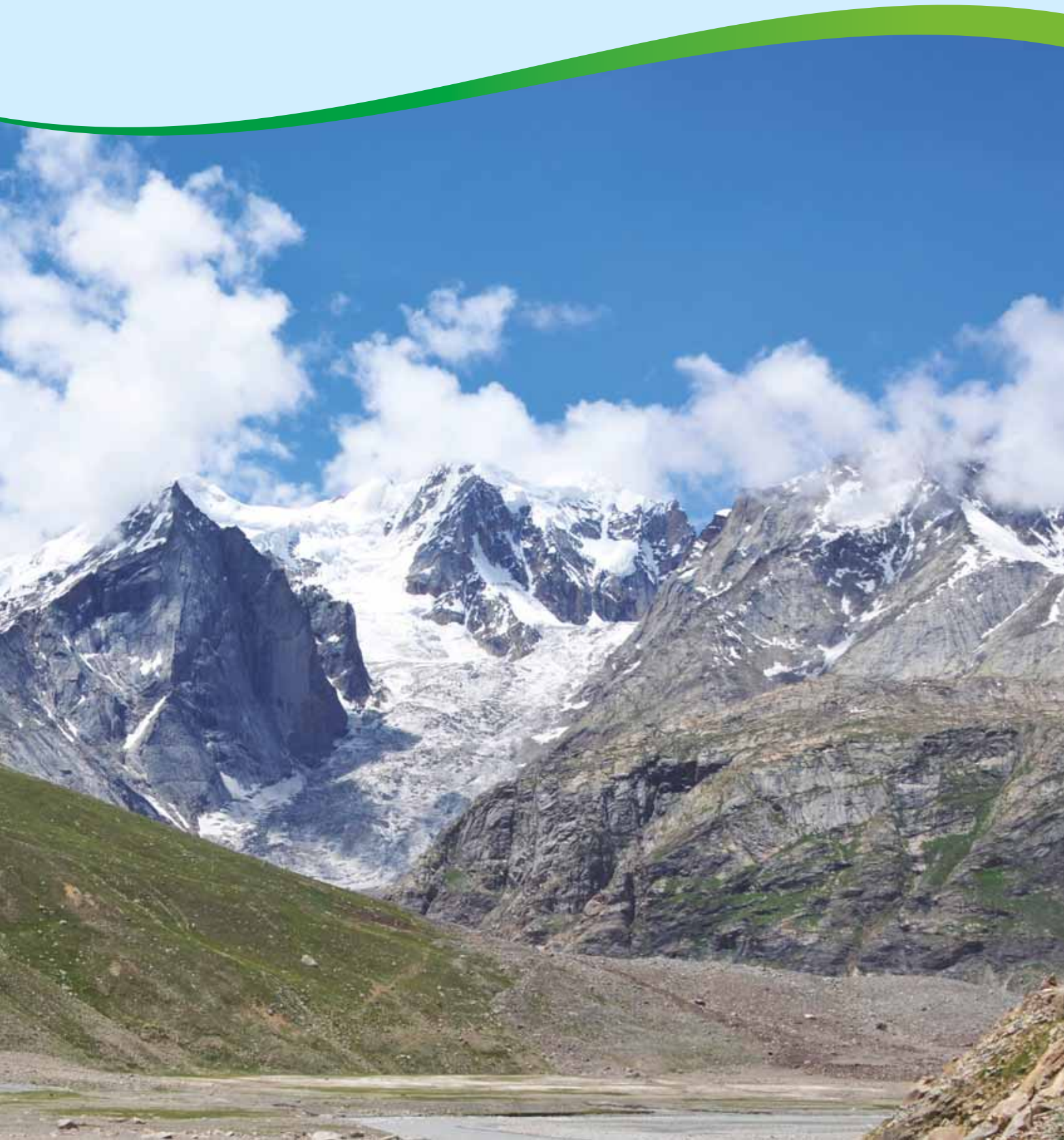


**Fig.60** 10th edition of NGO Directory released by Hon'ble MoS(I/C) Sh. Prakash Javadekar on 6th October, 2015.

## **CHAPTER-12**

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# **LEGISLATION AND INSTITUTIONAL SUPPORT**







## Policy and Law

### Introduction

The Policy and Law Division is implementing the Scheme “Environmental Monitoring and Governance”. The Budget under this Scheme is allocated to:-

- The National Green Tribunal
- Loss of Ecology (Prevention and Payment of Compensation Authority)
- Dhanu Taluka (Environment Protection Authority)

The establishment of NGT is under the Administrative control of this Division.

### National Green Tribunal (NGT)

The National Green Tribunal (NGT) has been established on 18th October, 2010 under the NGT Act, 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. It also hears cases relating to enforcement of any legal rights relating to environment and providing 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 is not bound by the procedure laid down under the Code of Civil Procedure, 1908, but is guided by principles of natural justice. The Tribunal is mandated to make an endeavor for disposal of applications or appeals finally within 6 months of filing.

Presently, the Tribunal has five places of sitting, including Principal Bench at Delhi. Pune, Kolkata, Bhopal and Chennai are four zonal Benches of sitting of the Tribunal. In addition, the Tribunal holds three circuit Benches at Shimla, Shillong and Jodhpur.

The present Chairman of the Tribunal, Hon’ble Mr. Justice Swatanter Kumar is a former Judge of the Supreme Court of India. In addition to the Chairperson, 8 Judicial and 9 Expert Members are presently working in the Tribunal.

Since its inception and upto 31.10.2015, the Tribunal has received a total of 12091 Cases where 8353 cases have been disposed off and 3738 cases are pending.

### Monitoring of Court Cases (LMC)

A Legal Monitoring Cell has been constituted to monitor the progress in Court Cases. The number of Court cases in March 2015 was 2177 out of which replies were pending in 420 cases. As on January, 2016 the number of Court cases was 2497 out of which replies were pending in 156 cases. The LMC organized two workshops during the year to sensitize Officers and legal counsels about the need for proper handling of Court Cases.

### Economic Cell

Economic Cell of the Ministry is responsible for the following areas of work:

- All matters having bearing on internal and external economic management in the Ministry and reform in the environment and forest sectors.
- Formulation, Implementation and Monitoring of Work Plans of the Centre of Excellence in Environment Economics, Madras School of Economics, Chennai.

- Development of Green Public Procurement Guidelines.
- Appraisal of environmentally-friendly proposals relating to fiscal incentives, and recommendation on inclusion of the same in Union Budget proposals - Budget proposals.
- Nodal Division for handling and coordinating all matters which have underlying economic issues referred by the Ministry of Finance.

### Achievements/Progress made

The Economic Cell had completed the following tasks assigned during previous years:-

- Concept paper clearly identifying India's stand on the environmental goods

agreement that some fourteen WTO members have launched in the forum of plurilateral negotiation.

- “Trade and Environment: India's Exports of Textile and Textile Products and Environmental Requirements” –The study attempted to understand the structural adjustment problems facing the industry, the global supply chain and the environmental compliance requirements, in order to create an enabling policy environment for the growth of the textile industry

### Trade and Environment

Trade and Environment Division of the Ministry is headed by the Economic Adviser working under the supervision of the

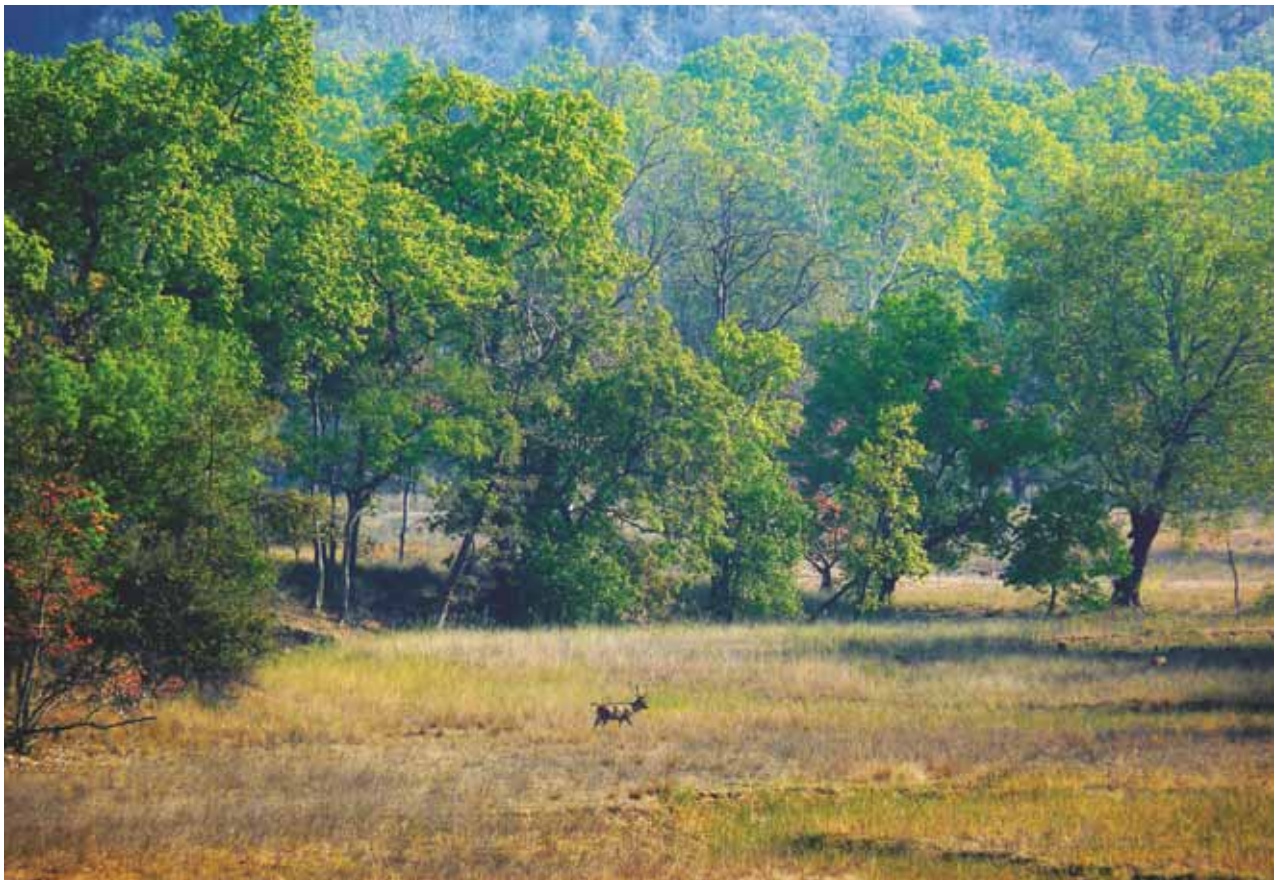


Fig. 61 Sambar deer at a Sal forest



Fig. 62 *Humboldtia brunonis* Wall. - Endemic to South Western Ghats

Senior Adviser, has the following areas of responsibility:

- Provision of technical inputs to the preparatory process in the area of Trade and Environment.
- Formulation of Ministry's position on trade-related matters referred to it by other Ministries, including views on issues relating to Regional/Bilateral/Multilateral Trade Agreements and other trade-related issues.
- Acting as Nodal Cell within the Ministry to deal with references received from M/o Commerce & Industry relating to Trade & Environment.

### Activities undertaken

The Trade and Environment Division regularly furnished comments and materials from environment, ecology, forestry and wildlife points of view to the Department of Commerce for drawing up India's position on disciplines in Domestic Regulation pursuant to

GATS Article VI, India's revised requests in the World Trade Organisation (WTO), in particular, the negotiations under trade in goods and services and domestic regulations and also inputs for India Australia Service Negotiations. This Division also coordinated and contributed comments on Cabinet Notes referred to this Ministry by Ministry of Commerce and Industry; the most noticeable ones include National Intellectual Property Rights Policy, Notification of commitments under the Trade Facilitation Agreement (TFA) of WTO. This Division also contributed inputs to the BRICS Environment Working Group meeting held in October - November 2015 in St.Petersburg.

Economic Adviser (EF&CC) has been nominated to represent this Ministry in Trade Policy Review -2015 exercise of Government of India's Report on 2nd Task Force on Transaction Cost in international trade constituted by Minister of Commerce & Industry. This Division has given inputs for the Report. The task force was mandated to identify reasons for high transaction cost in exports and compare procedural complexities in exports between India and its major competitors. Further to suggest guidelines/steps to move towards transparent and increasingly paperless processing through digital platform, this Division has taken up with Wildlife Division to facilitate the implementation of recommendations of Second Task Force on Transaction Cost Report which relates to linking of domestic regulations on various goods/items with their corresponding ITC (HS) Codes.



# CHAPTER-13

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# CLIMATE CHANGE







## Climate Change

### Introduction

The financial year 2015-16 was important for climate change both at domestic and international level. It started with the preparation of the third National Communication (NATCOM) under the United Nations Framework Convention on Climate Change (UNFCCC) and release of the Biennial Update Reports (BURs). Under the Prime Minister's Council on Climate Change (PMCCC) all National Missions under the National Action Plan on Climate Change (NAPCC) were asked to revisit their plans. New missions on wind energy, health, waste to energy and coastal areas was also taken up. Also, it redesigned the National Water Mission and National Mission on Sustainable Agriculture. The National Adaptation Fund for Climate Change (NAFCC) was made operational in 2015-16. To develop institutional capacities and implement state level activities to address climate change the State Action Plan on Climate change (SAPCCC) is being prepared. To create and strengthen the scientific and analytical capacity for assessment of climate change in the country different studies under Climate Change Action Programme (CCAP) has been initiated. During this financial year, many important bilateral and multilateral meetings and international negotiations on climate change were held in which Hon'ble Minister and senior Officials of the Ministry participated. India submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC. During COP21 in Paris, India Pavilion was set up to showcase and share information on India's action on climate change. In addition, a new online Management Information System (MIS) was launched by the National Clean Development Mechanism

Authority (NCDMA). Also, the National Designated Entity (NDE) for Reducing Emissions from Deforestation and Forest Degradation (REDD+) has been established in the climate change division along with the National Designated Entity for Climate Technology Centre and Network (CTCN) and Technology Executive Committee (TEC).

