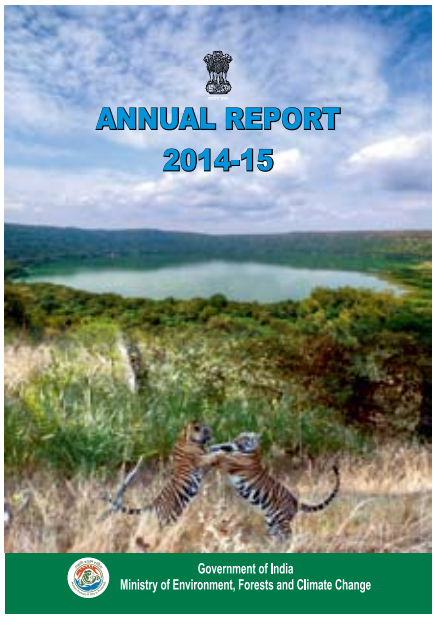
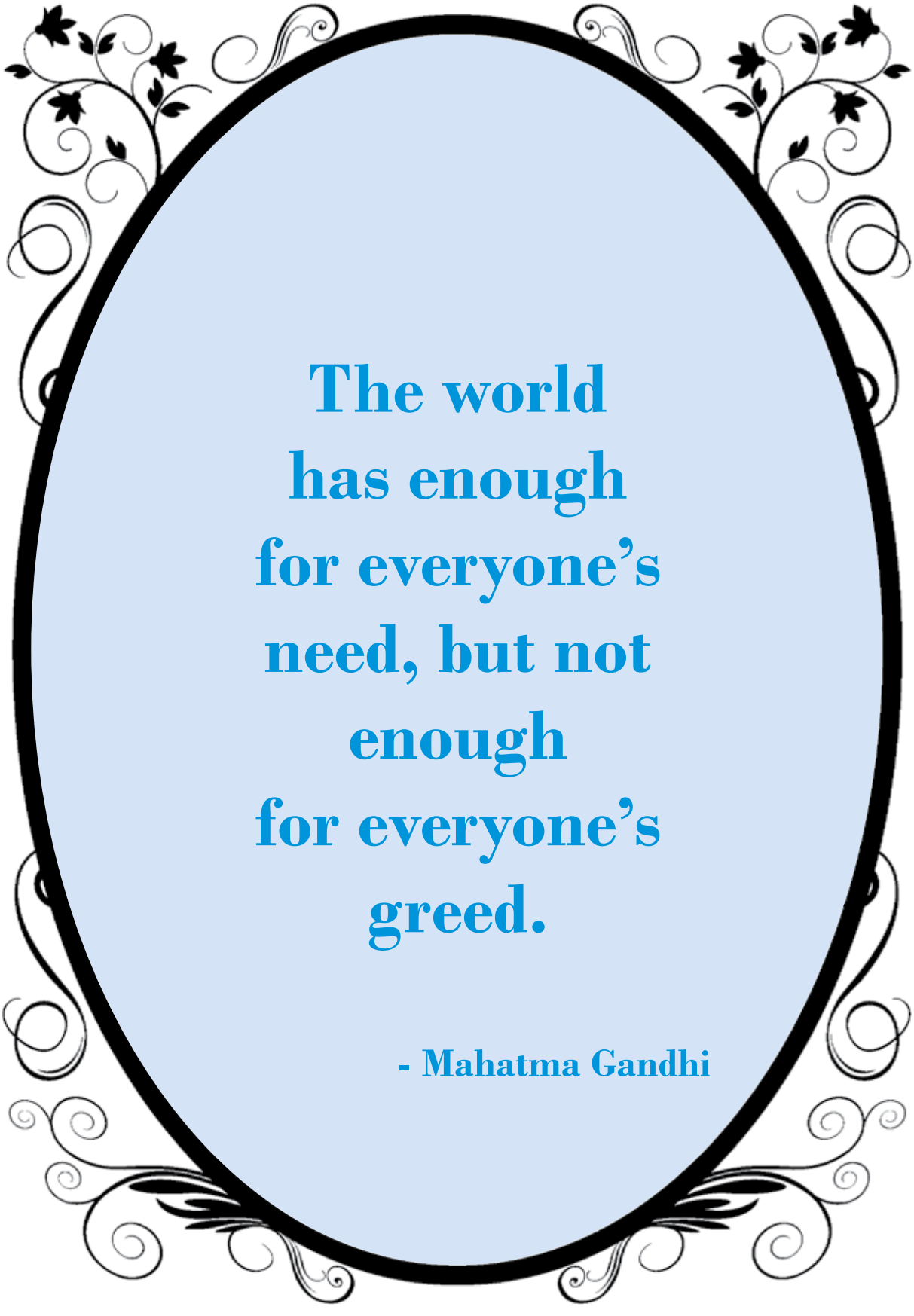
सत्यमेव जयते

ANNUAL REPORT 2014-15



प्रकृतिः रक्षति रक्षिता
Nature Protects if She is Protected

Government of India
Ministry of Environment, Forests and Climate Change


The world
has enough
for everyone's
need, but not
enough
for everyone's
greed.
- Mahatma Gandhi

“ Mahatma Gandhi did not go to every locality to clean up but his commitment created awareness towards cleanliness in entire India. We also have to do it together. Wherever we are, we should do it. I believe that we will be able to clean our Mother India. If once, we 125 crore Indians decide that we will not spread filth, no power in this world can make India dirty. ”

- Narendra Modi
Prime Minister

CONTENTS

ROLE AND MANDATE OF THE MINISTRY

Role and Mandate of the Ministry

Role of the Ministry

The Ministry of Environment & Forests (MoEF) is the nodal agency in the Central Government for overseeing the implementation of India's environment and forest policies and programmes relating to conservation of the country's natural resources including lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals and prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development.

The Ministry is also the nodal agency for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and the United Nations Conference on Environment and Development (UNCED). The Ministry also coordinates with multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and regional bodies such as Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Cooperation (SAARC) on matters pertaining to environment.

The broad objectives of the Ministry are:

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

These objectives are well supported by a set of legislative and regulatory measures,

aimed at the preservation, conservation and protection of the environment. Besides the legislative measures, a National Conservation Strategy and Policy Statement on Environment and Development, 1992, National Forest Policy, 1988, a Policy Statement on Abatement of Pollution, 1992 and a National Environment Policy, 2006 also guide the Ministry's work.

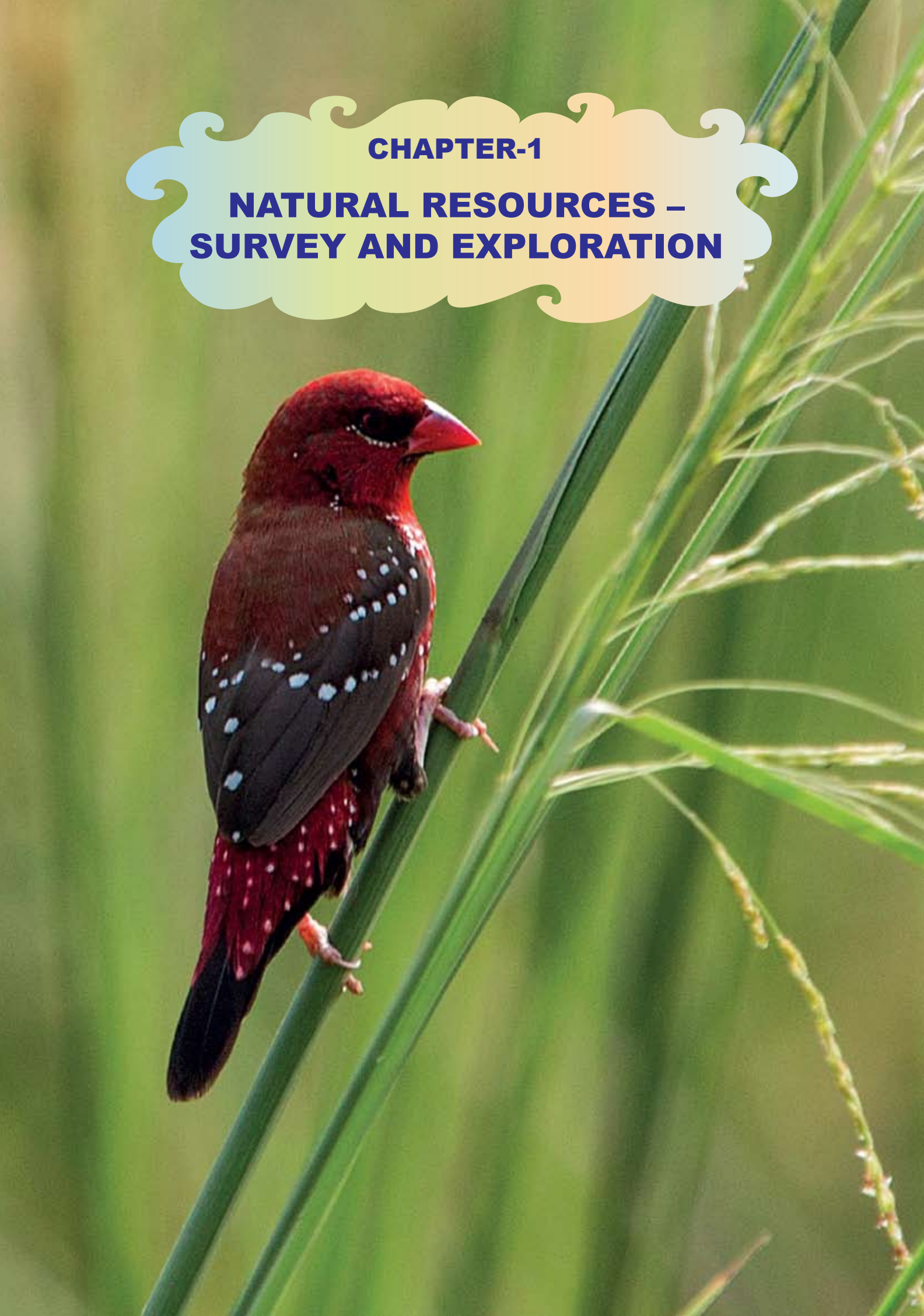
The organizational structure of the Ministry indicating various Divisions and its autonomous and subordinate offices is given at Annexure- II-A & II-B.

Mandate of the Ministry

Allocation of Business

- Environment and Ecology, including environment in coastal waters, in mangroves and coral reefs but excluding marine environment on the high seas.
- Survey and Exploration of Natural Resources particularly of Forest, Flora, Fauna, Ecosystems etc.
- Bio-diversity Conservation including that of lakes and wetlands.
- Conservation, development, management and abatement of pollution of rivers which shall include National River Conservation Directorate.
- Environmental Impact Assessment.
- Environment research and development, education, training, information and awareness.
- Environmental Health.
- Forest Development Agency and Joint Forest Management Programme for conservation, management and afforestation.
- Wildlife conservation, preservation, protection planning, research, education, training and awareness including Project Tiger and Project Elephant.
- International co-operation on issues concerning Environment, Forestry and Wildlife.
- Botanical Survey of India and Botanical Gardens.
- Zoological Survey of India.
- National Museum of Natural History.
- Biosphere Reserve Programme.
- National Forest Policy and Forestry Development in the country including Social Forestry.
- All matters relating to Forest and Forest Administration in the Andaman and Nicobar Islands.
- Indian Forest Service.
- Wild Life Preservation and protection of wild birds and animals.
- Fundamental and applied research and training including higher education in forestry.
- Padmaja Naidu Himalayan Zoological Park.
- National Assistance to Forestry Development Schemes.
- Indian Plywood Industries Research and Training Institute, Bangalore.
- Afforestation and Eco-development which shall include National Afforestation and Eco-Development Board.
- Desert and Desertification.

- Forest Survey of India.
- Indian Institute of Bio-diversity, Itanagar.
- Central Pollution Control Board.
- G.B. Pant Institute of Himalayan Environment & Development.
- Wildlife Institute of India and Indian Board for Wildlife.
- Indian Institute of Forest Management.
- Central Zoo Authority including National Zoological Park.
- Indian Council of Forestry Research & Education.
- Andaman and Nicobar Islands Forest and Plantation Development Corporation Limited.
- Prevention of Cruelty to Animals.
- Matters relating to pounds and cattle trespass.
- Gaushalas and Gausadans.
- The Prevention of Cruelty to Animals Act, 1960 (59 of 1960).
- The National Environment Tribunal Act, 1995 (27 of 1995).
- The National Environment Appellate Authority Act, 1997 (22 of 1997).
- The Water Prevention and Control of Pollution Act, 1974 (6 of 1974).
- The Water (Prevention and Control of Pollution) Cess Act, 1977 (36 of 1977).
- The Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981).
- The Indian Forest Act, 1927 (16 of 1927).
- The Wildlife (Protection) Act, 1972 (53 of 1972).
- The Forest (Conservation) Act, 1980 (69 of 1980).
- The Environment (Protection), Act, 1986 (29 of 1986).
- The Public Liability Insurance Act, 1991 (6 of 1991).



CHAPTER-1

NATURAL RESOURCES – SURVEY AND EXPLORATION

Survey of Flora

Botanical Survey of India

Botanical Survey of India (BSI) is the apex research organization under the Ministry of Environment, Forests & Climate Change, Govt. of India for carrying out taxonomic and floristic studies on wild plant resources of the country through Survey, Documentation and Conservation.

Fig-1. *Chrysanthemum* - economically important as a natural source of insecticide

During the successive plan periods, the functional base of Botanical Survey of India was further expanded to include various new areas such as inventorying of endemic, rare and threatened plant species; evolving conservation strategies; studies on fragile ecosystems and protected areas, like sanctuaries, national parks and biosphere reserves; multiplication and maintenance of endemic and threatened plant species, wild ornamentals etc., in Botanic Gardens and Orchidaria; documentation of traditional knowledge 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.

Over the years, the functional role of the Survey was further expanded. After the ratification of the Convention on Biological Diversity (CBD: 1994), Enactment of Biological Diversity Act (2002) and Biological Diversity Rules (2004), BSI has become an important institution as its mandate has direct relevance to Articles 6 (Conservation), 7 (Identification & Monitoring), 9 (Ex situ conservation), 12 (Research & Training), 13 (Public education & Awareness), 17 (Exchange of Information) and 18 (Technical & Scientific Cooperation) of CBD.

Activities undertaken so far

- 1 new family, 32 new genera and 925 new species, subspecies, varieties have been discovered as new to science.
- EIA studies on impact of over 100 developmental projects on flora completed.

Achievements

Botanical Exploration & Inventorisation of Plant Diversity

Field tours and Herbarium consultation tours

Ninety Eight field tours were undertaken by different regional centre units of BSI for collection of plant specimens/ materials for floristic, ethnobotanical and pharmacognostical studies on flowering and

non-flowering plants and three biodiversity hotspot, viz. the Himalaya, the Indo-Burma and the Western Ghats-Sri Lanka. These include 36 protected areas and 07 Sacred Groves. In addition, 12 tours for the collections of live germplasm were also undertaken in these areas.

Apart from that 15 herbarium consultation/ study tours were also conducted for identification of specimens/authentication.

During field tours, ca 14,261 (5976 of non-flowering plants) incl. specimens were collected, out of the total ca 13,204 specimens were identified into ca 6,201 taxa, subspecies and varieties. This resulted into the discovery of 1 genus and 37 species as new to science; 2 genera and 31 taxa as new to India and 56 new distributional records for different geographic regions/ states.

New Discoveries (New to Science)

	Genus	Family
1.	Sheathnema Dubey & Moonambeth	Stillbelaceae

Species/Varieties

1.	Bactrospora littoralis Jagadeesh	Roccellaceae
2.	Bactrospora medians Jagadeesh	Roccellaceae
3.	Bondarzewia zonata K. Das, A. Parihar & Hembrom	Bondarzewiaceae
4.	Bulbophyllum cherrapunjeensis D. Verma, et.al.	Orchidaceae
5.	Bulbophyllum manabendrae D.K. Roy et. al.	Orchidaceae
6.	Caloplaca indica Y.Joshi, Jagadeesh & G.P. Sinha	Teloschistaceae
7.	Chiodecton andamanicum Jagadeesh	Roccellaceae
8.	Custingophora ratnagiriensis Dubey & Moonambeth	Ascomycota (Phyllum)
9.	Cyathus thindii K. Das, Hembrom, A. Parihar & R.L. Zhao	Agaricaceae
10.	Glochidion kingie Ramana et al.	Euphorbiaceae
11.	Goosiomyces bambusicola Dubey & Moonambeth	Ascomycota (Phyllum)
12.	Habenaria nicobarica Murugan et. al.	Orchidaceae
13.	Habenaria osmastonii Karthig. et. al.	Orchidaceae
14.	Impatiens paramjitiana Gogoi & Borah	Balsaminaceae
15.	Ixora chakraborteyi Murugan & Prabhu	Rubiaceae
16.	Memecylon bengalensis Karthig. & Lahiru	Memecylaceae
17.	Musa argentii Gogoi & Borah	Musaceae
18.	Musa indandamanensis L. J. Singh	Musaceae
19.	Musa mannii var. namdanensis Gogoi & Borah	Musaceae
20.	Musa nagalandiana S.Dey & Gogoi	Musaceae
21.	Phanera glauca Benth. subsp. tenuiflora (Watt ex C.B. Clarke) A. Schmitz var. gandhiana Gogoi & Bandyop. Fabaceae	
22.	Phanera glauca Benth. subsp. tenuiflora (Watt ex C.B. Clarke) A. Schmitz var. murlenensis Ram. Kumar, Bandyop. et Sharma Fabaceae	
23.	Picrorhiza tungnathii Pusalkar	Scrophulariaceae
24.	Rhynchosia ravii Prasad et al.	Fabaceae
25.	Russula thindii K. Das & S.L. Miller	Russulaceae
26.	Russula shingbaensis K. Das & S.L. Miller	Russulaceae
27.	Sagenidiopsis atroalba Jagadeesh	Roccellaceae

	Genus	Family
28.	Sheathnema indicum Dubey & Moonambeth	Stillbelaceae
29.	Sonerila vythiriensis Ratheesh, Nandakumar and Sujana	Melastomaceae
30.	Staurogyne andamanica Ramana et. al.	Acanthaceae
31.	Suillus lariciphillus K. Das et. al.	Suillaceae
32.	Syzygium daneshiana Ratheesh et al.	Myrtaceae
33.	Syzygium hookeri Ramana et al.	Myrtaceae
34.	Syzygium sanjappaiana Ramana et al.	Myrtaceae
35.	Vermiculariopsiella papaye Dubey & Moonambeth	Helminthosporiaceae
36.	Zygosporium cocos Dubey	Zygomycota (Phyllum)
37.	Zygosporium dilleni Dubey	Zygomycota (Phyllum)

Disapeared species of plants collected after more than 50 years

- ***Impatiens porrecta Wall*** **-** The species was collected by William Griffith from Khasi Hills, Meghalaya in 1832. The second collection of this species was made in 1969 by R. S. Rao from Tirap district of Arunachal Pradesh. Afterwards the species was almost unknown in natural habitat. Now this species has been spotted and re-collected on 13.09.2014 from Poting, Papeum Pare district of Arunachal Pradesh.
- ***Impatiens toppinii Dunn*** **–** Recollected from the periphery of Kamlang Wild Life Sanctuary, Arunachal Pradesh after the last collection made from Kachin hill, Myanmar at 4000-5500 ft. Msl. in 1911 by Major Sidney Miles Toppin of British Army
- ***Psorotheciopsis patellarioides (Rehm) R. Sant.*** **–** A foliicolous lichen rediscovered from Assam after a gap of 135 years.
- ***Ceropegia odorata Nimmo*** **–** Recollected from its type locality in Maharashtra after 175 years.
- ***Prunus ceylanica Miq.*** **–** IUCN Red Data plant collected after 08 decades from West Bengal
- ***Ixora longibracteata Bremek.*** **–** Collected after type collection from Jaldapara National Park, West Bengal
- ***Uvaria eucincta Bedd. ex Dunn*** **–** An endemic and threatened liana collected from Odisha, after a century.
- ***Cortinarius flammeus Berk.*** **–** Known incompletely by an old collection from Sikkim Himalaya is rediscovered and described again after more than 160 years.
- ***Strobilomyces polypyramis Hook. f.*** **–** Reported earlier from India in 1851 and is recently rediscovered from N.Sikkim

Documentation of Plant Diversity

National Flora (Flora of India):

Taxonomic description for 183 taxa of flowering and non-flowering plants have been completed.

Regional/State Flora

Taxonomic description for 1236 taxa of flowering and non-flowering plants have been completed during the year is an important achievement.

Flora of Protected Areas

Taxonomic descriptions for 1528 taxa of flowering plants of the following 36 protected areas have been successfully completed.

Fig 2. *Impatiens toppinii Dunn (Balsaminaceae)* was re-collected after a century from Arunachal Pradesh, India

Documentation of Indegenous Knowledge of Plant Resources

– 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. Manuscript 'Ethnobotany of Dang District, Gujarat', comprising 348 taxa, is being finalized.

Ex-Situ Conservation

– About 2,865 saplings, seeds, propagules belonging to 376 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 Centre. Artificially pollinated, an IUCN red listed endangered species, Lodoicea maldivica Gmeln. (Double Coconut Palm) growing in the large palm house of AJC Bose Indian Botanic Garden, Howrah.

Micro-Propagation of Threatened Species

Experiment on Micro-Propagation of following mentioned threatened species has been initiated – *Ilex khasiana, Cymbidium tigrinum, Armodorum senapatianum, Rhododendron coxianum, Paphilpedilum hirsutissimum.*

From Lab to Land

– Successfully transferred 40 plantlets of *Cymbidium tigrinum to greenhouse*
– 219 plantlets of Armodorum senapatianum were planted in sphagnum, wood chips in different ratio and maintained in greenhouse.
– 05 plantlets of *Rhododendron coxianum* were transferred to greenhouse and maintained.
– Seed germination experiment was conducted in *Indopiptadenia oudhensis* but all the seeds failed to germinate.
– Screening of plant growth regulators for the induction of multiple shoots, callus induction in *Indopiptadenia oudhensis* done.
– Micropropagation protocol has been standardized for *Pittosporum eriocarpum*.

Pollen & Seed Morphology of Genus Andrographis Using SEM

Total Number of Photograph taken with SEM – 165.

Completed the following species

– **Pollen:** Andrographis beddomei C.B. Clarke, A. elongata Vahl; A. glandulosa (B.

Heyne ex Roth) Nees; A. longipedunculata Sreem.; A. ovata (T. Anderson ex Bedd.) Benth. & Hook.f.

- **Seeds:** Andrographis longipedunculata Sreem; A. viscosula Nees; A. stellulata C.B. Clarke; A. clarkeana sp. nov.
- **Leaf surfaces:** Andrographis paniculata (Burm.f.) Wall. ex Nees; A. rotundifolia (Sreem.) Sreem; A. alata (Vahl) Nees; A. elongata T. Anderson; A. echioides (L.) Nees; A. serphyllifolia (Rottler ex Vahl) Wight; A. glandulosa (B. Heyne ex Roth) Nees; A. stenophylla C.B. Clarke; A. neesiana Wight; A. stellulata C. B. Clarke; A. atropurpurea (Dennst.) Alston; A. explicata (C.B. Clarke) Gamble; A. lawsonii Gamble; A. lineate Wall. ex Nees; A. lobelioides (Wall. ex Nees) Wight; A. macrobotrys Nees; A. producta (C.B. Clarke) Gamble; A. rothii C.B. Clarke

Studies on Nutraceutical values of Wild Edible Plants

Nutritive values, mineral estimation and antioxidant profile of Eighteen plant species have been carried out.

Nutritive values, mineral estimation and antioxidant profile of Eighteen plant species have been carried out.

Parameter analysed	Name of the Plant	Local name	Parts used
A. Proximate composition (%) Ash Moisture Crude fibre Crude fat Protein Carbohydrate Energy content	Chenopodium album	Polong	leaves
	Dioscorea	Phan-Mluh	bulb
	Alternanthera philoxeroides	Kanchi-Sag	leaves
	Spondias axillaris	Dieng-Salait	fruits
	Homalomena aromatica	Shriew	Underground stem
	Homalomena aromatica	Shriew	leaves
	Phlogacanthus curviflorus	Jathang	leaves and flowers
	Debregeasia longifolia	Jallatyrsim	fruits
	Zanthoxylum rhetsa	Chingjal	leaves
	Rhus semialata	Sohma	fruits
	Cajanus indicus	Bethleng	leaves
	Ilex venulosa	Soh Phoh Khlaw	Fruits
	Medinilla erythrophylla	Shkor blang	leaves
	Ardisia humilis	Ja-Jew	Leaves
	Helicia erratica	Soh Priam Khlaw	fruits
	Careya arborea		fruits
B. Mineral content (mg/g)	Chenopodium album	Polong	leaves
Sodium,	Dioscorea	Phan-Mluh	bulb
Potassium	Alternanthera philoxeroides	Kanchi-Sag	leaves
Calcium	Spondias axillaris	Dieng-Salait	fruits
Zinc	Homalomena aromatica	Shriew	Underground stem

Parameter analysed	Name of the Plant	Local name	Parts used
Manganese Iron Copper Magnesium	Homalomena aromatica	Shriew	leaves
	Phlogacanthus curviflorus	Jathang	leaves and flowers
	Debregeasia longifolia	Jallatyrsim	fruits
	Zanthoxylum rhetsa	Chingjal	leaves
	Rhus semialata	Sohma	fruits
	Cajanus indicus	Bethleng	leaves
	Ilex venulosa	Soh Phoh Khlaw	Fruits
	Medinilla erythrophylla	Shkor blang	leaves
	Ardisia humilis	Ja-Jew	Leaves
	Helicia erratica	Soh Priam Khlaw	fruits
	Careya arborea		Fruits
C. Antioxidant activities (mg/g) of four different extracts (benzene, chloroform, acetone and methanol) Total phenoloic content Total flavonoid content Total flavonol content Radical scavenging activity (IC50) Reducing power (AAE)	Chenopodium album	Polong	leaves
	Dioscorea	Phan-Mluh	bulb
	Alternanthera philoxeroides	Kanchi-Sag	leaves
	Spondias axillaris	Dieng-Salait	fruits
	Homalomena aromatica	Shriew	Underground stem
	Homalomena aromatica	Shriew	leaves
	Phlogacanthus curviflorus	Jathang	leaves and flowers
	Debregeasia longifolia	Jallatyrsim	fruits
	Zanthoxylum rhetsa	Chingjal	leaves
	Rhus semialata	Sohma	fruits
	Cajanus indicus	Bethleng	leaves
	Ilex venulosa	Soh Phoh Khlaw	Fruits
	Medinilla erythrophylla	Shkor blang	leaves
	Ardisia humilis	Ja-Jew	Leaves
	Helicia erratica	Soh Priam Khlaw	fruits
	Careya arborea		Fruits
Quantitative estimation of Rutin, Quercetin, Kaempferol, Apigenin, Myricetin, Gallic acid, Catechin, Methyl gallate, Caffeic acid, Syringic acid, p-Coumaric acid and Sinapic acid content in five wild edible plants has been carried out using HPLC.	1. Zanthoxylum acanthopodium 2. Sonchus arvensis 3. Oenanthe linearis 4. Clerodendrum colebrokianum 5. Bauhinia purpurea	1. Jaiur 2. Jalynniar 3. Jatira 4. Jarem 5. Megong	1. Leaves 2. Leaves 3. Leaves 4. Leaves 5. Leaves

Status of Biodiversity Informatics Initiatives

Digitization of Flora of India and Plant Checklist of India

E-Flora of India

A project was undertaken to convert Flora of India publication of BSI in web enabled form. Vol. 1, 2, 3, 4, 5, 13 and 23 have been converted in the web format. These details can be accessed through a web portal to be launched on NIC server soon.

Plant Checklist Database

Under the above project Plant Checklist Database in the web enabled format has been developed. A total, around 10000 records of flowering plants (monocot and dicot) have been completed.

Work on additional 22,000 records pertaining to Lichens and Fungi Checklist is under way. Entire checklist would be available on BSI website through a separate portal

Digitization of Rare Books in BSI

A project for digitization of around 1200 rare books available with BSI is under way. Total 735 books cpmrising of 3 lakh pages have been converted in e-form and is stored in DVDs and HDDs. It will be made available through BSI website or through dedicated web portal.

Digitization of Publications of BSI

All the publications of BSI have been digitized and would be available through website of BSI under Archives. Around 300 publications comprising of nearly 1 lakh pages have been digitized and are being made available through a web application on the web portal of BSI.

Digitization of back volumes & on line publishing of Journal Nelumbo

All 52 back volumes of journal Nelumbo have been digitized and shall be available through BSI portal. Very soon on line publication of the journal shall be started with the functionality of submission, review and final publishing of articles on line.

Publications

During the period, following 08 books and 03 periodicals were published by BSI.

Books:

- Anonymous 2014. Natural Dyes – Destination India (Archival treasures from the Botanical Survey of India). Sutra Textile studies, Kolkata & BSI, Kolkata
- Benjamin, J.H.F. & G. V. S. Murthy. 2013. *Flora of Venkateshwara National Park, Andhra Pradesh. BSI,* Kolkata.
- Debnath, H.S., H.S. Mahapatra, S.S. Hameed & P.V. Sreekumar 2014. *Census of Plants in AJC Bose Indian Botanic Garden.* BSI Kolkata
- Kholia B.S. 2014. Ferns and Fern-allies of Sikkim: A Pictorial Handbook Part-II. (Dept. of Forest & Wildlife management, Govt of Sikkim and BSI Kolkata.
- Kumari, P. & P. Singh 2014. Bamboos of AJC Bose IBG, Howrah, BSI Kokata.
- Manikandan, R. & P. Lakshminarasimhan. 2013 (2014). *Flora of Rajiv Gandhi National Park, Karnataka.* BSI, Kolkata.
- Pal, G. D. 2013 (2014) *Flora of Lower Subansiri District, Arunachal Pradesh, Vol. I*
- Singh, P., D.K. Singh & S.S. Dash. 2013 (2014). Plant Discoveries 2013. BSI.

Periodicals:

- BSI 2013 (2014). Nelumbo – The Bulletin of Botanical Survey of India, Vol. 55.
- ENVIS Newsletter. 2014. Vol. 19

– वनस्पति वाणी, अंक 23, 2014.

In addition, during the period, BSI scientists also published 2 books, 185 research papers in peer reviewed journals, 08 book chapters, 2 obituaries and 36 popular Hindi articles. Apart from that, 65 research papers have been communicated for publication.

Miscellaneous

Maintenance and enrichment of Herbaria in BSI: During the period 15,265 specimens were mounted/remounted, 10,690 specimens were accessioned and 7548 specimens were incorporated in different herbaria.

Digitization: 8300 herbarium specimens were bar-coded and digitized in all the herbaria spread across different regional centres of BSI.

Digitization & scanning of Herbarium specimens at Central National Herbarium:

– Tagged Barcode on the Type sheets available in Dicot and Monocot type Section, scanned images with a definite set up, edited the images using Photoshop CS4, compression and conversion done for 92 sheets in different sizes and formats (viz. tiff & jpeg).

– Uploaded scanned image files in the share folders.

– Prepared label data for 284 herbarium sheets in database by checking Current Scientific name available in data sheet with IPNI, The Plant List, Tropicos etc for incorporation in DH database software.

– Prepared database of 8968 dicot species (Total 688 pgs. of MS word file) for uploading in the web in a prescribed format.

– Prepared database of 2933 monocot species (Total 300 pgs. of MS word file) for uploading in the web in a prescribed format.

Photographic Digitization of 20000 Economic Herbarium Specimens of ISIM: The work is being carried out by an outsourced agency under e-governance project of MoEFCC since December, 2013. Digitized 16000 specimens up to 30th September 2014 which includes 9172 specimens from ISIM, 2500 sheets from CBL and remaining sheets from CNH. Further work is in progress.

Public Services rendered: BSI disseminated scientific information to public and also assisted scientists, students and researchers in their pursuit of taxonomic research on plants. During the period 14,285 visitors, including scientists, students, teachers and VIPs, visited different botanic gardens, herbaria and museum of BSI. Apart from that, 1,66,607 general visitors and more than 1200 students, researchers, forest trainees, VIPs and other dignitaries exclusively visited the AJCB IBG, Howrah, Queries on plant distribution, nomenclature, threatened and endemic taxa of different regions,

Fig-3. *Ixora chakrabortyei* - flowers, leaves, roots, and the stem are used to treat various ailments in the Indian traditional system of medicine

etc., were attended; 14715 specimens of angiosperms, pteridophytes, bryophytes and fungi, received from students/scientists outside BSI were identified and photocopies of c. 4400 pages of literature were supplied. Pharmacognostically authenticated total of 41 plant samples (36 Red sandalwoods; 2 white sandalwoods; 1 Brown sandalwood; 2 vegetable crude drugs) for various law enforcing agencies of government.

Revenue earnings: During the period BSI earned ₹ 64,49,184/- which includes ₹ 66,215/- towards identification charges of specimens/samples, ₹ 2,08,205/- towards sale of departmental publications ₹ 2,441/- towards photocopying of literature, ₹ 2,18,907/- towards guest house charges, ₹ 51,32,250/- towards Entry fee, Photography Charges and boating charges at AJCB IBG, Howrah, ₹ 99,469/- towards entry fee at Yercaud garden, ₹ 6,78,274/- towards sale of old stores items & Jeeps and ₹ 45,864/- as charges for other miscellaneous charges

Current Projects

- Collection of Oil Crops, Pulse & Medicinal Plant materials for enrichment of Botanical Gallery
- Interpretation of Family Euphorbiaceae in ICONES Roxburghianae
- Interpretation of Family Asteraceae in ICONES Roxburghianae
- Listing of Burkil collections at BSIS
- Revision of Family Gesneriaceae of North East India
- Listing of collections of George Watt deposited at BSIS
- Flora of Buxa Wildlife Sanctuary, Jalpaiguri, WB.
- Flora of Jaldapara Wildlife Sanctuary, West Bengal
- Verification of deposition of types at different herbaria of BSI based on names
- of new taxa published during 1990-2004 in some selected journals
- Editing & Updating of mss. of Flora of West Bengal, Vol. V (Monocot)
- Hydrocharitaceae – Poaceae (37 families)
- Flora of Gautam Buddha Wildlife Sanctuary, Bihar & Jharkhand,
- Flora of Vikramshila Gangetic Dolphin Wildlife Sanctuary, Bhagalpur, Bihar
- Revision of the genus Fimbristylis of family Cyperaceae under Flora of India.
- Palynotaxonomic studies of Lauraceae of India

Eastern Regional Centre, Shillong: Jurisdiction – Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura.

Woodlands, Laithmukhta, Shillong – 793003, Meghalaya

Current Projects

- Flora of Yangoupokpi Lokchao Wildlife Sanctuary, Chandel, Manipur
- Flora of Amchang Wildlife Sanctuary, Kamrup, Assam
- Taxonomic Revision of the genus Riccia (Marchantiophyta) in India
- Flora of Eastern Nagaland (Mon, Tuensang, Kiphire & Longleng)
- Micropropagation, Phytochemical Screening of Medicinal Plants and Molecular
- Characterization of Selected Species of NE India
- Checklist for Flora of Nagaland 1500
- Flora of South Garo Hills Dist., Meghalaya
- Flora of Murlen National Park, Mizoram

- Bryoflora (Hepaticae & Anthocerotae) of Mizoram
- Flora of Laokhowa Wildlife Sanctuary Nagaon, Assam
- Micropropagation of RET plants of North East India

Sikkim Himalayan Regional Centre, Gangtok: Jurisdiction – Sikkim.

Below Rajbhawan Campus; P.O. – Rajbhawan, Gangtok-737103, Sikkim

Current Projects

- Red listing of Orchids of Eastern Himalaya (Entire Sikkim, Darjeeling of West Bengal & Arunachal Pradesh (excl. Changlang & Tirap) as per IUCN criteria.
- Family Rubiaceae for Flora of India

Central Regional Centre, Allahabad: Jurisdiction – Madhya Pradesh, Chhatisgarh, Uttar Pradesh.

10, Chatham Lines, Allahabad-211002, Uttar Pradesh

Northern Regional Centre, Dehradun: Jurisdiction – Uttarakhand, Chandigarh, Punjab, Haryana, HimachalPradesh, Jammu & Kashmir.

192, Kaulagarh Road, Dehradun-248195, Uttarakhand

Current Projects

- Floristic Diversity and Phytosociological study of Simbalbara National Park,
- Himachal Pradesh
- Flora of Sonanadi Wildlife Sanctuary, Uttarakhand
- Flora of Nandhour Wild Life Sanctuary
- Flora of Kalesar National Park, Yamunanagar, Haryana

Arid Zone Regional Centre, Jodhpur: Jurisdiction – Rajasthan, Gujarat.

Near Khema Ka Kuan, Pal-Basni Canal Link Road, P. O.: Nandan Van, Jodhpur- 342 008, Rajasthan.

Current Projects

- Ethnobotany of Gujarat (Dang District)

Western Regional Centre, Pune: Jurisdiction – Maharashtra, Karnataka, Goa, Daman, Diu, Dadra & Nagar Haveli.

7, Koregaon Road, Pune-411 001 Maharashtra

Current Projects

- Foliicolous Fungi of Maharashtra
- Studies on the Orchids of Maharashtra with ecological aspects, population status of endemics and GIS mapping
- Flora of Biligiriranga swamy Temple Wildlife Sanctuary, Karnataka
- Ferns of Karnataka
- Flora of Sharavathi valley Wildlife Sanctuary, Shimoga, Karnataka
- Flora of Koyna Wildlife Sanctuary

Deccan Regional Centre, Hyderabad: Jurisdiction – Andhra Pradesh, Odisha. Established in 2005 at Hyderabad, the circle has ca 10,000 herbarium specimens.

In the ZSI Campus, Plot No. 366/1, Attapur (Village) Near O/o. DFO Flying Squad, Inner Ring Rd., Hyderguda Post, Hyderabad – 48

Southern Regional Centre, Coimbatore: Jurisdiction – Tamil Nadu, Kerala & Lakshadweep Islands.

T.N.A.U. Campus, Lawley Road, Coimbatore – 641003, Tamil Nadu.

Current Projects

- Pollen and Seed morphology of Genus Andrographis Wall. ex Nees using SEM
- Seed morphology of Ficus L. using SEM
- Study of Caryopsis in Eragrostis Sporobolus & Tripogon genera of Poaceae
- using SEM
- Study of Pollinia of South Indian Orchids using SEM
- Flora of Srivilliputhur Wildlife Sanctuary, Tamil Nadu
- Flora of Kerala Volume 7 (Part 1) Cyperaceae (18 genera and 230 taxa)

Andaman & Nicobar Regional Centre, Port Blair: Jurisdiction – Andaman & Nicobar Islands.

P.O. No.: 692, Haddo, Port Blair: 744102

Current Project

- Lichens of Nicobar Islands
- Flora of Trinket Island, Central Nicobar (ca. 29 sq.km.)

Survey of Fauna

Zoological Survey of India

The Zoological Survey of India (ZSI), a premier institution under the Ministry, has been undertaking survey, exploration and research leading to the advancement of our knowledge on the exceptionally rich faunal diversity of the country since its inception in 1916. Over the successive plan periods the functions of ZSI have also expanded gradually encompassing 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; National Designated Repository of type and voucher specimen; supporting enforcement of Wildlife (Protection) Act, 1972; establishment of marine aquaria and museum for awareness on conservation etc. and acts as a custodian of the National Zoological Collections. Headquarters (Kolkata) and 16 Regional Centers located at different parts of the country, ZSI in recent years re-oriented its plan of work by grouping the survey and studies under the following six major programmes:

- Fauna of States
- Fauna of Conservation Areas
- Fauna of Important Ecosystems
- Status Survey of Endangered Species
- Ecological Studies /Environment Impact Assessment Survey, and
- Computerization and Dissemination of Data

Activities undertaken since inception / cumulative performance

- There are 668 Protected Areas including 102 National Parks, 515 Wildlife Sanctuaries, 47 Conservation Reserves and 4 Community Reserves covering a total of 1,61,221.57 km2 of geographical area which is approximately 4.90% of the country. In addition there are 47 Tiger Reserves, 18 Biosphere Reserves, 25 Elephant Reserves, 5 Natural World Heritage sites and 25 Ramsar Wetland sites in India. Of these, ZSI surveyed and

documented 52 protected areas.

- Scientists of ZSI discovered 4,806 new species, more than 3,000 as new records
- The Zoological Survey of India also acts as a custodian of the National Zoological Collections, which comprise more than four million specimens belonging to as many as 81,000 species including about 10,000 species of our neighboring countries like Myanmar, Pakistan, Bangladesh, Sri Lanka and also of Thailand.
- One status survey was undertaken for Crab eating Macaque, one survey for Golden Langur, one for Himalayan Musk deer, two surveys for Caecilian species and two status surveys for Indian Bustard
- ZSI has published 1448 books / Journals viz., Records of the Zoological Survey of India 454; Occasional papers 363; Memoirs of ZSI 84; Annual Report 44, Handbooks/Pictorial Guides 60; Special Publications 52; Fauna of India (including British India) 131; Conservation Area Series (Protected Area Network) 53; State fauna Series 67; Ecosystem Series 30; Status Survey of Endangered Species 11; Bibliography of Indian Zoology 35; Animal Discoveries 7; Technical Monograph 68 (Discontinued Publication); Zoologiana 5 (Discontinued Publication) and Bulletin of ZSI 12 (Discontinued Publication).

Achievements

Faunal explorations and surveys

Mountain Ecosystem: Four surveys were undertaken to Lahaul & Spiti Valley Cold Desert, and Himachal Pradesh.

Estuarine ecosystem: Three surveys were undertaken to Odisha mangrove.

Marine/Island ecosystem: Total nine surveys were undertaken of which three surveys were undertaken in East coast, two in Andhra coast, two surveys in Andaman coast and two surveys at Tamil Nadu coastline.

Freshwater ecosystem: Two surveys were taken in Andhra Pradesh, two surveys in Arunachal Pradesh, one each in Chandratal and Gobinda Sagar and two in Nilgiri.

Desert Ecosystem: Two surveys were undertaken in Thar Desert.

Biosphere Reserve/ Conservation areas: Three surveys were undertaken in Sunderban Biosphere Reserve (West Bengal), two surveys in Kachchh Biosphere Reserve (Gujarat), two surveys were undertaken in Gulf of Mannar Biosphere Reserve (Tamil Nadu) and two surveys in Niligiri Biosphere Reserve (Tamil Nadu).

National Parks: One survey was undertaken in Sultanpur NP & Bird Sanctuary (Haryana).

Wildlife Sanctuaries: Three surveys were undertaken in Sonanadi WLS (Uttarakhand), three in Valmiki Tiger Reserve, one survey in Kalakkad-Mundanthurai WLS (Tamil Nadu), three surveys in Sonamukhi R.F., one in Nauradehi WLS and one survey in Thattekkad Bird Sanctuary.

States and Union territories: Six surveys were undertaken to Himachal Pradesh, two in Gujarat, three in Maharashtra, two in Rajasthan, one in Mizoram, two in Andhra Pradesh, two in Tamil Nadu, two in Assam, two in Arunachal Pradesh, four in Jharkhand, and two surveys in Madhya Pradesh.

Status Survey of endangered species: One status survey was undertaken for Crab eating Macaque, one survey for Golden Langur, one for Himalayan Musk deer, two surveys for Caecilian species and two status surveys for Indian Bustard.

Fig-4. *Antilope cervicapra (Linnaeus)*

Some Important Research studies undertaken

- Abundance and Diversity of Soil Nematodes in Agro-ecosystems of Dehradun, Uttarakhand, India (*Sponsored by DST*).
- 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)
- Taxonomic studies on Nematodes of Rajaji National Park, Uttarakhand.
- 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)
- Baseline Information on Faunal Inventory of Uttar Pradesh.
- Foraging ecology of White-bellied Heron *Ardea insignis* in Namdapha Tiger Reserve, Arunachal Pradesh.
- Strengthening of Marine Aquarium and Regional Centre at Digha, West Bengal (*Sponsored by World Bank*).
- Molecular Systematics & Phylogeny of economically Important thrips (Thysanoptera: Insecta) of India
- Marine Faunal Diversity along the Odisha Coast
- Restoration of Corals at Gulf of Kachchh
- Role of Insect pollinators on the conservation of the major mangrove species in Sunderban Island.
- Survey and Monitoring of Coral Reefs of Andaman and Nicobar Islands (National Coral Reef Research Institute) funded by MoEFCC.
- Population fluxes of commercially threatened sea cucumber species in Gulf of Mannar Biosphere Reserve – for sustainable harvesting strategies to regularizing sea cucumber fishery" with reference to MAB-Young Scientist Award (UNESCO).

Special Collaborative Projects

- DNA Bar-coding on Sponges of Andaman and Nicobar Islands (Technical

Collaboration with Central Agricultural Research Institute, ICAR, Port Blair)

- Optical Characterization of Corals–A collaborative project with Space Application Centre, Ahmedabad.
- Faunal Diversity of Protected Areas in Chhattisgarh (Phase-1)' and 'District–wise Faunal Diversity of Chhattisgarh (Phase-1) (*Sponsored by Government of Chhattisgarh : CAMPA Fund*).
- Integrated Coastal Zone Management Project (ICZM).
- Improving the Quality of Reefs through Transplantation/Restoration of Corals at Gulf of Kachchh– A community Based Sustainable Approach.
- Taxonomic Revision of Indian Pyralinae (Pyralidae: Lepidoptera) (Science & Engineering Research Board (SERB), DST, New Delhi)
- Molecular Systematics and Phylogeny of Economically Important Thrips.
- Molecular Identification of Tabanid (Tabanidae: Diptera) vectors for Surra disease.

Research Activities

Discoveries of New Taxa / Species: During the surveys 1,02,352 examples of various groups of animals were collected. Altogether 1,332 species were identified by the scientists of ZSI Headquarters and regional centres during the period under report. In addition 18 species new to science have been described during the year and 38 species were added new to the fauna of India.

New Genera Discribed from India In 2014

New genus of crab from India in 2014

Ghatiana Pati & Sharma, 2014

New genus of Insect from India in 2014

Chakra Rajmohana and Veenakumari 2014

New Species Discribed from India In 2014

Nineteen New species of Insects

- *Dipara nigrisucta* Sureshan
- *Dipara debanensis* Sureshan
- *Dipara venkati* Sureshan
- *Dipara nigra* Sureshan
- *Dipara hayati* Sureshan
- *Dipara thirumalai* Sureshan
- *Gastracanthus indica* Sureshan & Dhanya
- *Telenomus cuspis sp.* nov
- *Trimorus (Neotrimorus) sp.* nov.
- *Stenolemus annulatus sp.* nov.
- *Psilocera namdaphaensis* Sureshan
- *Psilocera intermedia* Sureshan
- *Psilocera keralensis* Sureshan
- *Chakra sarvatra* Rajmohana and Veenakumari
- *Hydrometra cherukolensis* Jehamalar & Chandra
- *Hydrometra nicobarensis* Jehamalar & Chandra
- *Pleciobates bengalensis* Jehamalar, Basu & Zettel
- *Pleciobates expositus* Jehamalar, Chandra & Zettel

– *Calyptobates rajani* Jehamalar & Chandra

Three New species of Crabs

– *Ghatiana aurantiaca* Pati& Sharma, 2014

– *Ghatiana hyacintha* Pati& Sharma, 2014

– *Gubernatoriana triangulus* Pati & Sharma, 2014

New Records of Species from India in 2014

Thirteen New records of Corals from India in 2014

– *Acropora cervicornis* (Lamarck, 1816)

– *Acropora akajimensis* Veron, 1990

– *Psammocoravaughani* Yabe and Sugiyama, 1936

– *Favia vietnamensis* Veron, 2002

– *Acropora azurea* Veron and Wallace, 1894

– *Turbinaria irregularis* Bernard, 1896

– *Viminella erythraea* (Kukenthal, 1914)

– *Menella woodin* Grasshoff 1999

– *Halomitra meierae* Veron and Maragos, 2000

– *Lobophyllia flabelliformis* Veron, 2002

– *Coscinaraea wellsi* Veron and Pichon, 1980

– B*alanophyllia galapagensis* Vaughan, 1906

– *Truncatoflabellum spheniscus* (Dana, 1846)

Fig-5. *The Asiatic lion (Panthera leo persica), also known as the Indian lion*

Ten New records of Molluscs from India in 2014

– *Abdopus aculeatus* (d' Orbigny, 1834)

– *Pesudobiceros murinus* Newman & Cannon, 1997

– *Crenavolva tigris* Yamamoto, 1971

– *Epitonium billeeanum* (Dushane& Bratcher, 1965)

– *Hypselodoris whitei* (Adams and Reeve, 1850)

– *Favorinus mirabilis* Baba, 1955

– *Cadinella ornatissima* (Risbec, 1928)

– *Kalaplocamus actus* Baba, 1955

– *Phestilla melanobranchia* Bergh, 1874

– *Costasiella formicaria* (Baba, 1959)

Six New records of Insects from India in 2014

– *Petrolisthes asiaticus* (Leach, 1820)

– *Petrolisthes pubescens* Stimpson, 1858

– *Urocaridella antonbruunii* (Brue, 1967)
– *Gnathophyllum americanus* Guerin-Meneville, 1855
– *Neuroctenus par* Bergroth 1887
– *Hydrometra okinawana* Drake, 1951

Ten New records of Crabs from India in 2014

– *Xanthias latifrons* (de Man, 1887)
– *Petrolisthes asiaticus* (Leach, 182)
– *Petrolisthes pubescens* Stimpson, 1858
– *Aulostomus chinensis* (Linnaeus, 1766)
– *Sesarmoides longipes* (Krauss, 1843)
– *Tetralia nigrolineata* Serene & Dat, 1977
– *Ceratoplax ciliata* Stimpson, 1858
– *Lissoporcellana spinuligera* (Dana, 1853)
– *Achaeus japonicus* Haan, 1839
– *Tetralia nigrolineata* Serene & Dat, 1957

One New Record of Platyhelminthes from India in 2014

– *Pseudoceros bolool* Newman and Cannon 1994

Identification and Advisory services:

The ZSI continued its task of rendering Identification and Advisory services free of cost to research and teaching institutions in India and abroad, Central and state Government/Agencies, NGO's, Industries and also to individuals on zoological specimens and related matters.

Training and Extension

– ZSI organized seven training programmes during the year on - GIS in faunal studies, data-basing and digitization of faunal collections; DSLR Macrophotography; Monsoon Photography; Capacity Building of Administrative and Scientific Staffs of Zoological Survey of India; Man animal Conflict; for the State Govt. officials on ICZMP; Conservation of Faunal Diversity.