### National Communication submitted to the UNFCCC

In pursuance of the reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC), India has undertaken to communicate information about the implementation of the Convention, taking into account the common but differentiated responsibilities and respective capabilities and specific regional and national development priorities, objectives and circumstances. The elements of information provided in the communication include a national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases, a general description of steps taken to implement the Convention including an assessment of impacts and vulnerability, and any other relevant information. The communication is meant to provide the context and the national circumstances inter alia India's geography, imperative of development needs, climate and economy; based on which India would be addressing and responding to the challenges of climate change.

India has submitted its Second National Communication (NATCOM) to the UNFCCC in 2012. The second NATCOM provides information of the emissions of Green house gases (GHG) for the years 2000 and 2007. The Ministry is currently preparing India's Third

National Communication (TNC) and in this connection a workshop on National Inventory Management System (NIMS) was organized in July 2015. The purpose of this workshop was to provide inputs for establishment of National Inventory Management System (NIMS) and increased accuracy of Green House Gas inventory preparation with use of higher tier methods.

The Biennial Update Reports (BURs) are new reporting obligation under the transparency arrangement of sharing information on implementation of the Convention. The BUR is a form of enhanced reporting, containing updates of national greenhouse gas inventories and information on mitigation actions, financial, technical needs and support received and an update to India's Second National Communication. The first BUR encompassing information on National Circumstances, GHG Inventories for the year 2010, Mitigation Actions, Analysis of Constraints, Gaps, and related Financial, Technical and Capacity Needs and other related information along with information on

domestic Monitoring, Reporting and Verification (MRV) arrangements has been released.

### National and State Action Plans on Climate Change

India's domestic strategy for addressing climate change is reflected in many of its social and economic development programmes. The National Action Plan on Climate Change (NAPCC) coordinated by the Ministry of Environment, Forest & Climate Change (MoEF&CC) is being implemented through the Nodal Ministries in specific sectors/ areas. Eight national missions in the area of solar energy, enhanced energy efficiency, sustainable agriculture, sustainable habitat, water, Himalayan eco-system, Green India and strategic knowledge for climate change form the core of NAPCC. All national missions were approved by the Prime Minister's Council on Climate Change (PMCCC) and are at different stages of implementation. The Missions are under constant review of the Prime Minister's Council on Climate Change. An Executive



Fig. 63 Indian Pavillion at COP-21 in Paris



Committee on Climate Change under the Chairmanship of Principal Secretary to Prime Minister has been set up for assisting the Prime Minister's Council on Climate Change in evolving a coordinating response to issues relating to climate change at national level with regular monitoring of the eight National Missions along with other initiatives on Climate Change and coordinating with various agencies on issues relating to climate change. Prime Minister's Office has entrusted the responsibility of convening and servicing the Prime Minister's Council on Climate Change as well as the Executive Committee on Climate Change to MoEF& CC. The PMCCC has taken the following important decisions:

- Revisiting of all National Missions under NAPCC in the light of new scientific information (AR5) and technological advances;
- Setting up new missions on wind energy, health, waste to energy, coastal areas;
- Redesigning of the National Water Mission and National Mission on Sustainable Agriculture.

The Ministry has also motivated State Governments to prepare State Action Plan on Climate Change (SAPCC). These SAPCCs aim to create institutional capacities and implement state level activities to address climate change. So far, 33 States namely Andaman and Nicobar, Andhra Pradesh including Telangana, Arunachal Pradesh, Assam, Bihar, Chandigarh Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Karnataka, Lakshadweep, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odhisa, Puducherry, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand and West Bengal, Uttar Pradesh,

Maharashtra, Goa have prepared and submitted document on SAPCC to the MoEF & CC. MoEF& CC is also closely following up with the remaining two states which have not submitted their SAPCCs.

### The National Adaptation Fund for Climate Change (NAFCC)

The National Adaptation Fund for Climate Change (NAFCC) was operationilised in 2015-16. The fund is meant to assist National and State level activities to meet the cost of adaptation measures in areas that are particularly vulnerable to the adverse effects of climate change. This scheme has been taken as Central Sector Scheme with the National Bank for Agriculture and Rural Development (NABARD) as National Implementing Entity (NIE). The overall aim of the fund is to support concrete adaptation activities which are not covered under on-going schemes of State and National Government that reduce the adverse affects of climate change facing community, sector and states.

During 2015-16, sixteen concept notes received from State governments (approx. cost of Rs. 313 Crores) have been considered by the Technical Scrutiny Committee (TSC). The National Steering Committee on Climate Change (NSCCC) approved 6 Detailed Project Reports (DPRs) submitted by Punjab (Rs. 18.24 Cr), Odisha (Rs. 20. Cr), Himachal Pradesh (Rs. 20 Cr), Manipur (Rs. 10 Cr) , Tamil Nadu (Rs. 24.7 Cr) and Kerala (Rs. 25 Cr) at a total cost Rs. 117.98 Crores.

### Climate Change Action Programme (CCAP)

Ministry of Environment, Forest and Climate Change is implementing a scheme titled 'Climate Change Action Programme'

since January, 2014, with an objective to create and strengthen the scientific and analytical capacity for assessment of climate change in the country, putting in place appropriate institutional framework for scientific and policy initiatives and implementation of climate change related actions in the context of sustainable development. Total budget for the scheme is Rs. 290 crore for the 12th plan period.

In order to enhance understanding of climate change the CCAP includes National Carbonaceous Aerosols Programme (NCAP), Long Term Ecological Observatories (LTEO), and Coordinated Studies on Climate Change for North East Region (CSCCNER). The NCAP is a major activity involving multi-institutional and multi-agency study. In this initiative, MoEF & CC will collaborate with the Ministry of Earth Sciences, the Indian Space Research Organization, the Ministry of Science and Technology and other associated agencies to enhance the understanding the role of Black Carbon in climate change through monitoring and assessment of the impacts of black carbon using modeling techniques. The work programme envisages three Working Groups namely Long term Monitoring of Aerosol (Working Group-I), Impact of Aerosol on Himalayan Glaciers (Working Group-II) and Modeling of Black Carbon emissions in India and assessment of its impacts (Working Group-III).

A Science plan was developed in December 2015, for launching long-term ecological observatories programme at eight sites to study the effects of climate change. Under this programme health of eight different biomes will be assessed.

The Ministry has awarded “Modeling Studies on Greenhouse Gas Emissions and Emission Intensity of Indian Economy” to TERI,

IRADe and IEG consortium. The aim of the studies was to have the projections of the GHG emissions in various time slices from 2010 to 2050 in a decadal fashion. Further, the studies examined the greenhouse gas emission intensity of Indian economy during 2005 - 2020 taking into account the ongoing and planned policies and the impacts thereof besides possible options for mitigation by 2020 including the economic implications thereof. The final reports of the studies will be provided by the agencies in 2016.

### **International Negotiations on Climate Change under the United Nations Framework Convention on Climate Change (UNFCCC)**

During the financial year 2015-16 many important bilateral and multilateral meetings and international negotiations on climate change were held in which Hon’ble Minister and senior officials of the Ministry participated. These meetings were crucial in the run up to the 21st Conference of Parties.

- Hon’ble Minister attended the first Official Meeting of the Environment Ministers of BRICS (comprising Brazil, Russian Federation, India, China and South Africa) on 21-22 April, 2015. He also participated in important meetings such as the Major Economies Forum during April 19-20, 2015, Petersberg Climate Dialogue VI during 17-19 May, 2015 and the Informal Ministerial Consultation during 20-21 July in Paris. Important issues such as differentiation, ambition, adaptation and loss and damage and roadmap to COP 21, were discussed. Joint Secretary (Climate Change) participated in the 20th BASIC Ministerial Meeting on Climate Change, held in 27-28





- June, 2015, New York and in the High Level Event on Climate Change in the United Nations Headquarter, New York on 29th June, 2015.
- On Gandhi Jayanti, India submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC. The approach of India's INDC has been anchored in the vision of equity inspired by Mahatma Gandhi's famous exhortation - "Earth has enough resources to meet people's needs, but will never have enough to satisfy people's greed". India's INDC focuses on all elements i.e. mitigation, adaptation, finance, technology development and transfer and capacity building. It represents high ambition and attempts to balance needs of the poor and environmental sustainability. It also has a strong focus on adaptation sectors. The key contributions envisaged in India's INDCs are as follows:
    - To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation;
    - To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development;
    - To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level;
    - To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF);
    - To create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030;
    - To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management;
    - To mobilize domestic and new & additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap;
    - To build capacities, create domestic framework and international architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies.
  - Ministry of Environment, Forest and Climate Change organized the Conference of the climate change negotiators of the Like Minded Developing Countries (LMDC) in New Delhi on 14-15 September 2015. Hon'ble Minister Mr. Prakash Javadekar, Minister of Environment, Forest and Climate Change of India, inaugurated the meeting. The meeting was convened to take stock of the climate change negotiations under the UNFCCC and provide an alternative roadmap by the LMDC for the Paris agreement.
  - Many foreign dignitaries visited India to discuss issues relating to the 2015 Agreement including H.E. Mr Laurent Fabius, Foreign Minister of France, Mr Todd Stern,

Special Envoy for Climate Change, USA, Mrs. Laurence Tubiana, Special Representative for climate change negotiations, Ms Amber Augusta Rudd, Secretary of State for Energy and Climate Change of UK.

- The 21st Conference of Parties under UNFCCC was held in Paris from 30th November to 12th December, 2015. Honble MoEFCC lead an inter-ministerial delegation that participated in the Paris conference. India engaged in the negotiations with a positive outlook and constructive spirit. Hon'ble Prime Minister of India attended the leaders' summit held on the opening day of the Conference on 30th November, 2015. His statement including the emphasis on climate justice, Common But Differentiated Responsibilities, renewable energy was lauded by many leaders including the French President Mr. Francois Hollande during the Conference.

The outcome of this conference represents a forward march for the global community in the fight against climate change involving all countries. India advocated for a balanced, equitable comprehensive, ambitious and effective climate agreement based on the principles and provisions of the Convention. Some of the main highlights of the Agreement are:-

- The Agreement explicitly recognizes in the Preamble the imperatives of climate justice and sustainable lifestyles as manifested in patterns of consumption and production, with developed countries taking the lead;
- The preamble also recognizes the

specific needs and special circumstances of the developing country parties, which are vulnerable to the adverse effects of climate change as provided under the Convention;

- Further, the Agreement recognizes that the principles of equity and common but differentiated responsibilities and respective capabilities, in the light of different national circumstances will be respected;
- India has always highlighted the urgent need of Adaptation to deal with the impact of climate change;
- Parties' contributions to tackle climate change are defined as 'Nationally Determined Contributions' and a top-down approach of apportioning mitigation ambition has been avoided;
- A 5 year communication-cycle for Nationally Determined Contributions (NDCs) has been agreed to. There is no mandatory ratchet up mechanism for Parties to raise their mitigation ambition. This will continue to be nationally determined. However, Parties would be free to raise their ambitions voluntarily any time;
- The Agreement maintains differentiation in mitigation actions of developed and developing countries. It mandates that developed countries should continue to take the lead and undertake absolute targets, while developing countries should continue to enhance their mitigation efforts and are encouraged to move over time towards absolute targets;



- A new market mechanism to provide opportunities for voluntary cooperation in the implementation of the nationally determined contributions using international transfer of mitigation outcomes has been adopted. Implementation of REDD+ mechanism has also been anchored in the Agreement;
- Agreement clearly recognizes the need for support to developing country parties for effective implementation of their mitigation and adaptation actions. Agreement mandates an obligation for developed countries to provide financial resources to developing countries. Other parties may also contribute, but on a voluntary basis, which will not dilute the obligation of developed countries;
- An enhanced system for transparency has been provided in the Agreement. This will cover not only mitigation and adaptation actions, but also the support provided by developed countries. The enhanced transparency system will build on the existing system under the Convention and provide flexibility to developing countries. In addition, a separate Capacity Building Initiative for transparency to help developing countries has been agreed to in order to build institutional and technical capacity;
- A new technology framework has been established. Collaborative approaches to Research and Development and facilitating access to technology and financial support for the technology mechanism have been provided;
- Pre-2020 actions are also part of the decisions. The developed country parties were urged to scale up their level of financial support with a complete road map to achieve the goal of jointly providing US \$ 100 billion by 2020 for mitigation and adaptation by significantly increasing adaptation finance from current levels and to further provide appropriate technology and capacity building support. It was also decided to identify ways to enhance the ambition of mitigation efforts by all parties including identifying opportunities to enhance the provision and mobilization of support and enabling environments.
- The Conference also witnessed the launch of the historic International Solar Alliance by Hon'ble Prime Minister of India Shri Narendra Modi on 30th November, 2015 along with Hon'ble President of France, Mr. Hollande in the sideline of COP -21.
- The Mission Innovation was launched on 30th November, 2015 in the sideline of COP-21 to accelerate widespread clean energy innovation as an indispensable part of an effective, long-term global response to the shared climate challenge; necessary to provide affordable and reliable energy for everyone and to promote economic growth; and critical for energy security. Through this mission the participating countries aim to reinvigorate and accelerate global clean energy innovation with the objective to make clean energy widely affordable.



**Fig.64** Hon'ble Prime Minister, Shri Narendra Modi inaugurated the Indian Pavilion at COP - 21 in Paris

### India Pavilion at COP-21, Paris

An India Pavilion was set up in COP-21 to showcase and share information on India's actions on climate change. Shri Narendra Modi, Prime Minister of India inaugurated the Indian Pavilion at COP21 in Paris in the presence of Hon'ble Minister Shri Piyush Goyal and Hon'ble Minister Shri Prakash Javadekar.

The pavilion hosted 25 sessions, 150

speakers, 130 presentations, over 80 Films, 13 book/reports/CDs/Films/ Brochures releases. Pavilion was appreciated and viewed by nearly 6500 visitors from different countries. Information on India's initiatives was also shared in the form of books or brochures and digital material. Indian Pavilion was one of the centre of attraction in COP-21 due to its water screen, 360 Degree Film, Ipad Forest, E-book on India's culture & Sustainable living.



**Fig. 65** The book titled "PARAMPARA" on India's culture of climate friendly sustainable practices was launched in India Pavilion on 30th November, 2015 by the Hon'ble Prime Minister

### Clean Development Mechanism (CDM)

- A new online Management Information System (MIS) – <http://www.ncdmaindia.gov.in>

gov.in has been launched by the National Clean Development Mechanism Authority (NCDMA) in the Ministry of Environment, Forest and Climate Change with the support of GIZ.





**Fig. 66** A booklet on “Climate Friendly Lifestyle Practices in India” was launched by Shri Prakash Javadekar, Hon’ble Minister, MoEF&CC.

- The on-line system captures the entire life cycle of Clean Development Mechanism (CDM) projects. It will also enable monitoring of the projects at different stages to promote transparency in operation and monitor sustainable development activities relating to the CDM projects in the country. Globally, it will be the first such web-based application developed for CDM.
- In the year 2015, NCDMA has accorded Host Country Approval to 37 CDM projects. Over the years, NCDMA has approved 2978 projects in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste, renewable energy and forestry which are spread across the country (covering all states in India).
- By end of 2015, 1594 out of total 7,685 projects registered by the CDM Executive Board under the United Nations Framework Convention on Climate Change (UNFCCC) are from India, which so far is the second highest in the world. As on date Certified Emission Reductions (CERs) issued to Indian projects is 191 million (13.27%).

### Reducing Emissions from Deforestation and Forest Degradation (REDD+)

- The National Designated Entity (NDE) for Reducing Emissions from Deforestation and Forest Degradation [NDE (REDD+)] has been established in the Climate Change Division of this Ministry. The Key function of NDE will include: (i) Identification of possible needs and gaps in coordination of support (ii) Improvement for the effectiveness of finance (result-based finance, technology and capacity-building) (iii) Sharing of information on knowledge, experiences and good practices (iv) Exchange of information as per the United Nations Framework Convention on Climate Change (UNFCCC) requirements and (v) Approval of the national level REDD+ proposal for submission to UNFCCC.
- The Reference document on “Reducing Emissions from Deforestation and Forest Degradation (REDD+) in India” has been formulated and adopted to develop REDD+ policy and facilitate its implementation in

the country. The Reference Document comprehensively addresses the need of capacity building across all levels of the government, expert organizations, civil society, other organizations and local communities.

### **Climate Technology Centre and Network (CTCN) and Technology Executive Committee (TEC)**

The National Designated Entity (NDE) for Climate Technology Centre and Network (CTCN) and Technology Executive Committee (TEC) [NDE (CTCN & TEC)] has been established in the Climate Change Division of this Ministry. The key function will include: (i) Leading and coordinating the formulation, selection and submission of requests for Technology needs assessment and support (ii) Facilitating and monitoring the implementation of CTCN response assistance (iii) Foster collaboration and access to information and knowledge to accelerate climate Technology transfer in the country; (iv) Strengthen network, partnership and capacity building for climate technology transfer.

### **Ozone Cell**

#### **Ozone Layer Protection**

##### **Introduction and objectives**

- Ozone, a tri-atomic molecule of oxygen is formed from oxygen naturally in the upper levels of the Earth's atmosphere by high-energy Ultraviolet (UV) radiation from the Sun. The UV radiation breaks down oxygen molecules, releasing free atoms, some of which bond with other oxygen molecule to form ozone. About 90 per cent of ozone formed in this way lies between 10 and 50

kilometers above the Earth's surface, called the Stratosphere. The ozone found in this part of the atmosphere is called the ozone layer.

### **The Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer**

- The Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer are the international treaties specific for the protection of the Stratospheric Ozone (Ozone layer). The Montreal Protocol has been recognized as the most successful international environmental treaty in history. It has been universally ratified and all the 197 United Nations Member countries of the world are the Parties to the Vienna Convention and its Montreal Protocol. In the 29 years of operation of the Montreal Protocol, extraordinary international cooperation under this agreement has led to phase-out of production and consumption of several major Ozone Depleting Substances (ODSs) such as Chlorofluorocarbons (CFCs), Carbon tetrachloride (CTC) and halons globally from 1st January, 2010. The production and consumption of Methyl Chloroform has been phased out globally as on 1.1.2015, with possible essential use exemptions. The production and consumption of Methyl Bromide has been phased out globally as on 1.1.2015, except use in quarantine and pre-shipment applications. Global systematic observations have confirmed that atmospheric levels of key ODSs are



declining and it is estimated that with continued, full implementation of the Montreal Protocol's provisions, the global ozone layer should return to pre-1980 levels by around the middle of this century and the Antarctic Ozone around 15 years later. The Montreal Protocol has also delivered substantial climate benefits.

- The Protocol is currently addressing the phase-out of Hydrochlorofluorocarbons (HCFCs) with an accelerated phase-out schedule.
- The UN General Assembly on 19th December, 1994 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.

### Activities undertaken

#### Regulatory Measures

- The Ozone Depleting Substances (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986 has been published in the Gazette of India on 19.7.2000. These Rules set the deadlines for phasing out of various ODSs, besides regulating production, consumption, trade, import and export of ODSs and the products containing ODSs. The ODS Rules were amended in 2001, 2003, 2004, 2005, 2007 and 2014 to facilitate implementation of ODS phase-out activities by the enterprises in various sectors.

- The Ozone Depleting Substances (Regulation and Control) Rules, 2000 have been amended to align with the accelerated phase-out of HCFCs as per the adjustment of the Montreal Protocol at the 19th Meeting of the Parties (MOP) in September, 2007. The Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2014 had been published in the Gazette of India in March, 2014.
- The ODS (Regulation and Control) Amendment Rules, 2014 control production and consumption of HCFCs from the date of publication of the Rules. These Rules propose introduction of quota system for production and supply to the domestic market of HCFC-22 for non-feedstock applications for the domestic producers. The Amendment Rules, 2014 prohibit import of pre-blended polyols containing HCFCs and blends containing ODSs including HCFCs from January 2013. The Rules also prohibit creating new capacities to manufacture products with HCFCs from 2013. Further, import of HCFC based Air-conditioners is prohibited from 1st July, 2015.

#### Fiscal Measures

- Fiscal incentives in terms of Customs and Excise duty exemptions on “Capital Goods” have been extended for implementation of the Montreal Protocol funded ODS phase-out projects or establishment of new capacities/expansion of capacity with non-ODS technology since 1994 and the same is being continued.

## Implementation of phase-out of ODSs

- India has completely phased-out production and consumption of CFCs with 50% phase-out by 2005, 85% phase-out by 2007 and complete phase-out as on 1st August, 2008, 17 months ahead of the agreed phase-out schedule.
- India has successfully implemented the National Strategy for transition to non-CFC Metered Dose Inhalers (MDIs) and plan for phase-out of CFCs in the manufacture of pharmaceutical MDIs. The implementation of National MDI Transition Strategy has resulted successful phase-out of pharmaceutical grade CFCs in manufacturing of MDIs as of December, 2012, 11 months prior to the schedule approved by the Executive Committee (Ex-Com) of the Multilateral Fund (MLF) for Implementation of the Montreal Protocol.
- The production and consumption of virgin halons in India was phased out as early as in 2002. The use of CFCs and halons was prohibited in manufacturing of new equipment since 1st January, 2003.
- India has completely phased-out production and consumption of CTC with 85% phase-out by 2005 and complete phase-out as on 1st January, 2010.

## Implementation of HCFC Phase-out Management Plan (HPMP) Phase-I

- The phase-out of HCFCs was accelerated by 10 years with reduction schedule vide decision XIX/6 of the 19th MOP in 2007.
- A Roadmap for phasing-out of HCFCs was launched in October 2009 describing the

long term vision and action plan including the policy instruments for phasing out of production and consumption of HCFCs in India.

- An Action Plan for implementation of the Roadmap for phasing out of HCFCs in India has been developed indicating the responsibilities of the implementing agencies/ organizations and timeline for its smooth and effective implementation.
- The HPMP Stage-I, to comply with 2013 and 2015 targets, was prepared in close cooperation with United Nations Development Programme (UNDP), the lead implementing agency, United Nations Environment Programme (UNEP) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in consultation with the stakeholders, industry, industry associations, line Ministries and other concerned agencies.
- The India's HPMP Stage-I addresses the conversion of manufacturing facilities from HCFCs to non-ODS technologies in foam sector, technical assistance to the systems houses for developing pre-blended polyol system for Micro, Small and Medium Enterprises (MSMEs) of foam manufacturing and initiation of activities in the servicing sector.
- India has successfully achieved the freeze as on 1.1.2013 and 10% reduction of production and consumption of HCFCs as on 1.1.2015, in line with the accelerated phase-out schedule of the Montreal Protocol.
- The Ex-Com of the MLF during its 75th meeting held during November, 2015 approved the release of the third and final





tranche of funding approved under the HPMP Stage-I, based on an independent verification conducted by UNDP, which confirmed the achievement of the phase out targets for both production and consumption sectors respectively..

### HPMP Stage-II

- The Ex-Com of the MLF in its 72nd meeting held in May, 2014 has approved US \$ 490,000 for the preparation of HPMP Stage-II for India with UNDP as the lead implementing agency in association with UNEP and GIZ, Government of Germany as cooperating agencies. The HPMP Stage-II would address phase-out of HCFCs in various sectors of foam manufacturing including Extruded Polystyrene (XPS), various sub-sector of Refrigeration and Air-Conditioning (RAC) manufacturing and RAC servicing sector. The HPMP Stage-II would also include strategy for awareness among the stakeholders and training of enforcement officers across the country.
- The Ex-Com of the MLF during its 74th meeting held in May, 2015 approved the policy guidelines for HPMP Stage-II in the consumption sector.
- UNDP has appointed Refrigeration and Air-conditioning Manufactures Association (RAMA) and the Indian Polyurethane Association (IPUA) for preparation of sectoral strategies in the RAC and foam manufacturing sectors respectively.
- RAMA and IPUA organized 3 awareness workshops each for RAC and Foam Manufacturing Sectors at Chennai, New Delhi & Mumbai. All the workshops were well attended and resulted in creation of awareness on HPMP.

- RAMA and IPUA are currently in the process of conducting survey for collection of data for the preparation of HPMP Stage-II. The data collected will be analyzed and a draft strategy will be developed.
- The draft sectoral strategy developed by the RAMA and the IPUA will be discussed in the National Stakeholder consultative meeting and based on the inputs received, the sectoral strategies for the foam and RAC sectors will be finalized for submission to the Ex-Com of the MLF.

### India-US Task Force on Hydrofluorocarbons (HFCs)

- HFCs being non-ODS chemicals are not controlled under the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer. However, HFCs have high-Global Warming Potential (GWP). The emissions of HFCs are controlled along with other six Green House Gases (GHGs), Carbon Dioxide (CO<sub>2</sub>), Methane, Nitrous Oxide, Perfluorocarbons (PFCs), Sulphur hexafluoride (SF<sub>6</sub>) and Nitrogen Trifluoride (NF<sub>3</sub>) under the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol.
- During the year 2015, two meetings of the Task Force were held from 15th to 16th January, 2015 and 7th to 8th July, 2015. The meetings provided a unique opportunity for the industry, experts and the concerned officials, from the two countries to have in-depth discussions on various aspects related to HFCs and to develop better understanding on the issues of concern.

## India's Amendment proposal for phase-down of HFCs under the Montreal Protocol

- In April, 2015 India submitted an amendment proposal to the Montreal Protocol for phase-down of HFCs using expertise and institutions of the Montreal Protocol and continue to include HFCs within the scope of UNFCCC and its Kyoto Protocol for accounting and reporting of emissions.
- During the 35th meeting of the Open Ended Working Group (OEWG) of the Parties to the Montreal Protocol held in Bangkok from 22nd to 24th April, 2015, 19 challenges relating to HFCs were identified, to be

addressed at the 36th OEWG.

- The 36th OEWG held at Paris, France from 20th to 24th July, 2015 and 29th to 30th October, 2015 at Dubai, UAE finalized the mandate for a contact group on the feasibility and ways of managing HFCs.
- The 27th MOP to the Montreal Protocol held from 1st to 5th November, 2015 at Dubai, United Arab Emirates (UAE) decided to establish a Contact Group to discuss the ways of managing HFCs, including the 19 challenges and then discuss the 4 amendment proposals submitted by the Parties, including by India. The Contact Group initiated discussions on the challenges.



**Fig.67** Shri Ashok Lavasa, Secretary, MoEF&CC on 27th MOP at Dubai, UAE.

## Awareness Activities

- A bi-monthly newsletter Value Added Technical Information Service titled 'VATIS UPDATE-Ozone Layer Protection' is being published and distributed to more than 2000 individuals and institutions in

collaboration with United Nations Asia and Pacific Centre for Technology Transfer (APCTT). This newsletter covers the latest technologies and developments relating to ozone layer, including technical options evolved to ODSs around the world.

## International Day for the Preservation of the Ozone Layer

- The International Day for the Preservation of the Ozone Layer is being organized every year in the country on 16th September, at national and state levels since 1995.
- The 21st International Day for the Preservation of the Ozone Layer was organized on 16th September, 2015 at New Delhi with the theme: "**30 Years of Healing**

**the Ozone Together**". The theme is supported by the slogan "**Ozone : All there is between you and UV**". A large number of stakeholders and school children participated in the event.

- Hon'ble Minister of State for Environment, Forest and Climate Change (Independent Charge) Mr. Prakash Javadekar was the Chief Guest for the 21st International Day for the Preservation of the Ozone Layer.



**Fig.68** Shri Prakash Javadekar, Hon'ble Minister of State for Environment, Forest and Climate Change (Independent Charge) addressing the participants during the "21st International day for the Preservation of the Ozone Layer" function held on 16th September, 2015 at New Delhi.

- On this occasion, the publication "Montreal Protocol: India's Success Story" was released by the Chief Guest and distributed to the participants. In addition, poster design, painting, slogan writing competitions were organized among school children. Prizes for the winning entries in each category of the competitions were awarded by the Chief Guest.

The following workshops were conducted during 2015:

- A Stakeholders Consultation meeting on India's Amendment Proposal for Phase-down of HFCs was organized on 10th July, 2015, to have wider consultations with the stakeholders and seek their inputs on the proposal. The meeting was inaugurated by Shri Prakash Javadekar, Hon'ble Minister of State.