ZSI Publications

Four books entitled viz. *Protected Marine Animals of India, Status of Holothurians in the territorial waters of Andaman and Nicobar Islands, Threatened Amphibians of India, and Agariciids of Andaman and Nicobar Islands* were released by Lt. Gen. A. K. Singh, Hon'ble Lieutenant Governor of Andaman and Nicobar Islands on the occasion of International Biodiversity Day – 2014 celebrated on 22nd May, 2014 at Port Blair in the presence of Mr. Hem Pande, Additional Secretary, MoEFCC and Dr. K. Venkataraman, Director, ZSI.

Achievements

Achievements/ progress made in 2014-15 vis-a–vis that in 2014-15 (for on-going programmes/ schemes/ projects) is given in Table-1.

Table-1. Achievements/ progress made in 2014-15 (for on-going programmes/schemes/projects).

Sl. No.	Physical targets	Achievements during the Financial year 2014-15	
1.	Surveys conducted	Targets	Achievements
		100	84
2.	Publication	26	31
3.	Species identified	1500	1332

Details of responsibilities

The main responsibilities of ZSI and its 16 regional centre are survey, collection, documentation (including the traditional knowledge associated with animals) and ex

situ conservation of wild animal diversity of the country.

Society of Integrated Coastal Management [SICOM]

SICOM has been established under the Societies Registration Act, New Delhi and is involved in implementing the National component and coordinating with three State Project Management Units [SPMUs]. SICOM has 15 scientific and administrative staff headed by National Project Director. SICOM is under direct supervision of MoEFCC.

National Centre for Sustainable Coastal Management [NCSCM]

NCSCM, established as a society under Tamil Nadu Society Registration Act, as per para 5(ii) of CRZ 2011 notification, is located within the campus of Anna University campus, Chennai. NCSCM conducts advanced scientific research through its six research divisions viz., Geo-spatial sciences (GEO), Integrated island management (IIM), Integrated social sciences and economics (ISE), Coastal environmental impact assessment (CIA), conservation of coastal and marine resources (CMR), Knowledge, governance and policy (KGP) and Futuristic research (FTR).

The Centre promotes integrated and sustainable management of coastal and marine areas in India and advices the Union and State Governments and other stakeholder(s) on policy and scientific matters related to ICZM.

Capacity building by SICOM

SICOM has undertaken capacity building of the stakeholders including the NGOs in the areas of policy, legal and scientific matters related to ICZM practices in India. Including 14 training programs, workshops, seminars, for various stakeholders on ICZM. Further, it is coordinating with the SAARC Coastal Zone Management Centre, Maldives for capacity building in SAARC countries.

Mapping of Coastal Sediment cells and Training

Sediment cell is a stretch of coast between the boundaries of which, the sediment movement is partly or wholly contained. Its is a basic tool to understand the behaviour of the coast. SICOM through NCSCM took up the sediment movement analysis within the sediment boundaries, for the first time in the country.

State Component

Under the ICZM project, the following project sites have been identified for ICZM Project implementation.

- Gulf of Kachchh in Gujarat comprising of 163 coastal villages
- Between Paradip and Dharma and Gopalpur and Chilika in Odisha
- Coastal stretches of Sundarban and Haldia; and Digha to Shankarpur

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, National Working Plan Code, Permission for Industrial Estates including North Eastern States and NE Cell. SU Division is also a nodal division of Scheme for 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. Component wise details are described along with the achievements during the year.

Forest Survey of India (FSI)

Forest Survey of India (FSI), an organization under the Ministry of Environment, Forests & Climate Change, Govt. of India is engaged in the assessment of the country's forest resources on a regular interval. Established on June 1, 1981, the Forest Survey of India succeeded the "Pre Investment Survey of Forest Resources" (PISFR), a project initiated in 1965 by the 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.

Fig-6. *Sea turtles - human induced threats are increasingly problematic for turtle populations*

Major activities

The major activities of FSI are:

- Forest Cover Assessment every two years using remote sensing technology.
- Inventory of forest and trees outside forests (Rural & Urban areas).
- Data processing.
- Methodology design for carrying out various types of survey & inventory.
- Training and extension.
- 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 13 cycles of forest cover assessment have been completed since 1987 till year 2013. Work for the 14th cycle is under progress.

Forests & 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 level. In addition to inventory of forests, Trees Outside Forests (TOF) 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.

Training

Forest Survey of India (FSI) has been imparting training to forestry personal of State Forest Departments since 1981 through short term courses (one/two weeks) on the modern geomatic tools such as remote sensing, GIS, GPS, DGPS, carbon stock inventory and inventory techniques. About128 forestry personnel have been trained in different courses since April 2014 to November 2014.

Recent initiative/achievements

Estimation of carbon stock in India's forest

Forest Survey of India has been one of the major contributors on forest biomass estimation and carbon stock change. In India's Initial National Communication (INC) submitted to United Nation Framework Convention on Climate Change (UNFCCC) 2004, FSI estimated forest carbon of woody growing stock. In 2010, FSI has completed estimation of forest carbon stock and change between two time period viz 1994 and 2004 as part of Second National Communication (SNC) to UNFCCC. Since inventory of forest /TOF is a regular process of FSI which forms the basis for estimation of carbon stock, FSI is estimating carbon stock in India's forest, both at national and state level, using forest inventory data, forest cover mapping and forest type mapping information. In ISFR – 2013, the estimate of Carbon stock corresponding to data year of 2011 and the change in carbon stocks with respect to 2004 has been given as 278 million tones.

Inventory of TOF in Haryana and Uttarakhand

Two projects on Inventory of TOF in Haryana and Uttarakhand are going on in FSI. The field work in both the projects have being undertaken by state forest departments. After data collection, processing will be done by FSI Head Quarter. Both the projects are likely to be completed by next six months.

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.

Real Time Monitoring of Forest Fires

Forest Survey of India has been monitoring forest fires across the country on real time basis using MODIS satellite data (Moderate-Resolution Imaging Spectrometer) and GIS based technology. The system involves downloading of fire points based on MODIS data, filtering the pure forest fire signals, value addition with each fire points and dissemination to SFDs for taking appropriate steps for controlling the fire.

From year 2012, FSI under a collaboration program with NRSC/ISRO, started disseminating fire signals on Real Time basis. Under the program, signals received from NRSC are filtered, followed by value addition and disseminated to State Forest Departments. In addition, the signals are disseminated in KML files, which are Google earth compatible. This means the fire points can be viewed on the Google earth image. The curtailing down of the fire dissemination period to duration of 2 hours has been a major achievement in fire monitoring exercise. Number of fire points generated and disseminate to SFDs during 2014 are 19054.

Burnt area assessment of Maharashtra

Forest Survey of India carried out near real time burnt area assessment of Maharashtra for the period of May-June 2014 using 03 scenes of A WiFS data covering whole of Maharashtra, having a spatial resolution of 56 m. The near real time burnt area assessment was carried using digital image processing of satellite data and an in-house developed methodology with the help of ancillary data. This exercise was carried out under a collaborative program between Maharashtra Govt. and FSI.

Project for Forest Cover Mapping and Inventory of Forest/Tree Resources in Nagaland

In order to help Nagaland state, which has forest cover of 12,868 square kilometers (77.61% of the states geographical area) for preparation of Working Plans of its nine forest divisions spread over 11 districts, a new project has been completed. The project objective was achieved as indicated by Nagaland Forest Department using remote sensing data and inventorying of forest and tree resources including vegetation survey and estimation of

Fig-7. *A beautiful dense forest view from Lakhamai village, Nagaland*

soil carbon as per the methodology laid down by FSI. The different types of satellite data (LIIS-III and LISS-IV 2011-12 multispectral data, ASTER DEM, SOI Toposheets 1:25000/1:50000) were used for the execution of this project. In addition to this, the work of species diversity and important Non Timber Forest Products (NTFPs) is in progress.

e-green watch

e-Green Watch is web based programme developed as an integrated online system that is completely transparent, reliable and accountable. It will allow for monitoring and evaluation of different activities carried out under CAMPA. The 'e-Green Watch' has mainly been developed with a view to empower all administrators to monitor the progress made under various projects that are being carried out using the CAMPA funds. It will also facilitate the change detection for proper monitoring and evaluation of plantation activities. Further it will provide the platform for social and ecological audits by independent organizations, researchers and the public. Currently FSI is analysing the polygons of plantation received from SFDs. In addition, training is being imparted to the forestry personnel of state forest departments.

Decision Support System

In pursuance of the orders of the Supreme Court of India and as mandated by the MoEFCC, FSI has instituted web based Decision Support System (DSS). It is an application using the remote sensing technology creating a database containing the district wise details of the location and boundary.

Under DSS scheme, FSI has developed a Web based application which was launched by Hon'ble minister of Environment, Forests and CC on 11th November, 2014 in Delhi. At present DSS, allow the users to extract the information about the four layers viz; Forest Cover map, Forest type map, Biodiversity richness, landscape integrity and Wildlife areas & Corridors. The work on two layers viz, NPV layer and Hydrological layer is under progress. This will support the user to take appropriate decisions primarily on the FC Act cases.

Forest (Conservation) Act (FCA) related functions:

- 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, 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.

The Ministry is administrative and coordinative for all the activities in relation to the functions assigned to the Regional Offices as enumerated above under the overall control of the Secretary, Government of India in the Ministry of Environment and forests New Delhi

The total sanctioned strength of Regional Office Headquarters in the Ministry and ten Regional Offices is 341 (existing 96 + 145

New created) i.e. (22 for Headquarters, 36 for Regional Office Shillong and 34 each for Regional Office Bangaluru, Bhubaneswar and Lucknow, 33 for Bhopal, 30 each for Chennai, Dehradun, Nagpur and Ranchi and 28 for Regional Office Chandigarh).

Progress of Activities Undertaken

The Heads of the Regional Offices are empowered to grant approval for diversion of forest land for non-forestry proposes upto 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 land to non-forestry purposes involving an area of more than 100 hectares.

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

- The Regional Office, Bangalore organized a meeting of the State Nodal Officers (FCA) of Karnataka and Kerala on 05.05.2014 and that of Goa on 17.06.2014 to discuss the issues related to implementation of Forest (Conservation) Act, 1980.
- The Regional Office, Bangalore conducted a training programme on the portal for online submission and tracking of the status of application seeking prior approval of Central Government under Forest (Conservation) Act, 1980 for diversion of forest land for non-forestry purposes, on 25.07.2014 involving State Forest Department Officials of Andhra Pradesh, Telangana, Goa, Karnataka, Kerala, Tamil Nadu & UTs of Daman & Diu, Puducherry and Lakshdweep.
- The Regional office, Shillong organized a two days review meeting of Nodal Officers, Working Plan Officers and CAMPA Officers of North Eastern States from 23-24 December, 2014
- The Regional Office, Shillong conducted one day training Program on New portal for online and approval of application of Central Government under Forest (Conservation) Act, 1980 for the North Eastern States on 01.08.2014 at Guwahati.
- The Regional office, Shillong conducted National conference on "Legal framework on conservation of forest and environment and implementation of environment safeguards" on 25.06.2014 at Shillong.

International Tropical Timber Organization (ITTO)

- The International Tropical Timber Agreement (ITTA) was negotiated under

Fig-8. The Siroi Lily *(Lilium mackliniae Sealy) is a beautiful lily which is found only in the upper reaches on Siroi hill ranges of Manipur*

United Nation Conference for Trade and Development (UNCTAD's) auspices to provide an effective framework for cooperation and consultation among countries producing and consuming tropical timber;

- promote the expansion and diversification of international trade in tropical timber and the improvement of structural conditions in the tropical timber market;
- promote and support research and development to improve forest management and wood utilization;
- encourage development of national policies for sustainable utilization and conservation of tropical forest and their genetic resource and for maintaining ecological balance in the regions concerned.

- The ITTO also administers assistance for related projects.
- At Present, the ITTO has 69 members divided into two caucuses: Producer Countries (32 members) and Consumer Countries (37 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.
- The highest authority of the ITTO is the International Tropical Timber Council (ITTC), which governs the performance of all functions necessary to carry out the provisions of the ITTA, 2006.
- The Council is supported by four committees open to all member countries, which provide advice and assistance to the council on policy and project issues.
- Three of the committees deal with key areas of policy and project work. They are (i) Committee on Economic Information and Market Intelligence; (ii) Committee on Reforestation and Forest Management; and (iii) Committee on Forest Industry.
- These committees are supported by the Expert Panel for the Technical Appraisal of projects and Pre-Projects, which reviews project proposals for technical merit and relevance to ITTO objectives.
- The fourth committee, on Finance and Administration, advises the Council on matters related to the budget and other funding and administrative issues concerning the management of the Organization.
- As a member of ITTO, India has to pay annual contribution to ITTO which is made every year.
- In the current year 2014-15, the Government of India sanctioned the balance contribution of US$ 75,005 for the calendar year 2012 and annual contribution of US $ 107,479 for the calendar year 2014 on 20th October, 2014.

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 2014-15, Government of India sanctioned annual contribution of US $ 28,000 for the calendar year 2014 to INBAR.

Sustainable Forest Management (SFM) Cell

– Sustainable Forest Management of Forests is of immense significance due to its contribution towards sustainable development. Sustainable Management of Forest is not a new concept in India. India remains committed to the goals of Sustainable Forest Management and is a signatory to the "Objective 2000" of the ITTO.

– A Workshop was held on 21st August, 2014 in the Ministry under the chairmanship of DGF&SS to finalize the report of Pilot testing on Criteria and Indicator for Sustainable Management of Natural Forests in India. In the workshop, the Criteria and Indicator for natural forests mentioned in the report of Pilot Testing was accepted and recommended for its implementation in the country for sustainable management of natural forests after the approval of Hon'ble MEF&CC.

– Forest Research Institute, Dehradun has developed National Working Plan Code-2014 over a period of five years in consultation with all State/UTs Forest Department and other stakeholders.

Fig-9. *Bamboo - socially, economically, and environmentally important*

Working Plan is a tool for scientific management of forests and is extremely useful in evaluating the status of forest resources, assessing the impact of past management practices and deciding about suitable management intervention in future. The National Working Plan Code 2014 addresses aspects related to climate change; biodiversity conservation; use of geospatial techniques; soil and water management revitalization of rural economy on forest fringe sustainable management of forests and people's participation, etc.

Andaman & Nicobar Islands Forest and Plantation Development Corporation Ltd.

The 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 has been examined and Ministry with the approval of Secretary (E,F&CC) vide its letter dated 24.07.2014 requested Andaman and Nicobar Administration 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.

Now, the Ministry has decided on 5th November, 2014 to constitute a committee under the Chairmanship of Director General of Forests and Special Secretary, Ministry of Environment, Forests and Climate Change to study the viability of the use of biomass/firewood for generation of power in Andaman and Nicobar Islands and to suggest measures for revival of the Andaman and Nicobar Islands Forest and Plantation Development Corporation Limited, Port Blair, inter-alia through biomass/ firewood extraction for generation of power. Two meetings of the Committee were held on 24.11.2014 in New Delhi and 24.12.2014 in Port Blair.

CHAPTER-2

CONSERVATION

Environmental Conservation

Conservation and Survey

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 and Cartagena Protocol on Biosafety / Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress.

Biodiversity Conservation

In 2000, a Cartagena Protocol on Biosafety (CPB) was adopted under the aegis of the Convention on Biological Diversity (CBD). The objective of CPB is to ensure safe transfer, handling and use of living modified organisms resulting from modern biotechnology. India is a Party to the CBD as well as CPB.

Thereafter, a Nagoya Protocol on access and benefit sharing (ABS) has been adopted in 2010 after six years of intense negotiations under the aegis of CBD. India has made significant positive contributions in these negotiations. The objective of this protocol is the fair and equitable sharing of benefits arising from the utilization of genetic resources. India had signed the Protocol on 11th May 2011, and ratified it on 9th October, 2012. During India's Presidency of CoP, India facilitated ratifications by requisite number of Parties to the CBD's Nagoya Protocol on Access and Benefit Sharing (ABS) for its entry into force on 12th October 2014. Ratification of the Nagoya Protocol by 51 Parties to the CBD is also a major step towards achieving the first of the global Aichi Biodiversity Targets (Target 16 that by 2015, the Nagoya Protocol is in force and operational), and that too more than a year before its target date, which is quite remarkable. The Nagoya Protocol would be implemented at the national level through the Biological Diversity Act.

Activities undertaken so far

Convention on Biological Diversity and CoP-Presidency

- India has taken up a number of biodiversity related activities, some of them quite unique and innovative, during her Presidency. These inter alia include:
  - Positioning of Science Express Biodiversity Special (SEBS) train as the brand Ambassador of CoP-11 for creating large-scale awareness on biodiversity issues, and following its resounding success, the second, and third phases of SEBS launched in 2013 and 2014.
  - Setting up of a biodiversity garden and a proposed National Biodiversity Museum on the site where the Prime Minister had unveiled a commemorative Pylon in Hyderabad.
  - Adopting the logo and slogan of CoP-11 as the new logo and slogan of this Ministry.
- India through an extensive consultative process, has developed 12 national biodiversity targets along with indicators for monitoring, using the global Aichi targets as a framework, and brought out a National Biodiversity Action Plan

Addendum 2014 to NBAP 2008. India also submitted its Fifth National Report to the CBD 2014, which provides an update on biodiversity status, trends and threats, updating of NBAP, and India's progress towards Aichi targets.

Fig10. *Frogs – the biodiversity indicators*

– The hosting of CoP-11, including the genesis, background, preparation and the event itself, has been documented in the form of a booklet on 'Hosting of CoP-11 by India: A Pictorial Presentation'. Another document, 'A Panoramic View of India's Presidency of CoP to CBD 2012-2014', giving information on the important activities undertaken during India's Presidency of CoP, has also been brought out.

– India handed over the Presidency of CoP to the Republic of Korea at CoP-12 to the CBD, held in Pyeongchang, Republic of Korea in October, 2014. During India's Presidency of CoP, India facilitated ratifications by requisite number of Parties to the CBD's Nagoya Protocol on Access and Benefit Sharing (ABS) for its entry into force on 12th October 2014. The first CoP/MoP to the Nagoya Protocol was held concurrently with CoP-12 to the CBD in Pyeongchang from 13-17 October 2014. Recognising the stellar leadership role played by India in facilitating entry into force of the Nagoya Protocol, India was invited to preside over the historic first meeting of the Parties to the Nagoya Protocol, since the host country, Republic of Korea has not yet ratified this Protocol. Presiding over of a meeting hosted by another country is unprecedented in the UN system.

Biological Diversity Act, 2002 and NBA

– 34,135 BMCs have been constituted by the local bodies in 26 States viz., Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamilnadu, Telangana, Tripura, Uttarkhand, Uttar Pradesh and West Bengal. So far, about 1900 People's Biodiversity Registers (PBRs) have been prepared to chronicle biodiversity and associated traditional knowledge across 14 States.

– NBA has received 937 applications so far. The applications received from public/ private sectors and foreign nationals are for approval of access to bio resources and/ or associated traditional knowledge,

obtaining IPR, transfer of research results and third party transfer of biological resources. So far, 533 applications have been cleared, of which 147 agreements have been entered based on mutually agreed terms with the applicants.

- The second ABS dialogue meeting was successfully organized at Goa in August, 2014. India hosted a number of inter-sessional meetings and delegates from various countries participated.
- The International Biodiversity Day (IBD) was celebrated at Tagore Government College, Port Blair organized by National Biodiversity Authority along with Andaman & Nicobar Administration, Zoological Survey of India and UNDP-India.
- NBA has received benefit sharing in the form of royalty to the tune of ₹44.48 lakhs. Of which, it has shared the royalty amount of ₹20,000/- to Amarchinta BMC in Mahboob Nagar district of Andhra Pradesh for the export of neem leaves to Japan. The NBA is working out the modalities for distributing the royalties to the benefit claimers.
- During the year, the NBA formulated and notified guidelines on Access and Benefit Sharing in pursuance to the provisions of the Biological Act. The guidelines describe the scheme of processing the applications, alongwith template and terms for benefit sharing arising out of the use of biological resources and associated traditional knowledge obtained from India.
- A notification for exempting crops covered by the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) from the purview of Biological Diversity Act has been finalized in consultation with the Ministry of Agriculture. The notification approved by MEFCC and vetted by Legislative Department has been issued in the gazette.

Achievements

Convention on Biological Diversity (CBD) and CoP-Presidency

During the period, India participated in the following biodiversity related meetings:

- Second Dialogue Seminar on Scaling up Finance for biodiversity held in Quito, Ecuador from 9-12 April, 2014, back to back with meeting of the High Level Panel on the Global Assessment of Resources for Implementing the Strategic Plan 2011-2020 held in Brasilia, Brazil on 14-15 April, 2014.
- IPBES Expert Group meeting held in Bonn, Germany during 6-8 May, 2014.
- CBD's Working Group on Review of Implementation held in Montreal from 16-20 June 2014, which India also chaired as CoP- President.
- CBD's eighteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-18) held in Montreal, Canada from 23 to 28 June 2014.
- As representative of CoP President, India served as Member of Judging Committee for Midori Prize for Biodiversity instituted by Japan, meeting for which was held on 29th July 2014 in Tokyo.

- A brainstorming meeting with key policy makers and negotiators on ABS, to discuss implementation challenges on Nagoya Protocol from selected countries was hosted by India in Goa on 4-6 August 2014.
- India hosted the 21st Governing Body meeting of Global Biodiversity Information Facility (GBIF GB21) and associated meetings at New Delhi during 15-19 September, 2014. GBIF is an open ended international coordinating body to promote compilation, linking, standardization, digitalization and dissemination of world's biodiversity data in the form of distributed open access system, within an appropriate framework for property rights and due attribution. MEF&CC inaugurated the event.

Process is underway for establishment of National Biodiversity Museum, and garden at Hyderabad on the site where PM unveiled commemorative pylon. 1st draft report of the DPR has been received.

Activities are being undertaken to strengthen institutional capacity of National Biodiversity Authority, State Biodiversity Boards and constitution of Biodiversity Management Committees, as well as preparation of Peoples Biodiversity Registers.

India through an extensive consultative process has developed 12 national biodiversity targets alongwith indicators for monitoring using the global Aichi targets as a framework, and brought out a National Biodiversity Action Plan Addendum 2014 to NBAP 2008. The document was submitted to the CBD Secretariat in October 2014.

India also prepared and submitted the Fifth National Report to CBD. The document was released by MEFCC on World Environment Day on 5th June 2014. The document provides an update on biodiversity status, trends and threats in India, updating of NBAP, and India's progress towards Aichi targets.

During India's Presidency of CoP, India worked closely with the CBD Secretariat for expediting ratifications of Nagoya Protocol. As a result, requisite ratifications were received during India's Presidency, a major step towards achievement of first global Aichi target 16. The Nagoya Protocol entered into force w.e.f 12th October 2014, and its first meeting of Parties was held concurrently with CoP-12 from 13-17 October 2014 in Pyeongchang. MEFCC made suo moto statement in both Houses of Parliament in July 2014 highlighting India's role in Protocol's entry into force. Recognizing the stellar leadership role played by India in facilitating entry into force of Nagoya Protocol, India was invited to preside over the historic first CoP-MoP of Nagoya Protocol since the host country, Republic of Korea had not ratified this Protocol. Presiding over of a meeting hosted by another country is unprecedented in the UN system.

Completion of India's Presidency of CoP to CBD, and participation in CoP-12

As President of CoP, India formally opened CoP-12, and handed over the Presidency of CoP to the Republic of Korea at CoP-12 to the CBD, held in Pyeongchang, Republic of Korea from 6th to 17th October 2014. An Indian delegation led by Additional Secretary, MoEFCC actively participated in CoP-12.

During India's Presidency of CoP, India facilitated ratifications by requisite number of Parties to the CBD's Nagoya Protocol on Access and Benefit Sharing (ABS) for its entry into force

on 12th October 2014. The first CoP/MoP to the Nagoya Protocol was held concurrently with CoP-12 to the CBD in Pyeongchang from 13-17 October 2014. CoP/MoP-7 to CPB adopted 14 decisions on: compliance; Biosafety Clearing House; financial mechanism and resources; cooperation with other organisations and conventions; handling, transport, packaging and identification of living modified organisms; risk assessment and management; socio-economic considerations; monitoring and reporting; unintentional transboundary movements; and contained use of LMOs.

CoP-12 to the CBD adopted 33 decisions on a series of strategic, substantive, administrative and budgetary issues. Among other items, the meeting conducted a mid-term review of progress towards the goals of the Strategic Plan for Biodiversity 2011-2020 and its Aichi targets; and reviewed progress in providing support towards implementation, through capacity building, technical and scientific cooperation, and other initiatives. Deliberations also focused on: resource mobilisation and other finance-related matters; improving the efficiency of the Convention's processes; biodiversity and sustainable development; cooperation with other organisations; marine and coastal biodiversity; biodiversity and climate change; biofuels; Article 8(j) (traditional knowledge); sustainable wildlife management; invasive alien species; synthetic biology; and ecosystem conservation and restoration.

CoP-MoP 1 to Nagoya Protocol on ABS marked the entry into force of the Nagoya Protocol on 12th October 2014. The meeting considered the status of the ratification and implementation of the Protocol, and adopted 10 decisions, including, inter alia: the Access and Benefit-sharing (ABS) Clearing-house and information-sharing; monitoring and reporting; compliance; model contractual clauses and other voluntary instruments; capacity building; awareness-raising; the need for, and modalities of, a global multilateral benefit-sharing mechanism; and organisational, financial and budgetary matters. Pyeongchang witnessed some firsts under the CBD; the first CoP/MoP of the Nagoya Protocol on Access and Benefit Sharing, and the first CoP/MoP held concurrently with the CBD CoP. Entry into force of Nagoya Protocol on 12th October 2014 with 54 ratifying countries also marked the achievement of the first part of Aichi Target.

Implementation of Biological Diversity Act through NBA

Some of the important actions taken up during 2014-15 to implement various provisions of the Act include the following:

- The Authority met four times on 15th May 2014, 11th July 2014, 27th August, 2014 and 12th December, 2014, and discussed various matters including finalization of ABS guidelines, considered the recommendation of the expert committee on the ABS applications, ABS mechanism on the export of Red Sanders, streamlining the procedures to process the ABS applications, considered the draft orders/notifications on exempting Annex-I crops under section 40 of the BD Act, user country measures and check points.
- The Authority had a special meeting on 11th July 2014 to discuss the draft guidelines on Access and Benefit

Sharing. After the detailed discussion, the Authority has approved the guidelines on Access and Benefit Sharing.

- National Biodiversity Authority notified the Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014 in the Official Gazette on 21.11.2014 duly approved by the MoEFCC and vetted by the Ministry of law and Justice. In this connection, NBA held meeting with various stakeholders including a special consultation meeting with SBBs and Authority Members on 13th May 2014.
- The Expert Committee on Access and Benefit Sharing met thrice on 25th & 26th July 2014, 02nd September 2014 and 29th November 2014 and evaluated more than 150 applications including applications which were re-submitted after collecting additional information /details from the applicants. EC also prepared guidelines for upfront payment.
- NBA examined imposing of ABS mechanism for the export of Red Sanders auctioned by the Government of Andhra Pradesh and decided that the NBA shall impose a benefit sharing of 5% of the auctioned price of Red Sanders from the successful bidder, who after filling the Form prescribed in the BD Act and Rules / State Biodiversity Rules, as the case may be, has to deposit the benefit sharing component of 5% of the auctioned amount (excluding taxes and other government dues) to NBA/SBB, before lifting the Red Sanders wood from the site.
- The Glory of Allapalli in Gadchiroli District of Maharashtra has been notified by the Government of Maharashtra as Biodiversity Heritage Site (BHS) under Section 37 of the BD Act. This is the 5th such BHS covering 6 hectares of a reserved forest being preserved as natural forest having biological, ethnical and historical values.
- The UNEP–GEF MoEFCC, Government of India project on "Strengthening the Implementation of the Biological Diversity Act & Rules with focus on its Access and Benefit Sharing provisions" is being implemented at the total cost of US$ 9,839,000 in five States for 3 years from 2011. Now, the project period has been extended upto June, 2015 with additional States.
- Government of India in collaboration with the Norwegian Government has established "Centre for Biodiversity

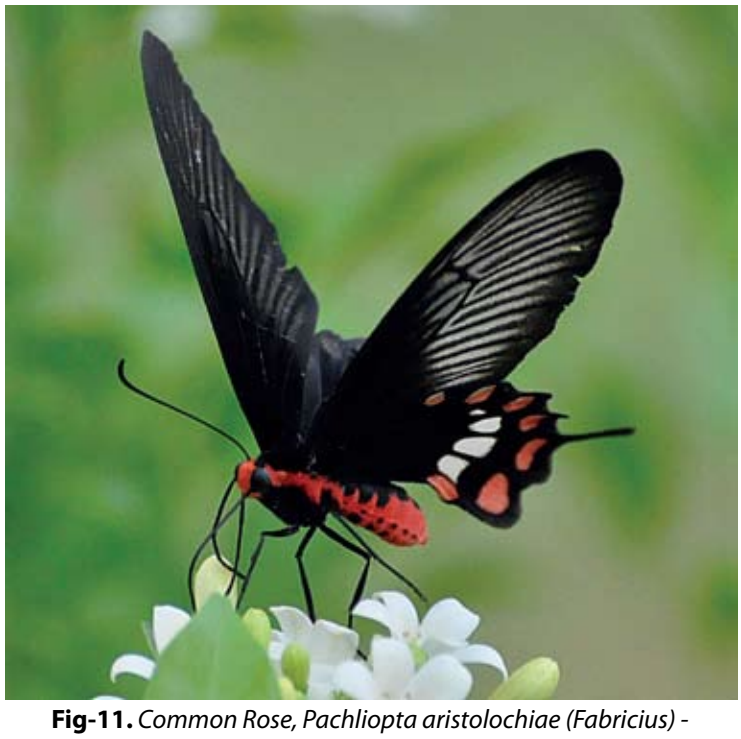


Fig-11. *Common Rose, Pachliopta aristolochiae (Fabricius) - extensively distributed across South and South-East Asia*

Policy and Law (CEBPOL)" in the National Biodiversity Authority (NBA), Chennai, towards strengthening the biodiversity policy and law in India. This programme has been executed in the NBA with technical collaboration from Norwegian Environment Agency through the Royal Norwegian Embassy, New Delhi, India.

- NBA has provided financial assistance to the tune of ₹1.05 crores to 24 SBBs to celebrate the International Day for Biological Diversity on 22nd May, 2014 with the theme being "Island Biodiversity" in a befitting manner.
- India accessed the grants to meet the national obligations under the Convention on Biological Diversity (CBD) for (a) preparing the 5th National Report (NR5) to CBD; (b) revision of National Biodiversity Action Plan (NBAP) and (c) setting up of National Clearing House Mechanism (CHM). This project was implemented through the National Biodiversity Authority. The NR5 provides an important source of information for the implementation of the Strategic Plan for Biodiversity 2011-2020 and progress towards the Aichi Biodiversity Targets. The NR5 was released by Shri Prakash Javadekar, Hon'ble Minister for Environment, Forest and Climate Change during the World Environment Day Celebration on 5th June, 2014 at New Delhi and the report was also uploaded in the CBD website. The NBAP report was released during CoP-12 held at Pyeongchang, Republic of Korea. India has also prepared a CHM to disseminate information on the national implementation of the CBD, targets, action plan programmers developed under each targets and also adequate links have been provided to various ministries, institutions and research organizations working on biodiversity related issues.
- A special grant was given by Government of India to strengthen the SBBs and preparation of PBRs & BMCs. A total amount of ₹2.22 crores have been released to strengthen the SBBs and an amount of ₹3.02 crores have been released for preparation of PBRs and formation of BMCs. Financial assistance provided to various Institutes / Organizations / SBBs / NGOs for creating awareness on implementation of BD Act among various stakeholders.
- During the year, NBA completed the long-pending exercise of developing guidelines on Access and Benefit Sharing (BS). The Guidelines on ABS have been notified on 21st November 2014. The ABS Guidelines describe the scheme of processing the applications, alongwith template and terms for benefit sharing.
- A notification for exempting crops covered by the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) from the purview of Biological Diversity Act was notified in the official gazette on 17th December, 2014.

Achievements

- India continued to guide and steered the implementation of CoP-11 decisions and organized/ participated the meetings / conferences. India has taken

up a number of biodiversity related activities, as described earlier, some of them quite unique and innovative, during her Presidency and handed over Co-Presidency to Korea in CoP-12 to CBD.

- During India's Presidency of CoP, India worked closely with the CBD Secretariat for expediting ratifications of Nagoya Protocol. As a result, requisite ratifications were received during India's Presidency, a major step towards achievement of first global Aichi target 16. The Nagoya Protocol entered into force w.e.f 12th October 2014.
- During the year, 29th, 30th, 31st and 32nd Authority meetings were held on 15th May, 11th July, 27th August, and on 12th December, 2014 respectively.
- Supported to the tune of ₹1.05 crores to the State Biodiversity Boards for celebrating International Day for Biological Diversity 2014.
- So far, 1900 PBRs have been documented in fourteen states.
- So far, 34135 BMCs have been constituted in 26 States
- So far the species which are on the verge of extinction has been notified in the 16 States and 1 UT.
- So far, 147 agreements have been entered between NBA and applicant for accessing biological resources and associated knowledge for undertaking various activities.

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 extents 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 in a three tiered institutional structures (NBA at National level, State Biodiversity Board at State level and Biodiversity Management Committee at local level)

The NBA is a body corporate established in accordance with the provisions of Sec.8 of the Biological Diversity Act, 2002, at Chennai w.e.f. 1st October 2003. It is an autonomous, statutory and regulatory organization which is intended to implement the provisions of Biological Diversity Act, 2002. 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.

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.

Objective of the Scheme

The scheme helps in strengthening the biosafety management systems and awareness in India through implementation of:

- Rules, 1989
- Provisions of Cartagena Protocol on Biosafety (CPB)
- National measures for bringing legislative, administrative and policy regimes in tune with CPB;
- National and international workshops / consultation
- Capacity building

Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP)

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

The BCRLIP is a fully blended GEF and IDA activity using a Specific Investment Loan instrument aimed at strengthening biodiversity conservation and improving rural livelihoods at landscape sites.

Objective

The Project objective is to develop and promote new models of conservation at the landscapes 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

- Seven World Bank missions have been conducted so far - almost twice a year
- Selection of two new Landscape sites (Agasthyamalai in Tamil Nadu and Kerala; and Satpura in Madhya Pradesh and Maharashtra) through a country-wide consultation process wherein >100 experts from various institutions and NGOs participated
- Formulation of Societies at project sites and Signing of MoUs with Implementing Agencies in four different states namely, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu and Uttarakhand
- Field Learning centres have prepared several draft manuals and resource material and training on landscape approaches for biodiversity conservation was organised by National Capacity Building Centre at Wildlife Institute of India, Dehradun, for young scientists associated with the project at the University of British Columbia, Vancouver, Canada.
- Biological Indicator study in Askot Landscape is underway along with development of monitoring protocols and initiation of participatory monitoring
- Trainings of staff for preparing micro-plans through Model Micro-plans at both landscapes
- More than 200 micro-plans are ready in landscapes and Entry Point Activities have been started in several villages around Wild Ass Sanctuary
- For Ecological Mapping in Askot Landscape, digitization of base layers on 1:50,000 scale and fieldwork including validation of data completed
- A report on socio-economic profiling of Askot landscape has been prepared
- Various meetings, workshops related to livelihood and biodiversity conservation were organised by Project Management Unit (PMU) and Implementing Agencies
- National Workshop on 'Strategies for Conservation and Management of Large Landscape' on April 03-04, 2014 at New Delhi.
- Annual Research Seminar on August 21st and 22nd 2014 at the Wildlife Institute of India, Dehradun.
- Field Review of project activities by Shri Hem Pande, National Project Director and Additional Secretary, MoEFCC.
- Field review of project activities at LRK Landscape, WII and all learning centres by the MoEFCC officials.
- Field visit to initiate the project at new project sites, i.e., Satpura landscape in Maharashtra & Madhya Pradesh; and Agasthyamalai Landscape in Kerala.
- Field Review of project activities in LRK, Gir and Askot by Monitoring & Evaluation Specialist and Financial Specialist.

Achievement

For the first time in India, attempts have been made to implement the landscape level approach for biodiversity conservation along with the improvement in the livelihood of local communities living in the fringes of the biodiversity rich areas. The PMU has assisted the project landscape societies in preparing conservation plans for entire landscapes and implementation of the micro-plans for rural livelihood improvement in select villages.

Up-scaling of the project was also done to replicate the project at two additional landscapes encompassing vast areas in four states of Agasthyamalai (Kerala, Tamil Nadu) and Satpura (Madhya Pradesh and Maharashtra).

Achievements have been accomplished by the respective Implementing Agencies in the following areas:

- Strengthening Biodiversity Conservation Management
  - Conservation Mapping of Landscape
- Strengthening of Conservation Management
  - Mainstreaming Conservation and Participatory Practices
  - Supporting Participatory Conservation Activities
  - Mainstreaming Biodiversity in Sector Plans and Programmes
- Preparation of Teaching materials and Tools
- Training for trainers and participants:

In addition to the above, progress has also been made in the following areas in the current financial year, through the Project Management Unit of the Project:

- Signing of MoUs with Implementing Agencies of the two new landscapes
- An award of consultancy for appointment of Internal Auditor to audit the BCRLI Project is in final stage.
- Three members of staff have been recruited under the Project Management Unit of BCRLI Project.
- Launch of the Phase 2 of project wherein project activities are being up-scaled at two new project sites, i.e., Satpura Landscape (Madhya Pradesh & Maharashtra) and Agasthyamalai (Tamil Nadu & Kerala).

Conservation Mapping of Landscape

The conservation mapping work is under process, the contract of which has been awarded to GEER Foundation, Gandhinagar in March, 2014.

Mainstreaming Biodiversity in Sector Plans and Programmes at Askot Landscape and Little Rann of Kachchh

Support to Landscape Sites

- Tentative indicators from the Gori valley have been identified consisting of 11 species of Galliformes birds and 15 species of mammals; criteria for identification of biological indicators under the birds and mammalian taxa have been finalized; inventorization for other taxa has been under taken.
- Under socio-economic analysis pilot survey from 130 households in Gori valley has been accomplished. The

methodology for sampling of households has been finalized.

- Data has been collected from lower valleys and alpine region and data interpretation is done for land use/ land cover and forest cover maps and geospatial layer has been created for settlement, drainage, road, soil, administrative layer and watersheds. The potential distribution maps of the indicator species based on elevation has been finalized. Updating of drainage map with respect to satellite data is ongoing.
- Spearhead team training in Askot landscape has been completed.
- Assisted in the preparation of two model micro-plans for the villages Pantha and Walthi of Askot Landscape through participatory approach.
- Conducted the policy level and site level workshops in Gujarat in collaboration with the Gujarat Forest Department on 19th and 20th December, 2013 on the issue of landscape management at the level of higher bureaucracy of the state and with the line departments and stakeholders operating at the site. It aimed at providing a new course of action to the policy makers and guiding the site level stakeholders on the methods of facilitating landscape level management of biodiversity and livelihood improvement through convergence of other state government departments.

Support to Learning Management Centres

- Coordinators from WII conducted workshops in PTR, KMTR and Gir in June and July, 2013 to guide the core team of the respective sites for preparation of training material.
- Finalization of the draft training modules of KMTR on 'Community mobilization and Empowerment', 'Micro-Planning and Participatory Monitoring' and 'Management of Self Help Group' is ongoing.
- Finalization of the draft training modules of PTR on 'Community Institutional development', 'Sustainable Financing for Protected Areas and Community Livelihood' and 'Private-public co-operation' is ongoing.
- Finalized the draft training modules of Gir Learning Centre on 'Rescue and rehabilitation' and 'Eco-development' which have already been published by GLC.

Core Training Programme

- Preparatory work for designing the national curricula for different Training Modules is ongoing.
- Finalisation of the additional two sites in the workshop on 'Strategies for Conservation and Management of large landscapes' organised by MoEFCC from 8th-9th July, 2013 in New Delhi.

Institutional Strengthening

- The international expert Dr. Kathy Mackinnon had visited WII and after intensive consultations on course curriculum designs and learning material preparations, a framework for the curriculum of the national level courses has been agreed. The consultant has prepared the structure of one course design.

Preparation of teaching materials and tools

- Gir Field Learning Centre
- KMTR Field Learning Centre
- Training for Trainers and Participants
- Gir Field Learning Centre
- KMTR Field Learning Centre
- Support to Participation in Learning Networks

The budget allocation of the scheme was ₹1500.00 lakhs (Plan) against which an expenditure of ₹1154.82 lakh has been incurred till 31.12.2014.

Implementing organization along with details of responsibilities

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.

Conservation and Management of Mangroves & Coral Reefs

The Ministry of Environment, Forests & Climate Change accords high priority to the conservation and management of mangroves and coral reefs in the country. 100% central assistance 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.

Mangroves

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

Fig-12. *Dense Mangroves are common varieties with roots submerged under water at Pichavaram, Tamil Nadu*

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 mangrove cover in the Country is 4628 km2. 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

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. The Indian reef area is estimated to be 2383.87 km2. 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 afforestoration in potential and also in degraded coastal areas;
- Maintenance of genetic diversity especially of threatened and endemic species; and
- Creation of awareness on importance of these ecosystems leading to their conservation; and

Fig-13. *Amphiprion clarkii & Entacmaea sp. – at Kavaratti Island of Lakshadweep*

– Sanctioning of approved annual MAPs of identified Mangrove and Coral Reef sites.

Achievements

An amount of ₹ 9.90 crore has been released to various coastal State Governments /Union Territories under the Scheme during 2014-15.

State-wise status

According to the Forest Survey of India (FSI) Report titled 'India State of Forest Report (2013)', the mangrove cover in the Country is 4628 km2 which is 0.14% of the Country's total geographical area.

Mangroves for the Future - India

Mangroves for the Future (MFF), is a partnership-based initiative promoting investment in coastal ecosystems conservation through sustainable development. MFF provides a collaborative platform to help countries, sectors and agencies in the MFF region to tackle the growing challenges to coastal sustainability.

MFF in India primarily focuses on improving the scientific knowledge base for enhanced management of coastal and marine ecosystems, and in working with coastal communities to increase resilience through livelihood interventions and ecosystem restoration. National and regional symposia supported by MFF have greatly contributed by establishing baseline database for coastal and marine ecosystems (specifically mangroves, coral reefs and fisheries). Knowledge and educational products and initiatives are also helping to raise awareness about India's valuable coastal resources. MFF (India) works through its small grant, medium grant and large grant and projects and regional initiatives, to bridge knowledge gaps on vulnerable coastal and marine ecosystems and threatened species for better-informed conservation actions and policy interventions. The MFF (India) programme is implemented by IUCN India Country Office.

Small Grant Projects

The MFF Small Grant Facility is the mechanism through which funds are provided for small-scale projects. In the second cycle of the SG Facility (2013), MFF India completed seven Small Grant Projects (SGPs), with a focus on marine and coastal species and ecosystem-based research for policy (including recommendations for State and National level management strategies for Whale Shark, trade in gastropod shells, Vembanad-Kol wetlands system, and sea-grass beds of Palk Bay and Gulf of Mannar), and community-based conservation and management of mangroves. By linking these projects to government agencies, much interest has been generated among officials in scaling up their learnings at national and regional levels.

The seven SGPs were as follows:

– An assessment of the past and present distribution status of the Whale Shark (Rhincodon typus) along the west coast of India (*with Wildlife Trust of India, WTI*)

– Survey and assessment in Gulf of Mannar and Palk Bay to support strategy to conserve and manage seagrass habitats (*with Suganthi Devadason Marine Research Institute, SDMRI*) Tuticorun

– Mangrove conservation and management: enhancing livelihood opportunities for mangrove dependent communities

in Bhitarkanika reserve forest (*with Development Alternatives, DA*)

- Community stewardship in conservation, restoration and sustainable management of mangroves in Orissa coast (*with Action for the Protection of Wild Animals, APOWA*)
- Ecological assessment and education for conservation of mangrove community in Ratnagiri district, Maharashtra (*with Bombay Natural History Society, BNHS*)
- Commercially important gastropod shell resources and trade in India: Distribution, Status & Conservation strategies (*with WWF, India*)
- Stakeholder led management planning for VembanadKol backwaters, Kerala (*with Wetlands International – South Asia, New Delhi*)

Regional Project:

Regional project between Sri Lanka and India on **Living resources of the Gulf of Mannar: Assessment of key species and habitats for enhancing awareness and for conservation policy formulation** aims to address threats to marine and coastal biodiversity in Gulf of Mannar, which stem from lack of information, awareness and inadequate policies. It further seeks to build a knowledge base on coastal and marine biodiversity, identify values and threats, create awareness and identify gaps in legal and policy frameworks especially at a regional level, which hinder the long-term survival of biodiversity and its benefits in Gulf of Mannar. It will also include pilot awareness and conservation initiatives, which can serve as case studies, with lessons learnt. This is vital for successfully implementing larger conservation programmes, which will be backed by strong policies and political will.

The project will also complement the regional body of knowledge and facilitate knowledge transfer by ensuring accessibility of currently available scientific and local knowledge, as well as tools and methodologies to national and sub-national contexts, practitioners and decision-makers.

Large Grant Project:

The Large Grant project entitled **Alternative livelihood options for vulnerable mangrove resource users in the Sundarban Biosphere Reserve, West Bengal is a two year project between MFF and the Sundarban Biosphere Reserve, State Forest Department, Government of West Bengal.** The purpose of the project is to reduce the pressure on the forest's natural resources through the provision of alternative livelihoods and income generating options. The project seeks to pilot disaster preparedness initiatives that will reduce the risk of damage to lives and livelihoods from flooding and other related natural disasters that the area is prone to. Institutional and organization building/strengthening is also a key component of the project.

Knowledge Products and Education Initiatives:

MFF India undertook several education and awareness initiatives in 2013, with an aim to fill capacity and knowledge gaps at the national, state and local levels concerning coastal and marine conservation. Part of this was the development of targeted knowledge products including a poster on **India's Coastal and Marine Treasure Chest** of marine faunal diversity, and a children's book on **Coral Reefs: Rainforests of the Ocean** (the second

in the series of children's books, the first being **Mangroves: Soldiers of our Coasts)**. The MFF India blog, Fishtales (www.fishtalesindia.org) continues to facilitate learning of India's marine and coastal diversity.

Additionally, through the Small Grant Projects, MFF India published a poster as a guide to the mangroves of Ratnagiri (*with BNHS*), a field guide on the ornamental gastropods of Kerala and Tamil Nadu (*with WWF, India*) and brochures to raise awareness about dugongs and the threats they face (*with SDMRI*).

MFF India, in partnership with IUCN member, OMCAR Foundation, brought together 50 students and 7 teachers for a two-day awareness camp on marine and coastal ecosystems. Held on 27th & 28th November 2013 at OMCAR's Palk Bay Center, the students (between the ages of 12 and 14 years) represented 5 different schools in the Thanjavur district of Tamil Nadu. A number of different activities were simultaneously run to engage the students in effective learning, covering topics such as mangroves, coral reefs and sea-grass beds; these lessons were further enriched by field trips to the Thanjavur beach, Muthupet mangroves, and a mangrove nursery. At the end of the camp, students passionately discussed and committed to protecting the coastal environment, sharing their observations on threats to, and means of preventing the unnecessary destruction of coastal habitats.

In partnership with DA, through the Small Grant Project, MFF India conducted nuttaknatak (street theatre) in the schools and market places around the Bhitarkanika region, with the aim of raising awareness of the importance of mangroves. Similarly, in partnership with APOWA, MFF India facilitated a mangrove art competition and a scavenger hunt for children in the Bhitarkanika mangroves, to teach children about mangroves and the functions they perform. Several awareness drives on mangroves were also conducted in Ratnagiri, by BNHS as part of the Small Grant Project.

Biosphere Reserves (Flexi-fund)

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

These Reserves are rich in biological and cultural diversity and encompass unique features of exceptionally pristine nature. The goal is to facilitate conservation of these representative landscapes and their immense biological diversity and cultural heritage, foster economic and human development which is culturally and ecologically sustainable and to provide support for research, monitoring, education and information exchange. The

scheme is a pioneering effort at pursuing the increasingly difficult yet urgent task of conserving ecological diversity under mounting pressures.

The programme was initiated in 1986 and till date, 18 sites have been designated as Biosphere Reserves (BRs) in different parts of the country (Table-2). The Ministry through the Centrally Sponsored Scheme of 'Biosphere Reserve' provides 100% financial assistance to the concerned State/UT Governments for conservation and management of the designated Biosphere Reserves. The Indian National Man and Biosphere (MAB) Committee constituted by the MoEFCC is the apex body to oversee the programme, provide policy guidelines and review the programme.

Out of the 18 Biosphere Reserves designated nationally, so far nine Biosphere Reserves, viz., Nilgiri (Tamil Nadu, Kerala and Karnataka), **Gulf of Mannar** (Tamil Nadu), **Sunderban** (West Bengal), **Nanda Devi,** (Uttarakhand), **Pachmarhi** (Madhya Pradesh), **Similipal** (Orissa), **Nokrek** (Meghalaya), **Achanakmar-Amarkantak** (Chhattisgarh & Madhya Pradesh) and **Great Nicobar** have been included in the World Network of Biosphere Reserves of UNESCO.

Table-2. List of Designated Biosphere Reserves (BRs)

S. No.	Name of the BR & total geographical area (Km2)	Date of Designation	Location in the State (s)/Union Territory
1	**Nilgiri (5520)**	1.8.1986	Part of Wynad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani hills in Tamil Nadu, Kerala and Karnataka.
2	**Nanda Devi (5860.69)**	18.1.1988	Part of Chamoli, Pithoragarh and Almora districts in Uttarakhand.
3	**Nokrek (820)**	1. 9.1988	Part of East, West and South Garo Hill districts in Meghalaya.
4	**Manas (2837)**	14.3.1989	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamprup and Darang districts in Assam.
5	**Sunderban (9630)**	29.3.1989	Part of delta of Ganges & Brahamaputra river system in West Bengal.
6	**Gulf of Mannar (10500)**	18.2.1989	India part of Gulf of Mannar extending from Rameswaram island in the North to Kanyakumari in the South of Tamil Nadu.
7	**Great Nicobar (885)**	6.1.1989	Southern most island of Andaman and Nicobar Islands.
8	**Similipal (4374)**	21.6.1994	Part of Mayurbhanj district in Orissa.
9	Dibru-Saikhova (765)	28.7.1997	Part of Dibrugarh and Tinsukia districts in Assam.
10	Dehang-Dibang (5111.5)	2.9.1998	Part of Upper Siang, West Siang and Dibang Valley districts in Arunachal Pradesh.