- Refrigeration and Air-Conditioning Servicing Sector Society (RASSS) was formed as part of the non-investment component of India's HPMP Stage-I which was formally launched in the workshop organized on 6th of August, 2015 at Ludhiana. A large number of service enterprises and technicians attended the workshop. Another workshop by RASSS was organized on 17th October, 2015 at Pune.
- Organized a Stakeholders Workshop on 13th August, 2015 in New Delhi. The objective of the workshop was to create awareness among the stakeholders and update on technical options for various sectors and sub-sectors as well as to develop approaches and strategies for phase-out of HCFCs during HPMP Stage-II. The workshop was well attended by the stakeholders, industry associations, industry, concerned Government organizations and implementing agencies.
- As part of the non-investment component of HPMP Stage-I, a number of Regional Awareness workshops have been organized in across the country in association with GIZ Proklima and UNEP Compliance Assistance Program (CAP), Regional Office for Asia and the Pacific (ROAP), Bangkok.
- Training, workshops were organized across the country for RAC servicing technicians by GIZ, Government of Germany as part of the Servicing Sector strategy of HPMP Stage-I. These include training to service technicians on good servicing practices of HCFC based appliances/ equipment. Through 408 programmes organised across the country, a total of 11000 servicing technicians have been trained.

## Achievements

- India has met the following compliance targets either on or ahead of the control schedule of the Montreal Protocol:-
  - The Ex-Com of the MLF so far has approved a total of 304 projects involving MLF funding of US \$279,342,203 to the Indian industry for phase-out of production and consumption of 58,980 Ozone Depleting Potential (ODP) tonne of the ODSs in India.
  - Phase-out of production and consumption of virgin halons as early as 2002, eight years prior to the Montreal Protocol schedule, being high ODP ODSs.
  - Prohibition of use of CFCs and halons in manufacturing of new equipments as early as 1.1.2003. This not only facilitated early phase-out of these ODSs in the country, but also reduced the inventory of ODS based equipments which resulted in reduction of use of CFCs and halons for servicing of existing equipment.
  - Phase-out of production of CFCs with effect from 1.8.2008, 17 months prior to the Montreal Protocol schedule except use of Pharmaceutical grade CFCs in manufacturing of MDIs.
  - Complete phase-out of production and consumption of CFCs, CTC and halons with effect from 1.1.2010.
  - Successful implementation of the National Strategy for transition to non-CFC MDIs and plan for phase-out of CFCs in the manufacture of MDIs in India.





- The production and consumption of Methyl Chloroform has been phased out globally as on 1.1.2015, with possible essential use exemptions.
- The production and consumption of Methyl Bromide has been phased out globally as on 1.1.2015, except use in quarantine and pre-shipment applications
- India in consultation with the MDI manufacturers withdrew the Essential Use Nomination (EUN) of pharma grade CFCs for 2011 and beyond. India was one of the first countries to withdraw the EUN, for which India was congratulated by the MOP.
- The implementation of National MDI Transition Strategy has resulted successful phase-out of pharmaceutical grade CFCs in manufacturing of MDIs as of December, 2012, 11 months prior to the schedule approved by the Ex-Com of the MLF for the Implementation of the Montreal Protocol.
- India has successfully met the freeze as on 1.1.2013 and 10% reduction of production and consumption of HCFCs as on 1.1.2015 in line with the accelerated phase out schedule of the Montreal Protocol.
- The Ozone Depleting Substances (Regulation and Control) Rules, 2000 have been amended to align with the accelerated phase-out of HCFCs. The Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2014 had been notified in the Gazette of India in March, 2014.
- Continuation of the Institutional Strengthening (IS) project implemented by UNDP as lead implementing agency.
- The 74th meeting of the Ex-Com approved

US\$ 30,000 for the preparation of a demonstration project for India on “Development and evaluation of spray foam polyols systems for buildings using Hydrofluoroolefins (HFOs) as blowing agent”

- The 74th Ex-Com approved a proposal for survey on ODS alternatives in India with a funding of US\$ 1, 80, 000.
- India has been elected as a Member of the Ex-Com of the MLF for the implementation of the Montreal Protocol for the year 2016.

### United Nations Convention to Combat Desertification

Desertification Cell for United Nations Convention to Combat Desertification reporting and other enabling activities.

#### Brief objective

- Coordination with United Nations Convention to Combat Desertification (UNCCD) for reporting, carrying out enabling activities and other obligations in accordance with the UNCCD COP/ Subsidiary Body decisions and recommendations
- Alignment of National Action Plan with UNCCD Ten year Strategy
- Networking and forging strategic partnerships among relevant scientific institutions, CSOs and stakeholders for enhanced knowledge database and scientific inputs for national reporting and revising the Desertification and Land Degradation Atlas of India
- Training and capacity building for formulation on reporting against performance and impact indicators of Desertification Land Degradation and Drought (DLDD)

- Awareness raising and sensitization of relevant stakeholders regarding DLDD issues
- Documentation, dissemination and promotion of case studies and best practices with the objective of providing inputs for informed policy decisions related to Sustainable Land Management (SLM).

### Progress/Achievements

- **World Day to Combat Desertification** : The World Day to Combat Desertification (WDCD), observed every year on 17th June, is a unique occasion to remind everybody that desertification can be effectively tackled, that solutions are possible, and that key tools to this aim lie in strengthened community participation and co-operation at all levels.

Many events involving schools children, practitioners, multi-lateral & bi-lateral agencies and private sector were organized by the Ministry at the Indira Paryavaran Bhawan, New Delhi on 17 June 2015. The theme for this year's celebration was **"Attainment of food security for all through sustainable food systems"**; with slogan **"No such thing as a free lunch, invest in healthy soil"**. Children were invited to participate in an on-the-spot painting competition. Entries were invited through open announcement on the website of Ministry and through advertisement in the newspapers for innovative ideas for making India Land Degradation Neutral by 2030 for poster making competition. Ministry had also invited GEF Small Grants India program partners and UN Food and Agriculture Organization to display their knowledge products in Ministry's campus on 17th June.

In addition, three round table dialogues were organized on the following themes:

- Role of Multi-lateral/Bilateral Agencies in addressing Desertification, Land Degradation and Drought
- Experiences from the Field: Best practices for addressing the issue of land degradation

Role of private sector in addressing Desertification Land Degradation and Drought in the Country.

- **India's New National Action Programme to Combat Desertification** : UNCCD 10-Year Strategy (2008-2018) adopted during COP-8 in 2007 aims at enhancing the implementation of Convention with a vision ***"to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability"***. The National Action Program (NAP) of India, submitted in 2001 to UNCCD though takes into account the issues of DLDD across the arid, semi-arid and dry sub humid environment; however, the NAP is to be realigned considering the emerging issues such as climate change and biodiversity conservation since the ratification of UNCCD in 1996. A multi-stakeholder consultative process has been adopted for preparing the aligned document including several regional level consultations. Draft of New National Action Programme has been prepared and is under review. It will be finalized by June, 2016.
- **Elucidation of India's 6th National Report to UNCCD** : As a member country, India has the obligation to submit national reports to



the UNCCD Secretariat providing information against the achievements of the UNCCD Operational Objectives which are reflected in performance indicators and Strategic Objectives reflected through impact indicators. The country parties are required to submit the reports every two years against the achievements of the UNCCD Operational Objectives which are reflected in performance indicators. In order to facilitate 6th National Reporting and for Alignment of the National Action Plan to Combat Desertification (NAP-CD), the Ministry has identified Indian Council of Forestry Research and Education, Dehradun (ICFRE) as the Executing agency. The Elucidation of India's 6th national report prepared by ICFRE was released on WDCD on 17th June, 2015.

- **12th Session of Conference of Parties to the UNCCD:** India became a signatory to UNCCD on 14th October 1994 and ratified it on 17th December 1996. The Ministry of Environment, Forest and Climate Change is the nodal Ministry in the Government of India for the UNCCD. The Convention addresses specifically the issue of land degradation in arid, semi-arid and dry sub-humid areas of drylands, which are home to some of the most vulnerable people and ecosystems in the world. The Convention's 195 parties work together to improve the living conditions for people in drylands, to maintain and restore land and soil productivity, and to mitigate the effects of drought. As a party to the Convention, India actively engages with the various processes of the UNCCD including participation in Conference of Parties (COPs) and other meetings of the UNCCD

Subsidiary bodies. India is currently the Chair of Annex II (Asia-Pacific region).

The twelfth session of the COP to the UNCCD (COP12) was held in Ankara, Turkey from 12-23 October 2015. An Indian delegation led by Secretary, MoEFCC participated in the COP. India, on behalf of Annex II countries has been appointed as a member of both Committee for the Review of the Implementation of the Convention and Committee on Science and Technology bureaus.

- **Study on Economics of Desertification, Land Degradation and Drought:** The Ministry of Environment, Forest and Climate Change has awarded a study to The Energy and Resources Institute (TERI) on Economics of Desertification, Land Degradation and Drought (EDLDD) in India in April, 2015 with a total financial outlay of Rs. 50, 18,279/-. The study is of one year duration and has the following primary objectives.
  - Assess Scale of Land Degradation in the country with the economic impacts.
  - Assess the quantum, along with the sources, of investment required for undertaking preventive and restorative measures which can help achieve the aspirational goal of land degradation neutral India by 2030.

The study will assess the actual impacts of land degradation in the country. This will help determine how optimal allocation of financial, technical and human resources to tackle DLDD can be achieved, thereby, facilitating the planning processes at the national level and informing action at the state level.

## CHAPTER-14

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# INTERNATIONAL COOPERATION AND SUSTAINABLE DEVELOPMENT







## International Cooperation and Sustainable Development

### Introduction

International Cooperation and Sustainable Development (IC&SD) Division of the Ministry coordinates matters related to international environmental cooperation and sustainable development including Sustainable Development Goals (SDGs). The major achievements of the division in the year 2015–2016 are as follows:

### Progress/Achievements

#### International Cooperation – Bilateral matters

The Ministry has signed memorandum of understanding (MoUs) with countries like Norway, Sweden, France, Finland, Canada, Bangladesh, Egypt, Morocco, Brazil and others on various environmental matters of mutual benefits. Most of these agreements are operated through the Joint Working Groups (JWGs) thus, providing an opportunity for dialogue and to work with the international community.

Shri Prakash Javadekar, Hon'ble Minister of Environment, Forest and Climate Change encouraged dialogue with the international community bringing in investment, knowledge and cooperation to meet country's environment-related priorities and needs. Some of his major meetings were with:

- Mr. Todd Stern, United States Special Envoy for Climate Change in June, 2015.
- H.E. Dr. Joao Cravinho, Ambassador of the European Union in July, 2015.

- Ms. Amber Augusta Rudd, Secretary of State for Energy and Climate Change and delegation in September, 2015.
- Shri Laurent Fabius, Hon'ble Minister for Foreign Affairs and International Development, France in November, 2015 on UNFCCC CoP-21.

In addition, the year witnessed a series of active bilateral dialogues between the senior officers of the Ministry and Ministers/Ambassadors/senior representatives from other countries on various environment, forest and climate change related matters.

#### Working Group (WG) meetings:

- **Indo-German WG:** The first meeting of the Indo-German Working Groups on Water and Waste Management & Circular Economy was hosted by Bonn, Germany from 17 to 19 August, 2015. The areas of possible collaboration identified by the WG on Water related to river Ganga (like determining river ecological flow, best available techniques and practices to control pollution by industrial units including textile, chemical, pulp & paper, tannery amongst others) and solid waste processing for resource recovery and energy generation. The WG on Waste Management and Circular Economy agreed to conduct a study on "New Frontiers for Indo-German Partnerships in green and Clean technologies" while providing technical support municipal corporations on waste management by undertaking pilot projects. The WG also explored possibility of technical cooperation for environment-friendly disposal and treatment of e-waste and hazardous waste.

- **Indo-Norway Joint Working Group on Environment (JWG-e):** Its eight meeting was hosted by India in New Delhi on 17th September identifying significant potential for cooperation between the two countries. The identified areas of collaboration included health impacts of air pollution, training and capacity building (on persistent organic pollutants and mercury emission control, co-processing in steel and TPPs), bio-energy utilization, wetland reclamation and restoration, marine management, technology transfer and cooperation on online environmental monitoring systems among others
  - Resource Efficiency and Management of secondary raw materials (€ 3 m).
  - Waste to Energy (€ 2 m).
  - CDM/Global Carbon Markets (€ 1 m).

Three of these projects are directly managed by the IC & SD Division and the major achievements of these projects are as follows:

Resource Efficiency project focuses on fostering resource efficiency and secondary raw material management in two sectors namely, automotive and construction & demolition. India is the first country to constitute an “Indian Resource Panel (InRP) on Resource Efficiency” at the country level. The Panel was announced by Hon'ble MEFCC on 18 November as a follow-up to the international workshop organized by the Ministry on “Securing Sustainable Resource Utilization & Reuse of Secondary Raw Materials by Fostering Resource Efficiency”. The Panel is expected to provide policy recommendations to the Government and develop an action plan to promote material resource efficiency and utilization of secondary resources. InRP members are: Shri Viswananth N Anand, Dr. Prodipto Ghosh, Shri R.H. Khawaja, Dr. Tishyarakshit Chatterjee, Shri Ashok Khosla, Dr. Ajay Mathur, Shri Ravi Agarwal, Ms. Sunita Narain, Ms. Seema Arora and Shri Prasad Modak. The first meeting of this Panel was organized on Feb 5, 2016.

Sustainable and Environmental friendly Industrial Production (SEIP) aims to promote public private partnership for strengthening monitoring capacities of relevant actors on waste water and waste management issues. The project started in June and three industrial

### Bilateral projects:

- **Indo-German:** There are nine projects worth € 43.2 million (m) developed as part of Indo-German cooperation. These are:
  - Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas (€ 9.6 m).
  - Indo-German Environmental Partnership Programme (€9.1 m).
  - Indo German Environment Programme in Rural Area (€9 m).
  - Himachal Pradesh Ecosystem Services Project (€5 m).
  - Incentives for Sustainable Management of Biodiversity and Ecosystem Services (€4.5 m).
  - Development and Management of nationally appropriate mitigation actions (€3 m).



Fig.69 First meeting of Indian Resource Panel (InRP) on Resource Efficiency at New Delhi

areas in Ganga river basin identified are Haridwar in Uttarakhand, Yamuna stretch in Delhi and industrial estate in Vapi.

Waste to Energy project is being implemented by Maharashtra's Nasik Municipal Corporation. Using the bio-methanation process, the project aims to showcase ways of handling municipal organic waste while generating energy. The first Project Steering Committee meeting was chaired by Shri Arun Kumar Mehta, Joint Secretary (IC&SD) on 15th January which reviewed the status and approved the year's work plan while providing strategic directions to deal with the challenges posed by bio-methanation waste management process.

- **Indo-Japanese:** There are four projects worth Rs 5,288.13 crores developed as part of Indo-Japanese collaboration which are operational and monitored by the IC&SD Division:
  - Karnataka Sustainable Forest Management & Biodiversity Conservation (KSMFBC) 3rd Phase;
  - Himachal Pradesh Forest Ecosystem Management & Livelihood Project;

- Odisha Forestry Sector Development Project - Phase-II; and
- Nagaland Afforestation and Eco-development Project.

### The activities schedule for the year 2016-2017 is as follows

- A Memorandum of Understanding between India and Australia in the field of environment, forest and wildlife is likely to be signed.
- Second meeting of the Indo-German WGs on Water and Waste Management & Circular Economy
- Eighth meeting on India-European Union Environment Forum.
- Ninth meeting India-European Union JWG on Environment.
- Second meeting of the Indo-Swedish JWG on Environment.
- First meeting of the Indo – Bangladesh JWG on Conservation of Sunderbans.

## International Cooperation – Multi-lateral matters

The division is nodal for United Nations Environment Programme (UNEP), Global Environment Facility (GEF), United Nations Development Programme (UNDP), the World Bank (WB), and regional bodies like Economic & Social Commission for Asia & Pacific (ESCAP), South Asian Association for Regional Cooperation (SAARC), South Asia Cooperative Environment Programme (SACEP), Association of South-East Asian Nations (ASEAN), Asian Development Bank (ADB), European Union (EU), India-Brazil-South Africa (IBSA) Summit on Environment amongst others. The Division supports annual contributions to various UN and other international bodies working on environmental matters. The Division directly contributes USD 31,850 annually to South Asia Cooperative Environment Programme (SACEP).

- **United Nations Environment Programme (UNEP):** India is a member of UNEP and provides annual financial contribution of USD 100,000 to UNEP Environment Fund. Three of the thirty three members on UNEP's International Resource Panel (IRP) are currently from India. The Ministry is a member of the IRP Steering Committee. IRP supports UNEP's Resource Efficiency/ Sustainable Consumption and Production (SCP) sub-programme and is carrying out assessments of the world's most critical resource issues with a view to developing practical solutions for government policymakers, industry and society.

United Nations Environment Assembly (UNEA) is the governing body of UNEP. The second session of UNEA is scheduled to be held in Nairobi, Kenya from 23 to 27 May, 2016 and the focus will be on 'Delivering on the Environmental Dimension of the Agenda 2030 for Sustainable Development'. The Ministry is actively working with the concerned stakeholders for finalizing the agenda of UNEA-2 by providing inputs and participating in the "Open-ended Meeting of the Committee of Permanent Representative (OECPR) to UNEP" in Feb 2016.

- **The Global Environment Facility (GEF)**  
**India:** India is a founder member of Global Environment Facility (GEF). Set up in 1991, GEF is the designated multilateral funding mechanism of 183 countries to provide incremental finance for addressing global environmental benefits which are also identified national priorities. The GEF mandate is decided as per the guidance provided by the Conference of the Parties of the multilateral environmental conventions namely Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), Stockholm Convention on PoPs and Minamata Convention on Mercury. The GEF grants are available under five focal areas namely, biodiversity, climate change, land degradation, international waters and chemicals & waste. The full-sized (> USD 2 m), medium-sized (up to USD 2 m) and small grants (exclusively for NGOs/CBOs up



to USD 50,000) projects are supported. The GEF works through its 18 designated agencies of which ten are operational in India (ADB, WB, UNDP, UNEP, UNIDO, FAO, IFAD, IUCN, WWF and Conservation International).

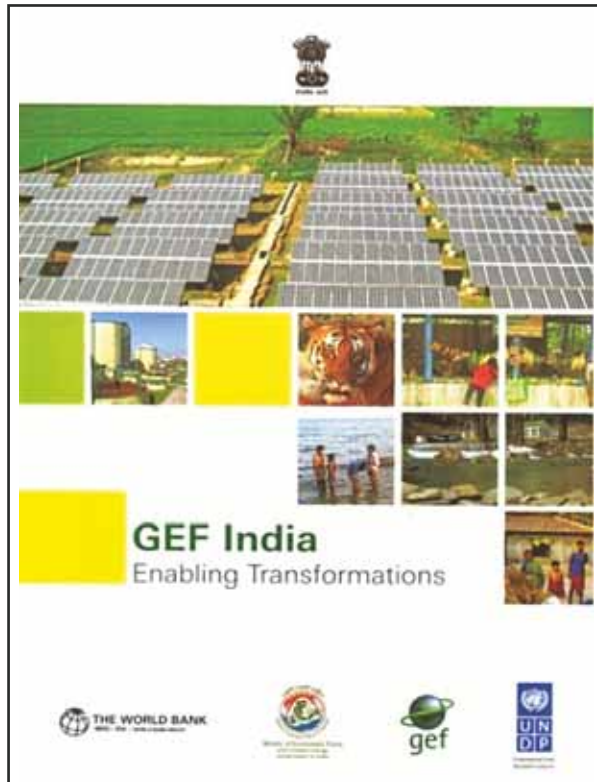


Fig.70 Renewable Energy

The Ministry of Environment, Forest and Climate Change is India’s GEF Operational Focal Point (OFP) responsible for all in-country coordination. The Department of Economic Affairs (DEA) is India’s GEF Political Focal Point. India is both a donor and recipient of GEF grant. Since 1991, India has contributed USD 63 m, accessed more than USD 516 m of grant, leveraged about USD 2.95 billion of co-funding for 84 national projects. Of these 37 projects are complete, seven cancelled, 34 under implementation, one under GEF approval and five are under programming. “GEF India: Enabling Transformation” publication presents

the impact of completed GEF projects in India in the field of energy efficiency, renewable energy, biodiversity conservation and sustainable land and ecosystem management. The book establishes that GEF support to India is relevant to the country’s priorities, needs and emerging challenges.

In 2015-2016, six projects were completed successfully. The major impacts of these projects are as follows:

- “Integrated Land Use Management to Combat Land Degradation in Madhya Pradesh” implemented by State Forest Department of Madhya Pradesh in nine forest divisions covering over 300,000 hectares (ha). The project completed in Dec 2015. It has demonstrated a management model for conservation of degraded bamboo forest land by providing usufruct rights to the beneficiary households. This model has worked successfully in three forest divisions of Chhindwara district where the benefit sharing arrangements were clarified. The project paid monthly stipend of Rs 3,500 to the beneficiary households to tend 20 ha of degraded land for five years. The bamboo in Chhindwara was recently harvested and the benefit from the sale was shared between the beneficiary household and the forest department. The beneficiary share ranged from Rs 7,000 to 17,500 which can now be accrued on an annual regular basis. This model showcased sustainable utilization of forest resources while ensuring significant visible improvements in the ecosystem services, local economy and lives of local population.
- “Sustainable land management in shifting cultivation areas of Nagaland for ecological

- and livelihood security” implemented by Soil and Water Conservation Department of Nagaland in three districts of Mokokchung, Wokha and Mon. This project piloted a participatory land-use planning tool. This led to the formation of 40 land-use committees, inclusion of women in these committees and codification of community land-use decisions, while empowering local decision-making processes to address conservation challenges. The vegetative cover of approximately 34,047 ha of shifting cultivation land across 70 villages has improved, more than 2100 ha of shifting cultivation land has been converted to community forest areas, soil erosion rate has decreased from 50 to 26 mt/ha/year and there has been a 20% increase in the average income of 8,523 households. About 2100 ha of shifting cultivation areas permanently to forest areas, to be conserved by the community. The state government is in the process of scaling up implementation of learning’s from the pilot.
- “Mainstreaming conservation and sustainable use of medicinal plants diversity in three Indian states” implemented by the Ministry in Arunachal Pradesh, Chhattisgarh and Uttarakhand. The project has provided inputs to a national level policy on the conservation and sustainable use of medicinal plants, revision of the National Forest Working Plan Code and inclusion of medicinal plants as a subject in the course curriculum of Indira Gandhi National Forest Academy. Geographical indicators of some medicinal plants were successfully registered thus protecting the rights of local communities. The project also supported the establishment of 20 medicinal plants conservation and development areas covering an area of 24,047 ha in three project states.
  - Last year was significant in cleaning up and streamlining the ongoing GEF India project portfolio. The GEF projects are implemented by the concerned thematic divisions/Gol ministries/state governments. As Ministry is the GEF OFP India, all the ongoing projects were reviewed one-by-one and mid-course corrections were recommended. The monitoring of 34 ongoing projects is now being done more rigorously and on a regular basis. The GEF India section was introduced on Ministry’s website. A leaflet highlighting GEF India - UNCCD initiatives was developed for the UNCCD CoP-12 in Turkey.
  - The GEF India portfolio (1991-2012) was evaluated by the Independent Evaluation Office (IEO) of GEF based in Washington DC. The two volume report was also presented to the GEF Council in June 2013. The evaluation found that “GEF support to India is relevant to the country’s priorities and emerging challenges. During the post completion stage, several projects have been able to achieve significant long-term impacts. There has been an increase in country ownership of GEF projects.”
  - In the GEF-6 cycle (June 2014 – July 2018), India has received an allocation of USD 130.58 m for three focal areas namely climate change, biodiversity and land degradation. A comprehensive

programming plan of worth USD 200 m has been developed and individual projects are under various stages of development and approval. Sustainable cities, climate-smart agriculture and renewable energy have been identified as three major national priorities for GEF-6 programming. The Ministry had jointly organized a GEF National Workshop in New Delhi on May 12 – 13 which was attended by more than 140 participants from various Ministries,

states, NGOs, academic institutions, private and financial sector, GEF agencies and GEF secretariat. The workshop facilitated in streamlining the current and future GEF India project portfolio but also reviewed the impact of completed projects (since 1991) after the project closure. USD 48.176 m of GEF-6 grant has been accessed.

- The GEF's Small Grants Program (SGP)



**Fig.71** Hon'ble Minister Shri Prakash Javadekar, MoEF & CC inaugurating the GEF National workshop at New Delhi

works exclusively with NGOs and CBOs providing project grants up to Rs 20 lakhs to undertake activities in identified priority sectors. The Centre for Environment Education (CEE) is working on behalf of the Ministry as National Host Institution (NHI) for GEF SGP India program. Till date, about

USD 10.3 m of GEF grant has been approved and USD 19.6 m of project co-funding accessed for 401 projects. About 77 of these projects were approved under OP-5 program. Ten of the 77 projects completed in 2015 and another 50 projects are expected to get completed by Dec

2016. The GEF SGP has also been organizing “Green Haats”, a market platform for program partners to link up their products with the market mechanism. To create awareness these haats were also organized in the Ministry. The SGP India program is also developing the capacity of partners and facilitating the environment certification of their products while creating an e-platform for the partners to sell their produce.

- For the OP5 phase of SGP India program the mid-term evaluation was conducted by a team of independent evaluators. The report concluded that the “overall the India SGP is operating in a satisfactory manner and can serve as a model for other country SGPs in numerous ways which are elaborated further in this report. The program is strongly aligned with national government priorities. The program requires more thematic and geographical focus”.
- **The World Bank (WB):** The Ministry-WB project portfolio comprises of four projects worth USD 322.56 m. Of these two projects are GEF projects managed by the Bank with a GEF grant of USD 32.78 m. All these projects are implemented by the respective thematic divisions. The project details are as follows:
  - Integrated Coastal Zone Management (IDA USD 221.96 m)
  - Capacity Building for Industrial Pollution Management (USD 54.18 m - IDA USD 28.97 m and IBRD USD 25.21m)
  - Biodiversity Conservation and Rural Livelihood Improvement project (USD 21.78 m - IDA USD 13.64 m; GEF USD 8.14m)
  - Ecosystem Services Improvement project (GEF USD 24.64 m)

The Ministry is in the process of developing a future strategy of cooperation with the Bank.

- **South Asian Association for Regional Cooperation (SAARC)** is an intergovernmental body which was established in 1985 to promote regional cooperation on sustainable development related issues amongst its eight member states namely Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In this regard, the SAARC secretariat organizes a meeting of the Heads of States once a year also known as SAARC summit. During the reporting year, the secretariat had organized the following events which were attended by the Ministry:

- Expert Group Meeting on Sustainable Forest Management and Mitigation against Climate Change in Bhutan from 21 to 23 April.
- Expert Group Meeting on Forest Management Techniques with Special Focus on Enhancing Ecosystem Services in the Climate Change Scenario in Bhutan from 9 to 11 June.
- Expert Group Meeting on Sustainable Management of Non-Wood Forest Products and Income Generation for Communities in Kerala from 11 to 13 August.





## Sustainable Development

- Last year was a landmark year leading to the adoption of 17 Sustainable Development Goals (SDGs) and 169 associated targets by the UN General Assembly in September 2015 by 193 countries including India. The negotiations on SDGs have been ably led by the Ministry of External Affairs (MEA). Though the inter-ministerial consultations were held by MoEFCC, MEA was always kept in loop and comments/ reservations furnished by line ministries were duly communicated to MEA. The outcome document known as “Transforming our World: The 2030 Agenda for Sustainable Development” highlights poverty eradication as the overarching goal of the new development agenda and has at its core the integration of the economic, social and environmental dimensions of sustainable development. The emerging development agenda is unique in that it calls for action by all countries, poor, rich and middle-income. The ‘five Ps’- People, Planet, Prosperity, Peace, and Partnership--capture the broad scope of the agenda. The SDGs are expected to be achieved by 2030.

### Sustainable Development Goals

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth

9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace and Justice Strong Institutions
17. Partnership for the Goals

- As SDGs are cross-cutting in nature, Niti Aayog has been given the task of coordinating the achievement of these targets with the concerned ministries and line departments. The Ministry has been made nodal for the achievement of the following SDGs:

- Goal: 12 Ensure sustainable consumption and production patterns
- Goal 13 Take urgent action to combat climate change and its impacts
- Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Target 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries

- Target 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships
- Jointly with other Ministries/Departments, MoEFCC is also tasked with the responsibility of achieving the following targets 3.9, 6.3, 6.6, 8.4, 9.4, 11.6, 13.2, 13.3, 13.a, 13.b, 14.1, 14.2, 14.3, 14.5, 17.14.
- The Division is actively working with Ministry of Statistics and Programme Implementation (MoSPI) by contributing in the development of global indicators for each of the SDG and targets. Development of indicators for achieving the targets under the SDGs is delicate and intricate process requiring a series of consultations with stakeholder Ministries and State Governments to assess their appropriateness and implementability. Many of the targets are overlapping and may require a composite indicator. In fact, this may also require a new data system to be created to facilitate this process.
- This Ministry is of the view that the primary focus of India should be on means of implementation, capacity building and transfer of technology. Through a study commissioned by this Ministry, it has been estimated that roughly an amount of Rs.35 lakh crores per annum will be required for achieving the targets under the SDGs. The developed countries should be asked to assist the developing countries in achieving these targets through financial assistance and transfer of cutting edge technology.