11	**Pachmarhi (4981.72)**	3.3.1999	Part of Betul, Hoshangabad and Chhindwara districts in Madhya Pradesh.
12	Khangchendzonga (2931.12)	7.2.2000	Part of North and West districts in Sikkim.
13	Agasthyamalai (3500.36)	12.11.2001	Part of Thirunelveli and Kanyakumari districts in Tamil Nadu and Thiruvanthapuram, Kollam and Pathanmthitta districts in Kerala.
14	**Achanakmar-Amarkantak (3,835. 51)**	30.3.2005	Part of Anuppur and Dindori districts of Madhya Pradesh and Bilaspur district of Chattisgarh.
15	Kachchh (12,454)	29.1.2008	Part of Kachchh, Rajkot, Surendranagar and Patan districts in Gujarat.
16	Cold Desert (7,770)	28.8.2009	Pin Valley National Park and surroundings; Chandratal & Sarchu; and Kibber Wildlife sanctuary in Himachal Pradesh.
17	Seshachalam (4755.997)	20.9.2010	Seshachalam hill ranges in Eastern Ghats encompassing part of Chittoor and Kadapa districts in Andhra Pradesh.
18	Panna (2998.98)	25.8.2011	Part of Panna and Chhattarpur districts in Madhya Pradesh

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

Achievements

Management Action Plans (MAPs) submitted by the concerned States/UT were scrutinized and sanctioned for implementation of approved items of activities.

The duly filled in Nomination Form in respect of Agasthyamala Biosphere Reserve for inclusion in the World Network of Biosphere Reserves of UNESCO has been forwarded to MAB Secretariat, Paris.

Progress made during the year

The statement showing progress during the year is given in Table-3.

Regulatory Acts /Rules governing the programme:

Existing regulations relating to Biodiversity, Land and Water are used in regulating activities in Biosphere Reserves. The Wildlife (Protection) Act, 1972 regulates activities in core zone.

Implementing organizations along with details of responsibilities:

Implementing organizations are the concerned State(s)/UT Government Environment and Forest Departments / line Departments. The approved items of the activities by the Central Government are within the recommended items by the concerned State/UT Level Steering Committee chaired by Chief Secretary/ concerned Addl. Chief Secretary/ Principal Secretary.

Universities, Research Institutions, State Forest Research Institutions, Autonomous bodies are conducting research activities

Table-3. Progress made during the year

Sl. No.	Activity	2013-14	2014-15
1	Number of Management action plans sanctioned for implementation in the BRs	8	7
2	Completed research projects	--	--
3	Ongoing research projects	15	15
4	New BRs designated	--	--
5	Nomination sent to UNESCO for inclusion in the World Network of BRs	--	1
6	Periodic Review Report for MAB Programme of UNESCO	1	--

on the sanctioned research projects in the BR areas and the periodic progress and review reports are evaluated by experts and evaluation of the completed research projects is carried out by the designated Committee.

Genetic Engineering Approval 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 the end of year 2014 include:

- Convene monthly GEAC meetings as per schedule for review of applications pertaining to GM technology. So far 122 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. Review of Bt brinjal post moratorium is in progress.
- 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.

- Pursuant to environment release of Bt cotton, post release monitoring to assess the development of insect resistance to Bt gene in cotton crop was undertaken through Central Institute of Cotton Research, Nagpur from 2002 to 2010.
- A workshop on 'National Consultation on Insect Resistance Management (IRM strategy) in Bt cotton was organized.
- 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. 13 issues have been circulated since July, 2011 across 10,000 stakeholders globally. The online version is available on the GEAC website (http://moef.nic.in/divisions/csurv/geac/information.html)

- Exhaustive counter affidavits have been prepared for several court cases.
- 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 TEC. 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 to be held at Pyeongchang, Republic of Korea from September 29 to October 03, 2014.

The Indian delegation and experts actively participated in the meetings of COP-MOP as well as preparatory meetings and online discussion forums organized by the CBD during the inter-sessional period prior to each COP-MOP meetings.

India has also participated in all the preparatory Regional Meetings/Workshops held prior to COP-MOP-7. These include:

- The meeting of the Informal Advisory Committee (IAC) on Biosafety Clearing House (BCH) from April 2-4, 2014 at Ispra
- Tenth meeting of the Liaison Group on Capacity Building Biosafety from April 7-9, 2014 in Budapest.
- Asian Regional MOP 7 preparatory meeting, held in Bogor, Indonesia, on August 25-26, 2014.
- 16th meeting of the NPCs held in Thimpu, Bhutan from June 09-13, 2014 to discuss about the emerging trends under the CPB and to provide hands on training in the use of A New UNEP Biosafety Information Systems (ANUBIS) for meeting the project management reporting requirements.

Indian delegation participated in the Seventh meeting of COP-MOP to the CPB held in Pyeongchang, Republic of Korea from September 29 to October 03, 2014. India also participated in a fair on national experiences on the implementation of the CPB as part of the Communication, Education and Public Awareness (CEPA) held in the margins of COP-MOP 7. A poster exhibit and presentation on publication as a tool for building capacity and awareness was presented by the Indian team in the CEPA fair.

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 Kula Lumpur Supplementary Protocol on Liability and Redress

The fifth meeting of COP MOP to the CPB held at Nagoya, Japan in October

2010 adopted the Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress to the CPB after six years of intense negotiations. India has made significant positive contributions in finalisation of the Supplementary Protocol, which is considered as a milestone achievement in multilateral environmental negotiations.

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. 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

As a Party to the CPB, MoEFCC has accessed funds from United Nations Environment Program (UNEP) / Global Environment Facility (GEF) for the "Phase-II Capacity Building Project on Biosafety" to strengthen the biosafety management system in India with special emphasis on risk assessment and management (RARM), handling, transport, packaging and identification of LMOs (HTPI), socio economic considerations (SEC) and public awareness (PA) with an aim to ensure adequate protection of human health and biodiversity from potential harm arising from all LMO-related activities.

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 five 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. Two meetings of the Steering Committee have been convened so far

Achievements

GEAC / CPB achievements

– GEAC has convened 6 meeting during March 2014 to August 2014. The GEAC

has considered about 80 applications for conduct of confined field trials subject to submission of NOC from concerned State Govts.

- GEAC has also given its approval for experimental field trials of 12 GM crops for generating biosafety data. The 12 crops for which GEAC has given its approval are rice, castor, cotton, wheat, maize, groundnut, potato, sorghum, brinjal, mustard, sugarcane and chickpea.
- Report of the TEC constituted by the Supreme Court has been examined and recommendations for improving the regulatory systems are under consideration. The UOI has filed its objection in the Supreme Court through a joint Common Affidavit on 1.4.2014. UOI is of the view that research in GM and confined field trials for generating biosafety data with all due precautions should be allowed to continue i the national interest. The matter is also pending final decision of the Supreme Court.
- Cabinet approved the proposal for 'Ratification of the Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress' on 29.10.2014. The Secretary-General of the United Nations, acting in his capacity as depository has issued Depository Notification on dated December 19, 2014. With the aforesaid deposit, India becomes the 28th country to do so and 12 more ratification / accession would be required for the entry into force of the Supplementary Protocol
- India was represented in the following international meetings:
  - Ninth meeting of Informal Advisory Committee (IAC) on Biosafety Clearing House (BCH) from April 2-4, 2014 at Ispra
  - Tenth meeting of the Liaison Group on Capacity Building Biosafety from April 7-9, 2014 in Budapest.
  - The Asian Regional MOP 7 preparatory Meeting, held in Bogor, Indonesia, on August 25-26, 2014.
  - Seventh meeting of COP-MOP held at Pyeongchang, Korea from September 29 to October 3, 2014.
- India handed over the Presidency of COP to the Republic of Korea at the seventh meeting of COP-MOP to the CPB held in Pyeongchang, Republic of Korea from September 29 to October 03, 2014. COP-MOP 7 adopted 14 decisions on: compliance; Biosafety Clearing House; financial mechanism and resources; cooperation with other organizations and conventions; handling, transport, packaging and identification of living modified organisms; risk assessment and management; socio-economic considerations; monitoring and reporting; unintentional transboundary movements; and contained use of LMOs. Follow-up action for implementation of the decisions have been initiated.
- A fair on national experiences on the implementation of the CPB as part of the Communication, Education and Public Awareness (CEPA) in the margins of COP-MOP 7 from September 29 to October 3, 2014 in Pyeongchang, Republic of Korea This fair was jointly organized by the Government of the

Republic of Korea, as the host of COP-MOP 7 and the CBD Secretariat. This Fair provided an opportunity to showcase India's experiences, good practices and lessons learned on various themes like experiences and lessons learned in the design and implementation of biosafety capacity-building activities and outreach materials for raising public awareness, education and participation concerning the safe transfer, handling and use of LMOs.

- Development of the State of Art GEAC website has been completed.
- The first draft of eight biology documents (pigeon pea, papaya, mustard, rubber, potato, sorghum and tomato) have been received. Dr. O. P. Govila, Former Professor, Department of Genetics, IARI and Member RCGM has been engaged to review these biology documents, pursuant to which a consultative process for finalizing the document would be initiated. This would include review by various experts and inviting comments by placing these documents in the MoEFCC website.
- Guidance document for generation of biosafety data at various stages of research and development of GM crops is awaiting GEAC approval. Development of ERA guidelines and risk analysis framework for GM crops, development of tools and methodologies for SECs of the impact of GM crops and training modules for pre and post release monitoring are in progress, Auditing of six laboratories to assess their capacity for LMO detection has been completed. Proposals from these institutions have been invited for strengthening the infrastructure and human resources capacity for further accreditation and setting up a network of LMO detection laboratories.
- Three meetings of the PMMC, mid-term review by UNEP and one meeting of the Steering Committee was held to review the project progress and approve the annual work plan and budget.
- India was one of the five panelists to make a presentation on 'Integration of Biosafety into National Biodiversity Strategy Action Plans and other National Programs' in the special session at COP-MOP Plenary on October 5, 2014. India also Co-chaired the Contact Group on SEC in the COP-MOP meeting.
- The format for the 3rd national report on implementation of CPB was adopted in the 7th meeting of COP-MOP at Pyeongchang, Korea in October, 2014. Preparation of the report would be initiated shortly.

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. Activities in progress includes:

- Formulation of Environmental Risk Assessment (ERA) Guidelines for LMOs. Two meetings of the ERA Committee have been convened. As part of this initiative. A five members Indian delegation engaged in the key regulatory agencies like RCGM, GEAC and members of ERA committee attended a technical training programme organized by the Office of

the Gene Technology Regulator (OGTR), Cabnerra, Australia from December 01-05, 2014 This programme will help India in incorporating international best practices in the environmental risk analysis framework which is being developed as part of the project activities.

- Development of biology documents for 8 crops viz. Chickpea, Pigeonpea, Sorghum, Papaya, Mustard, Rubber, Tomato and Potato. Draft documents are ready for further consultations;
- Auditing of six national laboratories for strengthening of institutions for LMO detection has been completed;
- Development of guidelines for SECs to assess the impact of the LMOs is in progress. Two Consultative Meetings have been convened so far;
- Online survey on "Genetically Engineered Plants in the Product Development Pipeline in India' has been completed.
- Publication of a "Project Brief' highlighting the activities under thrust areas, institutional co-ordination, project supervision and reporting requirements for wider circulation and dissemination among various stakeholder has been completed;
- Hindi translation of CPB and Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress in Hindi is ready for printing.
- A quarterly Biosafety Newsletter is being prepared on a regular basis and circulated to about 10,000 stakeholders both are national and global level. Since July, 2011, 13 issues were published and circulated which provides information on the project activities, developments under the CPB, information on new publications and upcoming events related to biotechnology and biosafety.
- Several outreach material and training programs for enhancing public awareness on GMOs and related biosafety issues is in progress through CABI International, Indian Institute of Mass Communication (IIMC), Asia Biobusiness (ABB) & BCIL.
- The project team participated in the 11th National Project Coordinators (NPC) meeting and 16th NPC meeting held in Mongolia and Bhutan during July, 2013 and Jun, 2014 respectively.
- Two international workshops i.e. "Biotechnology Communications Workshop" and "Invitational Media Workshop" have been successfully organized by the MoEFCC in the Indira Paryavaran Bhawan, New Delhi on November 19-20, 2014 in collaboration with International Food Information Council (IFIC) Foundation, Washington, IIMC and BCIL. The objective of the workshops was to deliberate on challenges in the area of risk communication in agricultural biotechnology by sharing of experiences.
- Several activities in the area of risk communication have been planned for sensitizing policy makers, regulators and scientists on effective communication approaches that can be followed while communicating decisions on GMOs as part of the ongoing biosafety project.

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

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 biosystematic 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.

Activities undertaken so far and significant achievements

Thirty thematic areas were chosen for investigation under the AICOPTAX. These were:

1. Plant viruses
2. Animal viruses
3. Pathogenic bacteria
4. Non-pathogenic bacteria
5. Pathogenic fungi
6. Non-pathogenic fungi
7. Fresh water phytoplankton/ Algae(including blue green algae)
8. Fresh water zooplankton (including euglenoids/ciliates/rhizopods)
9. Lichens
10. Bryophytes
11. Orchids
12. Palms
13. Grasses and bamboos
14. Pteridophytes and gymnosperms
15. Research in plant biosystematics and advanced training in taxonomy
16. Helminthes and Nematodes

17. Crustacea
18. Mollusca
19. Insects: coleoptera
20. Insects: hymenoptera
21. Insects: blateria and tettigonids
24. Insects: miscellaneous order
25. Arachnida
26. Oomycetes and cellular slime moulds
27. Protozoa and sporozoa
28. Annelida
29. Meiofauna
30. Research in animal biosystematics and advanced training in taxonomy

Of the aforesaid 30 thematic areas, so far, 15 have been successfully implemented by 15 Coordinators along with 61 Collaborators. The remaining 15 thematic areas are in the process of being taken up for investigation under AICOPTAX in phased manner.

The important achievements of the 15 thematic areas include: discovery of species new to science, new records for India, floristic and faunal accounts, status of species, number of students training in taxonomy and enrolled for doctoral studies, etc. Some significant achievements are given below:

Number of species identified/characterized/ Described	12789
Documentation of flora and fauna (with descriptions)	6759
Human resource development/training in Biosystematics	
Number of persons trained in taxonomy	450
Number of students enrolled for Ph.D	105
New Discoveries	
Taxa new to science	570
Taxa new to India	449
Species collected after a gap of 50 years or more	189
Number of rare taxa recorded from new locations	1059
Publications: Book	7
Research Papers	335
Book chapters	61
Popular articles	14
Papers accepted for publication	118
Training/awareness Workshops organized	12

Achievements

– Twelve research projects in the following thematic areas have been approved by the Apex Committee on Research in Environment and is being implemented through the respective Coordinating Centres and corresponding Collaborating Units: i) Crustacea; ii) Coleoptera; iii) Hymenoptera; and iv) Arachnidae.

- As per approved SFC Memo, 3rd party independent evaluation of the achievements of the AICOPTAX Scheme during 11th Plan has been done by the Expert Group constituted by the Ministry.
- The Steering Committee of the AICOPTAX in its meeting held on 7th April 2014 identified and recommended the following thematic areas for financial assistance from the Ministry:
  - Fresh water and marine zooplankton(including euglenoids/ ciliates/rhizopods)
  - Insects; bacteria and tettigonids
  - Insects: miscellaneous order
  - Oomycetes and cellular slime moulds
  - Protozoa and sporozoa
  - Annelida
  - Meiofauna
  - Research in plant biosystematics and advanced training in taxonomy
  - Research in animal biosystematics and advanced training in taxonomy
- The Ministry through an open advertisement invited research proposals from the various academic institutions/ universities/ recognized research institutes/reputed NGOs etc on the aforesaid thematic areas. So far we have received 25 research proposals from the various research Institutions and they are under process.

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 so far

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 plans. Under the scheme, 367 projects have been supported. Various organizations maintain botanic gardens and Centre of ex-situ Conservation which include 13 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.

Achievements

In current financial year, funds have been released to 10 Botanic Gardens thereby ensuring the ensuring the ex sitru conservation of nearly 100 RET plant species.

Progress of expenditure

Financial Grant of ₹ 118.21 lakh released under Assistance to Botanic Garden Scheme during the financial year 2014-15 (Table-4).

Table-4. Financial assistance provide to Botanic Garden Scheme during 2014-15

Sl. No.	Name of Organization	State /U.T.	Amount Released in 2014-15
1.	Tropical Botanical Garden Research Institute, Palode	Kerala	10.00
2.	Aligarh Muslim University, Aligarh – 202 002	Uttar Pradesh	11.75
3.	G.B. Pant Institute of Himalayan Environment and Development, Almora Uttarakhand	Uttrakhand	12.00
4.	University of Agricultural Sciences, GKVK campus Bangalore	Karnataka	14.40
5.	S.K. Rajasthan Agricultural University, Bikaner	Rajasthan	10.00
6.	Biju Patnaik Medicinal Plant Garden and Research Institute, Koraput, Odisha	Odisha	11.33
7.	Janata Shikshan Mandal's Devchand College, Arjunnagar, Dist. Kolhapur	Maharashtra	9.73
8.	Punjabi University Patiala , Punjab	Punjab	20.00
9.	Malabar Botanical Garden, Kozhikode, Kerala	Kerala	11.00
10.	Arts, Science and Commerce College, Kolhar, Maharashtra	Maharashtra	8.00
	Total		118.21

Forest Conservation

Objectives

The Central Government, with an objective to regulate the use of forest land for non-forest purposes, enacted the Forest (Conservation) Act, 1980. The said Act provides that use of forest land for non-forest land for non-forestry purposes requires prior permission of the Central Government. The Central Government accords approval under the Forest (Conservation) Act, 1980 for diversion of forest land stipulates appropriate conditions to mitigate impacts of diversion of forest land on the ecology, environment, biodiversity and overall forest cover in the country. Important among them are creation and maintenance of compensatory afforestation, realization of Net Present Value (NPV) for execution of various activities for conservation, protection and management of forests.

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, to 35,702 hectares per annum during 33 years of the existence of the Act, during which Central Government

accorded approvals under the Act for diversion of 11,78,195 hectares of forest land for non-forest purposes with adequate mitigative measures.

Mechanism of Compensatory Afforestation

To minimize impacts of diversion of forest land on the ecology, environment, biodiversity and overall forest cover in the country, the Central Government while according approvals stipulates appropriate conditions. Important among them are transfer and mutation of equivalent non-forest land in favour of State Forest Department (SFD) for creation of compensatory afforestation from the funds to be provided by the user agency, notification of such non-forest land transferred as Reserved Forest/ Protected Forest, realization of Net Present Value (NPV) of the diverted forest and from the user agency to be used for conservation, protection and management of forests and wildlife and realization of funds from the user agencies for preparation and execution of appropriate plans for conservation and development of wildlife in and around the forest land proposed to be diverted.

Compensatory Afforestation Fund management and Planning Authority (CAMPA)

A draft Order for regularization of the institution of the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) has been formulated by the MoEFCC. The said draft Order envisages constitution of National CAMPA at the National level and State CAMPA at each State/ Union Territory as authorities as under Sub-section (3) of Section 3 of the Environment (Protection) Act, 1986. Approval of the Union Cabinet has been obtained to file the said draft Order in the Hon'ble Supreme Court with the payer that the MoEFCC may be allowed to publish the said Order in the official gazette and to take such further action as envisaged in the said draft Order for utilization of CAMPA funds. Operationalization of Regular CAMPA will facilitate expeditious, efficient and transparent utilization of accumulated (approx. ₹ 30,000 corers) as well as fresh accrual (Approx. Rs. 6,000 crores per annum) of compensatory levies in lieu of Forest land diverted for non-forest purposes.

Recent Initiatives to Streamline Forest Clearance Process

– Launched a web portal for online submission and monitoring the Forest clearance proposals;

Fig-14. *Afforestation helps protecting earth*

- Accorded General approval under the FC Act for diversion of forest land required for construction and widening of two lane roads by the BRO/ other agencies whom the Ministry of Defence entrusts the job, in the area falling within 100 kilometers aerial distance from the LAC and widening of link roads, between Border roads in the area within 100 kilometer aerial distance from the LAC and National Highways/State Highways/ Other State Roads.
- Extended the general approval under the Forest (Conservation) Act, 1980 for diversion of upto 5 hecatres of forest land for construction of all categories of public roads by Government Departments in 117 LWE affected districts to projects involving diversion of forest land, not located within the protected areas, for construction of two lane public roads by Government Departments in these 117 LWE affected districts irrespective of the area of forest land involved in such projects
- With a view to ensure, speedy laying of transmission line projects, the general dispensation available for undertaking compensatory afforestation over degraded forest lands so far available to the transmission lines upto 220 KV has been extended to all kinds of transmission lines.
- Notified the Forest (Conservation) Second Amendment Rules, 2014 to provide for inter-alia constitution of Regional Empowered Committee (REC) at each of its Regional Offices 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 involved have been notified on 10th October 2014. These Rules will come into force on 1st November 2014.
- Amended the guidelines to provide that in case of linear projects in-principle approval under the Forest (Conservation) Act, 1980 may be deemed as the working permission for tree cutting and commencement of work, if the required funds for compensatory afforestation, NPV, wildlife conservation plan, plantation of dwarf species of medicinal plants, and all such other compensatory levies specified in the in-principle approval are realised from the user agency, and non-forest land for creation of compensatory afforestation, wherever required to be provided by the project proponent, has been transferred and mutated in favour of the State Forest Department.
- Filed an application before the Supreme Court for regularization of the institution of Compensatory Afforestation Fund Management and Planning Authority (CAMPA).
- Issued guidelines to the effect that in case of proposals seeking forest clearance for prospecting in forest land 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 is 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.

- Advised the States/ UTs to not to impose additional conditions over and above the conditions stipulated in the Forest Clearance accorded by the MoEFCC.
- 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 passenger safety.
- Advised States/ UTs 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 and also from management point of view. It has also been stated in the said letter that land available in the land bank may be made available to user agencies seeking prior approval of Central Government under the afore-mentioned Act 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 also 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 proposals seeking prior approval of Central Government under the FC Act for diversion of forest land for

non-forest purpose, once the 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.

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 organization under the Ministry of Environment & Forests, and its Institutes/Centers, Forest Survey of India (FSI) and its Regional Centres, 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 of 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.

Achievements

- Consultancy Rules of Indian Council of Forestry Research and Education (ICFRE) are being streamlined so that maximum revenue generated by consultancy is utilized to reduce the dependence of the ICFRE on government grants.
- Forest Establishment Division is working towards making the corpus fund of Pension Fund Trust of ICFRE self sustainable.

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 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.

Environmental Management and Pollution Control functions:

- To follow up implementation of conditions and safeguards laid down for projects/ activities when environmental clearance is given;
- To examine and analyse the Six Monthly Progress reports from the Project Proponents vis-à-vis conditionalities in the Environmental Clearance (EC) and take further necessary action;
- To do surprise and random checks/ verifications of EC conditions of various projects by site visits;
- To conduct enquiries as may be directed by the Ministry;
- To follow up pollution control measures taken by industries, local bodies, Government (State/ Centre);
- To collect and furnish information relating to environmental impact assessment of projects, Pollution control measures, methodology and status, legal and enforcement measures, environmental

protection for special conservation areas like wetlands, mangroves and biosphere reserves;

- To maintain liaison and provide linkage with the concerned State Government, with Central Government Agencies (including Regional Offices of BSI, FSI & ZSI) with project authorities, with the Regional Offices of the Central Pollution Control Board; with State Pollution Control Boards and with non-Government Organisation involved in implementation of programmes relating to environment;
- To organize workshops for State Pollution Control Board and State Environment Department to acquaint with the application of Hazardous Management Rules and Public Liability Act;
- Uploading on their website the Six Monthly Progress reports of compliance and site visit reports.

Miscellaneous functions:

- To service the Standing Site Inspection Committee in the matter of ascertaining the position of the forest or non-forest land.
- Rendering assistance in preparation of the National Forestry Action Plan.
- Regional level technical and scientific consultation on biological diversity
- To assist the State/ Union Territories in streamlining collection, collation, storage and retrieval of data/ covering all forestry activities and to transmit such data to the Central Government/ Central Data Processing Centre.

Table-5. Headquarter and jurisdiction of the Regional Offices

Sl. No.	Headquarter of Regional Office	State and UTs under jurisdiction
1	Bangalore	Karnataka, Kerala, Goa and Lakshadweep
2	Bhopal	Dadra & Nagar Haveli, Daman & Diu, Gujarat and Madhya Pradesh
3	Bhubaneswar	Orissa and West Bengal
4	Chennai	Andhra Pradesh, Tamil Nadu, Puducherry and Andaman & Nicobar Islands
5	Chandigarh	Chandigarh, Haryana, Jammu & Kashmir and Punjab
6	Dehradun	Himachal Pradesh and Uttarakhand
7	Lucknow	Delhi, Rajasthan and Uttar Pradesh
8	Nagpur	Chhattisgarh and Maharashtra
9	Ranchi	Bihar and Jharkhand
10	Shillong	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura

- Verification of nominees for Indira Gandhi Paryavaran Puruskar and other Awards of the Ministry;
- Attending to Court Cases pertaining to the Ministry of Environment and Forests
- Attend to RTI Applications, general complaints pertaining to environment and forest issues
- Such other work as may be assigned from time to time.

The Regional Offices Headquarters in the Ministry at New Delhi is administrative and coordinative unit for all the activities in relation to the functions assigned to the Regional Offices as enumerated above under the overall control of the Secretary, Government of India in the Ministry of Environment and Forests New Delhi.

The total sanctioned strength of Regional Office Headquarters in the Ministry and ten Regional Offices is 341 (existing 96 + 145 New created) i.e (22 for Headquarters, 36 for Regional Office Shillong and 34 each for Regional Office Bengaluru, Bhubaneswar, Lucknow, 33 for Bhopal, 30 each for Chennai Dehradun, Nagpur, Ranchi and 28 for Regional Office Chandigarh).

Progress of 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 year 2013-14 is given in Table-6.

Other Activities undertaken

The details of some of the important activities undertaken/ meetings held during

Table-6. Regional Office wise physical targets and achievements for monitoring of approved project under the Forest (Conservation) Act, 1980 during the year

S. No.	Regional Office	FCA		EPA	
		Target 2014-15	Achievement (Upto 30th Nov 14)	Target 2014-15	Achievement (Upto 30th Nov 2014)
1	Bengaluru	175	74	230	92
2	Bhubaneswar	100	16	120	87
3	Bhopal	175	18	220	52
4	Chandigarh	180	28	230	149
5	Lucknow	160	46	240	159
6	Shillong	80	76	100	61
7	Dehradun	0	25	0	19
	TOTAL	**870**	**283**	**1140**	**619**

2014-15 are as follows:

- The Regional Office, Bangalore organized a meeting of the State Nodal Officers (FCA) of Karnataka and Kerala was conducted on 05.05.2014 and that of Goa on 17.06.2014 to discuss the issues related to implementation of Forest (Conservation) Act, 1980.
- The Regional Office, Bangalore conducted a training programme on the portal for online submission and tracking of the status of application seeking prior approval of Central Government under Forest (Conservation) Act, 1980 for diversion of forest land for non-forestry purposes, on 25.07.2014 involving State Forest Department Officials of Andhra Pradesh, Telangana, Goa, Karnataka, Kerala, Tamil Nadu & UTs of Daman&Diu, Puducherry and Lakshdweep.
- The Regional office, Shillong organized a two days review meeting of Nodal Officers, Working Plan Officers and CAMPA Officers of North Eastern States on from 23-24 December, 2014.
- The Regional office, Shillong conducted one day training programme on New portal for online and approval of application of Central Government under Forest (Conservation) Act, 1980 for the North Eastern States on 01.08.2014 at Guwahati.
- The Regional office, Shillong conducted National conference on "Legal framework on conservation of forest and environment and implementation of environment safeguards" on 25.06.2014 at Shillong.

Forest Policy

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 MoEFCC and acts as a National Focal Division for the Forestry International Cooperation on United Nations forum on Forestry (UNFF), Asia Pacific Forestry Commission (APFC), Committee on Forestry of FAO and Centre for International Forestry Research (CIFOR).

The National Forest Policy, 1988

The basic objectives of the National Forest Policy, 1988 are:

- Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.
- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country.
- Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the "interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.

- Checking the extension of sand dunes in the desert areas of Rajasthan and along the coastal tracts.
- Increasing substantially the forest/ tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel-wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- Increasing the productivity of forests to meet essential national needs.
- Encouraging efficient utilisation of forest pro¬duce and maximising substitution of wood.
- Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimise pressure on existing forests.

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. Forest Policy Division is also the Nodal Division for UNFF, COFO and APFC.

Activities undertaken

However, brief on the activities undertaken so far on the subject matter pertaining to Forest Policy Division during the financial year 2014-15 is as under:

- Draft Guidelines for conservation, development and management of Urban Greens were issued on 11.07.2014.
- Draft Guidelines on Liberalizing Felling and Transit Regime for Tree Species Grown on Non-Forest/ Private land were issued on 11.07.2014 for final consultation with State Governments and other stakeholders.
- 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 on 18.11.2014 for necessary action. The Guidelines are also available at the MoEFCC website at http://moef.nic.in.
- The Ministry has been proactively involved in facilitating the Minisrty 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.
- 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.
- Process for study and reviewing the National Forest Policy, 1988 has been initiated in the Forest Policy Division in view of the later developments in the natural resource management and emerging national and international issues and challenging in the forestry sector. A Core Group for review of

the National Forest Policy has been constituted on 21.04.2014. Forest Policy Division is coordinating the process of revisiting National Forest Policy with the help of the Indian Institute of Forest Management, Bhopal supported by UNDP. The zero draft of Forest Policy is to be completed by 31.12.2015.

- The Forest Policy Division actively pursued the matters regarding availablitty of fodder and fodder development in the drought affected areas with the Planning Commission, Department of Animal Husbandry, all State Forest Departments as a measures for preparedness for Monsoons 2014. Advisories to the Chief Secretaries/ PCCFs of all States/UTs were issued for taking all possible steps and contigency measures in facilitating and improving the fodder availability from the forests and common lands and give greater emphasis to plant fodder species under pasture/ silvi-pasture development programme of National Afforestation Programme. The Hon'ble Minister also wrote letters to all Chief Ministers on 29.8.2014 for taking measures and coordinated efforts in their respective states for enhancing the fodder availability in drought affected area in view of likely impact on fodder availability for livestocks due to deficit rainfall.
- An advisory on simplifying the procedure for tree felling in cities/urban areas was issued to the Chief Secretaries of all States/UTs.
- The process for Tree Credit/ Green Credit Schemes including inviting Private Initiatives in afforestation on Degraded Forests and Private / Non forest lands has been initiated in the Division to encourage private initiatives on tree plantations with suitable incentives which will help in enhancing tree cover outside forest areas and towards achieving national goal of 33% of geographical area under forest and tree cover. Apart from economic benefits to the tree growers and reducing pressure on existing forests, this will also help in climate change mitigation and enhancement of ecosystem services and will connect general public with the trees & forest and in contribution in the greening of the country.
- 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). The same is available on UNFF's website at http://www.un.org/esa/forests/.
- 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 same is available on UNFF's website at http://www.un.org/esa/forests/.
- Prepared the draft National REDD+ Policy and Strategy. Available at the MoEFCC website at http://envfor.nic.in.
- Preparation of Guidelines on Voluntary Carbon Market with collaboration of GIZ India is in process.
- The Division is participating as a technical partner in organising a side event jointly with TERI on "Bamboo as Change Agent- Better Life, Better Future" during Delhi Sustainable Development Summit, 2015 (DSDS 2015)

– Activites under Forest PLUS Programme:-

The Forest PLUS programme are being implemented in the states of Himachal Predesh, Madhya Pradesh, Karnataka and Sikkim. The activities and progress reports are obtained from the respective states. The program also focuses 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, IGNFA etc.) and officials from four states where the programme being implementeed. The technical trainings/ workshops conducted under the Forest PLUS programme include training held in USA and India.

The following meetings were aranged for the Delegations visiting from abroad to India:

– Study tour of Delegations from Sri Lanka Forest Department in India from 19-23 January, 2015 on National Forestry Inventory at FSI Dehradun and a formal meeting with the officials of the Ministry.

– Delegation from German Foresters visited India for cooperation on Wood Based Industry.

– Delegation from USFS visited India cooperation on forestry and REDD+.

Despite immense biotic pressure on forests and biodiversity, India has been able to effectively protect its forests. As per India State of Forest Report (ISFR), 2013 published by Forest Survey of India, the total forest and tree cover of the country is 789, 163 sq. km (78.92 million ha) constituting 24.01% of the geographic area. Of this forest cover is 697, 898 sq. km (21.23%) and tree cover is 91, 265 sq. km (2.78%). There is an increase of 5871 sq. km in the forest cover of the country as compared to the ISFR, 2011 assessment.

Indian people have social, cultural, economic and spiritual linkages with the forests since time immemorial, not looking at forests simply as a resource but a basis for sustaining life and the country is presently celebrating 150th Year of Scientific Management of Forests.

Forest Protection

Intensification of Forest Management Scheme (IFMS)

The scheme deals with issues relating to the latest development and planning relating to Management of Forest Fire. It is also the focal point for the Crisis Management arising out of Forest Fire. The Division is the nodal Division for coordinating with Planning Commission and MHA in matters related to Forest Protection in respect of Left Wing Extremism areas.

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.

Plan Outlay of the Scheme in the XII Five Year Plan

The average expenditure in the last five years (2009-10 to 2013-14) is ₹ 5834 lakhs under the scheme. Under the guidelines of the scheme, proposals for Annual Work Programme (AWP) submitted by the respective State Governments is discussed in the Screening Committee which makes recommendation for allocation of funds for the year. On review of the past records, it is found that State Governments have been submitting AWP's for an amount or ₹ 8 to 14 crores where as the average allotment for States has been 2-3 times less. Requests for allotment according to the plans submitted by the states have been received by the division on many occasions during the meeting with representative of State Forest Departments, their argument being that the AWPs are prepared after identification of gaps for forest protection and specially in the area of Infrastructure development for frontline staff, communication and IT forest fire control.

Performance of the Scheme in 2014-15

The Annual Plan allocation for the year 2014-15 is ₹ 6825.00 lakhs. State wise allocation of the budget is represented in Table-7.

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 forest area of the country. This map is being shared with the States and 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 in real time. This information sharing has improved fire management as well as trueness of fire information in the country.

Crisis Management Plan

The Forest Protection Division is also the nodal Division for preparation and implementation of Forest Fire Crisis Management Plans which are being prepared 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 department is able to provide adequate resources for forest fire control.

A draft National Forest Fire Disaster Management Plan has been prepared by the Forest Protection Division. The Plan has been circulated to the States/UTs for their comments.

Budget allocation and progress of expenditure

The budgetary allocation of the scheme was ₹ 6825.00 lakhs for 2014-15 out of which

Table-7. State wise performance under IFMS in 2014-15 (Expenditure upto 31.12.2014)

S. No.	State	Received Proposal 2014-15	Annual Work Programme (Including Flexi Funds) 2014-15 (as on 29.12.2014)				Grant Total
			Amount sanctioned (Including Flexi Funds)		Total	Ist installment (Net release) 80% of Central Share	
			2014-15				
			Central share 75%	State share 25%			
3	Chhattisgarh*	3464.80	545.58	181.86	727.44	411.96	411.96
4	Gujarat	2055.00	437.14	145.72	582.86	349.71	349.71
6	Haryana	347.70	186.95	62.32	249.27	149.56	149.56
7	H.P	1721.45	459.20	51.02	510.22	365.90	365.90
9	Jharkhand	599.99	339.55	113.18	452.73	260.16	260.16
10	Karnataka	690.00	333.18	111.06	444.24	266.54	266.54
11	Kerala	602.08	288.21	96.07	384.28	183.76	183.76
12	M.P	12359.26	881.16	293.72	1174.88	701.07	701.07
13	Maharashtra	610.00	285.02	95.01	380.03	228.02	228.02
14	Odisha	425.00	275.63	91.87	367.50	220.50	220.50
16	Rajasthan	400.03	291.03	97.01	388.04	205.09	205.09
18	Telangana	400.00	200.91	66.97	267.88	160.73	160.73
19	U.P.	355.32	272.95	90.98	363.93	218.36	218.36
20	Uttarakhand	959.20	422.98	47.00	469.98	332.57	332.57
21	West Bengal	400.00	232.30	77.43	309.73	115.46	115.46
Total		**25389.83**	**5451.79**	**1621.22**	**7073.01**	**4169.39**	**4169.39**
23	Arunachal Pradesh	830.41	290.49	32.27	322.76	219.59	219.59
26	Mizoram	570.00	320.34	35.59	355.93	256.27	256.27
27	Nagaland	881.45	281.41	31.27	312.68	225.13	225.13
28	Sikkim	997.53	354.76	39.41	394.17	283.81	283.81
29	Tripura	1362.95	327.60	36.40	364	243.84	243.84
Total		**4642.34**	**1574.6**	**174.94**	**1749.54**	**1228.64**	**1228.64**
Union Territories							
31	Chandigarh	204.5	76.07	25.35	101.42	42.00	42.00
Total		**204.50**	**76.07**	**25.35**	**101.42**	**42.00**	**42.00**
Grand total		**30236.67**	**7102.46**	**1821.51**	**8923.97**	**5440.03**	**5440.03**

expenditure of ₹5440.03 incurred upto 31.12.2014.

Wildlife Conservation

In the Wildlife Division of the Ministry, the Additional Director General of Forests (WL) and Director, Wildlife Preservation is the head of the Wildlife Wing. The Wildlife Wing has two Divisions, namely, Project Elephant Division and Wildlife Division, each headed by an officer in the rank of Inspector General of Forests. A Deputy Inspector General of Forest (Wildlife) and an Assistant Inspector General and Joint Director (Wildlife) provide administrative and technical support to the Wildlife Wing. In addition, there are three autonomous bodies, Wildlife Institute of India (WII) for wildlife research & training, Central Zoo Authority (CZA) for conservation and zoo management and National Tiger Conservation Authority (NTCA). The NTCA has been constituted by converting the Project Tiger Directorate into an autonomous body for tiger conservation. The National Zoological Park in the capital is also a part of the Wildlife wing of the Ministry of Environment, Forests & Climate Change.

Integrated Development of Wildlife Habitats

The Protected Area network in India comprises 670 Protected Areas (102 National Parks, 517 Wildlife Sanctuaries, 47 Conservation Reserves and 4 Community Reserves). Apart from providing support to Protected Areas, 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.

Eligibility criteria and pattern of funding for the various component of the Scheme

Support to Protected Areas (PAs)

- Eligible PAs: National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves, other than those availing central assistance under the CSS- Project Tiger, which are duly notified under the Wildlife (Protection) Act, 1972 and are under the control of the Chief Wildlife Wardens.
- Pattern of funding: 100% central assistance is provided for non-recurring items and 50% assistance for recurring items. Areas falling in mountain regions, coastal zones, deserts, or those areas which support certain selected endangered species, are eligible for 100% central assistance for both recurring and non-recurring items.

Protection of Wildlife outside Protected Areas

There is substantial wildlife and natural resources lying outside the Protected Areas network of India. This component seeks to support the conservation of wildlife in these areas.

- **Eligible areas:** High value biodiversity areas outside PAs. Areas contiguous to PAs/corridors are given priority. The Chief Wildlife Wardens prepare a Biodiversity Conservation Plan for such selected area.
- **Pattern of funding:** Same as in the case of PAs.

Recovery programme for critically endangered species and habitats

This component is for affecting the recovery of critically endangered species in the country. Initially 16 species have been identified under this component. These are Snow Leopard, Bustard (including Floricans), Dolphin, Hangul, Nilgiri Tahr, Marine Turtles, Dugongs, Edible Nest Swiftlet, Asian Wild Buffalo, Nicobar Megapode, Manipur Brow-antlered Deer, Vultures, Malabar Civet, Indian Rhinoceros, Asiatic Lion, Swamp Deer and Jerdon's Courser.

The Director, Wildlife Preservation, Government of India, in consultation with the Wildlife Institute of India or the relevant scientific institute and with the approval of the Standing Committee of the NBWL can initiate other recovery programmes or wind up an ongoing programme.

- **Pattern of funding:** 100% assistance is provided for both non-recurring and recurring items. Each recovery programme has to be based on a comprehensive and scientific 'Recovery Plan'. The Chief Wildlife Wardens of the concerned States (if the species range is in more than one State), shall jointly prepare the Recovery Plan with the help of a national scientific institute/organization of repute.

  In all the above cases the areas falling in the high mountainous, snow clad regions (where working season is limited to a few months) in the States of Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Sikkim, the central assistance is given in one installment. For other States, the approved allocation is released in two installments (80 percent as first installment and balance as second installment).

Human-animal conflict

The incident of human-animal conflict has increased considerably. The increase is due to various reasons. Important among them are increase in wild animal population, fragmentation of habitats, non availability of food and water in the habitat due to degradation, disturbance in the corridors due to developmental activities, change in cropping pattern, increase in human populations etc. Various other reasons include adaptability of certain animals like leopard, monkey, nilgai, bear etc which allow them to live successfully close to human habitation.

The Ministry has been providing financial assistance to the State/UT Governments under various Centrally Sponsored Schemes like 'Integrated Development of Wildlife Habitats', 'Project Tiger' and 'Project Elephant' for management of wildlife and its habitats in the country which also includes activities to mitigate man-animal conflict. As an additional

measure Ministry has also directed the States to use the power of Wild Life (Protection) Act, 1972 for mitigation of such conflicts.

CS - Strengthening of Wildlife Division and Consultancies for Special Tasks

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

Wildlife Crime Control Bureau (WCCB)

India is one of the mega bio-diverse countries of the world and is a prime target of organized illegal international trade in wildlife and wildlife parts/derivatives. Wild Life (Protection) Act, 1972, is the umbrella legislation for wildlife conservation and protection in the country. The implementation of the provisions of the Act is done by States mainly through forest & wildlife departments and police department. However, due to inadequate infrastructure in the States for combating organized wildlife crime and also keeping in view the inter-state and international ramification of the crimes, Wildlife Crime Control Bureau (WCCB) was constituted by Government of India under the Ministry of Environment and Forests, as a sub – component of the ongoing Central Scheme 'Strengthening of Wildlife Divisions and Consultancies for Special Tasks'; to complement the efforts of the State agencies and coordinate the actions of central & state agencies in enforcement of the provisions of the Act.

Establishment and Mandate

The Wild Life Crime Control Bureau (WCCB) was constituted by Government of India on 6th June, 2007 under Section 38 Y of the Wild Life (Protection) Act, 1972, and it became operation in the year 2008. The Bureau has been envisaged as a multi-disciplinary body with officials from Police, Forest/ WL, Customs and other intelligence & enforcement agencies.

The Bureau is headed Ex-Officio by the Director, Wild Life Preservation, Govt. of India i.e. the ADG (WL); and its day to day operational activities are looked after by a police officer designated as Additional Director in the rank of IGP. The Bureau has its headquarters at Delhi, five regional offices at Delhi, Kolkata, Mumbai, Chennai and Jabalpur; three sub-regional offices at Guwahati, Amritsar and Cochin; and five Border Units at Moreh, Nathula, Motihari, Gorakhpur & Ramanathapuram.

Fig-15. *Seizure of nine otter skins at Baddi, Himachal Pradesh*

Achievements

The key objectives, success indicators and target set for Wildlife Crime Control Bureau for the FY 2014–15, under Results – framework document (RFD); and the achievements under the set targets are given in Table-8.

Table-8. Targets and achievements made under Wildlife Crime Control Bureau

S.N.	Objective	Weight	Success Indicator	Target	Achievement
1.	To detect violation of Wildlife (Protection) Act,1972 including detections of violations under CITES, WLP Act and FTP at exit points.	0.10	No. of Cases detected including detections of violations under CITES, WLP Act and FTP at exit points.	170	204
2.	To develop effective intelligence network	0.15	No. of alerts/ advisories/ actionable intelligence inputs	45	35
3.	To delineate organized syndicates working in wildlife	0.15	No. of wildlife criminals apprehended and dossiers prepared	40	52 & 151
4.	To assist in investigation of organized wildlife crime	0.10	No. of cases in which assistance rendered	21	35
5.	Capacity building of central and State agencies	0.10	No. of officers and staff of other agencies trained	450	450
6.	To conduct coordination meetings with other agencies to discuss wildlife crime issues	0.10	No. of inter – agency coordination meetings conducted	9	6
7.	To provide assistance in prosecution of important wildlife cases	0.10	No. of cases monitored and assisted during trial	15	17
8.	To conduct sensitization / awareness programmes for PRIs	0.05	No. of programmes conducted	30	28
9.	To conduct joint operations with other enforcement agencies against wildlife criminals	0.10	Number of Joint Operations conducted	15	37
10.	To conduct sensitization/ education programmes for other government agencies	0.05	No. of Programmes conducted	35	53

Project Elephant

Project Elephant (PE) was launched by the Government of India in the year 1991-92 as a Centrally Sponsored Scheme with following objectives:

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

Fig-16. *The Asian or Asiatic elephant (Elephas maximus indicus) is the only living species of the genus Elephas*

Financial and technical support is being provided to major elephant bearing States in the country. The Project is being mainly implemented in 16 States / UTs , viz. Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Odhisa, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh and West Bengal.

Important Initiatives taken during the year

- Steering Committee meeting of the Project Elephant was held on 17th December, 2014 at parliament House after a gap of more than Four years. Many important decisions concerning Elephant Reserves, Estimation and Distribution of Elephant Population, Welfare of Captive Elephant etc was taken during the meeting.
- For the first time in the history of Project Elephant Division Consultative Committee Members of Parliament take up the subject for discussion in its meeting at Project Elephant. The meeting was held on 04.01.2015 at Bandipur National Park, Karnataka.
- The issue of illicit trade of captive elephants from and to Nepal was taken up directly with Director General, Department of National Parks and Wildlife Conservation, Government of Nepal.
- The issue of illegal trade of wild animals/ birds including elephants at 'Sonepur Mela' where taken up with Hon'ble Chief Minister, Bihar.

Elephant Rescue Centre/ Rehabilitation Centre

Management of Captive Elephants is one of the main target in Project Elephant (PE) Division during 12th Five Year Plan. Even major initiatives are to be taken for establishment and maintenance/ strengthening of the existing Elephant Rehabilitation Centres. At present, Odisha, Haryana, Kerala and Tamil Nadu are having Elephant Rehabilitation Centres which are being funded by MoEFCC under PE Scheme.

Estimation of Wild Elephants

All India estimation of wild elephant population is done every five years. The trend of last five estimations clearly indicates increase in population of wild elephants in the country. The estimated populations of the elephants is being compiled by the different states.

Elephant Reserves

With the notification of Badalkhol-Tamorpingla in Chhattisgarh in the year 2011, the total number of Elephant Reserves (ERs) in the country has become 28 where as permission for two more Elephant Reserves such as Lemru in Chhattisgarh and Khasi Elephant Reserve in Meghalaya have been accorded by the Ministry and not been notified by the States so far. The area would be extended to about 61830 sq.km.

Table-9. State-wise status of amount spent under Project Elephant during 2014-15 (upto 27.01.2015)

Sl. No.	State	Proposed	Tentative	Approved	Unspent Balance	1st Installment	Additional proposal	2nd Installment
1	Andhra Pradesh	218.00	15.51	18.257	1.082	13.523		
2	Arunachal Pradesh	87.33	88.20	88.45	1.79	68.97	28.744	
3	Assam	452.51	295.83	295.83	Nil	236.664		
4	Chhattisgarh	200.00	49.74	59.992	4.192	43.7456		
5	Jharkhand	114.639	110.80	113.339	12.32	88.4256		
6	Karnataka	391.00	278.01	280.672	55.353	169.1846		
7	Kerala	414.08	299.89	300.65	3.80	236.72		
8	Maharashtra	60.00	9.63	10.00	0.002	7.998	30.204	
9	Meghalaya	226.06	118.84	118.842	0.002	95.07		
10	Nagaland	91.495	17.96	17.77	Nil	14.216	27.0432	3.554
11	Odisha	170.08	171.82	170.08	16.73	119.334		34.016
12	Tamil Nadu	552.94	250.19	250.91	0.72	200.008	51.20	
13	Tripura	105.15	6.03	10.58	4.55	3.914		
14	Uttar Pradesh	392.01	25.69	25.69	19.24	5.16		
15	Uttarakhand	596.18	150.12	150.12	16.188	103.908		
16	West Bengal	267.254	103.67	107.30	4.69	81.15	22.664	
	Total				140.659	1487.9908	159.8552	37.570

Central Zoo Authority

The Central Zoo Authority (CZA) with its headquarters in New Delhi was established in 1992 under the provisions of the Wild Life (Protection) Act, 1972 to oversee the functioning of zoos in the country with the view to enhance their role in conservation. Central Zoo Authority is a twelve- Member body. Minister of State (IC), Environment & Forests, Government of India is the ex-officio Chairman of the Central Zoo Authority and Member Secretary, Central Zoo Authority is the Chief Executive Officer of the Authority.

Fig-17. *Saltwater crocodile (Crocodylus porosus), Sundarban West Bengal*

Evaluation of zoos

The Central Zoo Authority evaluated in total of 46 (large, small and mini zoos, rescue centre and circuses) as on 15.01.2015. Apart from this Mid-term evaluation of 1 zoo was also done.

Recognition/ de-recognition of zoos

The Central Zoo Authority granted recognition in total of 16 zoos/deer parks/ rescue centre and 1 circus as on 15.01.2015. No further recognition was granted to 7 circuses. There are 192 recognized zoos (included Circuses) in the country.

Conservation Breeding Programme

The Central Zoo Authority is coordinating planned Conservation Breeding Programme of 73 identified critically endangered wild animal species in Indian zoos. CZA has prioritized 26 endangered animal species of total 73 identified species and already launched the programme for 23 animal species.

Target is to have at least 100 properly bred and genetically, physically and behaviorally healthy individuals of each targeted species in captivity in India for proper display and as insurance for future exigencies & ultimately release back to wild.

During the year the CZA has organised Coordination Meeting for Conservation breeding programme of Vultures, Snow Leopard, Lion tailed Macaque and One Horned Rhinoceros on 28.01.2014, 06.06.2014, 08.08.2014 and 27.08.2014 respectively.