## Externally Aided Projects (EAPs) / North-East Cell

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 (Government of France), KFW-GIZ (Government of Germany) etc.

The major objectives include increasing forest and tree cover, augmenting availability of fuel wood and fodder, improving livelihood opportunities and quality of life of the villagers adjoining forests, strengthening Joint Forest Management (JFM) 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. To achieve the said objectives, the activities undertaken include promoting afforestation, biodiversity conservation, rehabilitation of degraded forest areas, water and soil conservation measures, farm forestry, agro forestry, community development and institutional capacity development. These projects also help in livelihood activities through convergence with other line departments and other govt. schemes with a view to augment the income of the people, help in better living conditions and employment generation as well as addressing the sustainability in perpetuity once the funding ceases to flow due to completion of the project.



Fig. 72 Pied Kingfisher (*Ceryle rudis*) widely distributed in Asia and Africa

At present, there are 13 Externally Aided Projects under implementation. Out of these projects, twelve are State Sector Forestry Projects which are being implemented by the States and one is a Central Sector project titled “Capacity Development for Forest Management and Training of Personnel” being implemented in 11 States of the country. 10 State Sector Projects and the Central Sector Project are being funded by JICA and one State Sector Project each is being funded by AFD (Govt. of France) and KFW-GIZ (Government of

Germany). JICA state sector forestry projects are implemented in the States of West Bengal, Rajasthan, Tamil Nadu, Sikkim, Uttar Pradesh, Gujarat, Tripura, Himachal Pradesh, Orissa, and Karnataka. Himachal Pradesh Forestry Ecosystems and Climate Proofing Project and Assam Forest and Biodiversity Conservation Project are funded by Government of Germany and France respectively. Details of projects under implementation including Objective, Cost Components are given in the **Annexure-IV**.



## CHAPTER-15

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# ADMINISTRATION AND CIVIL CONSTRUCTION







## Administration

There are three sections in administration viz. P-I, P-II and P-III.

During the year, the major activities undertaken by Administration division are as under:

- Selection of 21 Scientists (Ministry Main) in various grades;
- Selection of 6 Scientists of National Museum of Natural History and 01 Scientist of National Zoological Park during the year;
- Recruitment process underway for selection of 6 posts of Scientists of Ministry (Main) and 20 Scientists of Zoological Survey of India;
- Recruitment of 8 Research Assistant (Environment) through SSC;
- Recruitment of 5 Technical Officer (Forestry) Grade-II through UPSC;
- Recruitment process in respect of 3 posts of Technical Officers (Forestry) Grade-I, 8 posts of Technical Officer (Forestry) Grade-II and 13 posts of Research Officer (Environment) Grade-II initiated during the year;
- Promotion of 11 Scientists 'F' of the Ministry, including attached and subordinate offices, to the grade of Scientist 'G' during the year;
- Processing of 18 cases of Scientists of the Ministry, including attached and subordinate offices, in various grades, under Flexible Complementing Scheme, during the year as per details given hereunder:
  - 03 cases of promotion from Scientist grade 'F' to 'G'

- 02 cases of promotion from Scientist grade 'E' to 'F'
- 12 cases of promotion from Scientist grade 'C' to 'D'
- 01 cases of promotion from Scientist grade 'B' to 'C'

## Indian Forest Service (IFS) Cadre Management

- Ministry of Environment Forest & Climate Change is the Cadre Controlling Authority for the Indian Forest Service (one of the three All India Service).
- IFS division deals with all cadre Management related matters.
- The total authorized cadre strength of the Indian Forest Service as on 1st January, 2015 is 3131 (three thousand one hundred thirty one ) which includes 2182 Direct Recruits and 949 Promotion posts. The Total Senior Duty Posts (SDP) in the Indian Forest Service are 1921 and remaining under various reserves. Besides serving the 31 Forest Departments in the States and Union Territories managing the country's natural resources, a good number of the IFS officers are in various Ministries and institutions both in the State and at the Central Deputation.

## Achievements

- Vacancy determination and Cadre Allocation for IFS batch 2015 was done.
- Cadre review completed in respect of Kerala, Madhya Pradesh, Punjab, and Bihar.
- Up-to- date Civil List of IFS officers is available on the website of this Ministry at

www.ifs.nic.in. The website also has information pertaining to the vacancy circulars, training programme circulars, Rules and Regulations concerning IFS. Further website also has Annual Confidential Report (ACR), availability status of IFS officers which can be accessed by concerned officer. Each and every members of the Service has been provided facility to have his unique Email account through NIC on this site and members of Service have been provided facility to update data relating to their posting details online for periodical upgradation.

- Seventy Four State Forest Service officers were included into the Indian Forest Service under IFS (Appointment by Promotion) Regulations, during January–December, 2015.
- Twenty-two IFS officers joined at various levels under the Central Staffing Scheme of the Ministry and Nineteen IFS officers joined under the Central Staffing Scheme of the Department of Personnel & Training.
- Cadre review of IFS of Andhra Pradesh, Uttarakhand, Telangana, Rajasthan, Odisha, Nagaland, Manipur, Maharashtra and Rajasthan is under process for approval of Cadre Review Committee.
- Around Thirty five Court Cases pending in various Courts across the Country were liquidated.
- Around 372 Court Cases relating to the issues of Indian Forest Service are pending in various Tribunals / Courts all over the Country.

## Vigilance Division

The Vigilance Division is responsible for examination and processing of complaints, disciplinary cases, appeals, reviews and memorials preferred by Indian Forest Service Officers and maintenance/scrutinization of Annual Immovable Property Returns (AIPRs) etc. Besides, examination and processing of cases referred by the Central Bureau of Investigation (CBI) relating to grant of sanction for prosecution/RDA in respect of officers/staff of the Ministry and IFS officers is also handled by the division.

A total of 299 complaints were received during the year, including 252 from CVC portal. 209 complaints including old ones were finally disposed off. During the year, 9 Disciplinary Proceedings cases, 01 Memorial, 07 Appeal cases and 08 Prosecution cases were processed in the Vigilance Division. Out of these, 02 Disciplinary cases, 01 Appeal case and 03 cases of Appeal of previous years were disposed off and 02 Prosecution cases of previous years were finally disposed off. Court cases were also pursued in the respective court/CAT Bench. Total 03 numbers of RTI applications were received in the Vigilance Division and disposed off with suitable replies in all the matters.

## Parliament Section

### Introduction

The Parliament Section in the Ministry is assigned with the responsibility of handling entire parliamentary work of the Ministry. It ensures that the parliamentary work pertaining to the Ministry of Environment, Forest and Climate Change is accomplished as



per the prescribed schedule and procedures. The Section maintains liaison with the Ministry of Parliamentary Affairs, Secretariats of Lok Sabha/Rajya Sabha, other Ministries/ Departments with a view to fully discharge the parliamentary obligations of the Ministry. The Section also coordinates the visits of various Parliamentary Committees to other parts of India.

During the year 2015-16, a total number of 1124 Parliament Questions pertaining to various aspects of environment were answered by the Ministry. It included 683 questions in the Lok Sabha, out of which 61 were starred and 622 were un-starred. A total of 441 questions were asked in the Rajya Sabha, out of which 50 were starred and 391 were un-starred. The questions covered a wide range of issues with which the Ministry is concerned, prominent among them being questions related to Environmental Conservation, Forest Conservation, EIA, Water and Air, Pollution, Freshwater and Marine Conservation, Wildlife Management, Water Management, Climate Change and Meteorology, Energy Studies, Environmental Education, NGOs and Media, Health and Sanitation etc.

The ENVIS Centre at WWF-India, under ENVIS scheme of the Ministry compiles the above mentioned Parliament Questions as replied by MoEF & CC and other Ministries pertaining to various environmental issues. Graphical representation of the Parliament Questions replied by the Ministry during 2015-16 both in Lok Sabha and Rajya Sabha in various Sessions are given in Table-A and Table-B respectively.

The ENVIS Centre, WWF-India has published the compendium of Environment in the Indian Parliament: An Analysis 2014-15 in collaboration with Parliament Section, MoEF&CC. The preparation of the Trends & Analysis of the above-mentioned Parliamentary questions replied by the Ministry of Environment, Forest and Climate Change and other Ministries related to Environment is available with the ENVIS Centre at WWF-India. Online accessibility is also available on the Centre's website: <http://www.wwfenvis.nic.in>.

During the year 2015-16, Parliament Section coordinated ten meetings of Department related Parliamentary Standing Committee of Science and Technology, Environment, Forest and Climate Change and five meetings of Consultative Committee of the Ministry.

The subject matter of five Consultative Committees was like:

- Project Elephant, Climate Change; 'CAMPAA' (Compensatory Afforestation Fund Management and Planning Authority); COP 21; and Biodiversity in general or wetlands, mangroves and coral reef in particular.

In addition of the above other meetings relating to Estimate Committee, Committee on Petition, and Committee on Government Assurances etc. were also co-ordinated.

## Information Technology and e-Governance

Government working is based on intensive knowledge and information sharing. Effective communication and sound Information and

Communication Technology (ICT) go hand in hand. For speedy implementation and monitoring of various programmes / schemes and to make most of ICT to secure efficiency in working, Ministry has embarked up on a comprehensive exercise to implement various e-Governance activities / projects.

### Progress/Achievements

- IT infrastructure of the Ministry and National Museum of Natural History (NMNH) and its Regional Centres was strengthened.
- Photographic digitization of 3,300 (9500 images including Dorsal, Ventral, Lateral) Faunal Type Specimens at Zoological Survey of India, Kolkata has been completed.
- Development and implementation of a software module for ERP Solution initially with four modules at Indian Institute of Forest Management (IIFM), Bhopal.
- Placing of infrastructure for IT Related services (Wi-Fi) in the New Indira Paryavaran Bhawan.
- Monitored the regular updation of material in eSamikSha (<http://cabsecmis.gov.in>) - a real time, on-line system to review follow-up action.
- Implemented eVisitor System for making an appointment with a Government Officer - Online visit request and approval status query (<http://myvisit.gov.in>) – for Public and Visit Management Module for Officer (<http://evisitors.nic.in/evisitormis/>) – For Officers
- Initiated process for implementing e-Office in two Division of the the Ministry under Digital India Programme.
- Designed and developed web based application “IFD Report Management System” for IFD, PAO, B&A, PC and Divisions.
- Designed and developed web based application “Document Management System” for GC Division.
- Designing and developing innovative and practical / technical solutions and applications/software for staff data bases including IT infrastructure inventory, online submission of compliant, monitoring the compliance etc.
- Examination of all policy issues pertaining to Information Technology.

### RTI Cell

The Ministry received 4448 applications and 550 Appeals under RTI Act, 2005 during the year 2015-16 (01-04-2015 to 29.02.2016) as per RTI-MIS portal.

Central Public Information Officer (CPIOs) and First Appellate Authorities (FAAs) in the Ministry have been designated for effective implementation of the RTI Act, 2005. The notification designating CPIOs/FAAs is revised periodically as and when there is change in the work among CPIOs/FAAs. All the subordinate offices/Autonomous bodies and Regional Offices have been pursued regularly for necessary action.

### General Administration

The General Administration (GA) Division of the Ministry is entrusted with the





responsibility of providing logistics and support services to senior officers and staff for discharging their duties and smooth functioning of the office. It includes procurement and supply of stationery, stores, equipments, support services to the officials of the Ministry including provision of transport, communication and general upkeep etc. The Ministry was shifted to the new building at Jor Bagh Road, New Delhi which is a green building with net zero energy consumption. It has the unique distinction of getting LEED INDIA PLATINUM & GRIHA-5 STAR Green Building ratings.

### **Towards transparency & Good Governance**

The Ministry's effort is to promote conservation of environment resources, inter and intra-generational equity, integration of environmental concerns in economic and social development, efficiency in use of natural resources, judicious environmental governance and commitment of all sections of society in respecting the resources of nature.

### **Public Grievance Cell**

A Public Grievance Cell has been functioning in the Ministry to attend to the complaints of public regarding forestry and environmental matters etc. Presently Shri Ravi Shankar Prasad, Joint Secretary (PG) is the Nodal Public Grievance Officer of the Ministry.

As on 31st December, 2015, out of total 13265 public grievances, 9036 grievances had been disposed of online and 4229 grievances were remain pending for disposal. The rate of disposal was 68%. Efforts are however, being

continued by the PG Cell to raise the disposal rate up to 90% by issuing periodical reminders to the Division / Sections concerned for settlement / disposal of pending grievance.

### **Implementation of Official Language Policy**

An Official Language Implementation Committee has been constituted under the chairmanship of the Joint Secretary (Admn.). All Officers of the rank of Section Officer and above are members of this Committee. The Quarterly Progress Reports regarding progressive use of Hindi in the official work received from the Sections/Desks were reviewed by this Committee and remedial measures were suggested to avoid recurrence of the shortcomings. Hindi workshops were also organized in every quarter for the officers/staff in the Ministry in order to remove their hesitation in doing work in Hindi and to enable them to carry out their day-to-day transaction in Hindi.

Efforts were made to increase the correspondence in Hindi with the offices of the Central Government, State Governments, UT Administrations and the general public.

Hindi fortnight was organized from 1st to 15th September, 2015 during which various Hindi competitions aimed at increasing progressive use of Official Language Hindi were organized. Employees of the Ministry, NAEB, NRCDD and CCU participated in these competitions with enthusiasm. 100 officers/employees were honoured with commendation certificates and cash prize through A/c Payee Cheques prepared in Hindi.

## Civil Construction Unit (CCU)

Civil Construction Unit (CCU), headed by



Fig. 73 Class room at IIFM, Bhopal

### Architecture Landscaping :

- Building Envelope designed to ensure daylight in 75% occupied area.
- Access friendly to differently-abled persons.
- Surface parking.
- Plantation and grassing in more than 50% area outside the building.