Exchange/Transfer of animals by zoos

Thirty four exchange proposals of animals between Indian Zoos and 8 exchange proposals between Indian and Foreign Zoos have been approved by the Authority as on 15.01.2015. Three exchange proposals have not been approved by the authority.

Theme/ Planning in zoos

The Central Zoo Authority is assisting recognized zoos in finalization of Master Plans for detailed long-term future development. The Central Zoo Authority has received

166 detailed Master (Layout) Plans as on 15.01.2015. The CZA is also reviewing the previously granted approved Master (layout) Plans of Zoos and Master Plan of the Zoos to ensure the more insight of CZA for better development of the zoos.

During the current financial year, CZA has approved Master (Layout) Plans of the 6 Zoos and Master Plan of 9 Zoos.

Human Resource Development

During the current financial year, the CZA had organized following training programme for the human resource development in the zoos:

- The Central Zoo Authority in collaboration with Wildlife Institute of India, Dehradun organized a workshop on "Master Planning on Zoo Education" during 15-18th Dec, 2014 for Zoo Education Curators/ Zoo Directors/ Deputy Directors/Biologist working in various Indian Zoos. Altogether 20 officials across country participated in the workshop.
- The Central Zoo Authority sponsored Sh. Chandan K. Bora, Director, Assam State Zoo, Guwahati and Dr. Ajay Kumar, Veterinary Officer, Bhawgan Birsa Biological Park, Ranchi for attending the Endangered Species Recovery Course organized by the Durrell Wildlife Conservation Trust, Jersey, UK during 14th - 25th July, 2014.
- The Central Zoo Authority provided financial assistance to zoos to organize one week training programme at Sepahijala Zoological Park, Agartala; Jaipur Zoo, Jaipur; Sri Venkateswara Zoological Park, Tirupati, Kanpur Zoological Park, Kanpur; Dhauladhar Nature Park, Gopalpur and Nandankanan Biological Park, Bhubaneswar for the zoo keepers working in various zoos in India on regional basis. The theme of the workshop is "Management of wild animals in captivity with special focus on Biodiversity Conservation or Nutritional enrichment".

Research & Publication

The Central Zoo Authority has granted ₹ 46.20 lakhs for carry out the research activities to "National Referral Centre on Wildlife Healthcare" at Indian Veterinary Research Institute (IVRI), Bareilly. A small grant research project of ₹ 2.00 lakhs on Surveillance of Diseases of Native Wild animals was awarded to Kamla Nehru Prani Sangrahalaya, Indore for duration of two year. The Wildlife Institute of India has been compiling and updating the studbooks for 34 endangered animal species.

The Central Zoo Authority has approved the financial assistance for the following books/ manuals to be distributed among the participants of Annual meeting of Conservation Breeding Specialist Group (CBSG) and Annual Conference of World Association of Zoos and Aquarium (WAZA)-2014 held at New Delhi on 30th October -2nd November 2014 and during 2nd-6th November, 2014 respectively. The books/manuals has been released and circulated among the participants.

- The Indian Zoo Year Book.
- Two Decades of Conservation Breeding.
- Enclosure Designing for Indian Zoos.

– Zoo's Print.

Besides this during the current financial year the Central Zoo Authority has published the following publications:

– Calendar for the year 2015 on "Biodiversity Is Us" which has been widely appreciated.

– The publication of revised edition of the book titled "Zoos in India-2014" incorporating legislation policy, Guidelines and Strategies.

– The Central Zoo Authority is regularly publishing and distributing its quarterly newsletter "Ex-situ Updates" among zoos. During the current financial year the Central Zoo Authority had published and distributed 2 issues of scheduled Vol. 3.

– The Annual "Inventory of animals in Indian Zoos 2013-14" is being printed.

– The Central Zoo Authority has published and distributed the brochure among the concern zoos and other organisations/ Institutes.

Improvement of zoos

The Central Zoo Authority convened meeting of the Technical Committee during the current financial year on 1st July, 2014 (70th Meeting) , 2nd September, 2014 (71st Meeting) and 12th December, 2014 (72nd Meeting) to discuss the proposal on improvement in zoos, conservation breeding programme, research and trainings, and approval of master plan apart from the other policy level issues.

The Expert Group on zoo designing convened its meeting on 5th June 2014 (51st Meeting), 1st July, 2014 (52nd Meeting), 11th August 2014 (53rd Meeting), 29th August, 2014 (54th Meeting), 11th September, 2014 (55th Meeting), 8th October, 2014 (56th Meeting), and 9th December, 2014 (57th Meeting) to approve the design of the enclosures to be constructed in Indian zoos and to recommend the approval of master lay out plan of the zoos.

The 27th Meeting of the Central Zoo Authority was held on 12th September,2014 at Indira Paryavaran Bhawan, Jor Bagh, New Delhi, under the chairmanship of Shri Prakash Javadekar, Hon'ble Minister of State (IC), Ministry of Environment, Forests and Climate Change, Government of India and Chairperson, Central Zoo Authority.

The meeting on the elephants in circuses was held on 4 July 2014, under the Chairmanship of Sh. B. S. Bonal, Member Secretary, Central Zoo Authority.

Other activities carried out during the year

The Central Zoo Authority has completed the digitization of official files and record. The National Informatics Centre (NIC) had developed a web based recognition module duly inaugurated by the Hon'ble Minister of State (I/C), MoEFCC

International Relations

– The Central Zoo Authority has signed a Memorandum of Understanding (MoU) with International Species Information System, USA for providing animal record keeping softwares and training to various Indian Zoos dated 07.09.2014.

– The Central Zoo Authority has signed a Memorandum of Understanding (MoU) with Prague Zoo, Czech Republic for Capacity building in the areas of zoo management, animal management, stud book management, veterinary wildlife medicine and scientific training etc dated 09.01.2015.

– The Central Zoo Authority has successfully hosted and organized Annual Meeting of Conservation Breeding Specialist Group (CBSG) and Annual Conference of World Association of Zoos and Aquariums (WAZA)-2014 at New Delhi during 30th October-2nd November, 2014 and 2nd-6th November, 2014 respectively. More than 200 foreign Participants and 60 Indian Participants attended the conference.

National Tiger Conservation Authority (NTCA)

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".

Achievements

Present status of tiger, co-predators, prey and habitat

The third countrywide assessment of the status of tigers, co-predators and their prey has been released in January, 2015. This assessment of 2014 is the third such countrywide assessment using the refined methodology as recommended by the Tiger Task Force. The findings indicate a countrywide 30% increase in tiger numbers in 2014 with an estimated number of 2226 (range 1945-2491). The 2010 estimation was 1706 (1520-1909 tigers). The 2006 estimation was 1411 (1165-1657 tigers).

The total number of tigers (>1.5 years of age) estimated in India in 2014 is 2226 (1945-2491). The details are given in Table-10.

Independent assessment of Tiger Reserves based on IUCN criteria, as adapted to our conditions, was done for the first time in 2005-06 for 28 tiger reserves. This assessment was peer reviewed by IUCN experts. Both assessment as well as peer review reports were placed in the Parliament. The second round of independent assessment based on refined criteria has been done in 2010-11 for 39 tiger reserves. This is also based on the globally used framework, as adapted to our conditions. In all, five independent teams conducted the evaluation using 30 indicators. The framework consisted of 6 elements: context, planning, inputs, process, outputs and outcomes. The 3rd round of independent Management Effectiveness Evaluation of Tiger Reserves has been done in 43 tiger reserves situated in 17 States. Altogether, 17 tiger reserves has been rated as very good, 16 as good and 10 tiger reserves as fair.

Economic Valuation of Tiger Reserves

The Economic Valuation of Tiger Reserves is first of its kind study in the world, done in collaboration with the IIFM. The tiger reserves provide lot of benefits to the society and many are intangible in nature. This study provides an assessment of economic benefits from tiger reserves across a range of tiger

Table-10. The total number of tigers (>1.5 years of age) estimated in India

State	Tiger Population		
	2006	2010	2014
Shivalik-Gangetic Plain Landscape Complex			
Uttarakhand	178 (161-195)	227 (199-256)	340
Uttar Pradesh	109 (91-127)	118 (113-124)	117
Bihar	10 (7-13)	8 (-)	28
Shivalik Gangetic	**297 (259-335)**	**353 (320-388)**	**485 (427-543)**
Central Indian Landscape Complex and Eastern Ghats Landscape Complex			
Andhra Pradesh (including Telangana)	95 (84-107)	72 (65-79)	68
Chhattisgarh	26 (23-28)	26 (24-27)	46
Madhya Pradesh	300 (236-364)	257 (213-301)	308*
Maharashtra	103 (76-131)	169 (155-183)	190
Odisha	45 (37-53)	32 (20-44)	28
Rajasthan	32 (30-35)	36 (35-37)	45
Jharkhand	-	10 (6-14)	3+
Central India	**601 (486-718)**	**601 (518-685)**	**688 (596-780)**
Western Ghats Landscape Complex			
Karnataka	290 (241-339)	300 (280-320)	406
Kerala	46 (39-53)	71 (67-75)	136
Tamil Nadu	76 (56-95)	163 (153-173)	229
Goa	-	-	5
Western Ghats	**402 (336-487)**	**534 (500-568)**	**776 (685-861)**
North Eastern Hills and Brahmaputra Flood Plains			
Assam	70 (60-80)	143 (113-173)	167
Arunachal Pradesh	14 (12-18)	-	28♣
Mizoram	6 (4-8)	5	3+
North West Bengal	10 (8-12)	-	3
North East Hills, and Brahmaputra	**100 (84-118)**	**148 (118-178)**	**201 (174-212)**
Sunderbans	-	70 (64-90)	76 (92-96)
TOTAL	**1411 (1165-1657)**	**1706 (1520-1909)**	**2226 (1945-2491)**

+ From scat DNA
♣ From camera trap data and scat DNA

Management Effectiveness Evaluation of Tiger Reserves

Fig-18. *The tiger (Panthera tigris) is the largest cat species*

landscape in India. While a large proportion of benefits that these tiger reserves provide are difficult to estimate, the study provides quantitative and qualitative estimates of those benefits which manifest the important but unaccounted national and global contribution of these tiger reserves. These findings provide adequate justification for enhanced investment in such areas which is critical to ensure continued flow of vital life-supporting ecological, economic, social and cultural services from these genetic repositories. The findings also highlight that conservation of habitats where tigers reside is perhaps as important as the number of tigers themselves. The highlights of the said study are as below:

- Study conducted in 6 tiger reserves across tiger landscapes, viz. Corbett, Kanha, Kaziranga, Periyar, Ranthambore, Sundarbans
- Qualitative and quantitative assessment of 25 ecosystem services
- Flow benefits: ₹ 8-18 billion/yr (0.5-2 lakh/ha/yr)
- Conservation of stock: ₹ 22–650 billion
- A large majority of benefits are intangible but amenable to scientific valuation
- Large benefits at national and global scale
- Investment multiplier: 200 to 530
- Assessment in for a patch of 1000 km2 in Pilibhit-Dudhwa shows its worth to the tune of ₹ 500 billion (only few costs have been taken into account)

Forest Cover Change in the Tiger Landscape of Shivalik-Gangetic Plain

The Forest Cover Change in the Tiger Landscape of Shivalik-Gangetic Plain done

in collaboration with the FSI has indicated an improvement of forest cover in core areas of tiger reserves. This finding is a useful baseline for future comparison, while indicating that investment in Project Tiger leads to overall revival of forest cover.

Animal Welfare

The Animal Welfare Board of India (AWBI)

The AWBI (Plan) scheme relates to provision of assistance for the following type of activities: financial assistance to animal welfare organisations for maintaining the stray animals in distress and for their treatment. **(financial assistance based on the number of animals kept for their fodder, water, minor treatment etc).** Human education programmes for the welfare of animals implemented by the AWBI as well as support to AWOs for this purpose. Capital expenditure at the Board's headquarters i.e. expenditure on non-recurring items such as purchase of assets/equipments. Expenditure on a variety of other animal welfare activities such as rescue of cattle from illegal smuggling and transportation, rehabilitation of rescued circus animals, Lab animals, inspections, legal expenses in connection with court cases pertaining to animal welfare, mobile clinics is also incurred.

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

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

The main objective of the above scheme in "Prevention of Cruelty to Animals Act (PCA), 1960 is to prevent infliction of unnecessary pain or suffering on animals". Accordingly, the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) was constituted under Section 15 of the Act. The Act provides for the duties and powers of the CPCSEA, and also penalties, in the event of contravention of orders made, or conditions imposed by the Committee. The mandate of the Committee is to ensure that while conducting various types of experiments, in connection with medical research or education, animals are not subjected to avoidable pain or suffering. The CPCSEA functions within the ambit of the PCA Act, and Rules framed thereunder e.g. Rules for Breeding of and Experiments on Animals (Control and Supervision), 1998 as amended from time to time.

As on date, CPCSEA has registered a total of 1797 establishments during the period from April to December, 2014, 50 new registrations and 80 renewals were done. A total of 110 Institutional Animal Ethics Committees (IAECs) were reconstituted in various establishment registered with CPCSEA during this period. A total of 10 Large Animal House Facility have been approved. 127 Research Protocols on large animals have been approved. CPCSEA has organized a National conference from 20-21 November, 2014 on Alternatives to Animal use in Experimentations at Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi. CPCSEA

(Amount in lakhs)

	Year 2014-15			Year 2015-16	
Scheme	**RE 2013-14**	**Quantifiable deliverables**	**Achievement till 31.12.2014**	**BE 2015-16**	**Quantifiable deliverables**
Animal Welfare Board of India (AWBI) Plan Scheme	800.00	700 AWOs	230 AWOs	1250.00	900-1000 AWOs
Scheme for Provision of Shelter House for Looking after the Animals	600.00	30 Shelters to be constructed	19 Shelters (38 AWOs)	750.00	33-40 Nos of Shelters
Scheme for Ambulance Services for Animals in Distress	350.00	25 Ambulances	15 Ambulances	350.00	78-85 Nos of Ambulances
Scheme for Birth Control and Immunization of stray Dogs	300.00	40000 operations	23807 Operations	400.00	90000 Operations
Scheme for Relief to Animals during natural calamities and unforeseen circumstances	10.00	Unforeseen Circumstances cannot be determined	Nil, (This fund is released only in the event of an occurrence of Natural Calamity and Unforeseen Circumstances)	30.00	Unforeseen Circumstances cannot be determined
Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA)	50.00	Cannot be fixed	50 new Registrations 80 Renewals 10 Large Animal Houses	50.00	Cannot be fixed
National Institute of Animal Welfare (NIAW)*	210.00	26 Training Courses	17 Training Courses	250.00	26 Training Programmes
Grand Total	**2320.00**			**3080.00**	

also supported Conferences and Workshops to promote awareness on Animal Ethics at Delhi, Kerala Gujarat, Uttarakhand and West Bengal.

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.

Budget

Out of the plan budget of ₹2320.00 lakh for the financial year 2014-15, amamount of ₹1078.00 lakh has been released.

Pprogress of physical achievements (upto 31.12.2014) are given in Table-11.

Table-11. *Budget allocation vis a vis progress of physical achievements (upto 31.12.2014)*

CHAPTER-3

ENVIRONMENTAL IMPACT ASSESSMENT

Environment Impact Assessment Notification 2006

The Environmental Impact Assessment has been used as a management tool to minimize adverse impacts of the developmental projects on the environment and to achieve sustainable development through timely, adequate, corrective and protective mitigation measures. The Ministry of Environment, Forests & Climate Change (MoEFCC) has used Environmental Impact Assessment (EIA) Notification 2006 as a major tool to regulate industrial development of the country for minimizing the adverse impact on environment and reversing the trends which may lead to climate change in long run.

The developmental projects have been re-categorized into category 'A' and category 'B' depending on their threshold capacity and likely pollution potential under EIA Notification of September 2006, requiring prior Environmental Clearance (EC) from MoEFCC or the concerned State Environmental Impact Assessment Authorities (SEIAAs). The notification provide for screening, scoping, public consultation and appraisal of project proposals. The notification has been amended from time to time to further streamline the Environment Clearance process.

Environmental Clearance to Developmental Projects during April–December, 2014

As per the provisions of the EIA Notification 2006, several meetings of seven sectoral Expert Appraisal Committees were convened during the year for appraisal of category "A" projects from sectors of industry, thermal power, infrastructure, river valley, mining, nuclear power and defence. 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 two hundred thirty seven projects (between April to December, 2014). The sector-wise list of environmental clearances issued to the projects by the Ministry is given in the Table-11.

Constitution of State Environment Impact Assessment Authorities (SEIAA)

The Ministry has so far constituted twenty six State/UT level Environmental Impact

Table-11. *Environmental Clearances accorded during April – December, 2014*

Sl. No.	Category of Projects	Total
1	Industry	97
2	Thermal	12
3	River Valley & Hydro-Electric	05
4	Mining (Coal)	29
5	Mining (Non-Coal)	39
6	CRZ, Infrastructure, Construction, Industrial Estates	52
7	Nuclear, Defence & Strategic Projects	03
Total		**237**

Assessment Authorities (SEIAAs) under sub-section [3] of section 3 of the Environment [Protection] Act, 1986 for approval of Environment Clearance of Category 'B' projects and activities which have been appraised by SEACs. In 2014, SEIAA/SEAC have been reconstituted in Tripura (30th January, 2014), Uttar Pradesh (25th February, 2014), Gujarat (2nd May, 2014), Karnataka (2nd May, 2014), Punjab (6th May, 2014), Madhya Pradesh (1st July, 2014), Bihar (3rd July, 2014), Andhra Pradesh (14th October, 2014), Himachal Pradesh (2nd December, 2014) and Rajasthan (24th December, 2014). Reconstitution of SEIAA/SEAC is in process in Delhi, Chhattisgarh, Daman, Diu, Nagar & Haveli, Jammu & Kashmir, Kerala, Maharashtra (SEAC-2), Mizoram etc.

Post Project Monitoring of Environment Clearance Conditions

The objectives of Post-Project Clearance Monitoring are (i) 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 (ii) 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 under EIA Notification, 2006 and Coastal Regulation Zone (CRZ), 2011 is carried out through the six regional offices. The monitoring report is scrutinized in the Ministry and on that basis appropriate action is contemplated under the Environment (Protection) Act, 1986 for violation of environmental clearance conditions.

Based on the observations made during field visit, necessary follow up action has been taken with the project proponents in respect of monitored projects to ensure an effective compliance to EC conditions. The monitoring cell in the Ministry, besides providing policy guidelines to these Regional Offices, also examines the monitoring reports submitted by Regional Offices. In cases of major non-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 the EIA Notification, 2006 based on the 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/SEACs. Till December, 2014, 375 consultant organizations have applied for the accreditation to QCI/NABET out of which 166 have been accreditated and 58 applications are under process. 151 applicants have either been not accreditated or have withdrawn their applications. MoEFCC is in the process of amending the EIA Notification, 2006 to provide this mechanism a legal cover.

Policy Reform Measures during April–December, 2014

– Due to bifurcation of Andhra Pradesh, an OM dated 13th May, 2014 has been issued indicating that In the absence of a duly constituted SEIAA or SEAC for the state of Andhra Pradesh, Category 'B' projects shall be treated as a Category 'A' projects and appraised by Expert Appraisal Committee of the respective sectors. As on today,

SEIAA/SEAC in the State of Andhra Pradesh is already constituted on 14th October, 2014 and proposal is awaited from the State of Telangana.

- A clarification has been issued on 02.06.2014 with regard to requirement of environmental clearance for "Mining of Minerals" at the time of mine renewal, under the provisions of EIA Notification, 2006. It is implied from the notification as amended in 2013, that the requirement of environment clearance shall not be applicable at the time of renewal of mining lease for all cases including pending cases if the environment clearance has already been obtained under EIA Notification, 2006.
- Vide OM dated 10.06.2014, OM dated 17.09.2013 has been kept in abeyance until further orders to the extent it related to the re-imposition of moratorium in eight CPAs till CPCB re-assess the CEPI taking into account all constituents of index as originally envisaged in 2009, subject to the following stipulations:
  - All projects requiring environment clearance in these areas will be considered only by MoEFCC.
  - At the stage of ToRs, the EAC concerned will spell out the due diligence required in terms of assessment of baseline conditions of ambient air, water bodies, etc as applicable and provide guidance on monitoring locations, parameters, etc. In doing so, in addition to pollutants to be discharged / emitted by the proposed project, the pollutants of concern in the area will also be kept in view. Assessment of performance of common facilities such as CETP, TSDF, etc. if proposed to be utilized should also be included as part of due diligence.
  - In addition to monitoring by the regional office concerned, third party monitoring by a reputed agency at a frequency to be specified by the EAC will be necessary.
  - The implementation of action plan of each of these eight CPAs will be jointly reviewed by the CPCB and SPCB on quarterly basis and report sent to MoEFCC.
- An O.M. has been issued on 10.06.2014 regarding applicability of EIA Notification, 2006 for Construction and Demolition (C&D) waste processing facility. The activity does not attract the provisions of EIA Notification, 2006.
- With a view to facilitate increase in coal production, the moratorium in Singrauli and Jharsuguda critically polluted areas (CPA) imposed in September, 2013 has been kept in abeyance vide OM dated 10.06. 2014 and has asked CPCB to re-assess CEPI score comprehensively.
- The MoEFCC has mandated on-line submission of proposals for Terms of Reference (ToR) and Environment Clearance (EC) with effect from 01.07.2014. All the TOR/EC proposals are being accepted only on-line by the Ministry with effect from 1st July 2014.
- Notification S.O. No.1599 (E) dated 25.06.2014 has been issued, amending the EIA Notification 2006, thereby delegating more powers to the State level Environment Impact Assessment Authorities (SEIAAs) for granting environment clearance and further streamlining the process.
- An OM has been issued on 25.07.2014 regarding where moratorium has been

lifted with immediate effect from the villages falling in non-Ecologically Sensitive Areas of the Talukas mentioned in OM dated 17.10.2013 except for the villages covered under PIL No. 179 of 2012 pending in the High Court of Bombay.

- The MoEFCC vide OM dated 28.07.2014 has issued guidelines for granting EC for expansion of coal mining projects involving one time production capacity expansion in the existing operation. One time capacity expansion to proposals of existing coal mining projects with production capacity exceeding 16 MTPA, the EAC may consider exempting public hearing subject to ceiling of additional production upto 5 MTPA if the transportation of additional production of coal is proposed by means of a conveyor and/or rail transport subject to satisfactory compliance with environment clearances issued in the past as judged by the EAC.
- The MoEFCC vide OM dated 11.08.2014 issued guidelines for ensuring the Corporate Social Responsibilities (CSR) while considering the proposals for grant of EC/TOR. The concerns expressed during public consultations, mitigation issues emerging from social impact assessment and Rehabilitation & Resettlement Plant (R&R), project proponents have to clearly stated in EIA/EMP Report the activity-wise cost involved (capital as well as recurring), phasing off these activities etc. the cost and timelines for various activities have to be looked into by the concerned EAC for their reasonableness and appropriate recommendations should be made for compliance from project proponent.
- The MoEFCC vide OM dated 20.08.2014 delineated the procedure for considering the developmental projects located within 10 km of national park and wildlife sanctuaries. As per the new procedure, additional ToRs as per annexure should be included while prescribing ToRs and a copy sent to Wildlife Division of the Ministry. Such ToRs will be considered by EAC and recommendations sent to Wildlife Division. After getting recommendations from the Standing Committee of NBWL, the proposal will be sent to IA Division for processing and obtaining approval under EIA /CRZ Notification, 2006 and 2011.
- Vide OM dated 22.08.2014 the MoEFCC has issued further instructions regarding validity of TORs prescribed under EIA Notification, 2006 to the project/activities for preparing EIA/EMP report before granting EC. Now, ToRs prescribed will be valid for two years except of River Valley and HEP Projects where the ToRs will be valid for three years. Validity of ToRs can be extended for another one year if applied for the same at least three months before the expiry of the validity period with proper justification. SPCB should ensure conducting public hearing within the timeline of 45 days as prescribed in EIA Notification, 2006. Public hearing held after validity period of ToRs will not be accepted by the Ministry. Further extension of validity will not be accepted and project proponent has to start the process de-novo for obtaining fresh ToRs. Baseline data older than three years will not be used in EIA/EMP and public hearing has to be conducted afresh.
- High Level Committee under the Chairmanship of Shri T.S.R. Subramanian, former Cabinet Secretary, Govt. of India has been constituted to review various acts administered by MoEFCC vide O.M. on 29.08.2014 who has submitted the report and is under discussion with various stake holders.

- An OM on dated 01.09.2014 has been issued for consideration of projects for EC based on CEPI in respect of coal mining expansion projects in Chandrapur CPA. All the existing moratorium imposed in Chandrapur CPA will remain in abeyance for one year, after which the position will be reviewed by reassessment of CEPI score and review of status of implementation of action plans subject to stipulations, viz. consideration of proposals for expansion of existing coal mines in the Ministry; no involvement of additional mine lease area; certified report from Regional Office, MoEFCC regarding compliance of EC conditions for existing mining; consideration by Expert Appraisal Committee including implementation of action plan of Chandrapur CPA prepared by Maharashtra SPCB; use of mechanically covered trucks during transportation of coal; review of action plans of Chandrapur CPA by the Chairman, Maharashtra SPCB on quarterly basis; monitoring of Chandrapur CPA by CPCB through a third party on annual basis; assessment of mercury in coal in Chandrapur area by Central Institute of Mining and Fuel Research (CIMFR) within six months and monitoring of industrial waste water, mine water and groundwater regularly.
- An OM on dated 02.09.2014 has been further issued regarding guidelines for granting EC for expansion of coal mining projects. Now, it has been decided that in respect of one time capacity expansion proposals of existing coal mining projects with production capacity exceeding 20 MTPA, the EAC may after due diligence consider exempting public hearing subject to the ceiling of additional production upto 6 MTPA if the transportation of additional production of coal is proposed by means of a conveyor and/or rail transport. The above dispensation would e subject to satisfactory compliance with environment clearances issued in the past as judged by the EAC.
- An OM on dated 25.09.2014 has been issued to ensure compliance to Environment (Protection) Amendment Rules, 2014 vide Notification dated 02.01.2014 regarding supply and use of coal with ash content not exceeding 34% to coal based thermal power plants. To ensure compliance, Ministry has asked project proponents of thermal power plants to submit compliance report, non-compliance from Regional Offices and SPCBs to the Ministry and stipulate condition for compliance in environment clearance by the EACs/SEACs.
- An OM dated 07.10.2014 has been issued clarifying the requirement of documents relating to acquisition of land w.r.t. the project site. Project proponent has to sublimit credible document to ensure the status of land acquisition w.r.t. project site when the case is brought before the concerned EAC/SEAC for appraisal. The documents may be considered as adequate by the EAC/SEAC at the time of appraisal of the case for EC, if land proposed has to be acquired through government and a copy of the preliminary notification issued by the concerned State Government indicating acquisition of land as per Land Acquisition, Rehabilitation and Resettlement Act, 2013 is submitted. If the land has to be acquired through private land owners, credible document showing the intent of the land owners to sell the land for the project is required. Submission of false, wrong, misleading information or data may lead to rejection under Clause 8 (vi) of EIA Notification, 2006.

- A Circular dated 07.10.2014 has been issued clarifying that all the conditions stipulated in the EC, both "general and specific" and for both category 'A' and category 'B' projects, should be categorised further in the EC letter in different phases of implementation, i.e. pre-construction, construction, post-construction and life of project.
- An OM dated 07.10.2014 has been issued clarifying individual projects or activities in a port viz. dredging, various construction activities etc. will not require separate EC and CRZ clearance if the port has prepared a master plan indicating all such projects or activities including time-phasing for their implementation, prepared comprehensive EIA/EMP report and has obtained EC and CRZ clearance for the whole project.
- A Circular dated 07.10.2014 has been issued advising EACs/SEACs to consider the proposal comprehensively at the scoping stage and seek information in one go from the proponent instead of revisiting the issues at the time of appraisal of the project.
- OM dated 08.10.2014 has been issued clarifying requirement of an outer limit of 5 years for the validity period of TORs for River Valley and HEP projects and 4 years for other category of projects.
- Vide circular dated 09.10.2014, the Ministry has advised all SPCB/UTPCC to not to specify additional requirements to the project proponent after granting of ToRs by the regulatory authority and conduct Public Hearing in a time-bound manner as per procedure prescribed in the EIA Notification, 2006.
- Ministry has issued an OM on 05.12.2014 directing to use of ENVIS website for appraisal of projects for environment, forest, wildlife clearance and other areas of work.
- Vide OM dated 10.12.2014, it has been clarified that the exemption from public consultation, as provided for under para 7 (i) III. Stage (3) (i) (b) of EIA Notification, 2006 is available to the projects or activities or units located within the industrial estates or parks, which were notified prior to 14.09.2006, i.e. the EIA Notification, 2006 coming into force.
- Vide draft Notification dated 11.12.2014 issued under CRZ Notification, 2011, following items have been substituted in paragraph 3 (prohibited activities):

  "(ix) Reclamation for commercial purposes such as shopping and housing complexes, hotels and entertainment activities except for construction of memorials/ monuments and allied facilities only in exceptional cases by the concerned State Government, on a case to case basis";

  (xii) Dressing or altering the sand dunes, hills, natural features including landscape change for beautification, recreation and other such purposes except utilising the rocks/hills/ natural features for development of memorials/monuments and allied facilities by the concerned State Government".

  The Ministry has also proposed vide draft Notification dated 11.12.2014, to relax the criterion for construction of memorials/ monuments and allied facilities by the concerned State Government within the CRZ-IV (A) areas in exceptional cases with adequate environmental safeguards subject to justification by the State Government in locating the project in CRZ area; recommendation of State CZMA to

MoEFCC to obtain ToRs to prepare EIA/EMP; submission of EIA/EMP, Risk Assessment Report with Disaster Management Plan; conduct of public hearing; submission of final EIA, EMP Report to the MoEFCC for the consideration of environment clearance as per ToR.

– Vide Gazette Notification dated 22.12.2014 the Ministry has enhanced built-up area from 20,000 m2 to 1,50,000 m2 built-up or covered area on all the floors including its basement and other service areas for building and construction projects and has been kept in category B requiring clearance from SEIAA/SEAC only. The Ministry has exempted the construction of industrial shed, school, college, hostels for educational institutions subject to such buildings who will ensure sustainable environment management, solid and liquid waste management, rainwater harvesting, using recycled materials such as fly ash bricks from requirement of environment clearance under EIA Notification, 2006. General conditions shall also not apply.

  All the townships and area development projects covering an area of > 50 ha and built-up area < 1,50,000 m2 shall require an EIA report and appraised as category 'B-1' project. General conditions shall also not apply.

Compendium of all Amendments/OMs/ Circulars/Orders/Notifications under EIA Notification, 2006

A Compendium of all Amendments/ OMs/Circulars/Orders/Notifications under EIA Notification, 2006 has been prepared and published for the ready reference of the project proponents, consultants, decision makers and other concerned stakeholders. This compendium will help the users in keeping their information updated on further developments in the EIA Notification, 2006 and is available on Ministry's website.

One day Workshop for on-line submission of applications for TOR/EC to SEIAAs/ SEACs

One day Workshop for on-line submission of applications for TOR/EC to SEIAAs/ SEACs, has been organised on 21.11.2014 in the MoEFCC where Chairman/Member-Secretaries of SEIAAs/SEACs, National Accreditation Board of Education & Training/ Quality Council of India (NABET/QCI), Accreditated Consultant Organisations participated in the deliberations by MoEFCC and National Informatics Centre (NIC) besides officials of MoEFCC. The Workshop was attended by more than 140 participants indicating curiosity in implementing on-line system for the benefit of all concerned stakeholders.

The Workshop was addressed by Shri Ashok Lavasa, Secretary, Shri Shashi Shekhar, Special Secretary and Shri Manoj Kumar Singh, Joint Secretary and other officials of MoEFCC. All the concerned stakeholders appreciated Ministry's initiative for organizing Workshop for on-line submission of applications for TOR/ EC to SEIAAs/SEACs.

Fig-19. *Shri Ashok Lavasa, Secretary, Shri Shashi Shekhar, Special Secretary and Shri Manoj Kumar Singh, Joint Secretary of MoEFCC at Workshop for on-line submission of applications*

CHAPTER-4

ABATEMENT OF POLLUTION

Control of Pollution

The concern for environmental quality has become the top most issue in the present scenario of rising population, increasing urbanization, industrial pollution, shipping, aviation and vehicular emission as well as pollution of water courses due to discharge of industrial effluents and sewage without conforming to the environmental norms and standards apart from agriculture run-off. To give effect to various measures and policies for pollution control, various steps have been initiated which include stringent regulations, development of environmental standards and periodical revision therein, control of vehicular, air, noise and water pollution.

Progress of Activities Undertaken under various programmes are as follows:

Control of Air Pollution

- The air quality has been an issue of social concern in the backdrop of various developmental activities. The norms for ambient air quality have been revisited and various industry specific emissions standards are evolved afresh or revisited and notified from time to time. With a view to initiate policy measures and to prepare ambient air quality management plans, 586 ambient air quality monitoring stations are operational covering 246 cities, towns and industrial areas apart from 4 villages in 28 States and 05 Union Territories. Presently, three criteria pollutants namely; sulphur dioxide (SO2), nitrogen dioxides (NO2) and fine particulate matter having size less than 10 micron (PM10) are monitored under National Ambient Air Monitoring Programme (NAMP) by the Pollution Control Boards, Pollution Control Committees, Universities and Research Institutes. Besides, additional pollutants for other toxic trace matters and polycyclic aromatic hydrocarbons are also being monitored in selected cities of the country. Installation of automatic air quality monitoring stations is undertaken in cities for continuous monitoring.

- The Government has published the Revised National Ambient Air Quality Standards, 2009 (NAAQS-2009) in the official Gazette on 16th November, 2009. These ambient air quality standards/ limits provide a legal framework for the control of air pollution and the protection of public health. Standard monitoring protocol to monitor 12 pollutants as per NAAQS has been developed.

- The monitored ambient air quality data during the year while comparing with revised (NAAQS-2009) indicates that the annual average levels of Sulphur Dioxide (SO2) are within the prescribed air quality norms across the country except in one city and that of Nitrogen Dioxide (NO2) are within norms in a majority of the cities. However, the levels of fine particulate matter (PM10) exceed the prescribed norms in many cities including Delhi. PM10 and NO2 are the emerging air pollutants.

Source Apportionment Studies

- Due to multiplicity and complexity of air polluting sources, apportionment of contribution to ambient air pollution from these sources is important for planning cost effective pollution control strategies.

In view of this, to evaluate contribution of particulate matter from various sources to air quality, Source Apportionment Studies (SAS) have been completed for six cities namely; Delhi, Bangalore, Chennai, Mumbai, Pune and Kanpur in association with the institutions like NEERI, Nagpur, TERI, New Delhi, IIT, Chennai, ARAI, Pune and IIT, Kanpur. The objective frame work for Source Apportionment Studies included preparation of emission inventory, emission profile, monitoring of ambient air quality, assessment of data and its authentication and source apportionment of PM10 using factor analysis and receptor modeling etc. Application of Chemical Mass Balance (CMB-8) Receptor model and ISC dispersion model have been used in the study.

- The results of the Study, so obtained were evaluated by the Technical Committee. International Peer Review of the study has been organized in Spain, Germany (through gtZ) and within the country, since such source apportionment studies have been carried out for the first time in India and the outcome of this Study would be used for future policy decisions such as Auto Fuel Policy.
- At national level, thematic Ministries have been requested to set up six working groups to deal with the sectoral recommendations of the study which would be housed in the respective thematic Ministries like Road Transport & Highways, Petroleum & Natural Gas, Heavy Industries, Commerce & Industry, Home Affairs & Urban Development.
- In case of six cities, respective State Governments have been requested to set up local Implementation Committee comprising various stakeholders viz. municipal corporation, development authorities, RTO, SPCB, etc. to oversee implementation of city-specific action plans. Wherever such Committees or Authorities are functional, the study findings could supplement their efforts. The local Committees may also address biomass. garbage/refuse burning and other city-specific sources.

Emissions Trading Scheme

- Emission of particulate matter (PM) which accounts for PM10 and PM2.5 in ambient air presents a particularly severe challenge for meeting NAAQS standards in India today. The concentration of particulate matter in Tamil Nadu, Maharashtra and Gujarat is higher than the norms prescribed in NAAQS-2009.
- It is felt that the market based approaches to control environmental quality have the potential to deliver desired environmental outcomes at the lowest social cost. This increases the ability of all stakeholders to participate and comply and improves regulatory effectiveness. The Ministry of Environment, Forests and Climate Change in association with the Central Pollution Control Board(CPCB) and the State Pollution Control Boards (SPCBs) of Gujarat, Maharashtra and Tamil Nadu, has undertaken a pilot programme to design a particulate emissions trading regulatory regime for industry. It's first phase has been completed. Second phase of the study is under progress.

Development of Environmental Standards

- In order to abate pollution from various sources, Ministry notifies general as well as industry specific emission and effluent standards for various categories of industries under the Environment (Protection) Rules, 1986 as per procedure specified in the Environmental (Protection) Act, 1986. Based on development of new pollution control technologies and their feasibility, these standards are revisited from time to time and new/revised ones are notified.
- The Ministry has constituted an Expert Committee (EC) to evolve Environmental Standards and Consequent upon the adoption of the National Environment Policy-2006 (para 5.3 : Environmental Standards, Management Systems, Certification and Indicators), the said Committee has been reconstituted. 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.
- 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 Generators (LPG and CNG);
- Emission Standards for Generators (Diesel and CNG);
- Emission Standards for Generators (Petrol + LPG/CNG);
- Effluent & Emission Standards for Fertilizer Industry,
- Effluent & Emission Standards Automobile Service Station, Bus Depot and Workshop

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

Effluent & Emission Standards

- Dye and Dyes Intermediates Industry (07.05.2014)
- Cement Plant (25.08.2014)

Emission Standards

- Generators (Diesel): extension for small desel gensets (11.11.2014 & 17.02.2015)
- Generators (Diesel): exemption for 20 gensets for defence purposes (23.01.2015)

Noise Pollution

- Keeping in view the increasing trend in noise levels, Ministry has issued various regulations from time to time to control noise pollution in ambient air, at source and at manufacturing stage. To control community noise, Noise Pollution (Regulation and Control) Rules, 2000 were notified in February, 2000 and amended from time to time. The recent amendments have been published on

11th January, 2010. A bilingual booklet has been brought out on Noise Pollution (Regulation and Control) Rules, 2000 by incorporating all amendments for creating mass awareness.

– First phase of National Ambient Noise Monitoring Network has been commissioned in accordance with NEP-2006 during the year in eight cities, namely, Delhi, Lucknow, Bengaluru, Kolkata, Hyderabad, Chennai, Mumbai and Navi Mumbai by commissioning 35 stations during 2014-15, making it 70 stations to monitor ambient noise on 24 X 7 basis.

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 ₹ 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 (2014-15), an allocation of ₹ 5.35 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 ₹ 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.

Fig-20. *Emissions released directly into the atmosphere from the tailpipes of cars and trucks are the primary source of vehicular pollution*

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

– The Ministry has been implementing a programme for recognition of environmental laboratories with the aim of increasing facilities for analysis of environmental samples.

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

– During the year, private sector Labs were visited for considering recognition under E(P)A, 1986 by the Regional Office of MoEFCC. Fourteen (14)Laboratories were recommended for recognition under E(P) Act, 1986 during the year.

Fig-21. *Demoiselle Crane (Grus Virgo) with sparkling red cornea and black iris at Tal Chhapar Wildlife Sanctuary*

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.

An Apex Committee was constituted on 1st June 2012 to address Environment and Health related issues. The first meeting of Apex Committee was held on 30th July 2012.The tenure of the Apex Committee is for three years. A Working Group on Environment Health also constituted on 1st June 2012 .The Working Group will meet at least twice in each year. The tenure of the Working Group is for three years. The first meeting of Working Group on Environment Health was held on 29th November 2012 and second meeting on 28th January 2014 in the Ministry under the Chairmanship of Advisor to Director General, National Institute for Research in Environment Health (NIREH), Bhopal & Scientist'G' of ICMR, New Delhi and on its recommendation, Expert Group constituted to evaluate the 45 proposals received in Environmental Health Cell on 13th June, 2014. The Expert group in its Meeting held on 23rd June, 2014, segregated these proposals, of these 12 no. pertains to ICMR and 17 no. pertains to MoEFCC

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.

- During this year (2014-15), an allocation of ₹ 9.00 crore in the BE was made for providing financial assistance to the on-going CETP projects. The expenditure in the CFY so far is ₹ 8.40 crore. Financial assistance was provided for the ongoing projects of CETPs at Palsana and new Palsana, Surat, Gujarat.

- The approved outlay for XII Five Year Plan for the scheme of CETPs is ₹ 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 ₹ 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.

- The TTZ Authority has been extended up to 31.12.2015 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. At present, only a token of ₹ one lakh is available under the scheme.

Central Pollution Control Board (CPCB)

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

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

CPCB's Activities

Standard Development

- **Effluent and Emission standards for Dyes and Dye Intermediate**

  The Environmental Standards for Dye and Dye Intermediate Industries have been recommended by the Expert Committee of MoEFCC for notification under under the Environment (Protection) Rules, 1986. The standards have been notified on 07.05.2014.

- **Environmental Standards for Fertiliser Industry**

  The approved standards by Peer and Core Committee were discussed in the 164th board meeting held on January 21, 2014. The new standards aim at harmonization of earlier standards. The standards got approved by the Board and forwarded

to MoEFCC for discussions in Expert Committee to evolve Environmental Standards in MoEFCC.

– **Environmental Standard of Man-made Fiber Industry**

Revision of emission standards for carbon disulphide (CS2) and hydrogen sulphide (H2S) is solicited by Association of Manmade Fibre Industry for new and expansion projects due to non-availability of desirable cost effective technologies to meet the existing emission norms for CS2 and H2S. The existing Comprehensive Industry Document (COINDS), first prepared in 1979-80 for liquid effluents in Manmade Fibre Industry and first COINDs document of CPCB.

The study has been completed and proposed standards were approved in the peer & core meeting & CPCB Board meeting & have been sent to Ministry for putting up in the Expert Committee meeting.

Preparation of Comprehensive Industry Document,

– **Development of Emission and Effluent Standards for Single Super Phosphate Plants:**

Single Super Phosphate (SSP) Fertilizer Industry is emerging fertilizer industry in the country and is a highly demanded fertilizer mostly used at the time of preparation of land. It comprises of 16% water soluble phosphate which is readily accepted by the crops. The fertilizer effectiveness of SSP remains unquestioned. In fact, it has become a standard of comparison for other fertilizer. SSP is a straight phosphatic multi-nutrient fertilizer which contains 16% water soluble P2O5, 12% sulphur, 21% calcium and some other essential micro nutrients in small proportions.

– **Preparation of Comprehensive Industry Document and the Status of Paint Industry**

Paints constitute a mixture solvents, binders, pigments and additives. The raw materials used in the manufacturing of paint are organic chemicals, solvents, heavy metal based pigments or complex resins which results in air emissions (VOC & dust), wastewater and solid waste / sludge (containing heavy metals & toxic organic chemicals).

The proposed standards were approved in the peer & core meeting & CPCB Board meeting & have been sent to Ministry for putting up in the Expert Committee meeting.

– **Preparation of Comprehensive Industry Document and the Status of Pesticide Industry**

Comprehensive Industrial Document (COINDS) for Pesticide Industry was prepared in 1985-86 and revised during 1988-89. Further, status of pesticide Industry was prepared in the year 1993-94. The existing document therefore needs to be upgraded to include new and developing technologies and their efficacy to treat various pollutants, also to include status of pesticide industries.

– **Development of Emission Standards & Preparation of Comprehensive Document (COINDS)for Pharmaceutical sector**

The existing document therefore needs to be upgraded to include new and developing technologies and their efficacy to treat various pollutants, also to include status of Pharmaceutical industries.

The revision of COINDS is required to include the status of pharmaceutical industries with production details of different types of bulk drugs with therapeutic use, number of units and their locations, type of pharmaceuticals and process adopted, Best treatment technologies available, by- product recovery / utilization, solvent recovery, type and source of emissions from processes, BAT for control of emission, Cost of Treatment both for waste water as well as emission etc.

Water Quality Status in Delhi Stretch of Yamuna River in the year 2014

Central Pollution Control Board is regularly monitoring about 40 km. long Delhi stretch of Yamuna River from Pall to downstream of Okhla barrage at 4 locations. Water quality status of the river in this studied stretch of river during the last five years is depicted in Figure 1 – 4. The values of Dissolved Oxygen (DO) observed during the first ten months of 2014 reflect that the level of this parameter was well above the prescribed limit 0f 4.0 mg/l at Palla and is in the range from 6.4 – 11.0 mg/l with annual mean of 9.0 mg/l. DO in the river depletes significantly after Wazirabad barrage and remain critical in remaining part of the studied river stretch. The value of this parameter from Wazirabad D/s to Okhla barrage D/s (after joining Shahdara drain) was observed in the range of 0.3 – 3.0 mg/ l which reflects that DO is always violating the prescribed standard (4.0/5.0 mg/l) in this river stretch. In the first three locations annual average values of DO are almost same as observed in the year 2013. However, at Okhla D/s significant depletion in DO is observed as compared to 2013. Bio-chemical Oxygen Demand (BOD) at Palla generally meets the prescribed standards of 3 mg/l and was found in the range of 1 – 5 mg/l with annual average of 3 mg/l. At Okhla D/s BOD values were found well above the limit (9 – 79 mg/l) and its annual average was 40.0 mg/l. At remaining two locations i.e. Nizamuddinbridge and Okhla at KalindiKunj where BOD is not a criteria parameter, its values were found in the range of 4 – 37 mg/l. The variation in annual average of BOD values from 2013 is same as observed for DO. Total Coliform (TC) was observed meeting the standard of 5000 MPN/100 ml at Palla on five rounds of study out of total ten rounds and its values were ranged between 450 - 43000 MPN/100 ml. At Okhla D/s TC with significantly high counts i.e. 450000 – 17000000 MPN/100 ml always found violating prescribed standard of 500 MPN/100 ml. At Nizamuddin bridge and Okhla at KalindiKunj where TC is not a criteria parameter, its vales are in the range of 330000-170000000 MPN/100 ml. Comparing to the annual average values as observed in the year 2013 except Palla in all other locations TC reflects increasing trends. Free ammonia (NH3) which is a criteria parameter for two locations i.e. Nizamuddinbridge and Okhla at KalindiKunj and is found exceeding the prescribed limit of 1.2 mg/l except once at Nizamuddin bridge. The annual average of this parameter at Nizamuddin bridge and Okhla at KalindiKunj parameter is 9.5 mg/l and 9.9 mg/l. at Palla free ammonia is in the range of 0.2-1.8 mg/l, whereas, at okhla

D/s it is in the range of 2.0-33.1 mg/l. Free ammonia is showing increasing trend except at Nizamuddin bridge while comparing observations of 2013. Like 2013, in the year 2014 also pH is the only parameter that meets the prescribed standards of 6.0 – 9.0 for Palla and 6.5 – 8.5 for the remaining three studied locations.

The reason of deterioration of Yamuna River water quality in Delhi stretch especially after Wazirabad barrage is due to unabated discharges of wastewater predominantly from domestic sources into the river. The study reflects that pollution level in the river is remain unchanged in spite of gradual reduction in pollution load contributed by the major drains in NCT-Delhi. This might be due to less availability of fresh water in the river, essential to maintain self-purification capacity of the river. Less availability of fresh water in the river may be due to reduction in the rain fall in the catchment area or increased rate of water abstraction from the river.

Discharge and pollution load contributed by major drains in 2014 at NCT- Delhi

The major wastewater outfalls of NCT-Delhi are regularly been monitored by Central Pollution Control Board on monthly basis. There are 18 major drains which join Yamuna River and 4 drains join Agra/Gurgaon canals. Last five years trend (2010 – 2014) of Bio-chemical Oxygen Demand (BOD) load and discharge of these 22 drains is depicted in Fig-21. The collective average of these studied drains for first ten months of year 2014 in terms of discharge and Bio-chemical Oxygen Demand load was about 3445 MLD and 164 Tones/day (TPD) respectively. Out of total BOD load and discharge of the monitored drains, Yamuna River receives about 92 percent of both. Gradual decrease in BOD load and discharge is being observed since 2011. The possible reasons for this variation are diversion of treated /untreated wastewater for irrigation and /or increased efficiency of waste water collection, transportation and treatment system.

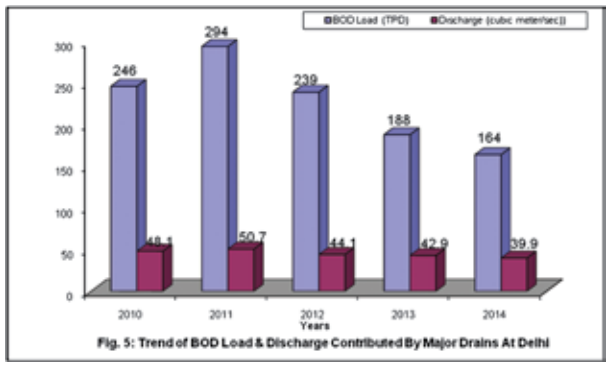


Fig-22. *Trend of BOD Load & Discharge Contributed by Major Drains at Delhi*

Analytical Quality Control (AQC/Water) for Central and State Pollution Control Boards, Pollution Control Committees and for Laboratories Recognised under E.P. Act.