### Construction of extension building for auditorium including E/I, fans, power wiring and conduits for IFGTB, Coimbatore

**Cost :** Rs. 160 lacs; **Structure :** Single storey Auditorium building having; seating capacity of 124 persons



Fig.74 Inside view of auditorium at IFGTB, Coimbatore

#### Provisions :

- VIP Lounge with toilets, Green room, Audio-visual room, Entrance lobby, toilet for disabled persons.
- Wooden flooring on stage.
- Calcium silicate tiles false ceiling.
- Propylene carpet in Auditorium hall.
- Acoustic treatment.
- Energy efficient electrical fittings.

#### Other works completed

- Improvement of infrastructure (Roads, water supply ,drainage system and Electrical services) at NZP,New Dehli (Sanctioned Cost of Project: 424.36 lacs)
- Strengthening and up-gradation of

laboratory at 4th floor in Parivesh Bhawan CPCB, East Arjun Nagar Delhi. SH: Civil Work & Electrical Installation. (Sanctioned Cost of Project: 443.80 lacs).

- C/o Training Facility Center And Wood Machinery workshop (Phase I Ground floor) including electrical installations and fans for IWST, Malleshwaram, Bangalore. (Sanctioned Cost of Project: 100 lacs).
- Additional Construction of Education Room, Dormitory, Reserve Collection Room, Library & Eco Theatre including Electrical installation and fans for RMNH at Mysore. (Sanctioned Cost of Project: 199 lacs).
- Extension of Administrative Block for the construction of Lecture Hall and Stores for sample Cell at IPIRTI, Yeshwantpur, Bangalore. (Sanctioned Cost of Project: 139 lacs).



# CHAPTER-16

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## PLAN COORDINATION DIVISION







## Plan Coordination Division

Plan Coordination Division is responsible for coordination of all Plan Schemes and Programmes of the Ministry of Environment, Forest & Climate Change, and works in close association with Niti Ayog and Ministry of Finance (Department of Economic Affairs' Budget Division and Department of Expenditure). Its work involves preparation, monitoring and review of the Ministry's Five Year Plans, Annual Plans and Annual Action Plans as also the Annual Union Budget and the Outcome Budget of the Ministry. The Division also looks after monitoring of progress in utilization of Plan funds.

## Twelfth Five Year Plan (2012-2017)

The Twelfth Plan Document, approved by the National Development Council (NDC) on 27th December 2012, has the basic theme of

“Faster, Sustainable, and more Inclusive Growth”, and lays out major targets, key challenges to meet them, and the broad strategy that may be followed to achieve the stated objectives. Ministry of Environment, Forest & Climate Change has been allocated an outlay of Rs 17,874 crores, which works out to 0.41% of the Plan allocation across various Ministries/ Departments as against a share of 0.42% or Rs 9231.00 crores in the Eleventh Plan. At current prices, the enhancement in this Ministry's Twelfth Plan outlay over the Eleventh Plan outlay, however, works out to 109%.

## Annual Plan 2015-16

Ministry has been allocated an outlay of Rs. 1556.60 crores which has subsequently been increased at RE stage to Rs. 1693.69 crores. The sectoral summary of the two Annual Plans is given in **Table-19** below.

**Table-18.** Sector-wise Summary of Twelfth Plan Outlays/ Actual Expenditure (as on 31st January 2016)

(Rs. in crore)

Sector Period	Environment	NRCD#	Forests & Wildlife	NAEB@	Animal Welfare	Total
XII Plan Approved Outlay	3,802.00	4,273.00	4,818.80	4,780.00	200.20	17,874.00
<b>2012-13</b>						
Outlay (BE)	580.42	771.80	606.09	446.49	25.20	2430.00
Actual Expenditure	388.13	421.02	577.81	224.08	25.09	1636.13
<b>2013-14</b>						
Outlay (BE)	614.37	619.80	719.14	451.49	25.20	2430
Outlay (RE)	431.10	530.26	580.31	300.93	7.40	1850
Expenditure as on 31.03.2014	416.43	517.11	571.33	299.07	7.4	1811.34
<b>2014-15</b>						
Outlay (BE) (Interim)	678.01	632.79	713.11	432.89	23.20	2480.00
Outlay (BE) (Regular)	873.80	*	713.11	432.89	23.20	2043.00
Expenditure as on 31.03.2015	504.29	114.61	617.67	270.57	16.19	1523.33
Revised Estimate	551.98	84.00	623.37	273.65	17.00	1550.00
<b>2015-16</b>						
Outlay (BE)	723.16	81.00	558.94	182.00	11.50	1556.60
Outlay (RE)	802.74	113.63	175.82	190.00	11.50	1693.69
Expenditure as on 31.01.2016*	485.95	76.75	438.65	145.04	6.68	1153.07

# National River Conservation Directorate (NRCD) and National Plan for Conservation of Aquatic Eco Systems (NPCA).

@National Afforestation & Eco-Development Board (NAEB), National Afforestation Programme (NAP) and Green India Mission (GIM).

\*Expenditure as per sanctions.



**Fig. 75** Green Pigeon in their natural habitat.

### Important activities undertaken

Preparation of the Annual Plan 2016-17 was also done in respect of all Demands/Appropriations controlled by the Ministry. This includes regular monitoring of physical and financial progress of the Annual Plan for 2015-16 against the targets set out therein. Revised Estimates for 2015-16 work also completed in timely manner. The Division has published the Outcome Budget document of the Ministry for 2015-16, which was placed in the Parliament by Hon'ble Minister for Environment, Forest & Climate Change. The outcome Budget provides

a holistic review of Plan Schemes, implemented by the Ministry.

Matters relating to State Plans were also taken up. Issues with regard to Special Component Plans, notably the Scheduled Caste Sub-Plan (SCSP), the Tribal Sub-Plan (TSP) and the North Eastern Region (NER) Plan are also taken up in consultation with the Planning Commission and Ministry of Finance. All other references on environmental planning and issues referred to by Planning Commission to this Ministry were handled in the Plan Coordination Division.







Annexure-I

**Significant Audit Paras as per Report No. 30 of 2015**

**Implementation of E-waste (Management and Handling) Rules, 2011 by Central Pollution Control Board – regarding.**

Central pollution Control Board did not conduct assessment of quantity of e-waste being generated/ processed in the country and effectively coordinate with State agencies for collection and compilation of such data. The Board also failed to implement framework for reduction of use of hazardous substances in Electrical and Electronic Equipment manufactured and imported in the country.

(Para 7.1)

**Inordinate delay in completion of pilot projects for sewage treatment – regarding**

Central Pollution Control Board took up a scheme for setting up demonstration projects for treatment of sewage at four locations. After more than four years of sanction and in spite of incurring expenditure of ₹ 8.22 crore, sewage treatment could not commence at any of the four location due to lack of planning, coordination and monitoring.

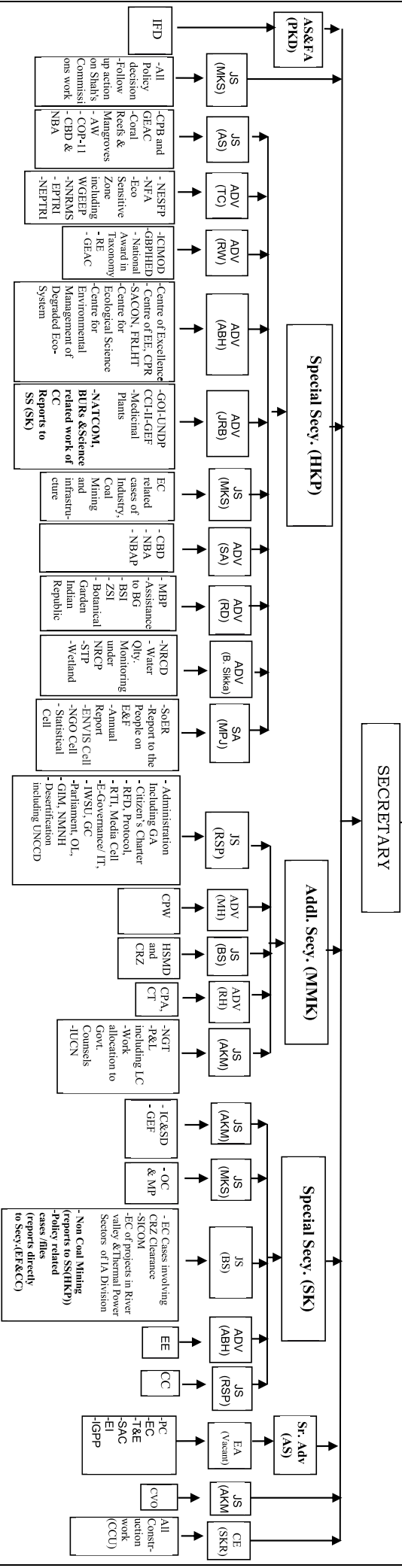
(Para 7.2)



**ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE (DIVISIONS UNDER ENVIRONMENT SECTOR)**

**MINISTER FOR ENVIRONMENT, FOREST & CLIMATE CHANGE**

As on 12 February, 2016



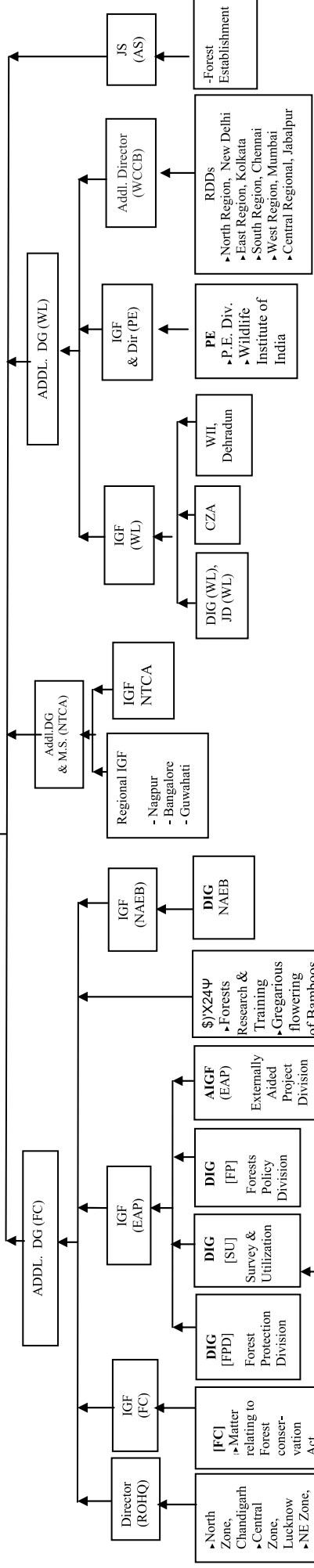
**ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE (DIVISIONS UNDER FORESTRY & WILDLIFE SECTOR)**

MINISTER FOR ENVIRONMENT, FOREST & CLIMATE CHANGE

As on 29 February, 2016

SECRETARY

DGF & SS



- ▶ North Zone, Chandigarh
- ▶ Central Zone, Lucknow
- ▶ NE Zone, Shillong,
- ▶ Eastern Zone, Bhubaneswar
- ▶ South Zone, Bangalore
- ▶ Eastern Plateau or Upper East, Ranchi
- ▶ West Zone, Bhopal
- ▶ South - Eastern Zone, Chennai
- ▶ North-Central Zone, Dehradun
- ▶ West-Central Zone, Nagpur

- ▶ A & N Islands Forests Plantation Development Corporation Ltd., Port Blair

- ▶ IGNSA, Dehradun
- ▶ IFM, Bhopal
- ▶ IPRTI, Bangalore
- ▶ DFE, Dehradun
- ▶ FSI, Dehradun

- ▶ Forest Research Institute, Dehradun
- ▶ Himalayan Forests Research Institute, Shimla
- ▶ Tropical Forests Research Institute, Jabalpur
- ▶ Centre for Social Forestry & Eco-Rehabilitation, Allahabad
- ▶ Centre for Forestry Research & Human Resources Development, Chindwara

- ▶ Institute of Rain & Moist Deciduous for Research, Jorhat
- ▶ Institute of Forests Productivity, Ranchi
- ▶ Institute of Forests Genetics & Tree Breeding, Coimbatore.
- ▶ Institute of wood Science & Technology, Bangalore.
- ▶ Tropical Forests Research Institute, Jodhpur



**A list of Ongoing Forestry Projects with external financial assistance  
Japan International Cooperation Agency (JICA) Assisted**

S. No.	Name of the Project	Cost (million JPY)	Project Objectives	Components
1.	Uttarakhand Forest Resource Management Project	11,390	To conserve and manage the Forest Resources of the State on a sustainable basis by empowering adjoining communities, particularly women, through alternate sustainable livelihoods. To ensure positive involvement of rural people in managing their own environment and strengthening community institutions like Van Panchayats.	(i) Restoration/ Development Forests Resource (ii) Livelihood improvement – Community Development & IGAs (iii) Supporting activities
2.	West Bengal Forestry and Biodiversity Conservation Project	6,371	To improve forest ecosystem and conserve biodiversity by undertaking afforestation, regeneration and wildlife management activities through Joint Forest Management approach, including institutional capacity development, thereby contributing to environmental conservation and harmonized socio-economic development of West Bengal	(i) Afforestation (ii) Biodiversity Conservation (iii) Community Development (iv) Institutional Capacity Development
3.	Rajasthan Forestry and Biodiversity Project (Phase-II)	15,749	To enhance forest area and livelihood opportunities of the forest dependent people and to conserve biodiversity by undertaking afforestation and biodiversity conservation measures through JFM approach, thereby contributing to environmental conservation and socio-economic development of Rajasthan.	(i) Afforestation (ii) Agro Forestry (iii) Water conservation Structures (iv) Biodiversity Conservation (v) Community Mobilization (vi) Capacity Building, Training & Research (vii) Monitoring and Evaluation (viii) Consulting Services