The most important mandatory task Central Pollution Control Board (CPCB) is to maintain vast water quality monitoring network with a aim to evaluate the status of water quality of different sources. In this programme the CPCB is monitoring 1019 water quality monitoring stations under GEMS, MINARS, GAP and YAP Programmes comprising rivers, lakes, wells, and ground waters spread over 27 States and 6 Union Territories through various State Pollution Control Boards (SPCB). Comparability of data within the collaborative programme becomes the key challenge to the water testing laboratories. The quality of data must be of

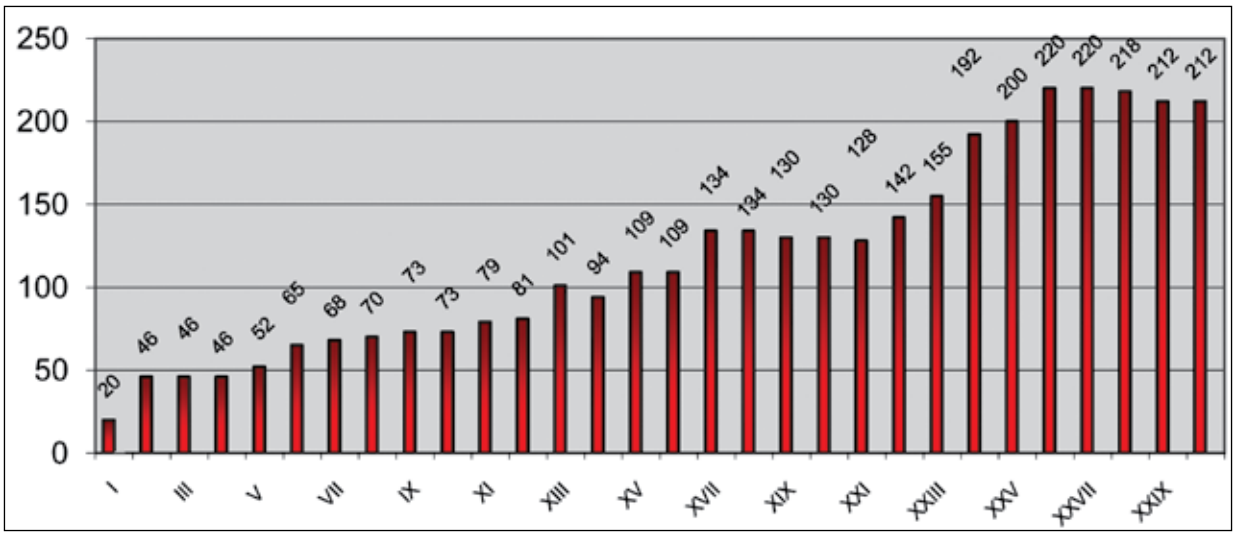


Fig-23. *Growth of AQC/ Water Programme (1991-2014)*

the desired quality to formulate the policy by the decision maker based on the data generated in the monitoring programmes. Therefore, to obtain relevant and reliable data, the analytical process has to proceed under a well established quality assurance with external proficiency test as an inherent component. To ensure the reliability of the data, a programme called "Analytical Quality Control (AQC)" was initiated with 20 laboratories in 1991. In 2014-15, number of laboratories participated in this exercise have reached to 229 laboratories of SPCB/ PCC, E.P. Act recognized laboratories (Fig-22). As on 28th Feb 2014, 30th rounds of exercises were conducted and performance reports are under progress. There are 11 physico-chemical parameters and 6 heavy metal parameters are covered under 29th& 30th AQC exercise. The performance of the laboratories in the 29th Exercise for physico-chemical parameters ranged between 66 to 86 % and overall performance was around 81% . The performance of the laboratories in the 30th Exercise for Heavy Metals parameters ranged between 86.8 to 93 % and overall performance of this round was around 89 %.

Two synthetic samples labeled as A&B of each 1 litre volume prepared in laboratory by adopting standard procedures and precautions are distributed to all participating laboratories by Courier service toavoid any transport delay. Samples were also analyzed in CPCB laboratory for arriving at "Reference value" for comparison and to estimate the acceptable limits of the reported values.

Recommendations for AQC Scheme

The overall findings of the performance of AQC exercises reveal the fact that Internal AQC system in all the laboratory is to be strengthened.The analytical capability of these laboratories could be improved by adopting appropriate steps.

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

The Central Pollution Control Board (CPCB) in collaboration with Rajiv Gandhi Water Mission has conducted a R&D Project entitled "Treatment of Water and Wastewater using Sludge-Reagent-Product (SRP) Technology" to tackle the problem of huge amount of sludge

generated from the water works which use alum for precipitation of colloidal particles by coagulation and flocculation process. While dealing with the sludge problem, CPCB came with an innovative idea of regenerating and recycling the alum along with positive charged colloidal particle in water treatment process.

Sludge Reagent Product

The discarded sludge obtained from process of coagulation of water treatment system was treated chemically and the product obtained was named as 'Sludge Reagent Product' (SRP) which was used successfully as coagulant in lieu of the fresh alum used in the water work.

CPCB's Activities on Ganga Rejuvenation

Central Government constituted National Ganga River Basin Authority (NGRBA) under Section 3(3) of the Environment (Protection) Act, 1986. The NGRBA is a planning, financing, monitoring and coordinating body of the centre and the states. The objective of the NGRBA is to ensure effective abatement of pollution and conservation of the river Ganga by adopting a river basin approach for comprehensive planning and management.

Central Pollution Control Board has been asked to execute the following three projects under NGRBA program.

- Pollution Inventorization, Assessment & Surveillance on River Ganga (PIAS), funded by NRCD, MoEFCC in 2010-11
- Water Quality Monitoring System for River Ganga(WQM), funded by the World Bank
- Strengthening of Environmental Regulators-CPCB (SER) , funded by the World Bank

Industrial Pollution Control

I. Inventorization of Grossly Polluting Industries (GPI)

- Under this project, CPCB has inventorised 764 Grossly Polluting Industries operating in the main stem of River Ganga locating in the five Ganga states and discharging effluent directly into River Ganga through drains or through its major tributaries River East-Kali and Ramganga. It is observed from the figure-7that number wise tanneries are dominant industries followed by sugar and pulp & paper.
  - GPI Means: Industry discharging pollution load of BOD 100kg per day and/or handling hazardous chemical as specified in Manufacturing, Import Storage of Hazardous Chemicals Rules 1989 and as amended.
  - GPIs were identified as Industries discharging effluents into a water course and a) handling hazardous substances, or b) effluent having BOD load of 100 Kg per day or more, or c) a combination of (a) and (b).

II. Status of Compliance verifications of Standard of the GPI

- Under this programme, CPCB is also implementing Compliance verifications of Standard of the GPI and inspected 727 units and action taken status as on 10th November, 2014 are given in Table-12.

Table 12. *Compliance verifications of Standard of the GPI and Status of action taken*

Sl. No.	Action State	Uttar Pradesh	Uttarakhand	Bihar	West Bengal	Total
1	Direction under section 5 of Environment (Protection)Act, 1986	167	23	2	2	194
2	Direction under section 18(1)(b) of Water Act,1974	177	0	0	1	178
3	Letter issued for ensuring compliance	45	7	1	6	59
4	Compliance with standards	91	0	1	5	97
5	Action taken for re-inspection/ revalidation	34	3	1	8	49
6	Industry found closed /not traceable	119	1	0	0	120
7	Action under process	28	0	0	2	30
	Total	**664**	**34**	**5**	**24**	**727**

III. Measures taken by CPCB to control pollution from GPI

- Based on the above observation CPCB is taking sector specific action plan and already implemented charter for Pulp & paper sector. Self regulatory monitoring mechanisms through real time effluent monitoring system in the identified GPI are also being implemented with the help of respective SPCBs.
- CPCB is in the process of implementing Zero Liquid Discharge concept in the important industrial sectors of Ganga Basin which is as follows;
- Zero liquid discharge in respect of distillery and sugar sector is already in progress. The spent wash from the distillery is to be utilized in making the compost following the CPCB protocol or to be incinerated employing the evaporation and concentration techniques.
- The effluent from the Sugar Mills is required to be recycled completely in the manufacturing process following a territory level of effluent treatment adopting reverse osmosis and sand filtration process.
- The concept of zero liquid discharge in the tannery has been tried successfully in southern part of the India and therefore, is required to be adopted likewise in Kanpur region.
- To minimize the water consumption and waste water discharge from the Pulp and Paper sector, CPCB is in the process of developing protocols in consultation with technical experts and other stakeholders. Series of interaction meetings are proposed to be held with all stakeholders so as to minimize or to achieve zero liquid discharge from this sector.

IV. National Green Tribunal (NGT) Case

– In one of the writ petition (196 of 2014), against the M/s Simbhaoli Sugar Mills Ltd. Simbhaoli, Ghaziabad, the Hon'ble National Green Tribunal (NGT) has asked CPCB to submit a list of the industries discharging effluents directly or indirectly into the river Ganga and its tributaries.

– CPCB has issued direction under section 18 (1) (b) of Water Act, 1974 to 11 Ganga basin states SPCBs/PCC for installation of continuous monitoring of industrial effluent quality monitoring system by the GPI operating in Ganga basin for self regulatory purpose before 31st March, 2015.

– The meeting of the Principal Committee held on 8th December, 2014 and all the members have agreed to follow the above guideline.

Wastewater Management

I. Drains

– CPCB has monitored 144 drains carrying 6614 MLD of waste water (domestic and industrial) into River Ganga from 50 Class-I and Class –II towns and from 687 GPI. Only 4 drains are falling into river Ramganga and 9 into river Kali-east and carrying 853 MLD of waste water. Details of drains are given in the Table-13 and Table-14.

– The observation indicates that focus need to be given on tributaries for improvement in water quality in terms of industrial waste water discharge and drains on the main stem involving the local authorities for improvement in domestic waste water quality.

Table-13. *Drains Discharging Waste Water into River Ganga*

State	No. of Drains	Flow (MLD)	BOD Load (Tonnes / Day)
Uttrakhand	14	444.2	42.80
Uttar Pradesh	51	3811.2	188.01
Bihar	25	579.7	99.50
West Bengal	54	1778.9	95.53
Total	**144**	**6614.0**	**425.84**

Table-14. Drains Discharging Waste Water through Tributaries

S.N.	Name of Tributary	No. of Drains	Flow (MLD)	BOD Load (tonnes/ day)
1	Ramganga	4	258.3	53
2	Kali -East	9	595	165
	Total	**13**		**218**

II. Sewage Treatment Plants (STP)

– CPCB has also monitored 51 STPs among the 63 STPs located in the main stem of Ganga in the 5 states. The status of STPs is given in Table-15.

III. Common Effluent Treatment Plants (CETP)

CPCB has also monitored 3 CETPs among the 4 CETPs located in the main stem of Ganga in the 5 states. The status of performance evaluation of CETPs is given below in Table-16. All the three CETPs monitored does not meeting the BOD standard for discharge into surface water body.

Groundwater monitoring

CPCB carries out the ground water quality assessment on yearly basis in the 51 districts through which the river is flowing

Table-15. *Status of NRCD funded STPs operating in 5 Ganga States*

States	No. of STPs	Installed Capacity (MLD)	Utilized Capacity (MLD)	No. of STPs Not In Operation	STPs Exceeding BOD Limits	STPs Exceeding COD Limits
Uttar Pradesh	8	358	287	1	4	0
Uttarakhand	4	54	-	0	1	1
West Bengal	34	457	214	13	3	0
Bihar	5	158	100	1	1	0
Total	51	1009	602	15	9	1

and covering five kms. stretch from the both side banks of river Ganga.

Water Quality Monitoring of Polluted Stretches

CPCB has identified so far 4 (four) stretches of the river Ganga failing to meet the water quality requirement as per the designated best use. Therefore, to understand the fate of pollutants and its potential to damage the ecological system of the river, a regular monitoring on half yearly basis should be conducted for maintaining the quality.

Water Quality Monitoring System for River Ganga

The World Bank funded project was sanctioned on 19th July, 2013 and has been allotted an amount of ₹ 94.45 crores. Under this project three major activities namely development of real time monitoring network, bio-monitoring and community monitoring are being carried out.

Real Time Water Quality Monitoring Network

– One of the components under this program is development of a Real Time

Table 16. *Performance Evaluation of CETPs*

Location of CETP	Type of Industries connected with CETP	Designed capacity (MLD)	Status Operation	Characteristics				Disposal of Treated Effluent
				INLET (mg/l)		OUTLET (mg/l)		
				BOD	COD	BOD	COD	
CETP Jajmau, Kanpur	Tannery and sewage	36	Operational	8050	18720	258	832	Irrigation channel/ River Ganga
Leather Technology Park, Banthar, Unnao	Tannery	4.15	Operational	2030	4113	262	401	Treated effluent disposed to city jail drain, which ultimately meets to River Ganga.
UPSIDC, Site-II, Unnao	Tannery	2.15	Operational	2053	3390	291	609	Treated effluent is discharged into Loni drain, which ultimately meets to river Ganga

Water Quality Monitoring network of 113 stations in the Ganga states at following critical locations:

- Upstream and downstream of major urban areas
- On major tributaries upstream of the confluence with the Ganga
- Downstream of Sewerage Treatment Plants (STPs)
- In major nallas
- Downstream of industrial areas
- At intakes of drinking water treatment plants
- At important bathing ghats
- The network would be developed on data purchase concept where monitoring system will be installed, commissioned and operated by vendors and CPCB would purchase data of water quality.
- The network has been designed in a manner that once it get operational would help to identify the sources of the pollution and their impact on the river water quality though online system.

Table-17. *Status of location surveyed for Bio-monitoring on river Ganga*

State	No. of Locations Proposed	No. of Locations Monitored
Uttrakhand	08	08
Uttar Pradesh	57	11
Jharkhand	-	-
Bihar	13	-
West Bengal	35	-
Total	**113**	**19**

- The physical site verification is being carried out in association with SPCBs.

Bio-monitoring

- Biological Monitoring (Bio-Monitoring) is an effective empirical approach of using biological community response to access an aquatic eco-system quality or river health. The project involves bio-monitoring at all 113 locations being monitored online.
- Development of protocol for bio-monitoring of river Ganga - To have a systematic approach for accomplishing the objective of bio-monitoring for River Ganga, a protocol has been developed. In situ field observations, as based mainly on the habitat characterization during the bio-monitoring of River Ganga at its selected locations in Uttrakhand and Uttar Pradesh, however, come up with the necessity of some structural up-gradation in protocol.
- Reconnaissance & survey to initiate bio-monitoring on river Ganga - Survey to finalize the location for bio-monitoring is being carried out in association with SPCBs on the locations lying adjacent to the proposed 113 Real Time Water Quality Monitoring (WQM) stations. Along with the survey bio-monitoring is also being carried out on the finalized locations. A brief tabular depiction on field based bio-monitoring status of River Ganga as on date is gives in Table-17.

Community monitoring

The projects also envisages the concept of community monitoring which will be carried out with the involvement of the

organizations, institutions, schools, colleges and universities and other reputed activists. Through this program organizations will be trained and make them feel responsible for water quality monitoring.

Strengthening of Environmental Regulators (SER)

The World Bank assisted project for institutional development a sanction of ₹ 69.26 crores was received on July 19th, 2013. The major components of this project are strengthening of manual water quality monitoring network and institutional development.

I. Manual Water Quality Monitoring Network

The key activity of SER project is to strengthen the manual water quality monitoring network of River Ganga. The strengthened network is basically an amalgamation of the 98 water quality monitoring stations being operated by NRCD and 57 stations by CPCB under NWMP at different locations along the main stem of River Ganga. The stations amalgamation will result in a network of 134 stations having 21 common monitoring locations. The project has supported the enhanced monitoring frequency (on fortnightly basis) and additional parameters monitoring of water quality at all 134 locations. The proposed network will support the validation of the real time network as well as indicate the river health in terms of micro pollutants also.

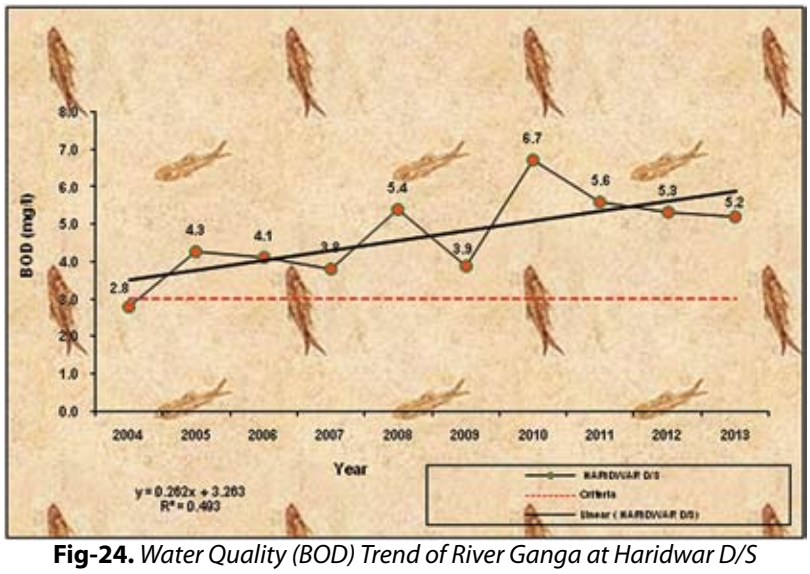


Fig-24. *Water Quality (BOD) Trend of River Ganga at Haridwar D/S*

II. Water Quality Trend Of River Ganga

The annual mean value of bio-chemical oxygen demand (BOD) which indicates the organic pollution in the river is selected to show the water quality trend of river Ganga based on ten years data from 2004 to 2013 with respect to water quality criteria notified for mass bathing under Environmental Protection Act 1986.

It is observed that the mean value of BOD is not complying the water quality criteria notified for mass bathing at all above mentioned monitoring locations from the year 2004-2013. At Varanasi D/s a sharp decreasing trend of BOD is observed while other locations are showing increasing trend.

Achievements during 2014-15 under National Ambient Air Quality Monitoring Programme (NAMP) and other projects

Central Pollution Control Board (CPCB) laid down an ambient air quality monitoring network along with State Pollution Control Boards (SPCBs) and other agencies consisting of 580 stations in operation. This network covers 244 cities in 29 states and 5 Union Territories. This expansion of NAMP network reaches 700 sanctioned

stations, as per XIth five year plan. At present three parameters Sulphur dioxide, Nitrogen dioxide and Particulate Matter (SO2, NO2, and PM10 < less than or Equal to 10 micron size) is measured. In future the parameters like PM2.5, Benzene, Ozone (O3), Carbon monoxide (CO), Ammonia (NH3), Benzo(a)pyrene (B(a)P, Lead (Pb), Arsenic (As) & Nickel (Ni) shall be added in phases.

Activities Performed and Achieved on the following Heads:

National Ambient Air Quality Monitoring (NAMP)

- **Monitoring-** 07 stations were operationalized (No. of Operating stations has been increased from 573 in 240 cities to 580 in 244 cities, 29 states and 5 UTs;
- **Strengthening of NAMP:**
- Four Rural ambient air quality stations of Punjab were put in operation.
- Six month extension of 18 NAMP stations monitored by NEERI.
- Revised MoU with NEERI for three years (2015-2017) for monitoring 8 parameters at 18 locations in six cities has been approved by CCB. Revised MoU send for signature of CCB.
- Revised cost for O&M and Capital for new parameters as per revised NAAQS has been approved in 164th Board meeting.
- **Calibration of NAMP Stations:** Expression of Interest (EOI) has been prepared and approved by Competent Authority. Approved EOI send to PR Division for Press release and hosting on CPCB website.

Development of National Air Quality Index

Issues involved

Traditionally, air quality information has been reported through voluminous data, which often does not make much sense to the general public. Therefore, it is important that information on air quality is put up in public domain in simple linguistic terms that is easily understood by a common person. In view of this, Central Pollution Control Board (CPCB) initiated for developing National Air Quality Index (AQI) as a tool for effective dissemination of air quality information to people.

Decision taken

AQI scheme was launched on October 17, 2014 for inviting public comments before it is made operational. It comprises of six categories, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe with different colour codes. It considers eight pollutants (PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO, O_3, NH_3, and Pb) for which short-term (up to 24-hourly averaging period) National Ambient Air Quality Standards are prescribed. Based on the measured ambient concentrations, corresponding standards and likely health impact, a sub-index is calculated for each of these pollutants. The worst sub-index reflects overall AQI. Information on likely health impacts for these categories is also provided.

Impact of decision

AQI is expected to result in larger public awareness and involvement in air quality improvement. It will help citizens in taking preventive measures such as avoiding unnecessary exposure in event of poor air

quality. It would help local government agencies and pollution control authorities in taking mitigation measures.

National Reference Trace Organics Laboratory

CPCB laboratories play an important role in assessing the status of environment comprising analysis of various matrices such as water, air, soil, hazardous waste, solid waste, waste oil etc. CPCB has developed and continuously upgrading ultra trace organics laboratory as National Reference Trace Organics Laboratory for analysis of trace organic pollutants as well as for analysis of Persistent Organic Pollutants in various environmental matrices including hazardous waste.The scientific Experts from USA, Canada and consultant from ERGO ForschungesellschaftmbH, Hamburg, Germany have provided basic inputs during planning and establishment of the laboratory. The Laboratory was inaugurated on 6th September 2006 by Secretary of Environment, MoEFCC, Govt. of India.The laboratory is one among the very few of its kind in India and has State of the Art Technology and infrastructure for analysis of Organic Pollutants at Trace Levels including Dioxin and Furan in environmental samples.The infrastructural facilities have been developed conforming to the International Standards.

Project Activities Undertaken

Measurement of Hazardous Organic Compounds Dioxin (PCDDs) and Furan (PCDFs) in Environmental Samples

Polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzo-furans (PCDFs) are environmental contaminants usually present in diverse environmental matrices. Out of 75 theoretically possible PCDD congeners and 135 PCDF congeners, 7 PCDD congeners and 10 PCDF congeners are having considerable toxicity. These congeners are monitored as per internationally practiced convention in environmental matrices, which may vary from sub ppt level and may reach up to ppm level. Under the purview of project, the following sub-activities have been executed:

– **Monitoring of Dioxin – Furan in Stationary Source Emissions**

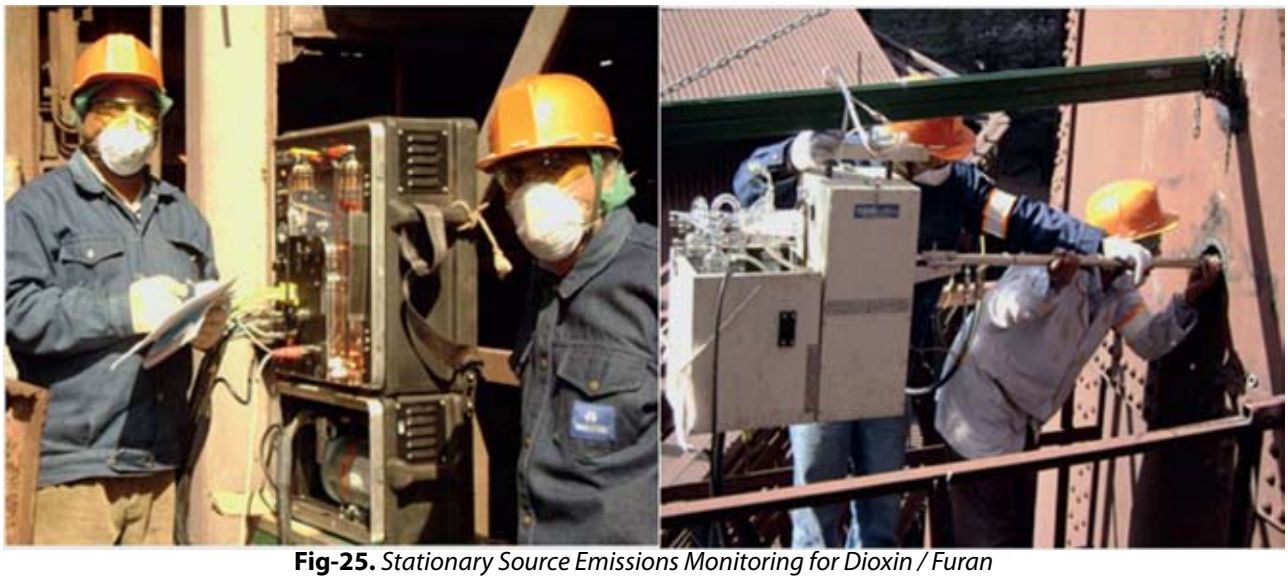


Fig-25. *Stationary Source Emissions Monitoring for Dioxin / Furan*

The monitoring of Dioxin – Furan in stationary source emission at Incinerators of Treatment Storage and Disposal Facilities (TSDFs) and municipal waste to energy plant (WtE) have been undertaken on request of Hazardous Waste Management Division.

– **National Ambient Air Dioxin Monitoring Program**

Ambient air dioxin – furan monitoring program being continued (10 CPAs monitored during the year 2012-2013) by National Reference Trace Organics Laboratory at ten additionally identified Critically Polluting Areas (CPAs) in the country in association with CPCB Zonal Offices at Bangalore, Kolkata and Vadodara.

Volatile Organic Compounds (VOCs) Measurement in Drinking / Surface Water Samples by Purge and Trap GC-MS

Volatile Organic Compounds (VOCs) are carbon-containing compounds that readily evaporate at normal air temperature. Fuel oils, gasoline, industrial solvents, paints, and dyes are the major sources of VOCs. US-EPA lists 68 most common VOCs for environment assessment from the known sources. These 68 VOCs cover a wide range of chemical compounds that have different chemical and physical properties and different levels of toxicity. Chlorinated VOCs are associated with commercial and industrial use and include dozens of chemicals that are typically very mobile, persistent, and toxic in the environment. Non-chlorinated VOCs are associated with gasoline, fuel oils, and industrial solvents. These non-chlorinated chemicals are persistent, volatile, but less

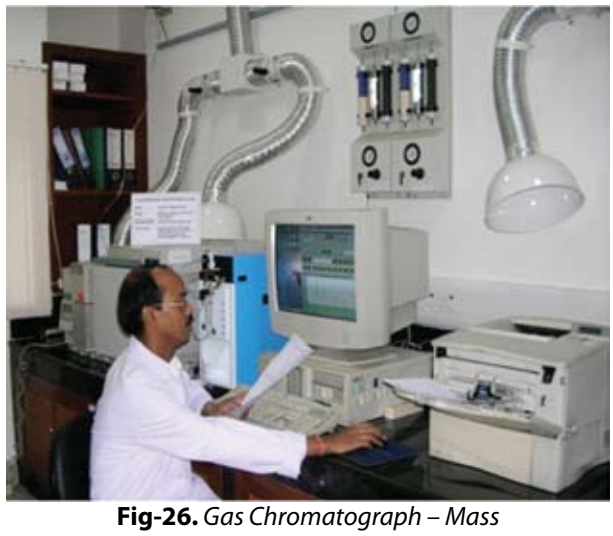


Fig-26. *Gas Chromatograph – Mass Spectrometer (GC-MS)*

toxic than the chlorinated solvents. VOCs are very mobile and these may be dissolved and washed out with run off water reaching surface water resources and may also leach into the ground water.

Sampling of VOCs at Ankleshwar and Vapi continued, as only one round of sampling accomplished so far. Two phases of sampling have been completed. Three newly identified critically polluted areas (CPAs) i.e. Bhiwadi (Rajasthan); Singrauli (U.P) and Korba (Chhattisgarh) during current year. The water samples collected have been analyzed for 43 VOCs by Purge & Trap concentration followed by GC-MS analysis using USEPA Method 524.2. The analytical data indicated presence of some VO compound in surface water at some Critically Polluted Areas.

Monitoring of Pesticide Residues at National Level - Sponsored Project by Ministry of Agriculture, New Delhi (IARI Funds)

The objective of the study is to evaluate the levels of pesticides in ground water, surface water and soil samples in National Capital Territory Delhi (Alipur Block, Kanjhawala Block,

Najafgarh&Nizamuddin Bridge), Uttar Pradesh (Ghaziabad, GuatamBudh Nagar &Bagpat), and Haryana (Sonepat, Faridabad &Ballabhgarh). Department of Agriculture and Corporation have extended the project at National Reference Trace Organic Laboratory of Central Pollution Control Board for the financial year 2013-14. The Monitoring of Pesticide Residue is being undertaken on monthly basis in about 70-75 surface water samples.

Standardization of Methodology for Determination of Chlorobenzenes by Reversed-Phase High- Performance Liquid Chromatography

Chlorobenzenes compounds can enter the environment via natural and anthropogenic sources such as; intermediates in the synthesis of pesticides and other chemicals, space deodorants and as a moth repellent, component of dielectric fluids. Chlorobenzene compounds are extremely hazardous to human health and can be biosorbed and bio-accumulated can be biologically accumulated.

The standardization of methodology for determination of Chlorobanzenes as per EPA notification using reversed-phase HPLC equipped with Ultra-Violet (UV) Diode Array Detector have been initiated during the financial year 2013-2014. The initial study comprising calibration, recovery check, QA / QC have been undertaken and limit of detection (LOD) and limit of quantification (LOQ) have been derived. (Table-18)

Scientific Research Papers Published During 2013-14

- Distribution of dichlorodiphenyltrichloroethane and hexachlorocyclohexane in urban soils and risk assessment. Journal of Xenobiotics, 2013, 3:1-8.
- Probabilistic health risk assessment of polycyclic aromatic hydrocarbons and polychlorinated biphenyls in urban soils from a tropical city of India.Journal of Environ Sci Health, Part A: Toxic/Hazard Subst Environ Eng,2013, 48:10, 1253-1263.
- Environmental and human health risk assessment of benzo(a)pyrene levels in

Table-18. *Derived limites of QA / QC and limit of detection (LOD) with limit of quantification (LOQ)*

S. No.	Chlorobenzenes	LOD (µg/l)	LOQ (µg/l)
1.	Mono-chlorobenzene	0.35	1.05
2.	1,4-chlorobenzene	0.07	0.20
3.	1,3-chlorobenzene	0.03	0.08
4.	1,2,3-chlorobenzene	0.05	0.14
5.	1,2,4-chlorobenzene	0.03	0.10
6.	1,2,4,5-chlorobenzene	0.03	0.10
7.	1,2,3,5-chlorobenzene	0.04	0.12
8.	Penta-chlorobenzene	0.07	0.20
9.	Hexa-chlorobenzene	0.12	0.36

agricultural soils from the National Capital Region, Delhi, India. Human and Ecol Risk Assess: An Int Journal, 2013,19 (1): 118-125.

- Preliminary Analysis of Polycyclic Aromatic Hydrocarbons in Air Particles (PM10) in Amritsar, India: Sources, Apportionment, and Possible Risk Implications to Humans. Arch Environ ContamToxicol, 2013, 65:382–395.
- Ecotoxicological Risk Assessment of Polychlorinated Biphenyls (PCBs) in Bank Sediments from along the Yamuna River in Delhi, India.Human Ecol Risk Assess: An Int Journal,2013, 19:6, 1477-1487.

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

Central Pollution Control Board, Delhi has been delegated the powers by Government of India vide Gazette Notification No. SO 145 (E) dated February 21, 1991 for recognition of environmental laboratories of Govt. / Semi Govt. organization Public Sector Undertaking and Educational Institutions under section 12(1) (b) & 13 to carry out the functions entrusted to the Environmental laboratories under the Environment (Protection) Act, 1986.

Ministry of Environment, Forests & Climate Change has constituted the Expert Committee for the purpose at CPCB. The Central Pollution Control Board has organized seven (7) meetings of Expert Committee during the year 2013-2014 (upto January, 2014) for assessment, review and recommendation of cases of private / government laboratories for recognition.

Central Pollution Control Board has participated in joint inspections of private laboratories alongwith Ministry of Environment & Forests (MoEF) and respective State Pollution Control Boards for consideration of recognition of private and government sector laboratories, environmental laboratories under the Environment (Protection) Act, 1986.

National Ambient Monitoring Programme

Ambient Air Quality of Delhi:

The Central Pollution Control Board has been monitoring ambient air quality at six locations in Delhi under NAAMP for the past many years. The ambient air quality data of 2014 up to October is compared with the annual average of the previous year.

The concentration of sulphur dioxide recorded at all six locations was almost same and within national standard (Fig 14). Average concentration remain same as previous year. The average concentration of sulphur dioxide in 2014 is well within national standard.

Concentration of nitrogen dioxide recorded in these six locations shows a decreasing trend (Fig 15). Concentrations recorded in four stations were above national standard. The average concentration for Delhi showed a decrease (7%) with respect to previous year.

Particulate Matter (PM10):

The concentration of PM10 recorded at three locations (Sirifort, Nzamuddin and Shahdara) shows an increasing trend and shows a decreasing trend in three locations (Pitampura, Janakpuri and Shahzadabagh) during 2014 in comparison with the previous year (Fig 16). The average concentration of Delhi in 2014 showed a decrease (5%) with respect to the 2013. Concentration of PM10 exceeded national standard at all locations.

CAAQM Stations at Million plus cities in the country:

The Central Pollution Control Board has initiated strengthening of Ambient Air Quality

Monitoring network by installing Continuous Ambient Air Quality Monitoring Stations. 46 million plus cities are being covered under this network. Action plan have been made for setting up of CAAQM stations in million plus cities and state capitals in 2014-17. CAAQM stations are to be set up in 20 million plus cities and capital of 20 state and union territories.

CPCB has identified total 88 critically polluted areas by Comprehensive Industrial Pollution Index (CEPI), distributed in 16 states in the country. Among these 43 industrial areas / clusters attributed to air pollution. Out of 43 industrial areas /clusters only 27 areas/clusters are Air Critical (AC) having sub index score more than 60. Accordingly CPCB decided to set CAAQM stations at 27 identified areas towards regular assessment of air quality. 15 critically polluted areas (CPA) are covered in phase I and funds released during financial year 2013-14. 12 CPA are to be covered in phase II.

Real Time Pollution Monitoring Network at Central Pollution Control Board

Central Pollution Control Board, State Pollution Control Boards, Pollution Control Committees and industrial units are operating Continuous Ambient Air/Water Quality Monitoring Stations (CAAQMS), Continuous Emission Monitoring Systems (CEMS) and Continuous Effluent Monitoring Systems as per the directions/guidelines of MoEF/CPCB. Ambient noise levels are also monitored on continuous basis, but at limited locations. A system for collecting online data on real time basis and publishing it for all stakeholders is in process for last four years.

The Central Board asked all major instruments' suppliers to install their central data processing systems at CPCB to collect and disseminate real time data (on their own web portals) along-with online remote calibration and verification procedure. This network opens a window for industries to contribute for developing a National Database which could be used anytime from anywhere in the world through Internet without any requirement of data authentication requirement. The task is really big and like dreaming in the day. But efforts are on to develop such an infrastructure in place. The network architecture of the existing model is given below.

Industrial units are also provided access to view its own data submitted to the Board online and provide its comments on the basis of actual environmental conditions which will help in data validation process. Glimpse of the Home pages of different Instrument Supplier's web portals are shown below.

The existing model of real-time data network has provided following capabilities:

- **National Database:** Real-time database is generated in the country which is being validated. This database will be one of the Decision Supporting Systems (DSS) for abatement of pollution based on which policy decisions could be made.
- **Real time Data View:** Real time pollution levels of emissions/ ambient /effluents in any industrial unit/ at a station are accessed from any place at any point of time through Internet. The snapshots of reports generated and instantaneous data displayed are shown below:
- **Easy procedure of data submission**: Systematic data collection & database generation procedure (without any human intervention) at CPCB/SPCB for long/short term planning. Hence, no physical data submission is required. Regulatory bodies will verify the data and take necessary follow-up action.

- **Responsibility Sharing:** The responsibility of data generation, validation & its real time transmission is on the data generator or the data custodian. The industrial representatives or the officials of SPCBs are the nodal persons.
- **Data modification/validation:** Original (raw) data & Modified (validated) data (validated only through regulatory bodies i.e. SPCB/CPCB within a time period) are stored in databases along-with details of the officials involved in validation along with date & time stampings.
- **Additional Data for validation**: Information on diagnostics – health of instruments, calibration and other supporting/ supplementary data is also collected online. This data will enable the officials at CPCB/ SPCBs for proper validation of the data on pollution levels.
- **System Auditing:** Remote calibration procedure to audit the instruments' status and current pollution levels online to ensure the reliability of data produced.
- **Tamper proof:** Minimized human intervention guarantees submission of tamper-proof data in real time. The regulatory checks in the form of snap shots and video recordings are also planned for implementation in future.

All the firms associated with CPCB are either providing the desired capabilities or in the process of developing the software under the guidance of the Board. Presently data from twenty seven (27) CAAQM Stations operated by CPCB/PCCs/SPCBs and one hundred and thirty four (134) CAAQMS operating in 79 industrial/ institutional sectors is being transmitted to CPCB. In addition, data from one hundred and eight (108) CEMS installed at 51 industrial units and seven (07) continuous effluent monitoring stations from 07 industries is being transmitted to CPCB. The industrial sectors sharing the data are cement, oil refineries, steel plants, power plants and other industries coming under 17 categories of Industries.

Constitution of Sectoral Standing Committee and National Task Force

With an objective of regular review the progress of implementation of pollution control measures for enhancing pollution compliance status and enforcement mechanism, In the 164th Board meeting approved to re-constitute the Task Forces for each of the 17 category of highly polluting industries to regularly review the progress of implementation of pollution control measures implemented in each category of industry and suggests action to be taken. The task force nor Refineries, Thermal Power Plants, Fertilizer & Caustic Soda, Tanneries and Aluminium, Zinc and lead industries has been constituted. The objectives are:

- To review the unimplemented recommendations of CREP, if any.
- To review the performance and upgradation of standards.
- To identify new action points for CREP and monitoring its implementation.
- To review data and findings of vigilance carried out by SPCBs and CPCB under ESS.
- To visit the industries to assess the implementation status, if required.
- To help the units in each sector, in setting up short and long-term goals towards pollution control, adoption of clean technology, waste minimization and resource conservation.

Installation of continuous emission and effluent monitoring system

The Central Pollution Control Board (CPCB) has directed all State Regulatory bodies i.e. State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) under section 18 (1) b of the Water Act, 1974 and the Air Act, 1981 to ensure that all the highly polluting industries shall install and operate continuous effluent and emission monitoring system and shall connect SPCBs/CPCB server by March 31, 2015. CPCB has directed all the highly polluting 17 categories of industry and those water polluting industries identified under the Ganga basin through SPCBs to submit bank guarantee of 25 % of the cost of online monitoring systems (emission and effluent whichever applicable) for ensuring timely installation of online monitoring systems, so that industries will develop discipline and commit for self regulatory mechanism. The systems which will give high quality scientific results of effluents and emission quality continuously on real time basis and will be brought into public domain after through validation. As on date there are 120 continuous emission monitoring stations are connected to CPCB server by 70 industries.

Hazardous Substances Management (HSM)

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 Division 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 four International Conventions viz. Basel Convention on Control of transboundary movement of Hazardous waste and their disposal; Rotterdam Convention on Prior Informed Consent Procedure for certain Chemicals and Pesticides in International trade; Stockholm Convention on Persistent Organic Pollutants and the Minamata Convention on Mercury.

Besides International Conventions/ Protocols, 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, Forests and 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.

Hazardous Waste Management

– **National Inventory of Hazardous Wastes:** The Ministry has 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.

– **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.

  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.

Solid Waste Management

– **Municipal solid waste management including plastic waste management:** As per information, municipal areas in the country generate 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.

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

– **Bio-Medical waste management:** As per the information received from SPCBs and PCCs of Union Territories, about 4.16tons 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 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.

Fly ash utilization

To address environmental problem of fly ash disposal, the Ministry of Environment & Forest and Climate Change (MoEF) 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 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. The Central Pollution Control Board has been asked to undertake a study to assess the environmental impacts of utilization of fly ash in abandoned mines.

Achievements

- Financial Assistance for project on Web-Based GIS Emergency Planning and Response System has been released to NICSI, New Delhi through NIC.
- The notification of revised Draft Municipal Waste (Management and Handling) Rules, 2013 have been published for public comments. A public notice was issued in this regarding in leading News papers across the country.
- The notification of Draft Hazardous Wastes (Management, Handling and Transboundary Movement) Fifth Amendment Rules, 2013 have been published for public comments. Stakeholder consultation subsequent to receipt of the Public comment is completed.
- Process for amendment of E-Waste (Management and Handling) Rules, 2011 has been initiated. The Draft amendment Rules are ready for public consultation.
- Finalization of the draft revision of Biomedical Waste (Management and Handling) Rules completed.
- The status of implementation of the Plastic Waste (Management and Handling) Rules, 2011 was reviewed. Revision of the existing Rules on plastic waste management is under process.
- 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 ₹ 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.

Budget allocation and progress of expenditure during 2013-14; Xii Plan Outlay

XII PLAN OUTLAY: ₹ 39.25 Crores

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 22 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

Introduction and Objectives

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

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

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

Activities undertaken

Since the inception of the scheme in 1994, important activities undertaken include; (a) Demonstration projects for Development of Cleaner Technologies, (b) Life Cycle Assessment, (c) Carrying Capacity Studies, (d) Creation of database for Clean Technologies, (e) Training programmes for Adoption of Clean Technologies etc. (f) Development of Clean

Technology Park for showcasing important cleaner technologies.

Ongoing Projects:

Under the grant-in-aid scheme on Development & Promotion of Clean Technology twenty five projects continued during the period and their progress was monitored through Monitoring Committees, followed by workshops and field visits. These are:

- Performance Evaluation the Biodegradation of Absorbable Organic Halides (AOX) from Pulp and Paper Mills by Aligarh Muslim University (AMU), Aligarh.
- Environment Friendlier Technology in Glass Industry at Firozabad by Winrock International India.
- Creation of Data Base and Evolving a Mechanism for Capacity Building in the financial sector and application of fiscal instrument for clean technology projects, CPCB, Delhi.
- Demonstration Project of PLASMA Technology for Waste Destruction by JYOTI OM, Chemical Research Centre Pvt. Ltd. Ankleshwar, Gujarat.
- Development and Demonstration of Nano-sized TiO2- based Photo catalytic Oxidation Technology for controlling VOCs at Source and in situ Ambient Air by Indian Institute of Technology, Kanpur.
- Modification & Designing of Fly ash composites in Building Materials for energy Conservation & shielding Application by National Physical Laboratory, New Delhi.
- Improved Chromium Recovery system Integrated with Water Recovery for Reuse in Tanneries Under Zero Discharge Concept by Indian Leather Industry Foundation (ILIFO), Chennai.
- Waste Minimization in small scale Industries by National Productivity Council (NPC), New Delhi.
- Production of bioelectricity from sludge and domestic wastewater using microbial fuel cell University of Calcutta, Kolkata.
- Synthesis of Polymer Hydrogel and Development of Hybrid Waste Water Treatment System using Cavitation Technique and Hydrogel by NIT, Warangal, Andhra Pradesh
- Development of Reactive Thermal Plasma Reactor to Synthesis SiALON and Silicon Nitride Based Ceramics from Fly Ash by Department of Manufacturing Engineering, Annamalai University, Tamil Nadu.

Details of the Completed Projects

Eco Friendly Road Technology

Basically, RBI 81 Grade is an inorganic, water activated stabilizer that reacts with soil to create layers, interconnected through a complex inter-particle framework. It can be applied to any in situ soil. This natural soil stabilizer is a unique and environment friendly product that was developed in the project for stabilization of a wide spectrum

Fig-27. *Inspection of road by members of the Project Monitoring Committee for Eco Friendly Road Technology*

Fig-28. *Road constructed using Cold Recycling Technology: 9.30 to NH-206, Tumkur, Karnataka*

of soils in an efficient, cost-effective and non-toxic manner. Four types of roads using RBI 81 grade technology were laid. This includes National Highways, rural road and forest road etc. All are performing well even after three monsoons.Toxicity study of the soil stabilizer was studied by IITR(ITRC), Lucknow, which revealed that mixing of RBI Grade-81 with soil does not contribute to contamination of water. It can also effectively bind other hazardous materials and can be used in the road construction.

Important features of the technology are as follows:

The average CBR obtained across all the stabilized layers was 100% at 3% RBI grade-81 dosage, going up to 158% with 4% RBI Grade-81. Permeability studies indicated that the RBI Grade-81 layers are relatively impermeable, ensuring no leaching. Decrease in the deflection values over three cycles using FWD showed that there is no cracking in the pavement and the modulus is also gradually improving. By the strength & functional evaluation, it was further observed that the RBI Grade-81 pavements are more durable and stronger than the conventional pavements. RBI-81 pavement technology has given the following clear environmental benefits over the conventional methodology.

Aggregate saving	=	84.35%
Bitumen saving	=	59.85%
Fuel saving	=	34.62%
Carbon Emission saving	=	44.70%
Saving of construction cost	=	50.00%
Avg. construction cost	=	19.00%

It has been, thus, established and proven beyond doubt that the use of RBI Grade-81 technology will result in the conservation of natural resources and provide with more durable roads for Indian conditions, at a lower cost.

This project was carried out by M/s Alchemist, India and monitored by the Project Monitoring Committee comprising CRRI, Indian Road Congress, M/o Road Transport and Highways, IIT Roorkee and CPCB, under the Chairmanship of Prof. Veeraragavan, IIT, Madras.

Waste minimization through co-composting of on and off-farm wastes for sustainable crop productivity and soil health

Co-composting dairy farm wastes with clean organic agricultural and non-agricultural wastes offers a number of opportunities for farmers. Co-composts can be utilized effectively for all crops along with fertilizers to improve nutrient use efficiency. In addition, coating these co-composts with lignite fly ash (LFA) will also add more nutrients to

crops, besides putting LFA to effective use which would otherwise be an industrial waste, difficult to be disposed off. With the above stated background, experiments were conducted, to effectively minimize on and off-farm wastes through co-composting and then blended with different levels of fly ash to see the response of crops to their application.

Use of pressmud + crop residue compost @ 10 t ha -1 proved to be a better option, for paddy, groundnut, maize and Brinjal followed by Dairy Farm Waste + Crop Residue compost @ 10 t ha-1, in general. In particular, application of pressmud + crop residue compost, blended with 10 t ha-1 of lignite flyash recorded the highest growth, yield, nutrient uptake as well as benefit-cost ratio and improved the physical and chemical status of the soil. This type of waste management practice through co-composting and safe utilization of industrial wastes viz. lignite fly ash blended with compost for crops, would lead to sustainable crop production and soil health, thus contributing to waste minimization and environmental cleanliness.

Dr. A. Angayarkanni, Prof. of Agriculture, Anamalai University has conducted this project and completed it.

CHAPTER-5

CONSERVATION OF WATER BODIES

National River Conservation Directorate

The National River Conservation Directorate is engaged in implementing the River, Lake and Wetland Action Plans under the Centrally Sponsored Schemes 'National River Conservation Plan (NRCP)' and 'National Plan for Conservation of Aquatic Eco-systems (NPCA)' by providing financial assistance to the State Governments.

National River Conservation Plan

The objective of NRCP is to improve the water quality of the rivers, which are the major water sources in the country, through implementation of pollution abatement works, to the level of designated best use. So far a total of 42 rivers mentioned below have been covered under the programme. (Table-19).

Table-19. *List of Rivers covered under the NRCP programme*

S. No	River	S. No	River
1	Adyar	23	Mindhola
2	Beas	24	Musi
3	Betwa	25	Narmada
4	Beehar	26	Pennar
5	Bhadra	27	Pamba
6	Brahmani	28	Panchganga
7	Cauvery	29	Rani Chu
8	Cooum	30	Ramganga
9	Chambal	31	Sabarmati
10	Damodar	32	Satluj
11	Dhipu & Dhansiri	33	Subarnarekha
12	Ganga	34	Tapti
13	Ghaggar	35	Tapi
14	Godavari	36	Tunga
15	Gomati	37	Tungabadra
16	Khan	38	Tamrabarani
17	Krishna	39	Vaigai
18	Kshipra	40	Vennar
19	Mahanadi	41	Wainganga
20	Mandovi	42	Yamuna
21	Mandakini		
22	Mahananda		

The pollution abatement works taken up so far under the NRCP include:

- Interception and diversion works 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.
- Afforestation on the river banks.
- Public Participation & Awareness and capacity building etc.

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, Beehar, Khan, Kshipra, Betwa, Ramganga and Mandakini have been shifted to MoWR, RD & GR.

National River Conservation Plan (Other Schemes)

The river conservation programme in the country 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. NRCP covers polluted stretches of 42 rivers in 199 towns spread over 21 States at a sanctioned cost of ₹11527.84 crore (including NGRBA programme upto 07/2014). The pollution abatement works are implemented on a cost sharing basis between the Centre and State Governments. So far, sewage treatment capacity of 4992 mld (million litres per day) has been created under the Plan. Prevention and control of industrial pollution is being addressed by the Central and State Pollution Control Boards/Pollution Control Committees (UTs).

National River Conservation Plan (Non-Externally Aided Projects)

Twelve projects amounting to ₹502 crore in 11 towns of Punjab for pollution abatement of river 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 40%.

- **Pollution Abatement of River Ghaggar :** River Ghaggar between Mubarakpur to Sardulgarh in Punjab has been identified by the CPCB as a critically polluted stretch in their list of 150 polluted stretches of rivers in India and has been kept in priority 1 category with BOD value ranging between 6mg/l to 30 mg/l.

  Based on the proposal received from Government of Punjab for pollution abatement of river Ghaggar in Punjab, 4 proposals for the towns of Lehragaga, Khanauri, Moonak and Patran at a cost of ₹57.10 crore has been sanctioned under NRCP. Under the sanctioned projects, 4 numbers of STPs having total treatment capacity of 15 mld will be created.

- **Sabarmati River Conservation Project Phase-II at Ahmedabad:** Ahmedabad city with an area of 190.84 sq.km and population of approximate 56 lakhs is situated on bank of River Sabarmati. Sabarmati River passes through city for a length of 14 km. 36 storm water outlets carrying sewage and sullage of the city, drain into Sabarmati River.

  River Sabarmati, in the stretch of Ahmedabad, is one of the 150 polluted river stretches in the country identified by CPCB. Water quality of river Sabarmati in terms of Biochemical Oxygen Demand (BOD), a key indicator of organic pollution, is 2.8 mg/l at upstream of Ahmedabad, but increases to 118 mg/l at downstream. Similarly, the dissolved oxygen (DO) is 8.8 mg/l at upstream of Ahmedabad and reduces to about 1.7 mg/l at downstream. Thus, the water quality of river Sabarmati in the Ahmedabad stretch is much below the designated best use 'Class B' criteria of CPCB, as per which BOD should be 3 mg/l or less and DO should be 5 mg/l or more.

  At present, about 804 mld of sewage is generated in the town, against which

treatment capacity of 817 mld is available. Sewage treatment capacity of 232 mld STP was created under Sabarmati River Conservation Project Phase-I at a cost of ₹101.96 crore under NRCP and 585 mld capacity created under JNNURM programme of Ministry of Urban Development). However, the existing STP capacity is not being fully utilized due to gaps in the sewerage system in the town, malfunctioning of some existing sewage pumping stations due to ageing, frequent break-down of sewers and pipes due to corrosion, silting of sewer lines, etc.

'Sabarmati River Conservation Project Phase-II at Ahmedabad, Gujarat' under NRCP has been sanctioned in October, 2014 at a cost of ₹444.44 on 70:30 funding pattern between Government of India and Govt. of Gujarat. 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 planned to be completed within a span of 4 years from the date of sanction.

– **Pollution Abatement of River Mindhola at Surat, Gujarat :** Surat having a population of about 44 Lakh is located on the banks of two rivers namely, Tapi and Mindhola. Sewage is also reaching the sea through the creeks. In the catchment of river Tapi, at present about 100 mld sewage is being generated against which STP capacity of 115 mld is available. The State Government has posed a proposal of construction of 55 mld STP in this catchment to the Ministry of Urban Development under JNNURM recently. About 86 mld sewage is being generated in the catchment area of Tena creek, for which 115 mld sewage treatment capacity is available and one STP of 84 mld capacity is being constructed under JNNURM. This will take care of the pollution load in the Tena creek catchment area.

In the catchment area of Mindhola, total sewage generation is about 400 mld. At present, not all of the sewage is reaching the STPs due to some uncovered area by the sewerage system in the catchment area. Thus, about 250 mld sewage is reaching the STPs, and balance 150 mld is falling in the river Mindhola.

For conservation of river Mindhola at Surat, project proposal costing ₹262.13 crore was sanctioned in August, 2012 under which works relating to sewerage networks, sewage pumping stations (in three drainage districts) along with creation of sewage treatment capacity of 53 mld are envisaged. Project is under implementation and physical progress of about 48% has been achieved so far.

National River Conservation Plan (Externally Aided Projects)

– **Pollution Abatement of River Mula-Mutha:** The stretch of Mula-Mutha River in the Pune City falls under Priority 1 in the list of 150 polluted river stretches identified by Central Pollution Control Board (CPCB). The Biological Oxygen Demand (BOD) level in the river, upstream and downstream of Pune city is 2.2 mg/l and 50 mg/l respective. Similarly, DO level in the river upstream and downstream of town is 10.6 mg/l and 2.2

mg/l respectively. At present about 196 mld of waste water generated from Pune is finding its way to river Mula-Mutha, thereby polluting it.

A proposal for pollution abetment of river Mula-Mutha was received in the Ministry under NRCP. The proposal was posed to Japan International Cooperation Agency (JICA) for external assistance. Subsequently, JICA dispatched a Contact Mission to Delhi and Pune in February, 2014 and it was decided that a short preparatory survey is required for the project to access the ground situation and for filling in the gaps in the proposal after conducting the survey in the field viz-a-viz to the components proposed in the DPR.

The Preparatory Survey Team appointed by JICA started their work in Pune in end August, 2014 and continued till end of December, 2014. JICA study team prepared revised DPR based on the discussion held with PMC, NRCD and on the surveys conducted in the field. The revised DPR cost for the project of abatement of pollution of river Mula Mutha at Pune works out about ₹1181.20 crore. The proposal is under active consideration of JICA for external assistance.

Other initiatives: North East

Identification of polluted stretches of rivers and polluting towns in rest of the NE states are being carried out by the state governments. On the basis of survey, investigation and DPRs, rivers from NE states would be considered for inclusion under NRCP. The cost sharing ratio between the Centre and States of the projects under NRCP and NLCP in the NE states is 90:10. The State Governments have been advised to prioritise the works for the polluted stretches identified by the CPCB and to send proposals for pollution abatement works.

Fig-29. *Beautiful river stream at Senapati District, Manipur*

Under NRCP, seven schemes are being implemented for conservation and pollution abatement of river Rani Chu in Sikkim at a sanctioned cost of ₹ 181.09 crore in three towns of Gangtok, Ranipool and Singtam. The works envisaged under the projects pertain to interception & diversion of sewage, sewage treatment plants, rehabilitation of sewer mains, sewerage trunk line, 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, against which eight 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 ₹82.80 crore. The works envisaged under the projects 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.

Programme on Water Quality Monitoring for various rivers

From this year, the Central Pollution Control Board has been assigned to undertake water quality monitoring of identified rivers. ₹ 84.00 lakhs has been sanctioned to CPCB to undertake the programme. The financial pattern shall be on reimbursement basis.

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

The 'National Wetlands Conservation Programme' (NWCP) and the 'National Lake Conservation Plan' (NLCP) has been merged 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 including biodiversity of these water bodies to the stakeholders. NPCA is operational during XII Plan Period on 70:30 cost sharing between Central Government and respective State Governments (90:10 for NE States

The XII Plan outlay for NPCA is ₹525 crore for implementation of conservation projects under the scheme. During first two years of the Plan period, ₹64.58 crore and ₹55.59 crore were released. For FY 2014-15, the budget allocation for the scheme is ₹75 crore. An expenditure of ₹ 37.02 crore has been incurred in the current financial year till January, 2015 under the scheme. The projects funded during 2014-15 include Pichola and Fatehsagar lakes in Udaipur (Rajasthan), Laxmi Tal in Jhansi (UP), Sindhsagar lake in Ashoknagar (MP) and Twin Lakes in Mokokchung in Nagaland.

Conservation of Lakes

Fig-30. *View of restored urban/semi-urban Dal lake, degraded due to waste water discharge*

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 ₹1096.09 crore 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 27 lakes have been completed.

- Conservation and Management of Dal-Nigeen Lake in Srinagar has been a major project amounting of ₹298.76 crore as 100% central funding. The J&K Lakes & Waterways Development Authority (LWDA), Govt. of J&K has undertaken works for control of pollution in the lake by controlling ingress of waste water (sewage) into the lake by installing five (5) Sewage Treatment Plants (STPs). Out of these 5 STPs, 4 STPs of 20.6 mld (Habal 3.2 mld, Hazrat Bal 7.5 mld, Laam Nishat 4.5 mld and Nalla Amir Khan 5.4 mld) have been commissioned. STP at Brari Numbal (16.1 mld capacity) is in advance stages.

Conservation of Wetlands

Wetlands are lifeline for a very large number of people. Nearly 80% of paddy cultivation is directly or indirectly dependent on wetlands in India. Wetlands are also the most 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, these Wetlands are degrading rapidly which has become a matter of concern. Major pressures on wetlands include fragmentation of hydrological regimes, siltation from degraded catchments, pollution, spread of invasives, species and over-harvesting of resources.

- To control degradation and conserve wetlands, the National Wetland Conservation Programme (NWCP) was initiated in 1987 with the following objectives:-
  - to lay down policy guidelines for conservation and management of wetlands in the country;
  - to provide financial assistance for undertaking intensive conservation measures in the identified wetlands;
  - to monitor implementation of the Programme; and
  - to prepare an inventory of Indian wetlands.

  The Ministry has been providing financial assistance to the State Governments for implementing action plans for conservation and management of identified Wetlands. So far, approx. ₹ 137.98 crore has been provided to 22 States. During the year 2014-15, Management Action Plans of 30 wetlands were approved and financial assistance of ₹5.05 crores was provided to the concerned State Governments (till 31.12.2014). Under the Prime Minister's Reconstruction Plan, three wetlands namely Tso Morari in Laddakh, Mansar-Surinsar in Jammu and Wullar in Srinagar were identified from J&K and ₹ 46.00 lakhs has been provided for conservation activities.

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

Fig-31. Sarus Crane *(Grus antigone)* at Keoladeo Ghana Bird Sanctuary, Rajasthan

National Action for conservation and wise use of Wetlands which includes a wide variety of habitats, such as rivers and lakes, coastal lagoons, mangroves, peatlands, coral reefs and numerous man made wetlands such as ponds etc.

International issues and Ramsar Convention

India participated in Pre-CoP Meeting of Ramsar Convention held in Cambodia from 3-7th November, 2014.

The Wetlands (Conservation and Management) Rules 2010

To implement the objectives of the convention, a regulatory mechanism consistent with the Ramsar Convention was put in place through Wetlands (Conservation and Management) Rules in December, 2010 vide GSR-951(E). As per the Rules, the wetlands of specific importance and in ecological sensitive areas need to be protected by the Government. There are six criteria given in the Rules for inclusion of the wetlands for protection. As a preliminary exercise, 25 Wetlands in the country have been notified as Ramsar sites under the Wetlands Rules and 115 wetlands have been identified for conservation and management (Annexure-VII).

To improve the implementation of Wetland Rules in States and bringing conservation of wetlands into mainstream, a meeting was held with the State Governments. The key issues regarding conservation and management of wetlands, bottlenecks in undertaking various activities, measures for streamlining the institutional arrangements etc. were discussed with the

State Governments. The Wetland Rules are in the process of revision.

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 Harike wetland, Punjab during 2014 by Ministry of Environment & Forests in collaboration with the Punjab State Council for Science and Technology (PSCST), Deptt of Environment and Forests, Govt of Punjab. 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. This year, the theme of WWD is 'Wetlands for our future' and has been celebrated at Nalsarovar Wetland in Gujarat.

Implementation organizations along with details of responsibilities

Department of Environment and Forests, Department of Fisheries, Council for Science and Technology, State Wetland Development Authority of the concerned States are the nodal departments for implementing various conservation activities in states where wetlands have been identified under NWCP. The main responsibilities of these organizations are- Preparation of Comprehensive Management Action Plan of identified wetlands in the state, Implementation of MAPs of wetlands through concerned departments, Monitoring and evaluation of works, Creation of education and awareness among the stakeholders and preparation of progress report and utilization certificates for submission to MoEFCC.

Research and Development

To encourage new methods for conservation and restoration of wetlands and to supplement Management Action Plans, the Ministry encourages R& D activities. Financial assistance is provided for research & developmental activities in various thrust areas of research which include: Survey and assessment of resources, Value of wetlands, Hydrological functions and assessment of associated values, Assessment and conservation of wetland biodiversity, Anthropogenic pressures and natural calamities, Socio-economic aspects etc. Funds were released to academic organizations for four on-going research projects.

Review and Monitoring

Regular review of plans submitted by the State Governments was carried out and about eight (8) wetlands were visited and conservation activities were monitored during the year.

Website for NPCA

A GIS based national website on NPCA is under preparation which shall provide complete information about the projects undertaken by various States. The website shall have link with States and Research Organisations websites.

Progress during the year

Sewage Treatment Capacity of 134 mld was targeted to be created during the year 2014-15 against which, 54 mld has been created so far during the year. A total of 4992 mld STP capacity has been created under NRCP

so far since launching of Ganga Action Plan in the year 1985.

Four lakes have been targeted for completion during 2014-15, rejuvenation/ Conservation/ works in one lake completed and balance likely to be completed by March 2015.

Budget Allocation

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 have been transferred to the Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&GR). Consequently, the sharing of budget provisions of NRCP as agreed between the two ministries for the financial year 2014-15 is as under:

Sl. No.	**Name of the Plan**		**BE for 2014-15**	**Sharing of Budget between two Ministries (Rs. in Crore)**	
				MoWR,RD &GR	**NRCD MoEFCC**
(1)	(2)	(3)	(4)	(5)	(6)
1	**NRCD**		7.00	1.00	6.00
2	NRCP	General	17.00	8.00	9.00
		Capital Assets	158.00	89.00	69.00
		Total (NRCP):	**175.00**	**97.00**	**78.00**

Budget Allocation and expenditure for 2014-15 under National River Conservation Plan and National Plan for Conservation of Aquatic Eco-systems (NPCA):

(Rs. in Crore)

Sl. No	**Name of the Plan**	**Budget Estimate**	**Revised Estimate**	**Expenditure by GOI (31 January 2015)**
1	National River Conservation Directorate (NRCD)	7.00	6.00	5.67
2	National River Conservation Plan (NRCP)	78.00	78.00	73.03
3	National Plan for Conservation of Aquatic Eco-systems (NPCA)	75.00	37.12	37.02
	Total	**160.00**	**121.12**	**115.72**

CHAPTER-6

REGENERATION AND ECO-DEVELOPMENT

National Afforestation and Eco-Development Board (NAEB)

The National Afforestation and Eco-Development Board (NAEB) aims to promote afforestation, tree planting and ecological restoration in the country. Special attention is also given by NAEB to the regeneration of degraded forest areas including ecologically fragile areas like the Western Himalayas, Aravallis, and Western Ghats etc.

Objectives

The detailed objectives of the NAEB are to:

- Evolve mechanisms for afforestation/ ecological restoration of degraded forest areas 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;
- Create general awareness and help foster a people's movement for promoting afforestation and promote participatory and sustainable management of degraded forest areas; and
- Undertake all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco-development activities in the country.

Name of the Schemes

National Afforestation and Eco-Development Board (NAEB) operates the following three major schemes:

(a) National Afforestation Programme (NAP) Scheme

(b) NAEB Scheme: The major components of the Scheme are:

i. Support to Regional Centres (RCs)

ii. Monitoring and Evaluation (M&E)

iii. Communication & Awareness

(c) Eco Development Forces (EDF) Scheme

(a) National Afforestation Programme (NAP) Scheme

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 eight years of the 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.

Achievements

- Twenty eight SFDA Projects have been operationalised in the country at an expenditure of ₹ 3513.81 crore to treat an area of 20.98 lakh hectares since inception of the NAP scheme.
- During the year till 31.12.2014, ₹212.47 crore has been released under the NAP scheme sanctioning an advance area of 73435 ha for afforestation in 2015 monsoon.
- Progress of National Afforestation Programme during current year and Tenth Plan is given in Table-20 and Table-21 respectively.

Table-20. *Progress of National Afforestation Programme during the year*

Year	No.of New FDA/ SFDA projects approved	No. of New JFMCs involved	Project Area approved (ha.)*	Release (Rs. in crores)**
2014-15	25 SFDA Projects	--	73435	212.47

* Area approved for advance soil work/preparatory plantations during the year for all ongoing FDA projects.

** Total (financial assistance provided during the year for planting, advance soil work, maintenance, etc.) for all ongoing FDA projects

Table-21. *State-wise status of SFDA projects (from 01.04.2010 to 31.12.2014) (Under Revised Guidelines)*

S. No.	State	Total Cost	Amt. Released	Approved Advance Work
		(Rs. in crore)		(Area in Hectares)
1	Andhra Pradesh	56.44	36.65	10209
2	Bihar	49.45	35.64	13733
3	Chhattisgarh	118.85	112.70	23086
4	Goa	0.00	0.00	0
5	Gujarat	131.63	92.91	22929
6	Haryana	78.87	71.83	10699
7	Himachal Pradesh	28.69	13.91	8807
8	Jammu & Kashmir	50.82	25.95	13209
9	Jharkhand	78.88	38.86	12714
10	Karnataka	82.46	58.45	17373
11	Kerala	57.01	30.68	7711
12	Madhya Pradesh	139.61	104.07	38240
13	Maharashtra	167.78	140.89	26251
14	Orissa	65.33	45.15	20830
15	Punjab	10.90	5.09	3600
16	Rajasthan	36.37	21.47	9825
17	Tamil Nadu	33.53	20.53	7628
18	Telangana	4.07	2.03	795
19	Uttar Pradesh	119.60	94.97	35310
20	Uttarakhand	45.32	25.84	13319
21	West Bengal	22.43	16.44	9350
	Total (Other States)	**1378.05**	**994.06**	**305618**
22	Arunachal Pradesh	10.33	7.18	3125
23	Assam	31.83	18.49	3675
24	Manipur	52.69	48.68	16184
25	Meghalaya	38.13	26.69	14730
26	Mizoram	60.84	53.87	13605
27	Nagaland	53.50	48.00	19040
28	Sikkim	43.84	35.36	8875
29	Tripura	62.08	44.11	23269
	Total (NE States)	**353.24**	**282.38**	**102503**
	G. Total	**1731.29**	**1276.44**	**408121**

Table-22. *Achievements/progress made in 2014-2015*

S. No.	State	2014-15	
		Amt. Released	**Area**
		(Rs. in crore)	(in Hectares)
1	Andhra Pradesh	4.56	810
2	Bihar	7.00	1786
3	Chhattisgarh	20.00	4699
4	Goa	0.00	0
5	Gujarat	10.50	5284
6	Haryana	11.00	1900
7	Himachal Pradesh	0.73	2237
8	Jammu & Kashmir	3.59	1606
9	Jharkhand	6.00	3924
10	Karnataka	21.35	2900
11	Kerala	2.82	1478
12	Madhya Pradesh	21.00	4786
13	Maharashtra	35.00	6647
14	Orissa	17.92	6535
15	Punjab	1.87	1628
16	Rajasthan	3.35	2550
17	Tamil Nadu	4.25	750
18	Telangana	2.03	795
19	Uttar Pradesh	12.00	8548
20	Uttarakhand	2.50	1330
21	West Bengal	0.50	2495
	Total (Other States)	**187.97**	**62688**
22	Arunachal Pradesh	0.00	0
23	Assam	0.00	0
24	Manipur	4.00	1835
25	Meghalaya	0.00	0
26	Mizoram	7.50	3135
27	Nagaland	5.50	2130
28	Sikkim	3.00	1851
29	Tripura	4.50	1796
	Total (NE States)	**24.50**	**10747**
	G. Total	**212.47**	**73435**

New initiatives under the Scheme

A number of initiatives have been taken by the Ministry to expedite the implementation of the scheme as well as to improve the qualitative aspects of implementation. These include:

– Comprehensive amendment in Guidelines of NAP scheme has been made to promote further decentralization by delegating more responsibilities to State Forest Departments with respect to processing of the FDA project proposals, greater organic linkage of JFMCs with Gram Panchayats, increased security of the elected members

Fig-32. *Empowerment of women is being ensured through increased participation in FDAs*

of JFMCs through longer tenure of JFMC presidency, capacity building in particular of frontline staff of Forest Department and JFMC members especially with regard to local management and administrative responsibilities.

– In general, women are the largest beneficiary group of all interventions by the NAEB. In addition to being users of the resource, and their participation in the labor force, the empowerment of women is being also ensured by requesting the States to increase their representation to 50% in FDA. Similarly, the revised guidelines of NAP scheme also require 50% women in the JFMCs. It is proposed to monitor the benefit of the NAP scheme to women members in quantifiable terms. Accordingly, the formats for progress reports of FDA projects under NAP scheme have been modified.

– While formulating proposals under National Afforestation Programme, Sates have been advised to give adequate representation to SC/ST in FDA and JFMC at village level. Information received from FDAs reveal a larger participation of SCs/ STs, in afforestation programme, and there has been corresponding increase in generation of employment in the project areas.

– Adequate emphasis has been given to the development of North-Eastern States including Sikkim. Jhum areas in the North-East have been given special priority. The Board is also supporting new initiatives and new technologies to support States efforts in tackling the problem of jhum land degradations. Alder-tree based jhum rehabilitation project is also being implemented and if found suitable would be scaled up in the coming years. In view of the fact that a majority of forest lands in the North-East is owned by clans and communities, adequate emphasis will be given on supporting projects proposed on these lands under National Afforestation Programme.

– A website of NAEB has been launched and the relevant information on the approvals is being provided on the website. SFDA/ FDA is required to discuss the approved works in the General Body of the JFMCs.

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 & Awareness

Regional Centres of NAEB

The Board has designated seven Regional Centres in various universities/ national level - institutions Dr. Y.S.Parmar University of Agriculture, Solan, Himachal Pradesh, University of Agricultural Science, Bangalore, Indian Institute of Forest Management, Bhopal,

Jadavpur University, Calcutta, Agricultural Finance Corporation, Mumbai, Agricultural Finance Corporation, Delhi, North Eastern Hill University (NEHU) Shillong. These Centre's help NAEB in promoting extension of replicable technologies and for dissemination of research findings. They provide technical and extension in effective implementation of regeneration of degraded forests and adjoining lands with people's participation and also act as a forum for the exchange of ideas and experiences amongst the States of the region as well as across the regions. In addition, these Centre's carry out problem-specific studies as well as evaluation of NAEB's programmes in the field and organize training programmes and workshops focusing on priorities set out by the Board.

The work programmes of the Regional Centres are formulated to address the emerging needs of promoting sustainability of Joint Forest Management beyond the NAP scheme funding. The new areas include training for forest-based micro-enterprises, development of Joint Forest Management Committees, Self Help Groups, district-level inter departmental linkage workshops for synergy of JFM with other schemes of Government and studies on improved silvicultural practices for management of non-timber forest products. Pilot projects on capacity building for forest based micro-enterprise have been initiated by the Regional Centres across the country. It is hoped that based on the experience of these pilots, the forest-based microenterprise could be scaled-up as a means of promoting sustainable livelihoods of the forest-fringe communities. The financial assistance provided to Regional Centres during financial year 2012-13 and 2013-14 is given in Table-23.

During 2014-15 no fund has been released since performance appraisals of Regional Centres are under process in NAEB. However, in the meantime, as per Revised Estimate non availability of any grant has been indicated.

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 & 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. In order to increase the forest and tree cover, an aggressive media campaign has been launched in 12 districts of six selected States of Bihar, Gujarat, Rajasthan, Karnataka, Uttar Pradesh and West Bengal. This includes print publicity, advertisements, audio spots, audio-visual spots and TV commercials in regional and local languages.

During 2014-15 an amount of ₹ 1.20 crores has been provided as the outlay for various items under Communication out of which ₹12.15 lakh has been released upto 31-12-2014. An amount ₹ 7.15 lakh was used for preparation of Eco-Tableau for Prime Minister's Territorial Army Day Parade while ₹5.0 was used as financial assistance and participation in 18th National Exhibition at Kolkata in September, 2014. It is proposed to significantly scale-up this activity during 2014-2015 through preparation and implementation of a structured Media Plan

Table-23. *Financial assistance provided to Regional Centres during the year*

Sl. No.	Name & Address of Regional Centre	State/UTs covered as per MOU	Financial Assistance (Rs. In lakh) 2013-14
1.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. B-1/9, Community Centre, Janakpuri, New Delhi-110058	Haryana, Rajasthan, Uttar Pradesh, Uttrakhand and UT of Delhi	68.00
2.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. DhanrajMahal, Ist Floor, CSM Marg, Bombay-400001	Maharashtra, Gujarat, Goa and UTs of Daman & Diu, Dadar& Nagar Haveli	79.57
3.	Regional Centre for NAEB North Eastern Hill University, Shillong – 793 014	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura	0.00
4.	Regional Centre for NAEB University of Agricultural Sciences, GKVK Campus, Bangalore-560065	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and UTs of Pondicherry and Lakshadweep	56.00
5.	Regional Centre for NAEB Indian Institute of Forest Management, Nehru Nagar, Post Box no. 357, Bhopal-462003	Chhattisgarh, Madhya Pradesh and Orrissa	52.00
6.	Regional Centre for NAEB Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan-173230	Himachal Pradesh, Jammu & Kashmir, Punjab and UT of Chandigarh	0.00
7.	Regional Centre for NAEB Jadavpur University, Kolkata-700032	Bihar, Jharkand, Sikkim, West Bengal and UT of Andaman & Nicobar Island	88.12

for tree planting on non-forest lands by private individuals and institutions. A multi media campaign will be run through DAVP and will be in the regional languages to bring focused efforts on raising awareness on benefits of tree planting.

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. The progress of ETF Battalions during the year 2014-15 is given in Table-24.

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 ₹ 22.00 crores and the same has been reimbursed to the Ministry of Defence.

Table-24. *The progress of ETF Battalions during the year 2014-15*

Batallion	Location	No. of plants planted (in lakh)	Plants survived (in lakh)	Survival % age	Area Covered (in ha.)
1	2	3	4	5	6
127 Inf. Bn(TA) Eco	Jaunpur District Tehri Garhwal (Uttarakhand)	4.00	3.92	98%	400
128 Inf. Bn(TA) Eco	Shri Mohangarh District Jaisalmer (Rajasthan)	1.44	1.43	98.10%	180
129 Inf. Bn(TA) Eco	Bahu Jindra Project (J&K)	0.97	0.78	90%	125
130 Inf. Bn(TA) Eco	Pithoragarh (Uttarakhand)	5.00	4.50	90%	500
134 Inf. Bn(TA) Eco	Gamani (Assam)	6.06	4.71	78%	1072
135 Inf. Bn(TA) Eco	Chirang Res. Forest (Assam)	4.69	3.00	80%	469
TOTAL		22.16	18.34	89% (Average)	2746

All ETF Battalions have undertaken works like raising nursery and plantation and protection measures to protect the plantation area. They have also constructed boulder 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.

Grants in Aid for Greening India Scheme

National Mission for a Green India

The National Action Plan on Climate Change (NAPCC) launched by the Government of India outlines the strategy to be adopted to meet the challenge of the impact of climate change in India. Ministry of Environment & Forests has launched "National Mission for a Green India" through a consultative process involving relevant stakeholders, aimed at both increasing the forest and tree cover by 5 million ha, as well as increasing the quality of the existing forest cover in another 5 million ha. The Mission proposes a holistic view of greening and focuses not on carbon sequestration targets alone, but, on multiple ecosystem services, especially, biodiversity, water, biomass etc., along with carbon sequestration as a co-benefit. The Cabinet Committee on Economic Affairs (CCEA) approved the Mission as a centrally sponsored scheme with total outlay of ₹13,000 crore for the 12th Plan period and spill over of one year in the 13th Plan Period. This includes convergence worth ₹6000 crore with CAMPA, ₹4000 crore with MGNREGS and ₹600 crore with National Afforestation Programme. The Planning Commission outlay for the scheme is ₹2000 crore and ₹400 crore from 13th Finance Commission. The share of Centre being in the ratio 90:10 respectively for all states except North-Eastern States and Jammu & Kashmir for which it will be in the ratio of 90:10.

Fig-33. Mûrlên National Park, Mizoram

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.

Activities undertaken so far

In the Preparatory Phase of GIM prior to approval of CCEA, funds to the tune of ₹62.61 crore were released in upto financial year 2013-14 respectively to the State Governments for undertaking preparatory activities which included institutional strengthening, training, identification of landscapes and preparation of Perspective Plans.

Achievements

The guidelines for implementation of GIM have been finalized in November, 2014 after a series of consultative meetings with all stakeholders, viz., State Governments, UT Administrations, line Ministries of Union Government, NGOs and experts in relevant fields where various aspects of the Mission, particularly the convergence issue with other schemes, were discussed threadbare and valuable inputs were received.

State-wise Status

Eleven State Governments had submitted Perspective Plans for implementation of Green India Mission in the identified landscapes in their States. The Perspective Plans are currently being examined by the Ministry in consultation with Integrated Finance Division for release of funds.

Implementing Organizations along with details of responsibilities

GIM will be implemented through strengthening institutions for decentralized forest governance. It will be the Gram Sabha and the Committees mandated by the Gram Sabha, including revamped JFMCs, which will plan and implement the Mission activities at the village level. The revamping of JFMCs includes setting up of JFMCs by the Gram Sabha following due process as may be specified in State Panchayati Raj Act or in the JFM guidelines. The plans will be approved by the respective Gram Sabha. It will have explicit linkages with Panchayat level planning to ensure maximum convergence. States may develop their own mechanism for execution of the works by forming a committee and naming a Member Secretary for each JFMC at local level. In urban areas, ward level committees/RWAs linked to Municipality/Municipal Corporation will have role in implementation of the Mission activities. In conformity with the Mission objectives, it is imperative to have a cluster level institution to facilitate planning, problem solving and seeking convergence opportunities at the level of cluster (L2 landscape). This will facilitate common approach to different issues arising in the villages of that particular cluster. It may be serviced by sub-Range/Range. The Chair of the Committee may be elected by the elected office bearers. Cluster level institution like federation of JFMCs in a given landscape/cluster would therefore be key to oversee and agree upon development of landscape level plan on one hand while planning for those activities that affect them as cluster/sub-cluster.

At District Level, it will be revamped Forest Development Agency (FDA), under the Chair of elected representative for General Body of the FDA, that will facilitate the Mission activities at

the district level. It will have explicit linkages with District Planning Committee. Each State Government shall appoint a Member Secretary for each District FDA and District level Steering Committee which will ensure convergence of schemes and programmes.

At State Level, a revamped State Forest Development Agency, as autonomous society, will facilitate the Mission implementation within the state. To provide for maximum convergence opportunities and strategic direction to the Mission, a Steering Committee under the Chairmanship of Chief Secretary shall be setup by each State Government.

At National Level, the Mission will have an all inclusive Governing Council, Chaired by the Minister, Environment, Forest & Climate Change to provide for overall guidance and synergy of action and the Mission Director as Member Secretary. There shall be a National Executive Council chaired by the Secretary (E,F&CC) which will have overall responsibility for the Mission. There shall be a Mission Directorate at the National level with the Mission Director as its CEO with overall accountability for the Mission deliverables and will be supported by a team of experts and secretarial staff.

CHAPTER-7

RESEARCH

Environmental Research

Research and Development (R&D)

The Ministry of Environment and Forests 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".

Objectives

The main objectives of research support are:

- To generate information and knowledge required for developing strategies, techniques and methodologies for better environmental management.
- To find practical solutions to problems of environment protection and management(e.g. Eco-regeneration of degraded areas, management of plastic wastes, bioremediation of contaminated sites etc.,)
- To build endogenous capacities and strengthen scientific manpower in multidisciplinary and emerging areas of environmental sciences.
- To promote development of infrastructure facilities, where necessary, for undertaking Environmental Research.
- To nurture trained scientific manpower and recognize established scientists through National Fellowship programmes, Chairs, National Environmental Sciences Fellows Programme and post Doctoral Fellowship Programme.
- To generate document and analyze information for taking policy decisions relating to environment and natural resources, including preparedness for international negotiations.
- To facilitate database management at one single point in the Ministry.

Progress and Activities:

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 carryout epidemiological studies, strategies to reduce impact of mining, chemical pollution of soils, and hazardous substances including pesticides, heavy metals etc. Projects related to waste recycling and resource recovery from waste along with the development of eco-friendly and cleaner technologies are given priority. Projects are supported in the identified thrust area of environment research.

Under the Environment Research Programme (EnvRP), during the financial year eight 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 Three hundred and sixty six proposals were considered by the Programme Advisory Committee (PAC) of which six were recommended. Progress of seven ongoing projects were reviewed and monitored. Final Technical Reports (FTR) of 8 completed projects during the period (up to 31.12.2014 reviewed).

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.

The objective of the programme is to develop a basis within the field of natural and social sciences for rational use and conservation of resources for general improvement of the relationship between man and his environment. The programme seeks to provide a scientific basis to solve the practical problems of resource management. The programme also seeks to provide a scientific knowledge and trained personnel needed to manage the natural resources in a rational and sustainable manner.

During the current financial year two meetings of the Ecosystem Research Programme (EcRP) committee were held where progress of 25 ongoing projects was reviewed and mid-term corrections were suggested on case to case basis. In addition Final Technical Reports of 04 completed projects were also reviewed. During the year 2014-15, the Committee also appraised 70 new/revised/peer reviewers proposals received under Ecosystem Research Programme (EcRP), out of this, 14 new projects were sanctioned (Annexure-IV) and 12 projects were completed (Annexure-VI).

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, three meetings of the Programme Advisory Committee (PAC) were held and a total of 36 proposals were appraised, one Final Technical Report(FTR) was submitted.

Summary of the Completed Projects

Following is the Executive Summary of completed projects under Enviromental Research Programme (EnvRP)

– ***"Cellular/ molecular mechanisms involved for arsenic detoxification and tolerance in rice and Indian mustard varieties" by Dr. Meetu Gupta.***

The major goal of this study was to evaluate the differential response of

as species in two varieties of Brassica juncea (Indian Mustard) and Oryza sativa (Rice) as Brassica is known as good metal accumulator and rice is the main staple food in As contaminated areas. With this goal, experiments were designed to see the responses of different varieties of both plants at physiological, biochemical and molecular level.

Opposite patterns of response to Arsenic species in Brassica and Oryza varieties were obtained as judged by enhanced activities of antioxidative enzymes, stress related parameters and metal tolerant genes along with some basic toxicity parameters. Better As stress tolerance in Pusa Bold (mustard) and Pusa Basmati (rice) variety was associated with its ability to maintain higher induced activities of stress indicators and modulators parameters along with more transcript accumulation of metal tolerant genes.

– **Removal of SO_2 and NOx from coal fired thermal power plant stack gases by Dr. M.K. Mondal.**

The objectives of the project were to fabricate a laboratory scale magnetic stirrer agitated vessel, bubble column and spray scrubber for simultaneous removal of SO2 and NOx using chemical reagents, to study the effects of change in operating parameters on the performance of these wet scrubbers and compare the work being done in this project with earlier studies already done in different industries.

Experimental set-ups of various configurations i.e. magnetic stirrer agitated vessel, bubble and spray column were fabricated and tested for effective simultaneous SO2 and NOx removal using various chemical absorbents. Experiments were carried out with suitable absorbent (NaClO) in a continuous spray column to investigate the effect of various operating parameters on simultaneous SO2 and NOx removal. The NaClO can be used as an innovative low-cost absorbent in the pool of other absorbents used for simultaneous removal of NO and SO2 available in literature. The indigenous data generated out of the project work can be used to upscale and design of optimized wet scrubber for industrial application to control air pollution being caused by SO2 and NOx emissions.

Following is the Executive Summary of completed projects under Ecosystems Research Programme (EcRP)

– **Impact of Agricultural Pesticides on the Population Status and Breeding Success of Select Species of Fish-eating Birds in Tamil Nadu" by Dr. S. Muralidharan**

The study was conducted in Tami Nadu with the following objectives; identify the heronries in the state, monitor population and study breeding ecology of fish-eating birds in select locations, document residue levels of organochlorine pesticides (OCPs) in fishes, birds, their eggs and assess the impact.

Towards assessing the impact of OCPs, residue levels were quantified in fish-eating birds, their eggs and food (fish) using Gas Chromatograph. Among the pesticides analyzed in nine species of fishes, HCH was most frequently detected

followed by Heptachlor Epoxide, Endosulfan and DDT. Concentrations of Σ-DDT in two species of fishes, namely Cirrhinus mirigala (17.40 ng/g) and Oreochimis mossambica (41.72 ng/g) from Vedanthangal were closer to the levels responsible for gill damages. Among DDT metabolites, p,p'-DDT had the highest percentage of occurrence. Among the cyclodienes, Endosulfan was detected in more than 60% of the fishes.

Eggs of 12 species of birds including near threatened species (Painted Stork, Spot-billed Pelican and Black-headed Ibis) had varying levels of contamination. Shell thickness negatively correlated with OCP residues. Among the isomers, γ-HCH contributed more than 50% to the Σ-HCH. Among the metabolites, p,p'-DDE had higher accumulation in the eggs of all species studied. Concentration of Σ-DDT, HCH, Heptachlor Epoxide and Endosulfan in the eggs significantly ($P<0.05$) varied among the species. Although residues in the eggs are below threshold levels associated with impaired reproduction, DDE in eggs of Painted Stork (228.06 ng/g) and Black-headed Ibis (72.74 ng/g) may affect survival rate of young ones.

– **Floristic studies on Macrophytic Diversity of Nameri National Park (Assam) and Pakke Tiger Reserve (Arunachal Pradesh) by Dr. Nilakshee Devi**

The study deals with the Macrophytic vegetation of Nameri National Park (Assam) and Pakke Tiger Reserve (Arunachal Pradesh) and is the outcome of extensive field surveys carried out during Dec, 2008 to Nov, 2011.

The habitat is flouriest by varieties of flora and fauna. A total 560 macrophytic taxa were recorded from the area belonging to 128 families, representing a high diversity of macrophytes prevailing therein. Among them 432 species belong to dicotyledones, 102 to monocotyledones, 25 pteridophytes and 1 species of gymnosperm. Ten families have been identified as the largest ones based on number of species: Poaceae (39), Asteraceae (31), Euphorbiaceae (31), Papilionaceae (29), Lamiacea (23), Rubiaceae (15), Acanthaceae (13), Orchidaceae (12), Scrophulariaceae (12) and Araceae (11). A total 70 families are represented by monotypic genera (15 Pteridophytes, 1Gymnosperms & 44 Angiosperms) and total 53 genera have single species. Both NNP and PTR cover all types of forest communities namely (i) Moist mixed semi-evergreen forest (80.88 %), (ii) Moist mixed deciduous forest, (iii) Degraded forest, (iv) Tall grass and (v) Short grass and (vi)Riparian as well as wetland vegetations. Herbaceous flora represents a major component with 50% (42% herbaceous & 8 % Grasses & Sedges) followed by Trees (22%) , Shrubs & Under –shrubs (16%) and Climbers (12%), only a small percentage is represented by aquatic and Epiphytic vegetation (5% each).

The flora also comprises a good percentage of wild edible fruits (39 spp), dye yielding plants (18spp), fish poisoning plants (9 spp.) and Fodder plants (46 spp.). The area harbors a large number of medicinally and economically important plant species. Total 42 spp. of plants are used against 18 number

of ailments. Total 37 species are Timber yielding plants categorized under either ClassI or Class II Timber.

Biotic and natural factors particularly anthropogenic pressures are responsible for degradation of various ecosystems in the NNP and PTR during last few decades and as a consequence a large number of plants are at the verge of extinction. Total 32 species are recorded under RET categories, out of which 9 are Critically Endangered, 8 are endangered and 15 are Vulnerable based on available literature. It is interesting to note that 42 spp. are exotic and many of them are representative of scrub forests.

Following is the Executive Summary of completed projects under Research Programme in Socio-Economic Issues of Environment (RPSE)

– **Distribution of Benefits and Costs among Stakeholders of a Protected area: an empirical study of Great Himalayan National Park (GHNP) in Kullu, Himachal Pradesh by Dr.R.S. Prasher.**

Given the increasing importance of conservation of natural resource, the Government of India is making efforts to conserve the biodiversity through polices and plans like creation of protected Areas (PAs).However, this often results in loss of welfare of the local communities who depend on resource of the PAs for their livelihood and cultural survival. This study, based in areas peripheral to the Great Himalayan National Park (GHNP) in northern Indian state of Himachal Pradesh, assessed the impact that biodiversity conservation in GHNP has on the local communities. Traditionally, the GHNP ecosystem has been of crucial importance to communities living in the vicinity of the park. These communities draw many valuable goods from the park to sustain their subsistence oriented livelihoods. Thus the possibilities of serious conflicts between park authorities and the resident population can be there which could jeopardize the long-term conservation goals. The study reveals that the local population would have to forego an estimated amount of ₹ 8.20 cores as net benefits under the new conservation programme in the great Himalayan National Park conservation Area (GHNPCA). However, on a macro level, the benefits from protecting the GHNP are likely to be far greater than the opportunity costs of local residents, hence the importance of the GHNP protected area initiative. Furthermore, the GHNP also protects the watersheds of Sainj and Parvati hydroelectric power plants. A notable impact noted of the biodiversity conservation policy has been on farming community. This study has shown that people are willing to pay for biodiversity conservation, and this willingness is positively related with income of the households.

This implies that with rising incomes and better living standards more people can be expected to contribute for conservation of natural resources. The need therefore is to plan and promote income generating and educative activities (direct and indirect) as part of the project component. The experience

in GHNP suggests that the communities can be successfully weaned from existing dependence on park resources by providing alternatives for energy, modified livestock raising practices, development of bio-resources on private lands and village commons and facilitating income-generating activities not dependant on forest resources. So, it is imperative that local communities are made aware of the benefits of conservation and they begin appreciate the project goals.

Ecologically Sensitive Areas

Ecologically Sensitive Zones may be defined as areas with identified environmental resources having "Incomparable Values" which require special attention for their conservation. The Ministry has already notified six ecologically sensitive areas / zones for areas falling in non-protected areas and for 17 areas falling around protected areas under the Environment (Protection) Act, 1986.

Achievements

During the year 2014-15 following final and draft notifications were issued:

Final Eco-sensitive Zone Notifications issued

- Khangchendzonga National Park Eco-sensitive Zone, Sikkim, S.O. 2166(E) Dated 27th August 2014.
- Kitam Bird Sanctuary Eco-sensitive Zone, Sikkim, S.O. 2167(E) Dated 27th August 2014.
- Kyongnosla Alpine Sanctuary Eco-sensitive Zone, Sikkim, S.O. 2168(E) Dated 27th August 2014.
- Shingba Rhododendron Wild Life Sanctuary Eco-sensitive Zone, Sikkim, S.O. 2169(E) Dated 27th August 2014.
- Maenam Wildlife Sanctuary Eco-sensitive Zone, Sikkim, S.O. 2170(E) Dated 27th August 2014.
- Fambonglho Wildlife Sanctuary Eco-sensitive Zone, Sikkim, S.O. 2171(E) Dated 27th August 2014.
- Barsey Rhododendron Sanctuary Eco-sensitive Zone , Sikkim, S.O. 2172(E) Dated 27th August 2014.
- Pangolakha Wild Life Sanctuary Eco-sensitive Zone, Sikkim, S.O. 2173(E) Dated 27th August 2014.
- Bhagwan Mahaveer Wildlife Sanctuary & National Park Eco-sensitive Zone, North Goa, Goa, S.O. 221(E) Dated 23rd January, 2015.
- Thol Wild Life Sanctuary in the State of Gujarat, Dated 9th January, 2015.
- Five Final Eco-sensitive Zone notifications around the protected areas in the State of Goa are under final stage of publication.

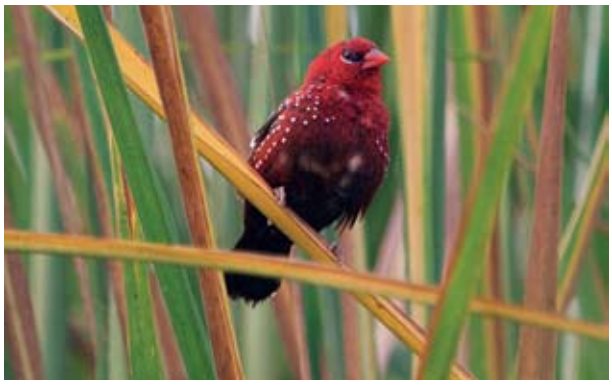


Fig-34. *Red Avadavat (Amandeva Amandeva) male adult at Surajpur Bird Sanctuary*

Draft Eco-sensitive Zone Notifications issued

- Bondla Wildlife Sanctuary Eco-sensitive Zone, North Goa, Goa, S.O. 633(E) Dated 3rd March, 2014.
- Cotigao Wild Life Sanctuary Eco-sensitive Zone, South Goa, Goa, S.O. 630(E) Dated 3rd March, 2014.
- Dr. Salim Ali Bird Sanctuary Eco-sensitive Zone, North Goa, Goa, S.O. 634(E) Dated 3rd March, 2014
- Madei Wildlife Sanctuary Eco-sensitive Zone, North Goa, Goa, S.O. 632(E) Dated 3rd March, 2014
- Netravali Wild Life Sanctuary Eco-sensitive Zone, South Goa, Goa, S.O. 631(E) Dated 3rd March, 2014 and amendment issued on 19th March, 2014.
- Kapilash Wildlife Sanctuary Eco-sensitive Zone, S.O. 1690(E) Dated 4th July, 2014.
- Bhitarkanika Wildlife Sanctuary, Bhitarkanika National Park and Gahirmatha (Marine) Wildlife Sanctuary in the State of Odisha, S.O. 2730(E) Dated 21st October, 2014.
- Pranahita Wildlife Sanctuary, in the State of Telangana, S.O. 2926(E) Dated 17th November, 2014.
- Dadra & Nagar Havelli Wildlife Sanctuary, S.O. 2927(E) Dated 17th November, 2014.
- Okhla Bird Sanctuary in the National Capital Territory of Delhi (NCT) and the State of Uttar Pradesh, S.O. 2499(E) Dated 24th September, 2014.
- Kaimur Wildlife Sanctuary in the State of Bihar, S.O. 274(E) Dated 28th January, 2015.

The Committee has met three times during the year and considered various draft notifications for finalization.

A draft notification declaring Ecologically Sensitive Area (ESA) in the Western Ghats vide S.O. No. 773(E) dated 10th March 2014 based on the recommendation of the High Level Working Group has been issued.

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

- Organised one meeting of Technical and Financial Sub–Committee of the National Natural Resources Management System on Bio-resources and Environment (NNRMS SC-B) during the year and considered 46 new / revised projects and accepted Eleven Final Technical Report (FTR) of the completed projects.
- During the year under NNRMS programme three new research projects have been initiated and two are under submission, one research project has been completed and outcomes have been published & disseminated among scientific community as well as displayed on the Ministry's web-site.

G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora

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 four regional Units located at Mohal - Kullu (Himachal Pradesh), Srinagar-Garhwal (Uttarakhand), Pangthang (Sikkim) and Itanagar (Arunachal Pradesh). The Institute designs and implements R&D activities on priority environmental problems; develops and demonstrates best practices and delivers technology packages for improved livelihood options for the people of IHR. The identified thematic categories for Institute R&D activities include: (1) Watershed Processes and Management (WPM), (2) Biodiversity Conservation and Management (BCM), (3) Environmental Assessment and Management (EAM), (4) Socio-economic Development (SED), (5) Biotechnological Applications (BTA), and (6) Knowledge Products and Capacity Building (KCB). Research, demonstration and dissemination are underlying essential components of all project activities geared towards development of environment-friendly technology packages. In addition GBPIHED also provides guidelines to the ministry with policy implications.

Objectives

The Institute has three broad objectives:

- To undertake in-depth research and development studies on environmental problems of the Indian Himalayan Region
- To identify and strengthen the local knowledge of the environment and contribute towards strengthening researches of regional relevance
- To evolve and demonstrate suitable technology packages and delivery systems for sustainable development of the region in harmony with local perceptions.

Achievements

- Rehabilitation of 25 ha of village common degraded land was successfully done under NAIP project with two restoration models (10 ha), five Horticulture models (13 ha) and one MAPs model (2 ha) in three village clusters of TehriGarhwal districts of Uttarakhand.
- Seasonal water scarcity was investigated with continuous recording of water discharge data through integrated approach of isotope technique, remote sensing and GIS application.
- The Institute initiated implementation of transboundary project "Khangchendzonga Landscape Conservation and Development Initiative" for developing a trans-boundary framework for conservation and sustainable development in the Khangchendzonga region of India, Bhutan, and Nepal.
- 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 Himalayan Young Researchers Forum as a prelude to Institute's Annual day at Almora (September 7-9, 2014) to connect young mind of diverse regions and disciplines; the event elicited participation of 74 researchers from all the twelve Himalayan states.

- The Rural Technology Centres (RTCs) of the Institute, at Triyuginarayan and Kosi, which are the programmes of participatory action research and training, got wide popularity and played a catalytic role in capacity building of the user groups on various rural technologies introduced/ developed by the Institute; the capacity building programme at Triyuginarayan made significant contribution towards off-season vegetable cultivation and bioprospecting of wild bioresources.

- The Institute, considering the important role of 'Landscape Yatras' as an effective tool to connect with the land and the people, organizeda number of landscape yatras to cover Kali, Gori and Ramganga Valleys in Uttarakhand and Khangchendzongaarea in Sikkim.

- Letter of Agreement with Uttarakhand Biodiversity Board and Forest Department was signed under Kailash Sacred Landscape Conservation and Development Initiative Project.

Research and Development Achievements

Group 1: Watershed Processes and Management (WPM) & Knowledge Products and Capacity Building (KCB)

- To address the ecological, social and policy implications of changing water resource scenario in the Indian Himalayan region variousthematic maps viz. watershed and sub-watersheds, administrative, drainage, geology, soil, altitudinal zonation map have been completed through GIS tools using data baseline studies andgeo-database for further modeling and analysis. Also,field study of 142 water springsand household surveys in the Suyal catchment, asub-watershed ofKosi, were carried out; the average per capita water consumption of 20.41 l/day which is lower than the national norms for rural areas, and 36.99 l/dayperlivestock was observed.

- To investigate the impact of climate change regimes on farming system, three different villages at different agroecosystem zones ofKosi catchment in Almora, Nayar valley and Guptkasi region at Rudraprayag district (Uttarakahnd) and Kullu district (Himachal Pradesh) showed variation in responses to climate change. Theyearly analyses of rainfall for the Kosi-catchment of Uttarakhand showedincreased precipitation by 5% during pre-monsoon season, and a decline of 3% during winter and 6% in monsoon season. Similarly,an increase of 1.3 0C/100 yr in minimum temperature and 1.1 0C/100 years in maximum temperature during winter season was noted. The pattern of variation in precipitation and

temperature also showed variability in decadal rates of change. All these factors might have influenced the farming system at different agroecosytem zones of the Kosi catchment.

– Under the operation of permanent and campaign mode GPS stations for quantification of tectonic deformation in Himalayan Terrain,sixpermanent stationsi.e. Almora (GBPK), Nainital (GBNL), Srinagar (GBSN), Kullu (GBKL), Pangthang (GBSK) and Zero (GBZR) have been established. Preliminary observations showed velocity of IISc and HYDE is ~52–54 mm/yr, and those of GBPIHED's permanentstations GBSK, GBPK, GBNL,GBSN, GBKL and GBZR are~51 mm/yr, 47 mm/yr, 46 mm/yr, 47 mm/yr, 39 mm/yr and 44 mm/yr, respectively (Fig. 31).

– The estimation of snow and glacier melt runoff was continued; the higher discharge observed during September confirmed delay in end of ablation season and consequent delay in next accumulation season. The high flows mostly occurring in the months of August and July confirmed that these events were caused by opening up of drainage network and excessive melting of snow and ice on account of rising temperature. The snow cover depletion analysis depicts a shift in the duration of ablation and accumulation in the basin. The data analysed indicated significant increase in SCA in the middle elevation zones (4000–5500 m) and decline in SCA in the lower elevation zones (3000–4000 m) during autumn with varying rates.

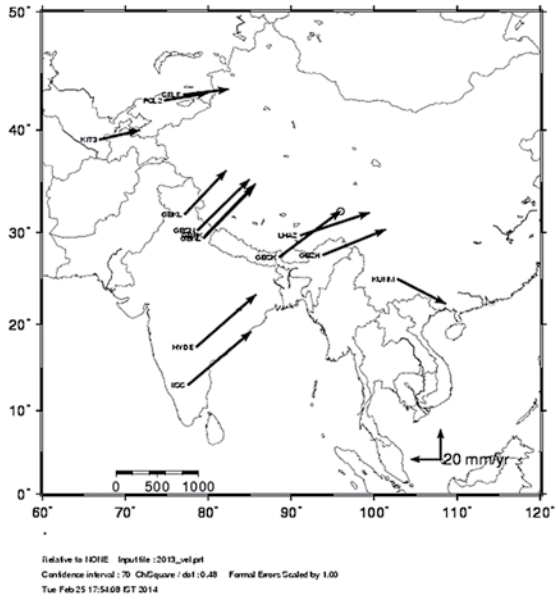


Fig-35. *Velocity of permanent stations (2010–2013) and reference IGS stations in ITRF08.*

– In order to understand the the role of enhanced UV-B radiation and nutrient fertilization on some high altude Pea (Pisumsativum) varieties revealed the highest content of total phenolics in Early Giant followed by Saloni, Ruchi, Lincoln, GS-10, CM-Avtar, Prachi and lowest in Anmol. Antioxidants using DPPH inhibition was shown highest in Early Giant followed by Lincoln, CM-Avtar, Ruchi, GS-10, Saloni, Anmol, Prachi and lowest in Anmol.Growth, biochemical and physiological performance of different varities of pea plants grown under field conditions of Kullu valley of Himachal Pradesh showed that Lincoln and Early Giant have maximum length, dry matter yield, total phenolics and chlorophyll contents as compared to other varities of pea plants. Similarly economic yield of Lincoln and Early Giant were also found highest among varities of pea plants.