S. No.	Name of the Project	Cost (million JPY)	Project Objectives	Components
4.	Tamil Nadu Biodiversity Conservation and Greening Project	8,829	To strengthen biodiversity conservation by improving ecosystem and the management capacity as well as undertaking tree planting outside the recorded forest areas, thereby contributing to environmental conservation and harmonized socio-economic development of Tamil Nadu.	(i) Biodiversity Conservation (ii) Increasing the Natural Resources base (iii) Institutional Capacity Development (iv) Consulting Services
5.	Sikkim Biodiversity Conservation and Forest Management Project	5,384	To strengthen biodiversity conservation activities and forest management capacity, and improve livelihood for local people who are dependent on forests by promoting sustainable biodiversity conservation, afforestation and income generation activities including eco-tourism for the community development, thereby contributing environment conservation and harmonized socio-economic development of Sikkim.	(i) Forest and biodiversity conservation (ii) Eco –tourism (iii) Joint Forests Management (iv) Supporting Activities (v) Consulting Services
6.	Capacity Development of Forest Management and Personnel Training Project	5,241	Strengthening human resource development (HRD)	i) Strengthening of Training System ii) Rehabilitation of Training Institutes/Schools iii) Trainings iv) Supporting Activities
7.	Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project	13,345	To restore degraded forests, to augment forest resources and to improve livelihood and empower the local people who are dependent on forest by promoting sustainable forests management including JFM plantation and community development, thereby improving environment and alleviating poverty	(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



S. No.	Name of the Project	Cost (million JPY)	Project Objectives	Components
8.	Gujarat Forestry Development Project – Phase II	17,521	To restore degraded forests and improve the livelihoods for and empower the local people who are dependent on forests by promoting sustainable forest management including JFM plantation and community/ tribal development, thereby improving environment and alleviating poverty.	<ul style="list-style-type: none"> <li>(i) Preparatory works</li> <li>(ii) Departmental Forest Development and Management</li> <li>(iii) JFM Forest Development and Management</li> <li>(iv) Social Forestry Development and Management</li> <li>(v) Forest Research</li> <li>(vi) Communication and Publication</li> <li>(vii) Wildlife Conservation and Management</li> <li>(viii) Monitoring and Evaluation</li> <li>(ix) Phase-out works</li> <li>(x) Consulting Services (including price and physical cont.</li> </ul>
9.	Tripura Forest Environmental Improvement and Poverty Alleviation Project	7,725	To restore degraded forests and improve the livelihood aspects of villagers, including tribal families engaged in traditional shifting cultivation, and promoting sustainable forest management through JFM, thereby improving environment and alleviating poverty	<ul style="list-style-type: none"> <li>(i) Rehabilitation of degraded land.</li> <li>(ii) Rehabilitation of degraded and available non forest land.</li> <li>(iii) Farm forestry in Private holding.</li> <li>(iv) Eco-Development.</li> <li>(v) Service Support.</li> <li>(vi) Rehabilitation of families engaged in shifting cultivation.</li> <li>(vii) Interface forestry Development.</li> <li>(viii) Supporting Works.</li> </ul>

S. No.	Name of the Project	Cost (million JPY)	Project Objectives	Components
10.	Swan River Integrated Watershed Management Project	3,493	To regenerate the forests, protect the agricultural land, and enhance agricultural and forestry production in the catchment area of the Swan River, Himachal Pradesh State, by carrying out the integrated watershed management activities including afforestation, civil works for soil and river management, soil protection and land reclamation, and livelihood improvement activities, thereby improving living conditions of people including the poor in the catchment area.	<ul style="list-style-type: none"> <li>(i) Afforestation</li> <li>(ii) Civil Work for Soil &amp; River Management</li> <li>(iii) Soil Protection &amp; Land Reclamation</li> <li>(iv) Livelihood Improvement</li> <li>(v) Institutional Development</li> </ul>
11.	Orissa Forestry Sector Development Project	13,937	To restore degraded forests and improve the income level of villagers by promoting sustainable forest management including JFM plantation and Community/tribal development, thereby improving environment and alleviating poverty.	<ul style="list-style-type: none"> <li>(i) Protection and Conservation of Biodiversity of forests</li> <li>(ii) Improving productivity of natural forests.</li> <li>(iii) Providing livelihood options for the people (Support to VSS)</li> <li>(iv) Eco-development and ecotourism activities</li> <li>(v) Catering to commercial and industrial demands.</li> <li>(vi) Capacity building of the Forest Department.</li> </ul>



## II. KfW – GIZ ( Govt. of Germany)

S. No.	Name of the Project	Cost (million JPY)	Project Objectives	Components
01.	Himachal Pradesh Forest Eco-Systems Climate Proofing project	35 million (Euros)	Forest ecosystems in HP are managed in a way, that the risks of climate change and its negative impacts are minimized and/or mitigated, resulting in an increase of biodiversity of the treated Himalayan ecosystems and raised income in rural areas from sustainable management of natural resources.	<ul style="list-style-type: none"> <li>i) Rehabilitation of lantana infested area</li> <li>ii) Under planting of Chir Pines areas</li> <li>iii) Rehabilitation of bamboo plantation</li> <li>iv) Treatment of 150 spring catchments for improved water management</li> <li>v) Soil and water conservation measures/drainage line treatments</li> <li>vi) Renewal of Silvicultural Operations</li> <li>vii) Project facilitation</li> </ul>

## AFD (Govt. of France)

S. No.	Name of the Project	Cost (million JPY)	Project Objectives	Components
01.	Assam Project on Forest and Biodiversity Conservation	54.00 million (Euro)	<ul style="list-style-type: none"> <li>i) To enhance the capacity of the Assam Forest Department</li> <li>ii) To establish a multi-level strategic plan for the management of Assam Forests</li> <li>iii) To carry out forest management activities in a transparent and sustainable way.</li> </ul> <p>To add value to goods and services generated through sustainable forest management</p>	<ul style="list-style-type: none"> <li>(i) FD institutional strengthening</li> <li>(ii) Multi-level Strategic Planning</li> <li>(iii) Sustainable Forest Management</li> </ul> <p>Adding value and opening markets/ opportunities for forests and biodiversity goods and services</p>



## Annexure-V

### List of wetlands of International Importance from India under Ramsar Convention

S. No.	Name of Wetland	State	Date of declaration
1.	Kolleru Lake	Andhra Pradesh	19-08-2002
2.	Deepor Beel	Assam	19-08-2002
3.	Nalsarovar Wetland	Gujarat	24-09-2012
4.	Renuka	H.P.	08-11-2005
5.	Chandrataal	H.P.	08-11-2005
6.	Pong Dam Lake	Himachal Pradesh	19-08-2002
7.	Surinsar - Mansar	J&K	08-11-2005
8.	Hokarsar	J&K	08-11-2005
9.	Wular Lake	Jammu & Kashmir	23-03-1990
10.	Tsomoriri	Jammu & Kashmir	19-08-2002
11.	Sasthamkotta Lake	Kerala	19-08-2002
12.	Ashtamudi	Kerala	19-08-2002
13.	Vembanad-Kol Wetland	Kerala	19-08-2002
14.	Bhoj Wetland	Madhya Pradesh	19-08-2002
15.	Loktak Lake	Manipur	23-03-1990
16.	Chilika Lake	Odisha	01-10-1981
17.	Bhitarkanika Mangroves	Odisha	19-08-2002
18.	Harike Lake	Punjab	23-03-1990
19.	Ropar	Punjab	22-01-2002
20.	Kanjli	Punjab	22-01-2002
21.	Sambhar Lake	Rajasthan	23-03-1990
22.	Keoladeo National Park	Rajasthan	01-10-1981
23.	Point Calimere Sanctuary	Tamil Nadu	19-08-2002
24.	Rudrasagar	Tripura	08-11-2005
25.	Uppar Ganga	U.P.	08-11-2005
26.	East Calcutta Wetlands	West Bengal	19-08-2002



### Abbreviations

A.I.C.O.P.T.AX.	: All India Coordinated Project on Capacity Building in Taxonomy	N.M.N.H.	: National Museum for Natural History
A.W.	: Animal Welfare	N.N.R.M.S.	: National Natural Resources Management Systems
B.C.S.	: Bio-Diversity Conservation Scheme	N.R.C.D.	: National River Conservation Directorate
B.G.	: Botanical Garden	N.R.C.P.	: National River Conservation Plan
B.G.I.R.	: Botanical Garden of the Indian Republic	I.N.C.C.A.	: Indian Network for Climate Change
B.S.I.	: Botanical Survey of India	I.P.C.C.	: International Panel on Climate Change
C.B.D.	: Convention on Biological Diversity	I.T.	: Information Technology
C.B.P.	: Capacity Building Project	I.U.C.N	: International Union for Conservation of Nature
C.C.	: Climate Change	I.W.S.U.	: Internal Work Study Unit
C.C.U.	: Civil Construction Unit	L.C.	: Legal Cell
C.D.M.	: Clean Development Mechanism	M.B.P.	: Man and Biosphere Programme
C.E.S.	: Centre for Ecological Science	M.G.C.E.&E.	: Mahatma Gandhi Chair on Environment & Ecology
C.M.W.	: Conservation and Management of Wetlands	N.A.T.C.O.M.	: National Communication
C.O.P.	: Conference of the Parties	N.B.A.	: National Biodiversity Authority
C.P.A.	: Control of Pollution Air	N.B.A.P.	: National Biodiversity Action Plan
C.P.W.	: Control of Pollution Water	N.C.Z.M.A.	: National Coastal Zone Management Authority
CPB	: Cartagena Protocol on Biosafety	N.E.P.T.R.I.	: National Environmental Protection Training and Research Institute
C.P.C.B.	: Central Pollution Control Board	N.E.S.P.F.	: National Environmental Science Fellows Programme
CT	: Clean Technology	N.F.A.	: National Fellowship Awards
C.R.Z.	: Coastal Regulation Zone	N.G.O.	: Non Governmental Organisation
C.S.D.	: Commission on Sustainable Development	N.G.T.	: National Green Tribunal
C.V.O.	: Chief Vigilance Officer	N.G.R.B.A.	: National Ganga River Basin Authority
D.T.E.P.A.	: Dahanu Taluka Environment Protection Authority	N.I.A.W.	: National Institute of Animal Welfare
E.C.	: Economic Cell	N.L.C.P.	: National Lake Conservation Plan
E.E.	: Environment Education	N.M.C.G.	: National Mission on Clean Ganga
E.I.	: Environment Information	N.M.N.H.	: National Museum for Natural History
E.I.V.R.	: Entities of Incomparable Value Regulations	N.N.R.M.S.	: National Natural Resources Management Systems
E.N.V.I.S.	: Environmental Information System	N.R.C.D.	: National River Conservation Directorate
E.P.T.R.I	: Environment Protection Training & Research Institute	N.R.C.P.	: National River Conservation Plan
E.S.A.	: Ecologically Sensitive Areas	I.N.C.C.A.	: Indian Network for Climate Change
F.E.	: Forest Establishment	I.P.C.C.	: International Panel on Climate Change
F.R.L.H.T.	: Foundation for Revitalization of Local Health Traditions	I.T.	: Information Technology
G.A.	: General Administration	I.U.C.N	: International Union for Conservation of Nature
G.B.P.I.H.E.D.	: G.B. Pant Institute of Himalayan Environment & Development	I.W.S.U.	: Internal Work Study Unit
G.P.G.	: Global Public Goods	L.C.	: Legal Cell
G.C.	: General Co-ordination	M.B.P.	: Man and Biosphere Programme
G.E.A.C.	: Genetic Engineering Approval Committee	M.G.C.E.&E.	: Mahatma Gandhi Chair on Environment & Ecology
G.E.F.	: Global Environment Facility	N.A.T.C.O.M.	: National Communication
G.I.M.	: Greening India Mission	N.B.A.	: National Biodiversity Authority
G.L.O.B.E.	: Global Learning & Observation to Benefit the Environment	N.B.A.P.	: National Biodiversity Action Plan
H.S.M.D.	: Hazardous Substances Management Division	N.C.Z.M.A.	: National Coastal Zone Management Authority
I.A.	: Impact Assessment	N.E.P.T.R.I.	: National Environmental Protection Training and Research Institute
I.C.	: International Co-operation	N.E.S.P.F.	: National Environmental Science Fellows Programme
I.C.I.M.O.D.	: International Centre for Integrated Mountain Development	N.F.A.	: National Fellowship Awards
I.F.C.	: Information Facilitation Counter	N.G.O.	: Non Governmental Organisation
I.F.D.	: Integrated Finance Division	N.G.T.	: National Green Tribunal
I.F.S.	: Indian Forest Service	N.G.R.B.A.	: National Ganga River Basin Authority
I.G.P.P.	: Indira Gandhi Paryavaran Puraskar	N.I.A.W.	: National Institute of Animal Welfare
I.N.C.C.A.	: Indian Network for Climate Change	N.L.C.P.	: National Lake Conservation Plan
I.P.C.C.	: International Panel on Climate Change	N.M.C.G.	: National Mission on Clean Ganga
I.T.	: Information Technology	N.M.N.H.	: National Museum for Natural History
I.U.C.N	: International Union for Conservation of Nature	N.N.R.M.S.	: National Natural Resources Management Systems
I.W.S.U.	: Internal Work Study Unit	N.R.C.D.	: National River Conservation Directorate
L.C.	: Legal Cell	N.R.C.P.	: National River Conservation Plan
M.B.P.	: Man and Biosphere Programme	N.F.A.P.	: National Forestry Action Programme
M.G.C.E.&E.	: Mahatma Gandhi Chair on Environment & Ecology	N.F.C.	: National Forest Commission
N.A.T.C.O.M.	: National Communication	N.T.C.A.	: National Tiger Conservation Authority
N.B.A.	: National Biodiversity Authority	N.Z.P.	: National Zoological Park
N.B.A.P.	: National Biodiversity Action Plan	P.E.	: Project Elephants
N.C.Z.M.A.	: National Coastal Zone Management Authority	P.T.	: Project Tigers
N.E.P.T.R.I.	: National Environmental Protection Training and Research Institute	ROHQ	: Regional Office Head Quarter
N.E.S.P.F.	: National Environmental Science Fellows Programme	R.Os	: Regional Offices
N.F.A.	: National Fellowship Awards	R.T.	: Research & Training
N.G.O.	: Non Governmental Organisation	S.U.	: Survey & Utilization
N.G.T.	: National Green Tribunal	S.F.A.	: Standard Financial Annex
N.G.R.B.A.	: National Ganga River Basin Authority	W.H.C.	: World Heritage Convention
N.I.A.W.	: National Institute of Animal Welfare	WCCB	: Wild Life Crime Control Bureau
N.L.C.P.	: National Lake Conservation Plan	W.I.I.	: Wildlife Institute of India
N.M.C.G.	: National Mission on Clean Ganga	W.L.	: Wildlife





## NOTES

A series of horizontal dotted lines for writing notes.



## Overall Supervision

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