Group 2: Socio Economic Development (SED) & Environmental Assessment and Management (EAM)

The group includes two themes: (i) Socio Economic Development (SED) which focuses on activities, such as livelihood enhancement, sustainable tourism, entrepreneurship and self employment, and socio-economic and cultural implications of migration, and (ii) Environmental Assessment and Management (EAM) which targets 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 highlights of the R&D work include:

- Towards developing the wildlife management/biodiversity conservation plan for trans-Arunachal highways road sectors, viz. Potin-Bopi, Godak-Tai, Tai-Bame, Nechipu to Bana, and Seppa to Passa, assessment of biodiversity was conducted (Fig. 5). Results revealed a total of 859 species along the road sector, of which 724 (84.28%) species were ethnobotanically important. Amongst the ethnobotanically important plants, 231 (31%) species were tree, 224 (30%) herbs, 151(21%) shrub and 109 (15%) climbers. A total of 287(33%) species were Rare, Endemic and Threatened (RET) categoty species, while 23 species were endemic to North East India, Indo-China and Arunachal Himalayan region. In addition, 52 animal species of prime ethnozoological significance were inventoried along the Trans-Arunachal Highway, which comprised 80% mammals, 12% birds and fish, and remaining 8% other species. Most animals were closely linked with indigenous faiths & beliefs.
- To study the status of hydropower projects in relation to strategic environmental assessment (SEA) in the Himalayan Region, seven hydroelectric projects in the Satluj basin, viz. Naptha-Jhakri (1500 MW), Shongthong (412 MW), Karchham-Wangtu (1000 MW), Shayang (2 MW), Tangling (3 MW), Baspa-II (300 MW) and Kashang (243 MW) that vary from 1350 m to 2829 m altitude were taken into account for soil (N,P,K) and air quality analysis (respirable particulate matter PM10, and gaseous pollutants like nitrogen dioxide NO2 and sulphur dioxide SO2). Results reveal that mean N, P, and K content in soils adjacent to HEP affected areas were found to be 221, 19 and 312 kg ha-1 respectively in the Satluj basin (Fig. 6). However, the NPK values in soil of adjacent sites of HEPs ranged between 150–326, 6–85 and 114–583 kg ha-1, respectively.Highest value of N is observed at Tangling HEP (326 kg ha-1), while lowest N (150 kg ha-1) was found at Shongtong HEP. Similarly, highest phosphorus was observed at Nathpa-Jhakri HEP (49 kg ha-1) and lowest at Kashang, Shongtong and NathpaJhakri HEP (6 kg ha-1). In case of potassium, it is observed highest at Nathpa-Jhakri HEP (583 kg ha-1) and lowest at Karcham-Wangto HEP (114 kg ha-1).
- Climate change impacts on ecosystem services in the IHR through phonological study infour major forest types from

the foothill Sal (Shorearobusta) to high altitude Tilonj Oak (Quercus floribunda) in the central Haimalayarevealed that species phenology is an early indicators of climate change. Important tree species at canopy and sub-canopy levels were investigated for change in phenophases with relation to past data set (i.e. for the year 1985–87) and results showed marked variation across altitude and slope aspects (Fig. 7 A-D). In general, leaf bud break and leaf drop was initiated earlier in low altitude species as compared to high altitude species. Sub-canopy species generally initiated all the phenophases little late than the canopy species probably due to shading effect.

– To identify the indicators of climate change in Himalayan forests along an environmental gradientdetection of the timing of offset and onset of greenness were analysed across 18 sites in Sal (S.robusta) forest in the foothills of the Kumaun Himalaya. Statistically significant trend in vegetation growth was observed using t-test method. Healthy vegetation has high NDVI value, whereas unhealthy or dry vegetation shows low NDVI value. Sal forest shed their leaves during spring season (from late February to early April), but did not become fully leafless and leaf flushing starts from late March and reaches maximum during April, and extends till mid June. Full canopy at the forest community level was achieved in September.

– Analysis of gaseous air pollution in the background site of sprawling urban environment of Himachal Pradesh revealed that NOx precursor and CO showed two peaksduring morning and evening. The emission of both the precursors takes place due to anthropogenic emissions such as vehicular emissions and biomass burning in the Kullu valley. Both of these pollutants are the primary pollutants. Maximum concentration of surface ozone was observed in the months of April, May and March. The daily maximum concentration of O3 was 51 ppb.The average fire counts from MODIS Terra and Aqua satellites showed their higher numbers in the month of May, June, October and November, which is the post harvesting and relatively dry season in the Kullu valley. It is interesting to note that the seasonal pattern of fire counts and surface ozone is found to be similar in the present study region.The surface ozone concentration was observed to be 38 ppbv, 32 ppbv, 24 ppbv and 23 ppbv for the months of May, June, October and November respectively, while the number of fire counts in the corresponding months were found to be 59, 27, 26 and 28.

– Analysis of aerosol climatology over the Himachal Pradesh revealed that due to continuously increasing anthropogenic activities, solar attenuation in the form of aerosol optical depth (AOD) has been increasing at the rate of 0.02 per annum. AOD from forenoon to afternoon was found to be increased in the convective process, afternoon AOD showed high values as compared to the forenoon AOD. On average, the solar flux due to atmospheric aerosols is attenuated from forenoon to afternoon by 50% at 500 nm and 51% at all wavelengths

(380–1025nm). Alpha (corresponds to fine size particles) and beta (corresponds to coarse size particles) were computed on monthly basis, maximum value of alpha (2.10) varied during different seasons. Observation of Black carbon concentration (BCA) was found to be decreasing in a number of fire cases. Relationship of AOD with temperature conditions was found positive (r=0.28), indicating an increase in air temperature with the simultaneous increase in AOD. The average total ionic concentration of different water soluble components at different depths of snow in the Beas Kund glacier was also measured (Table 25).

– Analysis of black carbon and other aerosols loading on the Parbati Glacier in the Northwestern Himalaya revealed that theglacier had lost 3.54 km2 from 1980 to 1989, which is about 7.93% decrease in the glacier surface area, 5.85 km2during 1989 to 2002, which is about 14.23% decrease in the glacier area (Fig. 8a–d). The Parbati glacier had retreated about 5.36 km2 which is about 15.19% decrease in the glacier area. While average retreat of the Parbati glacier between the periods 1980 to 2013 is 4.92 km2 accounting for 33.02% decrease in the total glacier area.

Fig-36. *The immediate effect of agricultural biomass is production and release of gases and particulates that result from the combustion of biomass matter into the atmosphere*

Group 3: Biodiversity Conservation and Management (BCM) & Biotechnological Applications (BTA)

The group includes two thematic areas (i) Biodiversity Conservation and Management (BCM), and (ii) Biotechnological Applications (BTA); the aim is to ensure long term conservation of sensitive Himalayan biodiversity elements and sustainable use of bio-resources for improvement in the rural economy of the Indian Himalayan Region. Highlights of the R&D work carried out under this group are as follows:

– Towards understanding biodiversity patterns and processes under changing resource use and climate scenario, study on (i) dependency of local people

Table-25. *Ionic concentration, pH, EC and TDS in snow samples at different snow depth*

Snow depth (cm)	Cation mg L-1 (%)	Anion mg L-1 (%)	pH	EC (mS cm-1)	TDS (mg L-1)
0–10	1.01(27)	2.68 (73)	5.4	72.0	35.5
10–20	6.46 (47)	7.21 (53)	6.6	106.5	51.0
20–70	2.25 (39)	3.47 (61)	5.2	13.4	0.8
70–85	2.53 (30)	5.91 (70)	6.1	7.0	3.4

on the natural resources in Kumaun region, (ii) qualitative assessment of floristic diversity and regeneration patterns in Kanawar Wildlife Sanctuary, Himachal Pradesh, (iii) identification of indicators for biodiversity conservation and sustainability in Kanchendzonga Biosphere Reserve, Sikkim, and (iv) inventory of ethnomedicinally important plants at West Kameng, Arunachal Pradesh was carried out.

– Assessment and quantification of forest ecosystem services in relation to pollination in different agroecosystem ofUpper Beas Valley of Kullu district, Himachal Pradeshwas carried out. Results revealed a total of 250 species representing 19 trees, 29 shrubs and 202 herbs including ferns and 49 species ofthe bee flora. In addition, three volunteer programmes were organized jointly with Earthwatch Institute, India for promotion of Citizen Science Programme. Volenteerswereinvolved in data collection on qualitative and quantitative assessment of vegetation, assessment of insect/ pollinators diversity and density, phenological observation of the apple and the associated crops; and different ecosystem services flowing from forest and agro-ecosystem.

– Towards investigating the ecological resilience of the extremophiles from Himalaya, 28 bacterial cultures, isolated from Soldhar and Ringigad hot springs in Uttarakhand, have been characterized and identified with particular reference to wide temperature and pH tolerance and production of enzymes in thermophilic range. Based on 16S rDNA similarity, 20 bacterial isolates belonged to Bacillus licheniformis, 5 to Paenibacillusehimensis and 1 each to B. sonorensis, Bacillus tequilensis and Staphylococcus epidermidis. Bacterial isolates exhibited tolerance to wide temperature range (20–80 °C), covering mesophilic (+11° to +45 °C) to thermophilic (+46 ° to +75 °C); few approaching the hyperthermophilic range (+76 °C). The isolates also tolerated wide pH range (4–14) and moderate salt concentration. The optimum growth of bacterial isolates was observed at 55 °C and 7 pH, respectively. Out of

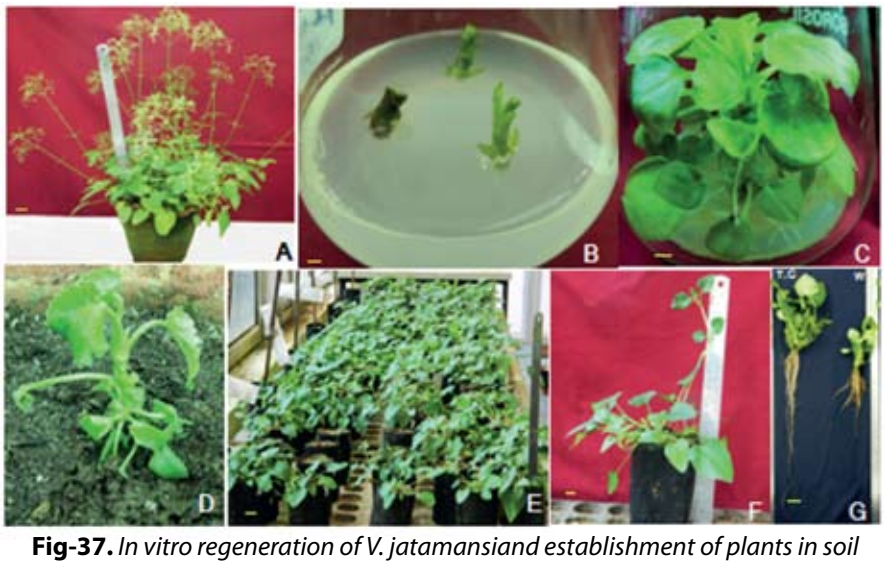


Fig-37. *In vitro regeneration of V. jatamansiand establishment of plants in soil (A-G). A: Mother plant of V. jatamansi,the sourceof explant (bar 5 cm), B: Nodal explants cultured on MS medium (bar 2 cm),C: Induction of multiple shoots and roots from 10 week old culture (bar 2 cm), D: Transfer of in vitro raised plants to soil (bar 1cm), E: Acclimatization of plants in green house (bar 5cm), F: Established tissue culture raised plant after 6 months growth in a polybag (bar 1cm), G: Well developed one year old & Tissue culture (TC) with profuse and well established root system (bar 5 cm).*

28 isolates, 25 produced lipase, 25 amylase, 24 cellulase, 22 protease and 13 xylanase at 55 and 65 °C. Tolerance to wide temperature and pH range and production of enzymes in thermophilic temperature range are considered as indicators of ecological competence of these bacterial isolates for colonizing the high temperature environment. The nucleotide sequences of all the bacterial cultures have been accessioned by NCBI.

Application of R & D Outputs in Demonstration and Dissemination:

- Under the model nursery development programme, about 150000 seedlings of Valerianawallichii and 25000 seedlings of Inularacemosa were raised under different microclimatic conditions for developing appropriate package of agrotechnology.
- Towards rehabilitation of degraded land a total of 24 hectare village common land was brought under development using different rehabilitation models (i.e. MPT models -10 ha, Horticulture -13 ha and MAPs -1.0 ha) and a total of 3900 seedlings of various horticultural crops i.e. Pear (Prunuspersica) – 350, Apricot (Prunusarmenica) - 1100, Walnut (Juglansregia) - 800, Apple (Malussp) - 200 and Peach (Pyruscommunis) - 400, and Plum (Prunusdomestica) - 600, were planted in three village clusters.
- Strengthening of ex-situ conservation efforts through: (i) improvement of seed germinationof Phoenix rupicola and Oroxylumindicum (ii) development of in vitro propagation protocols for Rhododendronniveum (Sikkim State tree) andBergeniaciliata (iii) field plantation of tissue culture and conventionally propagated plants of important Rhododendron spp. of Sikkim in 'Zoological Park', Gangtok, was carried out.

Fig-38. *The Scenic Siang (River) in Arunachal Pradesh*

R&D progress of GBPIHED

Categorization of R&D activities			
R&D areas	Research	Demonstration	Dissemination
Environmental Status Assessment and Monitoring	• Land and water resources assessment, monitoring of climate sensitive areas • Dynamics studies of sensitive biodiversity elements (species/ habitats) • Impact of development initiatives on natural systems • Resource-use surveys for rural planning • Documentation of IKS and database development	• Eco-Restoration and conservation • Arboretum, herbal gardens, multipleuse garden and Vriksh Vatika • Livelihood options	• Capacity building/ skill development • Networking • Publications / documentation
Environmental Conservation and Management	• Strengthening conservation of priority areas/species • Eco-restoration of degraded sites/areas • Factors and processes for mountain hazard management • Microbial diversity, potential application & culture collections		
Developmental options/ strategies/ plans	• Resource management interventions • Propagation of economically important plants • IERP for IHR		

Budget Allocation of the Scheme during the year and Progress of Expenditure

Budget Head including IERP	**Allocation (Rs in lakhs)**	**Expenditure (up to Nov. 30, 2013.)**
Revenue	1312.00	953.65
Capital	188.00	14.64
Total	1500.00	1095.40

Forestry Research

Grants in aid to Forestry & Wildlife Institutions

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

Indian Council of Forestry Research and Education (ICFRE), an apex body in the national forestry research system, has been undertaking the holistic development of forestry research by need based planning, promoting, conducting and coordinating 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. Topical research by the Council enhances public confidence in the ability of forest managers and researchers to successfully handle challenges related to natural resource management.

Achievements

– World Day to Combat Desertification was celebrated by ICFRE and MoEFCC on 17 June 2014 at New Delhi with the slogan ***'Land Belongs to the Future, Let's Climate*** Proof It'. Shri Prakash Javadekar, Hon'ble Minister of MoEFCC & CC, the Chief Guest of the function said that desertification and loss of biodiversity along with climate change is the greatest challenge to sustainable development. He said that India can become land degradation neutral by 2030, if efforts are made towards this goal. A short documentary on SLEM project in India prepared by ICFRE was released by the Hon'ble Minister. He also felicitated Mr. Jadav Payeng from Assam, Mr. Ranaram Bishnoi from Rajasthan and the Foundation for Ecological Security, an organization based in Gujarat for their outstanding contribution in restoring degraded land and ecosystems.

– **ICIMOD-GIZ-ICFRE REDD+ Planning workshop on "REDD+ Himalayas: Developing and using experience in implementing REDD in the Himalayas" at Dehradun from 26-28 August 2014:** A 3-days Planning Workshop was organized by BCC Division, ICFRE in collaboration with ICIMOD and GIZ at Dehradun from 26-28 August 2014 for finalizing the operational part of REDD+ capacity development programme for Bhutan, Nepal, Myanmar and India. It was addressed by Dr. Rajan Kotru, Regional Programme Manager, ICIMOD, Dr. Bhaskar Karky, REDD Coordinator, ICIMOD, Dr. G. S. Goraya, DDG (Research), ICFRE, Shri Saibal Dasgupta, DDG (Extension), ICFRE, Prof. S. P. Singh, Chair of Excellance, FRI (Deemed) University and Dr. T. P. Singh, ADG (BCC) among others.

Fig-39. *Shri Prakash Javadekar, Hon'ble Minister of Environment, Forests and Climate Change lighting the lamp on the occasion of the World Day to Combat Desertification on 17 June 2014 at New Delhi*

- ICFRE has conducted Cumulative EIA studies for various hydropower projects. During 2014-15, the Council 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 as per the directions of the Hon'ble Supreme Court in line with Central Empowered Committee (CEC) guidelines to Department of Mines and Geology, Government of Karnataka.
- 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.) continued. 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 the VVKs and DVs. 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 "Forestry Research- ICFRE Supporting Rural and Tribal Livelihood", a coffee table book "Forest Biodiversity in India", "Forestry in the Service of the Nation: ICFRE Technologies", Forest Types of India: Revisited", ICFRE State of Knowledge Series -1 Advances In Forest Seed Science & Technology etc. in recent past. ICFRE publications (other than the research papers) from 1999-2013 were enlisted and published in the form of ICFRE Catalogue 2014

Forest Research Institute (FRI), Dehradun

Research

- The problems in the salt-affected soils of northern plains were taken up (Panjab, Haryana and Uttar Pradesh). The practices developed was demonstrated in Sultanpur district in Uttar Pradesh in collaboration with Indian Farm Forestry Development Cooperative (IFFDC) and subsequently the technology was applied to more than 2000 ha in Sultanpur, Raebareilly, Allahabad and Pratapgarh districts.
- A Study of bioaccumulation of heavy metals and its impact on different plant species showed that Dalbergia sissoo has potential for use in phytoremediation and reclamation of heavy metal contaminated sites; other tree species like Alstonia scholaris, Holoptelia integrifolia have also showed positive response towards accumulation of heavy metals so that they can also be used for the same purpose.
- Identification and reclamation of degraded land and biodiversity development at NCL, Singrauli: The ecological restoration of coal mine areas has been undertaken in Northern Coalfield Ltd., Singrauli at Nighai and Krishanshila since July, 2014 by adopting physical (leveling, top soil spread, mulching etc.) and biological (species selection and their planting) techniques.

- Enhancing fodder productivity through Silvi-Pasture system on degraded land of India: Casualty replacement of tall planting of Khadik and Kachnar with Napier grass in Silvi-pasture agroforestry models on degraded land at Kharakhet, Dehradun.
- Studies on diversity of egg parasitoid wasps Trichogramma spp. from Punjab and Haryana and their application in biological control of important forest insect pests: Collection of Trichogramma spp. has been done from all agro-climatic zones of Haryana and 5 species two cultures of indigenous species (T.chilonis and T.japonicum) are being maintained as laboratory culture.
- Phytochemical screening of selected wild edible plants for exploration of new sources of Luteolin: Processed fruits of Myrica esculenta (Kaphal) were extracted using organic solvents and extractive values determined. Total phenolic content and total flavonoid content was estimated.
- Process refinement for extraction of quality fiber and optimal isolation of bioactive constituents from Agave sisalana: Saponin part was separated and hydrolyzed, examined by TLC using varying mobile phases. The steroid mixture Hecogenin-Tigogenin was recovered from sapogenin part and isolation of hecogenin was attempted with 90 % purity. Quantitative estimation of the target phytochemical was carried out using HPTLC.
- Enzyme aided alternative process for the extraction of oil from Cymbopogon citratus (lemon grass): Essential oil was isolated from lemon grass leaves, quantitative analysis and physico chemical constants were determined. GC-MS analysis was carried out for enhancing quality of essential oil.
- Development of molecular diagnostic kits for identification and early detection of nursery and plantation pathogens of Eucalyptus: Fresh eucalypts diseased samples from Punjab, Haryana and Uttar Pradesh were collected and isolations of associated fungal species were conducted. DNA extraction was carried out for 10 isolates of Pestalotiopsis sp. and amplification of the ITS region is in progress.
- Medicinal and edible mushroom cultivation for income generation in rural areas of Uttarakhand: Four villages of Dehradun were selected for sensitization and rapport building among women self-help groups for medicinal (Ganoderma lucidum) and edible (Pleurotus spp.) mushroom cultivation through an NGO, Baghban Gramodyog Samiti.

Extension

- A vermi-composting demonstration unit was constructed in FRI and training organized to train 217 women from eight different villages around Dehradun and vermicompost and earthworms were also distributed.
- Training held on "Raising, managing and marketing of bamboo" for the farmers of Uttarakhand and Uttar Pradesh under BTSG - ICFRE from 8 to 12 September 2014.

- Sensitization course on forest, wildlife and environmental conservation" for officers of Govt. Departments viz. Horticulture, Agriculture, Animal Husbandry, Soil & Water Conservation, Education & members of Eco-club of Uttarkhand, Uttar Pradesh, Punjab, Haryana & Chandigarh was held from 9 to 11 October 2014.
- Organised a National Bamboo Craft Mela at FRI, Dehradun from 25 to 27 November 2014 as a side event of National Silviculture Conference from 24 to 28 November 2014.

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

Research

- During the year many trials were established. New international germplasm of Eucalyptus mallee species from Australia and Leucaena accessions from USA have been introduced, national collections of Pterocarpus santalinus (Progeny trial), teak (Breeding population), Gmelina arborea (Progeny trIalS) have also been assembled for evaluation and breeding.
- Clonal propagation of Ailanthus and Phyllodinous, acacias has been standardized.
- Establishment of Community Seed Orchards Teak, Gmelina and Casuarina
- Commercialized RNA isolation technique in tree species
- Cost effective vegetative propagation structure established and produced rejuvenated planting stock. Developed a draft genetic linkage map in eucalypts
- Butterfly diversity studies vis-s-vis landscape changes in Walayar Valley have been taken up. 119 species were recorded.
- Studies carried out on the population and regeneration of Dalbergia latifolia and D. sissoides in Kerala and Tamilnadu
- Treerich biobooster – organic based product has been developed, introduced to farmers and received good response from the end users.
- Plant based biopesticidal formulation has been developed and evaluated in field conditions against P. marginatus that was found very effective.
- 91 high fruit yielding trees of Pongamia pinnata were selected from different agroclimatic regions of Tamil Nadu, Kerala and Pondicherry, multiplied clonally and assembled in the clone bank.
- Established three progeny trials of Neolamarckia cadamba in Tamil Nadu and Kerala. Established one multilocation trial of Sapindus emarginatus at Thuvarankurichi.
- Supplied 45 kg of quality seeds of various species like, Casuarina, Eucalyptus, Melia, Sapindus, teak etc. and generated revenue of ₹2.85 lakhs.

Institute of Wood Science and Technology (IWST), Bengaluru

Research

- **Evaluation of wood properties of Melia composita of different ages from southern India for finding suitability for various uses and development of value added products:** Studies on

physical and mechanical properties under green conditions were carried out. Completed studies on wood working qualities.

- **Development of coccinellids based biocontrol programmes for the management of sandal scales and mealy bugs:** 26 species of scales and mealybugs were found infesting on sandalwood which includes 4 species observed for the first time. 25 species of coccinellids were found very active in sandalwood growing areas out of which Cryptolaemus montrouzieri and Chilocorus nigrita have been identified as more potential predators.
- **Determination of treatability and durability of imported timbers as per bureau of Indian Standards:** Observation has been taken in four testing sites, viz., Jodhpur, Nallal, Palode and Visakhapatanam on the durability of moderately resistant timber Quercus robur, and highly resistant timbers viz., Dryobalanops aromatica, Tectona grandis, Shorea laevis, S. marcoptera, S. robosta, Pterocarpus soyauxii and Xylia dolabriformis. Natural durability experiment with two additional imported timber species viz., Instia palembanica (Merbau) from Malaysia and Dipterocarpus grandiflorus (Gurjan) from Myanmar were initiated. Development of mathematical model is in progress.
- **Chemical modification of Eucalyptus hybrid oil and development of fragrant products:** Oil was distilled from Eucalyptus hybrid leaf material. GCMS analysis has been carried out for constituents α-Pinene, P-cymene and 1,8-Cineone content. Developed 12 different blends using Eucalyptus hybrid oil.
- **Evaluation of the performance of Steam Volatile Creosote as wood Preservative:** 8 species of wood specimen were treated with Steam Volatile Creosote (SVC) along with natural and synthetic dyes and evaluated the preservative activity.
- **Vegetative propagation and silvicultural practices for selected tropical timber species for plywood and panel wood industries:** Experiments on effect of growth hormones, seasons and type of cuttings on rooting of cuttings was carried out in Melia dubia. Experiment on effect of elevated CO2 on seedlings of Melia dubia, Anthrocephalus chiensis , Grevillea robusta carried out. Established spacing and fertilizer trials for them.
- **All India coordinated project on genetic improvement of Melia dubia:** Established progeny trials of 21 families of M. dubia at two locations in Karnataka. Seed collection was carried out and variability in terms of seed size, shape and germination was recorded.
- **Development of natural fiber filled thermoplastic composites from natural resources available in the state of Punjab:** Lantana PP composites at 10-50% filler loading prepared with and without coupling agent. Injection moulded products like pen, pen stands and hangers have been developed from the composites.

- **Establishment of demonstration plots and modern nursery for producing quality planting stock of Santalum album and bamboo:** Sandalwood nursery established in Talwara, Hoshiarpur and 1 ha. demo plantation has been established at Bhatola, Mathewade, Ropar, Mullanpur. Sandal plants raised from seeds collected from germplasm bank of IWST at Talwara, Hoshiarpur. 1 ha. demo-plantation of 4 bamboo species raised in Hoshiarpur.
- **Bamboo genetic evaluation, improvement and propagation:** Evaluation of field trials of four species (B. bambos, D. stocksii, D.brandisii and D. strictus) in addition to B.balcooa, B.nutans and D.asper established in Koppa, Chickmagalur Dist. and Virajpet, Coorg Dist. in Karnataka. Identified 65 superior genetypes (CPCs) of D. stocksii and collected offset and culm cuttings for the establishment of rhizome bank.
- **Distribution, Diversity and Productivity of Dendrocalamus stocksii in the Western Ghats part of Karnataka:** Distribution of D.stocksii mapped in central western ghats from Kasargod in Kerala to Ratnagiri in Maharashtra. 102 genotypes of this species collected and established in DBSKVV, Dapoli.

Extension

- Two five- days training programmes was conducted under BTSG-ICFRE (NBM), Dehra Dun from 8- 12 September and from 15- 19 September, 2014 at IWST, Bangalore.
- Three training programmes on "Sandalwood cultivation" were organized jointly by VVK-KVK at Krishi Vigyan Kendra, ICAR on 14th, 16th and 28th October, 2014. More than 150 participants attended a programme.
- One day consultative workshop on "Alignment of National Action Programme on Combating Desertification to 10 years Strategy of United Nation Convention to Combating Desertification (UNCCD)" was organized by ICFRE at IWST, Bengaluru on 12th November, 2014.
- IWST conducted an International Conference "Wood is Good: Current Trends and Future Prospects in Wood Utilization" from 21st- 23rd November, 2014 at Bengaluru as part of year-long celebration of the IWST's Platinum Jubilee year. More than 150 delegates from various countries participated. Dr. Ashwani Kumar, Director General, ICFRE, presided over the function.
- The Institute participated in Kisan Mela held at Mudigere in Chikmagalur district from 28 – 29 November, 2014 where it had put up a stall to showcase the activities and technologies of the Institute.

Tropical Forest Research Institute (TFRI), Jabalpur

Research

- **Studies, evaluation, documentation etc** were conducted on variation in structure and composition of vegetation in preservation plots of Bhimashankar; population dynamics of Uraria picta and Andrographis paniculata in TATR; sal borer in MP & CG; predation behaviour and life cycle of Canthecona furcellata

on E.machaeralis; status of availability of medicinal plants in forest fringe areas of MP; Gmelina mortality due to fungi; assessment of genetic diversity and structure of Boswellia serrata.

- **Package of practices, models** and estimations on optimal combination of chemical and biofertilizers and pruning techniques for increasing tendu leaf size, time of pruning and control fire for reducing incidence of gall fly as well as increasing leaf size.
- **Disease and pest management** studies including development of certification criteria and production of microbial inoculants, management of pathogens responsible for low seed production in Teak, Fusarium moniliformae against Indarbela quadrinotata of aonla, field validation of biocontrol potential of EPNs against defoliators undertaken.
- **Value addition to NTFP:** include concentrate, leather, 'thandai', 'bati' and 'kathmith' from 'kusum'; saponins and diethanolamide products from Sapindus, Schliechera, Pongamia and Jatropha and their testing against insect pests/fungi of teak; phyto polymers from Shorea, Jatropha, Mangifera for preparation of bio-adhesives.

Extension

- Two training programmes under MP State Bamboo Mission consultancy at Dhooma district, Seoni from 9 to 13 June 2014 and at Balaghat from 16th to 20th June, 2014 for skill upgradation of bamboo artisans.
- 1 day training programme in VVK, Chhattisgarh on the topic ''वन रोपणियों तथा वृक्षारोपणों के कीटों तथा रोगो का समन्वित प्रबंधन'' on 26th May, 2014 and 'उन्नत नर्सरी तकनीक एवं कृषिवानिकी पर प्रशिक्षण'' on 27 May 2014 at Raipur
- Seven outreach trainings under VVK's in CG/MP/Odisha.
- Monthly e-magazine – Van Sangyan.
- Forest Museum and Interpretation Center Commissioned.

Rain Forest Research Institute (RFRI), Jorhat

Research

- **Ecological studies on monitoring the distribution patterns and food plant resources of butterflies along altitudinal gradients in different forest ecosystems of the Eastern Himalaya (Arunachal Pradesh):** 393 species have been recorded including 'rare' and 'very rare' species, endemic species, Species distribution maps are being prepared on a GIS platform
- **Investigations on the mortality of Parkia roxburghii in North East India:** Seedlings of Parkia roxburghii were raised in RFRI nursery, disease symptoms observed & fungus isolated from the infected portion of seedlings tested for its pathogenicity.
- **Studies on the economically important diseases of medicinal and aromatic plants of Assam to develop management practices through organic approach:** A new leaf necrotic disease caused by Curvularia maculans was observed on Kali Musli in nursery of NEDFC near Guwahati. Trichoderma

harzianum was found effective against Curvularia andropogonis under laboratory conditions.

– **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:** Soil samples from parts of Nagaland, Assam and Meghalaya were subjected to trap the fungal spores and 10 fungi were isolated and identified.

Fig-40. *Indo-Chinese Chocolate Albatross (Appias lyncida eleunora) in Tirap district, Arunachal Pradesh*

– **All India coordinated project for genetic improvement of Melia composita:** Survey work was carried out in Tripura, Nagaland, Meghalaya, Sikkim, Cooch Behar and Tripura to identify promising genotypes and provenances through selection and field evaluation. 91 trees were selected from these regions. Three trials were established. Initial one year observations are recorded in these trials.

Extension

– RFRI, Jorhat organized a district level workshop on 'Bamboo propagation and management' on 30 June 2014 jointly by FDA, Jorhat under National Bamboo Mission.

– Field functionaries training on bamboo propagation and management' was organised jointly with FDA, under NBM from 16 to 20 June 2014.

Arid Forest Research Institute (AFRI), Jodhpur

Research

– Trichoderma viride strains were isolated and mass multiplied for bio-control of khejri mortality. Surveyed 226 villages to document socio-economic impact of khejri mortality in Rajasthan and generated awareness on khejri mortality and its management.

– Progeny trial of 30 CPTs selected from various districts of Rajasthan was established for genetic improvement of Prosopis cineraria.

– Identified Lasidiplodia theobrome fungi as a causal organism of canker disease of Rohida and used salicylic acid, jasmonic acid and T. iride for acquired resistance.

– Identified three rapid decomposting

fungi and PSB to reduce composting period from 120 days to 90 days.

- Out of 7 desert plants species evaluated for broad spectrum antifungal compound, Datura stramonium alcoholic leaf extract was identified as the best species.
- Established 3 tier shelterbelt plantation cum urban forestry model at IIT, Jodhpur campus on NH-58.
- Developed field model for estimation of total volume and merchantable volume for Prosopis cineraria and Ailanthus excelsa and fodder and firewood in P. cineraria.
- A check list of 91 species of butterflies and 41 species of moth has been prepared and 5 rare species of butterflies were recorded in Gir wild life sanctuary.
- A total 264.23 million tonnes organic & inorganic carbon in soil, 1.24 million tonnes in dead material, 0.77 million tons in herbaceous and 38.97 million tonnes carbon in woody live biomass was recorded in Rajasthan forest.
- Established multilocational progeny trials of Melia composita in Rajasthan and Guajart and evaluated four progeny trials of Tectona grandis .
- Established new progeny trial of Tecomella undulata in Jodhpur and evaluated existing two progeny trials of 5 years old.

Extension

- Pamphlets on Khejri mortality problems and its management were distributed to generate awareness. Training on khejri mortality and its management was conducted at AFRI.
- Developed bilingual dynamic website of AFRI on research projects, publications, technologies, tropical information and data base of 160 important plant species of the region.

Himalayan Forest Research Institute (HFRI), Shimla

- Identification of superior chemotypes and ex-situ conservation of Podophyllum hexandrum Royle from HP and J&K done. Propagation trials and FGB (Field Gene Bank) were maintained at Field Research Station, Brundhar, Jagatsukh (H.P.). 41 samples of P. hexandrum were given accession numbers by the National Bureau of Plant Genetic Resource (NBPGR), Pusa Campus, New Delhi.
- **Survey and mapping of Ashtavarga Group of medicinal and aromatic plants (MAPs) in HP:** Four study sites were selected for phyto-sociological studies. Household data was collected from villages Sirmour (Nouradhar, Churdhar, Sangrah and Shimla districts. A nursery developed near Shimla maintains the germplasm of these Ashtavarga plant species. A pamphlet on Ashtavarga was published in the vernacular language (Hindi).
- **Determination of nursery requirement and initial planting performance of Diploknema butyracea (Roxb.) H. J. Lam and Myrica esculenta Buch. Ham. under mid-hill conditions of Himachal Himalayas:** Nursery stock of Cheura was raised from seeds collected from Champawat district of Uttarakhand and monitored. Continued germination studies in seeds of Kaphal collected from

various places of HP during the period with some success in germination. Also laid out fresh germination trials in model nursery Baragaon, Shimla. Observations recorded periodically in the plantations.

- **Studies on seed germination and longevity of Abies spectabilis (D.Don) Spach:** The germination trials of the seeds treated with different pre-sowing treatment laid out and maintained in the laboratory and nursery.

- **Ecological studies on distribution patterns and food plant resources of butterflies along altitudinal gradients in different ecosystems of Western Himalayan Sub-Alpine Forests of Himachal Pradesh:** 160 specimens of butterflies belonging to 44 species were collected from four sites and their host plants collected and identified. GIS mapping has been initiated with the technical support of Dept. Of Science & technology, Govt. Of H.P.

- **High Altitude Transition Zones in Himachal Pradesh:** Long-term studies to assess the effects of global warming and trials to rehabilitate degraded sites in this Zone: Potential sites were shortlisted for laying permanent study plots.

- **Identification of distinct traits for DUS for conifers:** Based on the recommendations of the Task Force to survey conifers in south India and North Eastern states, the observations recorded on morphometeric characters are also being included in the guidelines being formulated.

Extension

- 2-days National Seminar on "Hill Bamboos – An Important Resource for Improving the Rural Livelihood" was organized on 17th & 18th October, 2014 at Manali, District Kullu. A Bamboo Craft Mela was also organized from 17 to 21st October, 2014. Bamboo Artisans from Uttarakhand and Himachal Pradesh participated with their products.

- Under 'National Medicinal Plants Board' funded project, HFRI, Shimla conducted a one day training programme on 'Cultivation of High Valued Medicinal Plants' at Nogli, Rampur Distt. Shimla on 25 February 2014.

- A training programme titled "Cultivation of High Valued Temperate Medicinal Plants and related Issues" was organized by Himalayan Forest Research Institute, Shimla under NMPB Funded project on 20 March 2014 at Kishtwar, Jammu Province (J& K).

- Institute organized five days Training Programme on "Production, Management and Marketing of Bamboo" from 10 -14 August 2014 at Forest Training Institute, Sunder Nagar.

Institute of Forest Productivity, Ranchi

Research

- **Introduction of selected genotypes of karanj, kusum and bamboo as tree components in agroforestry models in lateritic belt of eastern India:** Seedlings & grafts of Kusum, Karanj were planted & used for agroforestry model, whereas for bamboo, existing plantation of D. asper

was used. Clump management done in bamboo. Shade reduction in Kusum plots was done through pollarding and soil samples were collected and tested at the initial stage of trial.

- **Development of agro- techniques for organic cultivation of Tribulus terrestris L. and Cissus quadrangularis L.-medicinal plants extensively used in traditional system of medicine (Ayurveda, Unani and Chinese):** Cuttings of Cissus quadrangularis collected from Ranchi districts of Jharkhand were treated with different concentrations of plant growth regulators. Young shoots developed from most of the cuttings. Seeds of Tribulus terrestris collected from the same place were subjected to different physical and chemical treatments. Methods are being explored to raise saplings of T. terrestris from cuttings.

- **Assessment of variability and genetic fingerprinting in Pongamia pinnata (L.) Pierre using microsatellite markers:** Accessions have been evaluated for morphometric and biochemical characteristics for molecular characterization. Multiplication of the selected germplasm, their plantation at different places along with stockplant management was done. DNA extraction protocol has been standardized. PCR amplification DNA extracted from all the germplasms was carried out and amplified products have been checked on electrophoresis. Gradient analyses was carried out on range of temperatures Band scoring and data analysis has been done to estimate genetic variability among the accessions. Evaluation of gel amplification patterns of different genotypes was done.

- **Evaluation of Dalbergia sissoo Roxb. Clones for suitability in large scale clonal forestry in Gangetic plains and Chotanagpur Plateau:** 26 CPTs have been selected in Jharkhand, Bihar and West Bengal state on the basis of earmarked criteria for plus tree selection. 12 previously collected clones have been multiplied. The stock plants in the CMG are maintained for consistent supply of propagules for clonal multiplication. Physiological characteristics and endogenous biochemicals were recorded in various clones. Genomic DNA of all 16 clones has been isolated for molecular studies. A clonal trial has been established in local conditions of Jharkhand with 12 clones and growth data recorded. .

- **Studies on pollarding and propagation in kusum (S. oleosa) for lac cultivation:** Collection of stem cuttings & scion of plus trees of kusum from Jharkhand, grafting operation & stem cutting trials were conducted. VMG was established with 15 clones and maintained. Clonal trial of kusum has been initiated. Plants of S. oleosa were pollarded and new shoots were inoculated using broodlac Overall 87 trees or saplings were inoculated. Removal of phunki was done and lac harvested on maturity of the crop. Total 42.5 kg stick lac was harvested. Proper control measures were taken against pests.

- **Tree Borne Oil seeds (TBOs) in community lands for improved livelihoods of Vulnerable Groups of**

Jharkhand: Survey was carried out in Khunti, Bano, Bolba & Simdega region for selection of plus trees of kusum and karanj. Five year old plantation of karanj and mahua plots were converted into TBOs demonstration plots. Growth data was recorded and spraying as well as soil application of insecticides was done for protection from insect pest attack. Seedlings of Kusum (120) & Karanj (80) were planted at 5m x 5m spacing on July, 2013 at Nagri to create demonstration plot cum fertilizer trial on these species.

- **Collection,conservationandevaluation of Melia dubia germplasm from North Bengal, Odisha Hills and other parts of India for identification and release of superior clones:** The planting material collected from FRI, Dehradun nursery has been raised and progeny trials of 21 progenies have been established in Jharkhand and Bihar. Seeds collected from IWST Bengalore of 12 progenies and nursery has been raised. Surveys has been conducted to identify and select superior genotypes of Melia dubia.

Institute of Forest Biodiversity (IFB), Hyderabad

Research

- Establishment and evaluation of multilocational trials of Meliaazedarach L. and Melia dubia Cav. Established progeny trial of M.dubia in Guduluru in TamilNadu.
- Seed germination techniques have been perfected. Macropropagation protocol through stem cutting is standardized. Micropropagation technique is being standardized.
- **Natural regeneration studies of important tree species of Nallamalais, Seshachalam hills and Kaundinya wildlife sanctuary of Eastern Ghats of Andhra Pradesh:** The data collection is going on in its second year on woody tree species. Soil samples have been collected and analysed. Phytosociological study is supplemented by sociological data through enquiry of local people.
- **The successional trends and productivity studies in Sriharikota (SHAR) and Pulicat lake ecosystem for conservation of biodiversity:** Specimens of the vegetation samples were collected and photo-documented. The phyto-sociological data were collected from all the quadrats and productivity studies completed for one season. Littoral benthic macrofauna were collected and analyzed. The meteorological data were collected.
- **Raising of model nursery sponsored by A.P. medicinal and aromatic plant board: Sandal seedlings target is achieved - more than 50 thousand seedlings are produced. Terminalia chebula:** 1200 kgs of seeds were brought and seeds are sown and seed germination is taking place. Gloriosa superba: 72 kgs seeds were already sown in the field and germination noticed was satisfactory.

Progress

Activities including publication of literature, training and exposition etc. have been undertaken in Van Vigyan Kendras. To expand the outreach of ICFRE technologies, processes, products etc. networking of VVKs with KVKs of ICAR has been undertaken

and various activities were conducted in collaboration in different regions of the country.

In another development under REDD+ activities, FRI, Dehradun will be implementing a project under Forest PLUS for development of tools, techniques and management for enhancing forest carbon while maintaining biodiversity and ecosystem benefits in few selected districts in India. The cost of project is ₹ 54 lakhs.

A project titled 'Enhancing capacity for alignment of National Action Programme to 10 year strategy of UNCCD and for National Reporting to UNCCD Secretariat (GEF Grant No.TFO 12765)' has been by World Bank-GEF with an funding amount of 1,48,00 US$. ICFRE has already submitted the 6th report to UNCCD and started working for the preparation of the NAP in consonance with UNCCD strategy. First regional workshop was organized on 12th Nov 2014 at Bangalore.

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

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.

IPIRTI has been at the forefront to meet this vital need of the wood Panel industry, by undertaking multidisciplinary projects to provide innovative solutions and make available technologies based on the problems identified by the Industrial representatives, Scientists and other stake holders. The Research activities of IPIRTI reflect the global concern for protection of environment and conservation of bio-diversity and are rationalised to keep pace with the changing needs of the industry, national policies, raw material scenario, and the market need for panel products.

Research, Training and Technical work done during the year

– **Development of blocked isocyanate resin for the manufacture of plywood**

Isocyanate or polyurethane resin is available in organic solvent based and has little application as wood adhesive as majority of woodadhesive specially those used in panel industry are water based.To bring polyurethane resin into water media a study to manufacture the blocked isocyanate resin suitable for bonding plywood was taken up. The blocked isocyanate resin was prepared using phenol and cresol as blocking agents. FTIR analyses confirms the blockage of the isocyanate (–NCO) group. DSC curing characteristics auguments the curing at 160-1800C. Plywood were manufactured using blocked resin and also with the combinations of Phenol Formaldehyde (PF) and bio adhesives like phenol cardanol formaldehyde resins (PCF). The panels made with blocked resin and with the combination of PF and PCF with a curing temperature of 1700-1800C conformed to boiling water resistant grade (IS-848:2006) suitable for exterior use.

– **Development of Fire Retardant Particle Board**

Particle boards is being widely used for furniture and interior of homes including kitchen. Particle Board being made of wood particles is very susceptible to fire. Development of fire retardant Particle Board was taken up at the institute and lab scale success was obtained.

The pilot scale trial of manufacturing fire retardant particle board was taken up by adopting the process parameters optimized on lab scale. The panels made on pilot scale were subjected for testing to evaluate the fire retardancy of particle board, as per IS:5509 and the physical mechanical properties of the boards as per IS 3087:2005. The density of the boards, were varying from 900-975 kg/m3. Fire retardant and physical mechanical properties have given excellent results.

– **To study the fatigue strength properties of Structural grade wood panels**

In various applications, panel materials are subjected to repeated stresses. The behavior of wood panels under such load conditions differs from the behavior under a static load. Panel is being subjected to repeated load-cycles inactual use. As the strength properties determined by static loading do not provide any information of the panel to predict its life in actual use. The study is being carried out on fatigue behavior of wood based panel products as a percentage of materials ultimate strength.

The objective of the project is to evaluate the fatigue strength properties of wood

Fig-41. *Servo Hydraulic Universal Testing Machine*

based panel products such as Laminated Veneer Lumber (LVL), Structural plywood, Bamboo Mat Board (BMB) and Compreg under cyclic loading and to correlate the same with static properties with a view to recommend its use in structural applications and to predict the life span of the product under repeated loading conditions. To determine the allowable design stress as a percentage of MOR under cyclic load effects so as to help the designers to design confidently the furniture/housing systems.

For applications in which cyclic loading must be taken into account, the results suggest that the allowable design stress for a material would be based on that percentage of its ultimate strength that will yield a fatigue life of material that agrees with the anticipated service life load cycles of the parts fabricated from it.

– **Study on suitability of plantation grown species viz., Meliadubia for particle board manufacturing**

The purpose of this study was to evaluate a technical feasibility of making three

layered particle board from Meliadubia. Meliadubiahas been one of the most promotedplantationspeciesforwoodand wood based panel industry in southern India. Particle boards from Meliadubiawas produced with urea formaldehyde resin of various formulations employing hot pressing conditions as required for each resin formulation. The panels made were subjected for evaluation of physical and mechanical properties as per relevant specifications (IS:3087). It is found that the process parameters for manufacturing particle boards from Meliadubiais almost same as that of the other species except that during drying additional care has to be taken to avoid the material from picking up the moisture to minimize the blister formation during hot pressing. From the study, it is found that the particle boards from Meliadubiameets the requirements as prescribed in IS:3087 – 2005 specifications for particle boards of wood and other lignocellulosics material (medium density) for general purpose for grade II medium density particle boards.

– **Assessment of relative toxicity of various panel products and study the toxicity index behavior of treated and untreated wood based panel products**

The concern over the danger of inhaling toxic gases released from decomposition of products has been increased in recent years. The question of whether the steady increase in the use of new materials is likely to result in an increase in the life hazard for the occupants of building in the event of fire is of paramount importance

The assessment of various toxic gases getting released from the panel products gives an indications of the relative importance of toxic gases produced from a given materials and the relative propensity of materials in generating harmful gases and vapors. The data collected would contribute for understanding the problem of combustion toxicology.

Training

Recognising the importance of training programmes conducted, CBDT New Delhi has categorised IPIRTI under "University/ Educational Institutions". The following training programs were conducted during the year:

– **Post Graduate Diploma in Wood and Panel Industry Technology:**

The 25th Training Course for One year Post Graduate Diploma in Wood and Panel Industries Technology for graduates in Science and Engineering was conducted wherein all the 28 candidates completed the course successfully and 100% placement was arranged through campus selection process.

Also, the 26th Training Course was started with an enrolment of 22 students.

– **Short Term Vocational Training courses:**

15 training courses on Resin manufacture and various aspects of Plywood Technology were conducted in Bangalore and in Field stations Kolkata and Mohali for fresh graduates and technicians from plywood factories. Total no. of technicians trained in 2013-14 are 114 Nos.

– **Special Training Courses for Students of Kannur University,Kerala:**

One Training course was conducted on Saw milling and Saw Doctoring for PG students in Wood Science and Technology of Kannur University.

– **Training Workshop for IFS Officers:**

One training course for senior IFS officers from various states and union territories of India on"Contribution of Forests Plantation in Livelihood Support and Industrial Production"was conducted during 26th-27th June, 2014.

New Infrastructure for Research Established at Institute

– **Hot Press -** Medium Density Fibre Board is manufactured using special hot press which can control the thickness of the panels automatically. A hot press of 120 tones capacity and platen size 600mmx 600mm was installed at the institute for pilot plant trials on MDF. The specialty of this hot press is the thickness of the panels can be well controlled within our requirement including customized controlling of temperature.

– **Bamboo Processing Unit -** Bamboo in panel form is best opted to replace timber in many applications. To overcome all the limitations of manual slivering, the field station has established full fledged facilities for processing of bamboo for cross cutting, splitting, knot removal, sliver making, double side moulding, preservative treatment tank, lab scale hot press, resin applicator, resin kettle and glue mixer. To cater the need of people living in north eastern parts of India working for handicraft sectors and bamboo composite based industries, the institute now full facility to conduct special short term courses on mechanised processing of Bamboo.

Fig-42. *Wood preservative analysis using Atomic Absorption Spectrometer*

– **Atomic Absorption Spectrometer -** Accurate analysis of metal components in wood preservative at PPM level can be determined using Atomic Absorption Spectrometer. Utilization of this process will not be accurate in addition it saves the time spent in the classical method of analysis.

IPIRTI Industry Meet

One IPIRTI-Industry meet organized at Kolkata during 19th December, 2014.

Wildlife Research

Wildlife Division of the Ministry provides financial assistance to the research institutions, Universities, NGO's for research in the field of Wildlife. The research projects are processed as per the guidelines of the Ministry.

During the year, Wildlife Division had provided an amount of ₹ 16,83,290/- for ongoing research projects to various NGOs.

Wildlife Institute of India (WII), Dehradun

Wildlife Institute of India (WII) was established in 1986 as an autonomous institute of the Ministry of Environment & Forests, 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 mandate is to generate quality information and knowledge products in wildlife science and mainstream it in capacity building programmes for various target groups and provide advisory support to Central and State Governments.

Research Projects

Wildlife research at the Institute covers ecological, biological, socio-economic and managerial aspects of wildlife conservation. The research projects generate valuable scientific data, help evolve study techniques relevant to the Indian ground conditions, and also create a group of trained field biologists, socio-economists and wildlife managers. The scientific information generated is utilized for management of protected areas. Research also enables the Institute's faculty to keep abreast of the current field situations, management needs and research trends in the field and thus constantly enhance its professional skills and update its teaching inputs. The research agenda is guided by the Training, Research Advisory Committee (TRAC) comprising eminent conservationists, academicians and representatives of scientific organizations as well as state wildlife organizations, which ensures that research conforms to the national conservation priorities.

During the reporting period, 22 research projects were completed and 28 projects were ongoing. The Institute worked on the following important research activities during the reporting period:

- Biodiversity Conservation and Rural Livelihood Improvement Project (BCLRIP)
- Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) Project: Implementation Programme in India
- Capacity Building for 'Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas in India'

Academic and Training

During the year following Courses and Training Programmes were organized:

- **XXXV P.G. Diploma Course in Advanced Wildlife Management**, September 1, 2013 to June 30, 2014.
- **XXXVI P.G. Diploma Course in Advanced Wildlife Management,** September 1, 2014 to June 30, 2015.
- **Special Certificate Course in Wildlife Management,** September 1, 2014 to December 1, 2014.
- **XXX Certificate Course in Wildlife Management,** November 1, 2014 to January 31, 2015.

Workshops, Seminars, Meetings and Other Activities

- Training Program on "Veterinary Intervention in Wildlife Management", Dehradun, April 2-5, 2014.
- Wildlife Institute of India and University of British Columbia signed Memorandum

of Understanding, Dehradun, April 23, 2014.

- Workshop on Digital Libraries Consortia for MoEFCC Institutions, Dehradun, May 2, 2014.
- Training Workshop on Wildlife Health Management, Dehradun, June 10-13, 2014.
- Two-day Training Workshop on "Management Effectiveness Evaluation of Protected Areas", Dehradun, July 17-18, 2014.
- Workshop on "Open Standards for the Practice of Conservation", Dehradun, July 21-22, 2014.
- Meeting on 'Developing Partnerships and Funding Conservation Initiatives under Corporate Social Responsibility (CSR)', New Delhi, August 13, 2014.
- Workshop on "Human-Wildlife Interactions and Management of Invasive Alien Species", Dehradun, July 23-24, 2014.
- X Internal Annual Research Seminar (IARS), August 18-20, 2014 and XXVIII Annual Research Seminar (ARS) of WII, Dehradun, August 21, 2014.
- Foundation Stone Laying Ceremony of the UNESCO's Training Centre for Asia and the Pacific Region at WII, Dehradun, August 30, 2014.
- Training-of-Trainers Workshop on Strategic Environmental Assessment (SEA), Dehradun, September 2-4, 2014.
- Himalayan Day Celebrations at the Wildlife Institute of India, Dehradun, September 9, 2014.

Fig-43. *Sambar (Rusa unicolor) at Nagzira Wildlife Sanctuary, Maharashtra*

- Training workshop on 'Understanding Human-Wildlife Conflict and its Management' Dehradun, September 15-30, 2014.
- 21st Meeting of the Governing Board (GB21) of the GBIF and Associated Events, New Delhi, September 16-18, 2014.
- Workshop on the Wireless Sensor Networks for Protection of Wildlife and Human, Dehradun, December 20, 2014.
- Follow-up meeting, December 21, 2014.

Wildlife Week Celebration, 2014

The XII WII-Friends of the Doon' Wildlife & Environment Quiz 2014'– a collaborative activity of Wildlife Institute of India and Friends of Doon Society was organized on

October 1, 2014 at the Institute to mark the celebrations of the Wildlife Week 2014. Twelve schools participated in preliminary round. Ann Mary School topped the list and won the WII-FoD Rolling Trophy, Book Prize and Sameer Ghosh Memorial Nature and Wildlife rolling trophy. Dr. Alok Saxena, Additional Director, Indira Gandhi National Forest Academy, Dehradun graced the occasion as Chief Guest and distributed the Prizes to the Winning Team.

CHAPTER-8

EDUCATION AND AWARENESS

Environmental Education, Awareness and Training

The 'Environmental Education, Awareness and Training' is a flagship scheme of the Ministry for enhancing the understanding of people at all levels about the relationship between human beings and the environment and to develop capabilities/skills to improve and protect the environment. This scheme was launched in 1983-84 with the following basic objectives:

- To promote environmental awareness among all sections of the society;
- To spread environment education, especially in the non-formal system among different sections of the society;
- To facilitate development of education/ training materials and aids in the formal education sector;
- To promote environment education through existing educational/scientific/ research institutions;
- To ensure training and manpower development for environment education, awareness and training;
- To encourage non-governmental organizations, mass media and other concerned organizations for promoting awareness about environmental issues among the people at all levels;
- To use different media including films, audio, visual and print, theatre, drama, advertisements, hoarding, posters, seminars, workshops, competitions, meetings etc. for spreading messages concerning environment and awareness; and
- To mobilize people's participation for preservation and conservation of environment.

Activities undertaken

The major programmes undertaken to achieve the overall objectives of the scheme are as follows:

National Green Corps (NGC) Programme

It is a well established and recognised fact that the children can be catalysts in promoting a mass movement about the ensemble of the environmental issues. Being future citizens, inculcation of environment friendly attitudes and behavioural patterns amongst them can make a significant difference to the long term efforts for protection of environment. Children are triggers for a chain reaction, making a difference at the local and community level which in due course lead to awareness at village, city, State, country and global level.

MoEFCC has hence, embarked upon a major initiative for creating environmental awareness among children by formulating National Green Corps (NGC) in 2001-02. The phenomenal response that NGC has received has made the network more than 1,00,000 Eco clubs across the country in 14 years, making it one of the largest conservation networks. The unique partnership between the MoEFCC, the state Government agencies alongwith the dedicated NGOs, working in the field of Environmental Education has contributed to the success of the programme. During the year, 92310 Eco-clubs were supported by the Ministry across the country.

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.

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. Action components could be plantation of trees, management of household waste, cleaning of water bodies, taking up water harvesting structures, use of energy saving devices etc. Diverse target groups encompassing students, youths, teachers, tribals, farmers, other rural population, professionals and the general public are covered under NEAC. The programme is implemented through designated Regional Resource Agencies (RRAs) appointed for specific States/Regions of the country. This programme was continued during this year with the main theme as 'Combating Desertification, Land Degradation and Drought (DLDD)". The following sub-themes are considered for financial assistance:

- National Nature Camping Programme
- Other Awareness Programme

  A suggestive list of such, "Other Awareness Programmes", being supported by the Ministry includes:

  - Awareness cum action programs in and around the protected area, in wildlife corridors, biodiversity hotspots, rivers and wetlands.
  - Awareness programs which focus on communities that are critical to conservation of forests/wildlife/environment.
  - Quiz Programmes/Competitions etc.
  - Yatras based on the environmental issues.
  - Organising appropriate awareness programmes on the occasion of mass congregations like industrial exhibitions, trade fairs, health melas, sport meets, conferences, training inter-school/college/university competitions etc.
  - Any other programme/activity that promotes awareness about environment.

Based on the scale of the proposed activity and merits of the proposals, financial assistance to be provided to each proposal shall be in the range of ₹5.00 lakhs to ₹10.00 lakhs. During the financial year, 21 organizations were approved for organizing Other Awareness Programmes.

Library

The Library is the documented repository of the Ministry for dissemination of information in the field of environment and its associated areas. It has a collection of over 25,000 books and Technical reports etc.

Fig-44. *Students drawing images on Tigers Day*

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 scheme facilitates the transfer of technical know-how to different people including local population.

Universities/professional bodies/technical institutions and other R&D organisations are very responsive to the programme as is evidenced by the increase in the number of proposals being received by the Ministry.

Achievements

- 92310 Eco-clubs under NGC programme were supported with the financial assistance of ₹24.88 Crores.
- The financial assistance of ₹3.37 Crores was released under NEAC & number of participating organisations in NEAC was 3237.

State-wise status

Statewise status of Numbers of Eco-clubs established in States / UTs; Details of financial assistance released under the NGC programme, Amount recommended under NEAC programme and, Number of participating agencies recommended in NEAC are shown in Table-26 & Table-27.

Directorate of Forest Education (DFE), Dehradun

The Directorate of Forest Education (DFE), under the Ministry of Environment, Forests and Climate Change, since its inception is engaged to imparting professional induction training of two year duration to direct recruit State Forest Service (SFS) officers and of 18 months duration to forest range officers(FROs) sponsored by respective state forest departments. There are three Academies and One College under the direct administrative control of the Directorate. The names and annual intake capacity of the Academies/ college is 150 seats.

Table-26. *State wise status of Number of Eco-clubs established in States / UTs, financial assistance under the NGC & NEAC programme during the year*

Sl. No.	States/UTs	No. of Eco-clubs supported	Financial assistance under	
			NGC	NEAC (Amt. Recommended)
1	Andhra Pradesh	5750	15697500	8215000
2	Andaman & Nicobar Islands (UT)			537000
3	Assam (NE)	5407	14477250	5884000
4	Bihar			9110000
5	Chhattisgarh	6750	18061500	1680000
6	Delhi (NCT)	1870	5250375	1218000
7	Goa	500	1262936	-
8	Gujarat	6360	16943874	8354000
9	Haryana			9197800
10	Himachal Pradesh			7836000
11	Jammu & Kashmir			11565000
12	Jharkhand			2992000
13	Karnataka	8500	22899459	2630000
14	Kerala	3500	9555000	3530000
15	Madhya Pradesh			8128000
16	Maharashtra	8818	23263473	9939000
17	Manipur (NE)			3316000
18	Mizoram (NE)			3412500
18	Nagaland (NE)	2600	7111875	1862000
20	Orissa	7500	20321692	11314000
21	Puducherry (UT)			716000
22	Punjab	5500	15015000	5767000
23	Rajasthan	8250	22449382	2950000
24	Tamil Nadu	8000	21779950	6416000
25	Tripura (NE)	950	2697500	3755000
26	Sikkim (NE)	766	2055000	1127000
27	Uttarakhand			1290000
28	Uttar Pradesh	11289	29986000	13570000
29	West Bengal			9642000
	Total	**92310**	**248827766**	**155953300**

Table-27. *Number of participating agencies recommended in NEAC.*

Sl. No.	RRA	Participation agencies
1	Indian Environmental Society, Delhi and Western UP, Delhi	753
2	Shohratgarh Environmental Society (SES), Uttar Pradesh	877
3	CUTS, Rajasthan	295
4	Rural Youth Coordination Centre, Patna (RYCC), Bihar	1067
5	Animal Welfare Society of Orissa, Bhubaneswar, Odisha (North)	482
6	Centre for Env. Studies & Env. Deptt, Bhubaneswar, Odisha (South)	632
7	Federation of Societies for Env. Protection (FOSEP), Darjeeling, All Areas of Darjeeling including Siliguri, WB	499
8	School of Fundamental Research, Kolkata , West Bengal excluding Darjeeling and Silliguri	776
9	C.P. Ramaswamy Aiyar Foundation, Chennai Tamil Nadu (North), Andaman & Nicobar	342
10	Karnataka Rajya Vijnana Parishad, Bengaluru	230
11	BAIF Development Research Foundation, Pune, Maharashtra	1186
12	CPREEC, Puducherry	50
13	EPCO, MP	902
14	Sri Swarupa Nishta Ashrama Philosophicla Welfare Society (SNAPS), Andhra Pradesh (South)	467
15	Baif Institute for Rural Vocations and Advancement (BIRVA), Jharkhand	334
16	Deccan Development Society (DDS)	313
17	Jan Kalyan Parishad, Chhattisgarh	202
18	VIKSAT, Gujarat and Daman-Diu	786
19	Tripura State Pollution Control Board, Tripura	458
20	Assam Science Society, Assam	903
21	Directorate of Environment, Govt. of Manipur, Imphal	340
22	Nagaland Pollution control Board, Dimapur, Nagaland	171
23	Centre for Env. Protection, Aizwal, Mizoram	632
24	Forest, Environment and Wildlife Management Deptt., Gangtok, Sikkim	125
25	Centre for Environment and Development, Kerala	272
26	PEACE Trust, Dindigul, Tamil Nadu	243
27	State Council for Science, Technology & Environment, Himachal Pradesh	585
28	WWF, Jammu	820
29	Punjab State Council for science and technology , Punjab (This include Participating agencies of Uttarakhand, as PSCST is also the RRA for Uttarakhand)	546
30	The NGOs Coordination and Federation (J&K)	144
31	Haryana Nav Yuvak Kala Sangam, Haryana	613
Total		**16045**

Recently in-service training for these officers in the five thematic one-week modules of: Wildlife Management; Legal Issues in Forestry; Joint Forest Management; Human Resource Management; Training of Trainers; and, one General Refresher Course of two-week duration have also been started with good results. Every year about 24 such courses are conducted focussing on skill development of state forest service officers and range forest officers from various states

The Directorate also supplements the efforts of various states for the training and capacity building of the forest frontline staff (deputy rangers, foresters and forest guards) through their respective forest training institutes. Every year about 300 frontline staff is benefitted under the scheme through about 100 such courses

Mandate of the Directorate

- To cater to the training needs of SFS Officers and FROs of States/ Union Territories in the country.
- To ensure standard and quality of training being imparted to SFS Officers and FROs.
- To develop appropriate and relevant training contents and evaluation standards for forestry training at various levels.
- To suggest training policy for effective Human Resource Management and Development in forestry sector.
- To supplement the efforts of State Governments in the training of Forest Frontline Staff (Forest Guards, Foresters and Deputy Rangers)

Achievements

During the year 2014-15, in the first six months, 40 SFS officer trainees and 81 RFO trainees passed out after completing 24 months and 18 months induction training respectively at various academies under the Directorate of Forest Education. During the first half of the financial year, 32 new RFOs joined induction training course at Coimbatore Academy. Presently, 40 SFS officer trainees and 216 RFO trainees are undergoing induction training respectively at various academies/College under the Directorate.

The detail of passing out and joining of SFS Officer trainees and RFO trainees for induction training at Academies/college under Directorate during the first six month of the year 2014-15 are as under:-

- One batch of 40 State Forest Service Officer trainees (course 2014-16) is undergoing two years induction training at Central Academy for State Forest Service (CASFOS), Dehradun from 1-2-2014 for the newly recruited SFS Officers of various States/Union Territories.
- One batch (course 2012-14) of 40 newly recruited SFS officers passed out on 06-09-2014 from Central Academy for State Forest Service, Dehradun after completion of two years induction training course.
- One batch of 38 RFO trainees (2013-2015 Course) is undergoing 18 months training at CASFOS, Coimbatore with effect from 10.9.2013. And, another batch of 32 RFO trainees (course 2014-15) commenced 18 months induction training from 1-4-2014 at Central Academy for State Forest Service (CASFOS), Coimbatore.

- Two batches (2013-14 Course and 2014-2015 course) of 32 and 28 newly recruited RFOs commenced 18 months induction training 1-3-2014 and on 17-6-2013 respectively at CASFOS, Burnihat (Assam).
- Two batches of RFOs (2013-2015 Course) of 88 trainees in total are undergoing training at Andhra Pradesh Forest Academy, Dullapally (Andhra Pradesh) with effect from 20-8-2013.
- One batch of 30 RFO trainees (2014-2015 course) is undergoing training at Kundal Academy of Administration, Development and Management, Sangli, Maharashtra with effect from 17-2-2014.
- Two batches (2013-14 course) of 39 and 42 newly recruited FROs passed out on 30.6.2014 & 30-8-2014 from Forestry Training Institute, Haldwani (Uttarakhand) and Forest Rangers College, Balaghat, (MP) respectively.
- 14 SFS Officers participated in one General Refresher Course of two weeks duration for in-service SFS Officers at CASFOS, Dehradun from 1-4-2014 to 30-9-2014
- 96 SFS Officers participated in Six Workshops, each of one week duration, on Legal issues in Forestry & Wild life; Human Resource Management; Training of Trainers; Community Forestry & Joint Forest Management and, Wild life Management for in-service SFS Officers at CASFOS, Dehradun and Coimbatore.
- 8 RFO's participated in one General Refresher Course of two weeks duration, conducted for in-service FRO's at CASFOS, Burnihat from 1-4-2014 to 30-9-2014
- 24 RFOs participated in three Workshops, each of one week duration, on Legal issues in Forestry & Wild life, Wild life Management, Human Resource Management for in-service FRO's at CASFOS, Burnihat.
- During the first half of the financial year 23 General Refresher Courses, each of two weeks duration, were sanctioned for in-service Forest Frontline Staff (Deputy Rangers, Foresters & Forest Guards); and, 42 General Refresher courses and 5 workshops on various thematic areas including JFM, Wild life management, and Biodiversity Conservation are proposed during the current financial year through various Forestry Training Institutions of the states.

Indian Institute of Forest Management (IIFM), Bhopal

Brief Objectives

The Institute offers three academic programmes, Post Graduate Programme in Forestry Management (equivalent to Masters Degree), Fellow Programme in Management (equivalent to Doctoral level) and M.Phil (Natural Resource Management). The Institute is also recognised as a Nodal Centre for Research by Forest Research Institute, Deemed University (FRI), Dehradun for Doctoral programme.

Mass Media

The Media Cell of the Ministry is mandated with taking up awareness campaigns using print and electronic media besides other mass

media to enhance awareness about various environmental issues which would in turn facilitate better compliance with environment regulations.

Science Express: Biodiversity Special (SEBS)

Th Ministry of Environment, Forests and Climate Change in a unique partnership with Department of Science & Technology (DST), launched an innovative exhibition mounted on a 16 coach air conditioned train rake. It envisaged running this innovative train mounted exhibition in two phases to cover at least 100 locations on Broad Gauge network of Indian Railway across the entire length & breadth of the country.

Phase- III of SEBS train flagged off by Hon'ble Minister of M/o EF&CC, Minister of Science & Technology, Dr. Jitendra Singh and the Hon'ble Minister of Railways Shri Sadananda Gowda on 28/07/2014.

Eight coaches of Science Express- Biodiversity Special are solely dedicated to showcasing the myriad biodiversity spread across the bio-geographical zones, viz. Trans-Himalaya & the Himalayas, Gangetic Plains, North East India, the Desert & Semi-Arid Zone, Western Ghats, Deccan Peninsula and Coasts & Islands with a focus on range of Biological diversity, critically endangered species, biodiversity hotspots, domesticated biodiversity, biodiversity & livelihoods, bio-culture; threats / challenges, conservation measures, success stories & unique experiences. Four other coaches have interesting & informative exhibits on Climate Change, Energy and Water conservation while another coach has the Joy of Science Lab in which students are guided to perform various experiments & activities to understand concepts in science besides a demonstration-cum-training facility for capacity building of teachers. About 40 young Science/Biodiversity Communicators remained on-board in another coach throughout the journey and explained the content and purpose of the exhibition to curious visitors.

The Ist Phase of SEBS was launched on World Environment Day (5 June 2012) from New Delhi's Safdarjung Railway Station by Smt. Sheila Dixit, Hon'ble Chief Minister of Delhi and Smt. Jayanti Natarajan, Hon'ble Minister of State (I/C), (MoEF). During its first phase which ended on 22 December 2012 at

Fig-45. *Phase- III of SEBS train flagged off by Hon'ble Minister of M/o EF&CC, Minister of Science & Technology, Dr. Jitendra Singh and the Hon'ble Minister of Railways Shri Sadananda Gowda on 28.07.2014.*

Ahmedabad, it made halts of 3-4 days duration each at 51 locations and over 23 lakh people visited SEBS. It included 6 lakh students and 32000 teachers from 7000 schools. The train was also stationed at Secunderabad during 9-19 October 2012 to showcase it to delegates to CoP-11. The IInd Phase of the SEBS was launched on 9 April 2013 from New Delhi's Safdarjung Railway Station. It covered 62 locations and over 22 lakh people, including 5 lakh students and 29000 teachers from 6005 schools valued the train and enjoyed learning about various aspects of the environment. The SEBS III Phase is now under implementation. It was flagged of 28/07/2014 and will cover 57 location & close at Gandhinager, its destination on 06/02/2015. It has already has 22 lakh visitors. The current decade (2011-2020) has been declared as the United Nations Decade on Biodiversity and the United Nations Decade for Deserts and Fight against Desertification. The 'Science Express - Biodiversity Special', therefore, primarily addresses the theme 'biodiversity'. The state-of-the-art exhibition aboard SEBS aims to create wide-spread awareness on the unique biodiversity of India, Climate Change, Water, Energy Conservation and related issues among various sections of the society, especially students.

Wherever the train halted, activities were planned before-hand to engage visitors across different age groups to reinforce the message of SEBS and specific Outreach Programmes were conducted at local schools and institutions associated with the National Environment Awareness Programme (NEAC) and National Green Corps (NGC) of MoEFCC and associates & partners of DST. In addition, a variety of interesting & informative take-away material was made available for wider distribution among visitors.

The train also reflected the dedication, diligence and dynamism of the knowledge partners who contributed immensely to bring forth the essence of 'biodiversity' and conservation practices as well as issues of 'climate change' in our country. Vikram A Sarabhai Community Science Centre (VASCSC) and Centre for Environment Education (CEE), Ahmedabad along with the lead knowledge partners including Bombay Natural History Society, Centre for Ecological Sciences, Indian Institute of Science, G. B. Pant Institute of Himalayan Environment and Development, Indian Council of Forestry Research and Education, National Centre for Sustainable Coastal Management, National Museum of Natural History, Wildlife Institute of India and Wildlife Trust of India, and several others contributed to give extremely useful information in this unique exhibition on wheel.

Print, electronic and digital media gave special attention to this programme with over 500 stories/ news items in all leading national & regional newspapers including vernacular print media besides most TV Channels and major related websites. Thus, through this innovative venture, MoEFCC was able to reach out to even those who could not physically visit the train but were made aware of its content by the extensive coverage in media including social media like Facebook, etc. The IVth Phase is being considered as a different theme.

World Environment Day

World Environment Day (WED) is celebrated every year on June 5 to raise global awareness for taking positive environmental action to protect nature and the planet Earth. The UN General Assembly declared 2014 as

the International Year of Small Island Developing States (SIDS) to focus world attention on the importance of the small island countries, as well as on their fate and future in the light of climate change impacts, notably frequent storm surges, & sea level rise.

Fig-46. *Release poster and books on occasion of World Environment Day by Hon'ble Minister of Environment, Forests and Climate Change*

Prof. M.S. Swaminathan a noted Scientist and the Guest of Honour of the day delivered the Key Note address on the theme of World Environment Day, 2014 at a function organised by the Ministry of Environment, Forests and Climate Change. Shri Prakash Javadekar, Hon'ble Minister of State (Independent Charge) for Ministry of Environment, Forests and Climate Change was the Chief Guest at the function. During the auspicious occasion, a poster on World Environment Day, books on animal and plant discoveries, Fifth National Report to the Convention on Biological Diversity, India's First Biennial Update Report to the UN Framework Convention on Climate Change and a book on Indian Mammals were released.

National awards were given to encourage identified categories of highly polluting industries and operations to take significant steps for prevention of pollution. The awards were given to:

1) M/s Binani Cement Limited, Sirohi, Rajasthan;
2) M/s Chambal Fertilisers & Chemicals Limited, , Kota, Rajasthan;
3) M/s Reliance Industries Limited, Surat, Gujarat;
4) M/s Vaibhav Paper Boards Private Limited, Vapi, Gujarat

A national level poster making competition is organized every year to select one national level winner who is given "Young Environmentalist of the Year Award" on the occasion of "World Environment Day". Samikhya Satpathy, a student of class IX of D. A. V. Public School, Chandrashekharpur, Bhubaneswar (Odisha) was the National winner for "Young Environmentalist of the Year Award- 2014" on the basis of her best performance in "Poster making competition" held on the occasion of Earth Day on 22nd April, 2014. A poster was released on the occasion. The Following books were also released India's 5th National Report to CBD:

- Towards Preparation of India's first BUR to UNFCCC
- Plant Discoveries (BSI).
- Animal Discoveries (ZSI).
- Indian Mammals A-Field Guide (WTI).

National Museum of Natural History

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).

Objective

- To implement the policies of the Ministry under the scheme of environmental education, training and awareness.
- To develop scientific temper in the society on environment and natural history/ heritage of the country.
- To innovate in natural history museum curatorship consonant with the scope of the Museum.
- To create human resource in natural history museum curatorship.
- To develop the NMNH as an institution of international standard.

Activities undertaken from its Inception till close of previous year, cumulative perfomance, both financial and physical

The NMNH has been undertaking various Environmental educational programmes through the means educational activities. These also include various programmes and competitions on the following occasions.

- World Environment Day
- Summer Programme-Green Teens and Green Cubs
- Earth Day
- International day for Preservation of Ozone Layer
- Wildlife week
- Teacher orientation workshop
- Programme for disabled children
- World Wetland Day

In addition, the NMNH has excelled in Communication, Education and Public Awareness (CEPA) about Biodiversity. It has also developed thrust areas on Museum Accessibility (Social inclusion) and Traditional Knowledge about Biodiversity (Intangible Natural Heritage).

Exhibitions

- **RMNH, New Delhi:** A photographic exhibition was organized in the new building, Indira Paryavaran Bhawan, MoEFCC, Jor Bagh, New Delhi on the occasion of International Mountain Day 11 December, 2014. Photos in the erected exhibition were related to the topic of Mountain & Mountain Farming shot by the renowned artists who are working

in different Ministries/ Deptt. i.e. Botanical Survey of India and GB Pant University. Scenes from the mountains, Flora and Fauna of the mountain along with diversity in orchids on mountain were the highlights in the exhibition.

Fig-47. *Trainee Teachers workshop at New Delhi.*

- **RMNH Bhubaneswar:** An exhibition on "Fish Diversity and Mineral Resources of Odisha" was opened to the public in the RMNH, Bhubaneswar on 10th August, 2014 to commemorate the 10th Foundation Day of the museum. The exhibition was inaugurated by Prof.Priyambada Mohanty Hejmadi, Vice Chanceller, National Law University, Cuttack in the presence of Shri. Abasar Beuria,Former Ambassador.

Workshops:

- **NMNH New Delhi:** Orientation Workshop for Trainee Teachers - Orientation Workshop was conducted for the trainee teachers with Science/Environmental Science background from 27th to 29th August, 2014. The objective of the workshop was to expose the trainee teachers to the resource material available at the museum and to provide know-how on the development of teaching aids for enhancing the effectiveness of classroom teaching. Emphasis is laid on the fact that museum be used as "Centre of Learning".

- **RMNH Mysore:** Teacher Training Workshop-2014 on topic "Connecting Children Back To Nature" from 11th To 13th September, 2014 at Vivekananda School, Bannuru, T. N.Pura TQ, Mysore Dist. The Museum selected 40 teachers employed in and around the small town Bannuru, T. Narasipura Taluk, Mysore District. The objective of the workshop is to develop environmental awareness among the teacher, to equip the teachers in imparting Environmental Education in the classroom.

- **RMNH Bhopal:** Workshop on "Interactive 3D painting and museums" - Regional Museum of Natural History (RMNH), Bhopal has organized a Workshop on "Interactive 3D painting and museums" on Sept. 29, 2014 on the occasion of their 17th anniversary for the benefit of museum professionals/art students/ general public from museums/colleges. Dr. Anil Oberoi, Apex PCCF of Madhya Pradesh was the chief guest of the inaugural session. The Participants of debate competition, street play contest, workshop and general public attended the inaugural session.

Collaborative Programmes

- **NMNH New Delhi:** A special workshop for specially challenged children was organized from 23rd to 25th July, 2014 at NMNH in collaboration with Association for Learning Performing Arts & Normative Action (A.L.P.A.N.A.), an NGO. Specially challenged children in different categories like physically challenged, Hearing impaired, mentally challenged and visually challenged in Delhi-NCR where invited through their schools/institutions. They participated in various activities during the programme. The activities included Drawing/Painting: Sketching, Colouring & Texture, Paper Craft/Origami: Paper Cutting, Folding & Pasting, Clay Modelling etc.

  NMNH in association with HT PACE conducted NMNH-HT PACE Essay Writing Competition-2014 on 12th November, 2014 for HT PACE member schools. The competition was conducted in two categories: Junior category for class IV & V and Senior category for class VI, VII & VIII. One participant in each category was invited from each participating school. Maximum 200 students were allowed to participate.

- **RMNH, Mysore:** A Drawing competition has been arranged on "Nature" on 19th April, 2014 with the collaboration of Manjushree Art & Craft Centre, Siddarthanagar, Mysore.

  RMNH, Mysore and Mysore Science Forum had jointly organized a programme "Celebration of Mars Orbiter Mission (MOM)" on 27th Sept.'2014 at RMNH, Mysore auditorium. Dr. Jagannath. Scientist, ISRO, Bangalore has delivered a lecture with power point presentation and explained the way Mars mission got success. A special Museum visit was arranged on 14th and 18th October to the postal officials who were on training in Postal Training Centre, Mysore and they gathered very useful information on importance and need of conservation of Western Ghats as need of the hour.

- **RMNH, Bhopal:** International Museum Day - RMNH, Bhopal organized an orientation workshop on "Introduction of Identified Birds Sites (IBS'S) of Madhya Pradesh and Role of IBCN in their conservation" on May 18th, 2014 in collaboration with Bhopal Birds, Bhopal. Superintendent of Narsinghgarh Sanctuary, School teachers, All India Radio personnel and RMNH staff participated.

- **RMNH, Bhubaneswar:** Master Trainers Training Programme - Three days Master Trainers Training Programme was organized for 180 Master Trainers of Eco-club teachers from 30 districts of Odisha from 19th – 21st August 2014 in collaboration with Centre for Environmental Studies, Forest and Environment Departments, Government of Odisha On 19th August, 2014, Shri Debi Prasad Mishra, Hon'ble Minister, School & Mass Education, Govt. of Odisha, Shri Sashi Bhusan Samant, IFS, Director, Environment-cum-Spl. Secretary, F&E Dept., Govt. of Odisha were the guests during the inaugural programme. The programme includes five (05) technical sessions comprising 13 presentations & talks, one Activity session, one field visit to RPRC.

Lecture on "Future Belongs to Those Who Have Innovative Thinking" - Museum in collaboration with Kalinga Foundation Trust and Department of Science & Technology, Govt. of India organized a lecture by Prof.XiangiYi Li, Honorary President of China Association of Natural Science Museums and UNESCO Kalinga Prize winner for Popularization of Science-2013 on the topic "Future Belongs to Those Who Have Innovative Thinking" on Sunday, the 14th September, 2014 at 10.30 AM in the museum auditorium. About 200 students participated in the programme.

Organization of Wildlife week - Museum in collaboration with Chandaka Wildlife Division, Forest & Environment department, Government of Odisha organized film shows on Bhitarkanika, Chilika, Gajaraj, Nandankanan Zoo, Chandaka wildlife sanctuaries etc. in the museum auditorium during the Wildlife week from 2nd to 8th Oct 2014.

Outreach Programmes

– **RMNH Mysore:** Film show and a talk on Tiger was done at Kanakagiri, chamarajanagara Dist. on May 23rd, 2014, for the students of Auyurveda College who were on National Integration camp. Scientists of the museum interacted with the students and discussed the issues of man and animal conflict in the context of recent incidence happened at the periphery of the forest. A documentary on Tiger & Leopard has been screened during the programme.

Earth Day

– **NMNH HQ, New Delhi:** A National Level "Poster Making Competition" was organized on the occasion of Earth Day on 22nd April, 2014 for the children born between 1st April, 1996 and 31st March, 2000. The theme for the competition was "Green Cities". The competition was held at NMNH, New Delhi and Regional Museums of Natural History at Mysore, Bhopal, Bhubaneswar and Sawai Madhopur. Entry was by Registration only which was done at each venue during 15th-18th April, 2014. A maximum of 200 children were allowed to register on first cum first served basis.

Summer vacation programmes

– **NMNH New Delhi-** NMNH HQ New Delhi organised "Summer Vacation Programme-2014" from 15th to 31st May, 2014 for children in two groups- Summer Vacation Programme (SVP) for Green Teens and SVP for Green Cubs. The programme is based on different themes for each day. During Orientation on the first day, children were introduced to the programme and the various activities to be done during the programme. They were also introduced and encouraged to write articles, poems, daily reports, etc. and put their ideas and experience on paper for the Magazine.

– **RMNH Mysore-** Summer Vacation Programme for Children (SVPC) - Green Teens & Green Cubs: The Museum organized Summer Vacation Programme – Green cubs & Green teens for Higher primary and High school students respectively from 12th to 19th May,

2014. The students were exposed to various activities like creation of paper Zoo through Origami, understanding the world of microbes and study of micro-organisms through Microscope.

- **RMNH Bhopal-** The RMNH Bhopal organized Summer Vacation Programme for Green Cubs and Summer Vacation Programme for Green Teens during 19th – 28th May, 2013.

- **RMNH Bhubaneswar-** During the programme, the participants were taught various creative activities such as clay modeling, nature painting, glass painting, collage work & pop-up card, museum based questionnaire, art & craft, snake bite awareness by Shri Subhendu Mallick from Snake Helpline etc. apart from other indoor and outdoor activities including field visit to sanctuary, rice museum and maritime museum.

- **RGRNMNH, Sawai Madhopur:** Museum organised "Summer Vacation Programme-2014" with two categories i.e. Green Teens & Green Cubs during 20th May to 29th May 2014.

Van Mahotsava

- Van Mahotsava week was also organized during 1st-7th July, 2014 at RMNH, Bhubaneswar, and RGRNMNH, Sawai Madhopur.

International Ozone Day

- The International Ozone Day was celebrated on 16th September, 2014 at NMNH New Delhi; RMNH, Bhopal; RMNH Bhubaneswar; and RGRNMNH, Sawai Madhopur.

Wildlife Week

- **NMNH New Delhi-** NMNH organized street plays in the premises of Indira Prayavaran Bhawan, Ministry of Environment Forests and Climate Change, Jorbagh Road, New Delhi to observe "Swachch Bharat Abhiyan" on 2nd October, 2014 (Gandhi Jayanti). In the forenoon, Shri Ashok Lavasa, the Secretary of MoEFCC, Shri Hem Pandey, Addl. Secretary and Shri Shashi Shekhar, Addl. Secretary and other Officials of MoEFCC took the "Swachhta Shapat" (Pledge) and watched the street plays performed by children of different age groups. The Senoir group - Shri Khusumb Creation performed on the theme: "Galtiyan" and the junior group - Rang Virasat performed the street play on the theme: "Hum Hongey Kamyaab" and "Narad Ki Yatra". In the afternoon, Shri Prakash Javadekar, Minister of State (Independent Charge), Ministry of Environment, Forests and Climate Change visited the venue and offered floral tributes on Babu's portrait and gave informative speech on health, hygiene and environment. Honorable Minister released a folders made of recycled paper giving a message on Reuse, Recycle and Reduce (3R). Honorable Minister and Secretary of MoEFCC appreciated the street plays performed by children on the theme of health, hygiene and environmental issues.

- **RMNH Bhubaneswar-** Museum in collaboration with Chandaka Wildlife Division, Forest & Environment department, Government of Odisha organized film shows on Bhitarkanika, Chilika, Gajaraj, Nandankanan zoo,

Chandaka wildlife sanctuaries etc. in the museum auditorium during the Wildlife week from 2nd to 8th Oct 2014.

– **RGRNMNH, Sawai Madhopur:** A collaboratory programme with WWF, SWM has been held in RGRMNH, SWM in connection with Wildlife Week-2014. A special lecture on "Role of the students to conserve Wildlife & Nature" delivered to about 80 students of different schools from SWM on 4th Oct., 2014 and a visit to museum followed by a documentary film on wildlife.

Winter Nature Camp

– **NMNH, New Delhi:** NMNH organised "Winter Nature Camp -2014" at "Aravalli Biodiversity Park", Vasant Vihar, Delhi on 13th & 14th December, 2014.

– **RMNH, Mysore:** RMNH, Mysore arranged "Winter Nature Study Programme -2014" for the higher secondary school children of urban, semi urban and rural schools. A three days camp at the crest of Southern Western Ghats, in Kerala state was held at field research station of Kerala Forest Department in Nilambur on 18th, 19th & 20th of December, 2014. A batch of 15 students was selected for this camp.

– **RMNH, Bhubaneswar:** Museum will be organising "Winter Nature Camp-2015" for PG Life Science Students at Bhitarkanika National Park during 18th – 20th January, 2015.

– **RGRMNH, Sawai Madhopur:** Museum will be organising "Winter Nature Camp-2015" for the students at Ranthambore National Park and Chambal Sanctuary, Khandar, Sawai Madhopur during the 3rd week of January, 2015.

Other Activities

– **NMNH, New Delhi:** NMNH and Ministry of Environment, Forests and Climate Change (MoEFCC) observed International Mountain Day on 11th December, 2014 and organized Keynote Lectures & Painting Competition for school children at Indira Paryavaran Bhawan, Jor Bagh, New Delhi to encourage sustainable development in mountains. Accordingly, this year, the aim was to highlight 'Mountain Farming'. 68 school children participated in the Painting Competition on the theme of 'Mountain Farming'.

– **RMNH, Bhubaneswar:** The museum facilitated a meeting on "Protection and Conservation of Olive Ridley Sea Turtles" organized by State wildlife organization involving local NGOs and frontline staff of coastal Forest Divisions including the Research Fellows of wildlife organization on 20th November 2014 for review of preparedness relating to the current year Olive Ridley sea turtle protection operation and conservation activities.

Museum also organized various competitions (on the spot painting, written quiz and Fancy dress competition).

– **RMNH, Bhopal: *Foundation Day*** - Debate Competition and Street Play Contest: Regional Museum of Natural History, Bhopal conducted a Debate Competition and Street Play Contest for the school children studying 8th to 12th class on Sept. 28, 2014, as part of their 17th anniversary programme of Museum. The topic of

debate was "saving urban wildlife is the responsibilities of public or not" and for the street play contest the theme was "Wildlife". Students from various schools located in Bhopal were participated in Debate Competition and Street Play Contest.

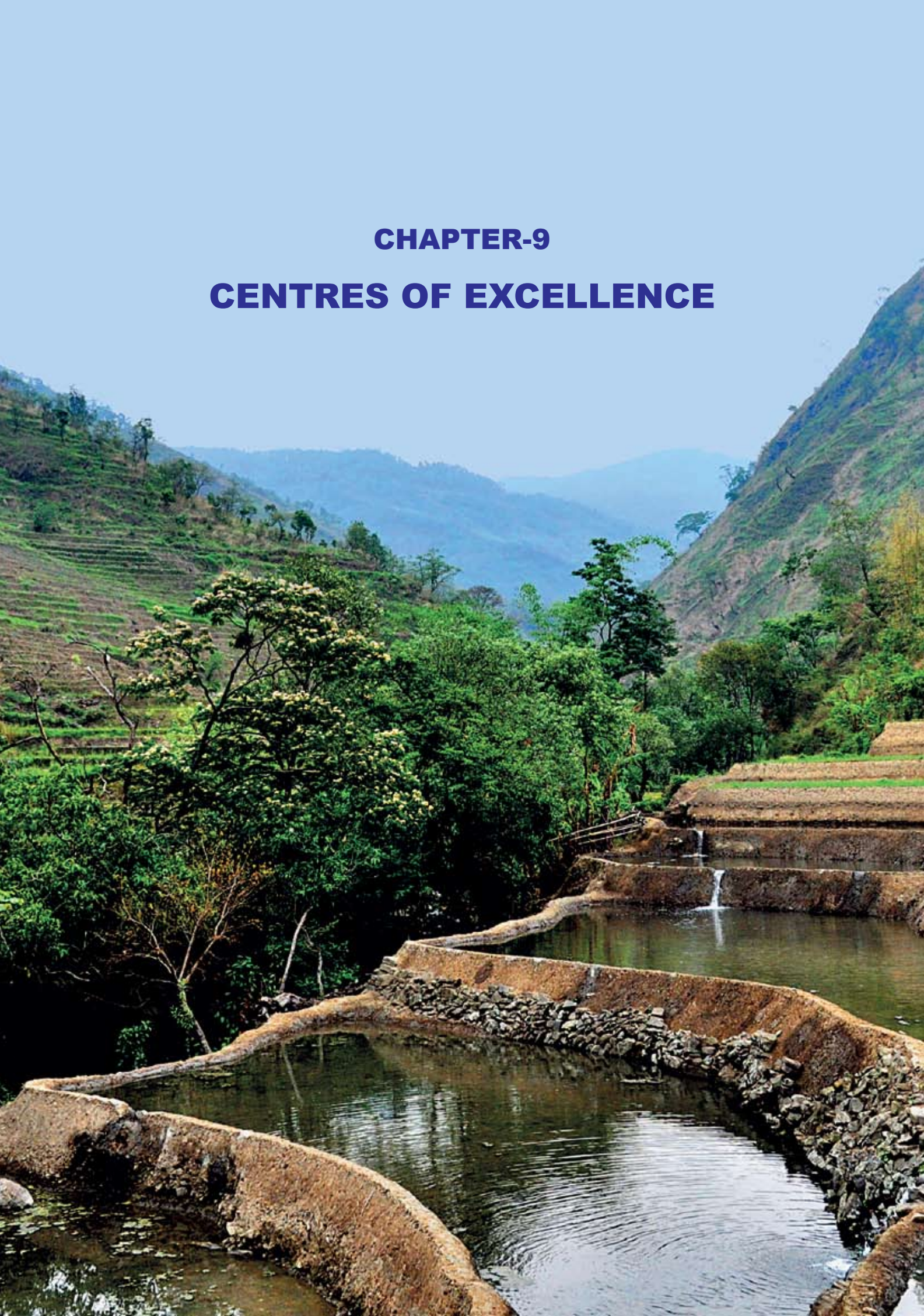
Empowerments of Women/Weaker Sections

– Outreach programme were organized for under privileged children- A large number of educational programmes and competitions for children with disabilities were organised by all the Museums under the NMNH located at New Delhi, Mysore, Bhopal and Bhubaneswar. In addition, the NMNH New Delhi organised special programme for socially excluded community.

– **NMNH New Delhi-** Essay writing in Braille, declamation contest for visually challenged students. A week long programme for Specially Challenged Children includes nature painting competition for hearing impaired, clay modelling for physically challenged and collage painting and animal – bird mask making for mentally challenged organised in the month of February. To mark "World Wetland Day" an outreach programme will be organised on 2nd Feb. 2014 for specially challenged children.

CHAPTER-9

CENTRES OF EXCELLENCE



Centres of Excellence

Enhancement of people's awareness about environment requires capacity building at institutional and individual level for providing adequate support to the efforts in the fields of environment education, research and training. To serve this 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:

Centre for Environment Education (CEE), Ahmedabad

CEE is a national institution engaged in developing programmes and material to increase awareness and concern, leading to action, regarding the environment and sustainable development. It has inherited the rich multidisciplinary resource base and varied experience of Nehru Foundation for Development (NFD), its parent organization, which has been promoting educational efforts since 1966 in the areas of science, nature study, health, development and environment.

Paryavaran Mitra Programme

Paryavaran Mitra programme is an initiative of Centre for Environment Education (CEE) in partnership with the MoEFCC and is supported by Arcelor Mittal India. Paryavaran Mitra is a nationwide initiative to create a network of young leaders, from schools across the country, who have the awareness, knowledge, commitment, and potential to meet the challenges of environmental sustainability in their own spheres of influence.

The Paryavaran Mitra programme reaches out to about 2,20,000 schools which have received the programme resource material and are carrying out action Projects focusing on local environmental issues in the five themes of the programme. The five themes are: Water and Sanitation, Biodiversity and Greening, Energy, Waste Management and Cultural Heritage. The programme encourages schools to qualitatively enhance their learning in project based learning and share their experiences. The focus is to recognize exemplary work done through the Paryavaran Mitra Puraskar. A total of about 2500 schools responded and submitted their entries in school, teacher and student categories. Through a process of scrutiny at state level by experts in the field of education and environment that included government officials, 96 schools, 65 teachers and 57 students were nominated for the national level Puraskar. A National Committee comprising of eminent experts in the field of education, environmental education, and environmental solutions short listed 15 schools, 14 teachers and 15 students for the Paryavaran Mitra Puraskar at national level. The Puraskar for the year 2013 was awarded at CEE, Ahmedabad on 14th October, 2014. Four best schools, four teachers, and students were awarded.

Campaigns:

World Environment Day: Taking forward this year's World Environment Day theme "Raise Your Voice, Not the Sea Level" CEE, developed a multilingual, activity-oriented interactive poster on the subject of Small Islands in India. The poster focuses on the environmental and sustainability issues of small islands. It encouraged students to send slogans for the national level competition.

Swachh Bharat Abhiyan: Supporting the Prime Minister's vision of a clean India, Paryavaran Mitra, SAYEN and CEE launched the 'I am Swachh I am Swasthh' Campaign from 14th November, 2014. This initiative encourages schools and youth to go beyond the symbolism and temporary action and focus on sustained actions towards sustainability at the school level and individual students and youth level.

Showcase

Paryavaran Mitra Programme showcased at UNESCO ESD Conference

The handprint programme was one of the 25 projects stories selected for showcasing at the end of decade of the Decade for Education for Sustainable Development (DESD) conference held in Nagoya 9-11 November, 2014. Paryavaran Mitra was one among the 25 handprint projects worldwide showcased at the conference. Paryavaran Mitra was also showcased amongst 5 best ESD projects from India. Paryavaran Mitra Young Leader for Change Anushka Kale's action project facilitated by CEE was selected under the Paryavaran Mitra Programme. The project "Good Practice Stories on Education for Sustainable Development" for UNESCO, aimed to build momentum for Education for Sustainable Development and document the knowledge of innovative ESD initiatives across India. Paryavaran Mitra is one of the largest handprint projects with schools in India.

National Green Corps (NGC)

National Green Corps (NGC), Programme aims to create awareness among school children throughout the country on issues related to sustainable development, keeping environmental issues as the major focus. CEE implements NGC programme in 15 States and 2 Union Territories as resources agency. Working through eco-club network, NGC has established nearly one lakh eco-clubs involving more than 35-40 lakh students and 10 lakh teachers. CEE organised series of environment-related events with NGC schools during 2014-15 focusing on various themes such as save fuel competiotions, water and sustainability, greening my school campus.

ENVIS

CEE hosts the ENVIS Centre on Environmental Education (EE) and manages information in the domains of Environmental Education (EE) and Education for Sustainable Development (ESD).

The Green Teacher website www.greenteacher.org is one of the components of the ENVIS EE programme of CEE which caters to the EE and ESD information needs of environmental educators and interested citizens, individuals and groups. As per the suggestions of the ENVIS Focal Point, a new website www.ceeenvis.nic.in compatible with the NIC platform is being redeveloped, which will help to meet the ENVIS objectives more effectively.

National Environmental Awareness Campaign

The National Environment Awareness Campaign (NEAC) is an annual scheme of the MoEFCC, operation since 1986. 'Combating Desertification, Land Degradation and Drought' was the theme for the year 2014-15. CEE was associated with the campaign in the capacity of a Centre of Excellence. CEE worked with 20 Regional Resources Agencies (RRAs) located nationally to scrutinize about 10000 proposals received by the RRAs.

C.P.R. Environmental Education Centre (CPREEC), Chennai

C.P.R. Environmental Education Centre (CPREEC) is a Centre of Excellence of the Ministry of Environment, Forests & Climate Change, Government of India, jointly set up by the Ministry and the C.P. Ramaswami Aiyar Foundation, Tamil Nadu.

Activities undertaken

Green Rameswaram

As part of Greening Rameswaram, CPREEC initiated plantation activities at the Sri Ramanathaswamy Temple lands, Mangala Theertham, Thangachi Madam village in Rameswaram.

Women and the Environment

CPREEC trained women of selected villages in waste management, vermicomposting, organic farming, health and nutrition in the states of Tamilnadu, Andhra Pradesh, Telangana and the Union Territory of Puducherry. Saplings and seeds were distributed to the participants and seed banks of local varieties were established by the women self help groups.

Nilgiri Biosphere Reserve Conservation Education

The importance of the Nilgiris Biosphere Reserve was conveyed to the teachers, teacher trainees, villagers, women and students in the districts of the Nilgiris, Coimbatore, Thiruppur and Erode in Tamilnadu, Wayanad in Kerala, Gundlepet district in Karnataka. A programme for the Committee Members and Leaders of Eco-Development Committee (EDC) of Germalem, Sathyamangalam Tiger Reserve was conducted by CPREEC at Sathyamangalam Tiger Reserve (STR).

The annual Anti Plastic Campaign of CPREEC was organized at the Botanical Garden in Ooty in the Nilgiris. Ozone day celebrations and wildlife week celebrations were also organized.

As part of the Tamil Nadu Biodiversity Conservation & Greening Project, Department of Forests, Government of Tamil Nadu CPREEC organized a series of awareness programmes on Participatory Rural Approach in the Nilgiris.

CPREEC organized Advanced Level Skill Development Training Programme on banana fibre products for rural tribes in Nilgiris Distirct, in Tamil Nadu.

Exhibition

Exhibition on 'Sacred Plants of India' and 'Sacred Groves of India' were organized this year. Ms. Maneka Gandhi, Hon'ble Minister for Women and Child Development, Government of India inaugurated the exhibition and released a publication on Sacred Plants of India.

Publications

CPREEC's publications are regularly updated and reprinted. Appropriate resource materials produced by CPREEC were distributed to the participants of the various training programmes organized in the states of Andhra Pradesh, Telangana, Goa, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu and the Union Territories of Andaman & Nicobar and Puducherry.

The annual issue of the Indian Journal of Environmental Education, which is a peer-reviewed journal was brought out.

25 Years of CPREEC

As part of Silver Jubilee Celebrations, CPREEC brought out two important publications:

– Sacred Groves of India – A Compendium

– Green Pilgrimage for a Clean India

Shri. Ashok Lavasa, IAS, Secretary, Ministry of Environment, Forests & Climate Change (MoEFCC), Government of India released the publications during the silver jubilee celebrations held at Chennai on October 28, 2014. Dr. M.S. Swaminathan, Chairman, CPREEC and Shri Jairam Ramesh, M.P., received the first copies. Shri Hans Raj Verma, IAS Principal Secretary, Department of Environment & Forests, Government of Tamil Nadu was also present.

CPREEC Award for Environmental Education

The Annual CPREEC's Award for Environmental Education was awarded to Shri G. Prabhakar, Teacher, Keshav Memorial Boys' School, Narayanguda, Hyderabad. Dr. M.S. Swaminathan, Chairman, CPREEC gave away the award.

CPREEC – Green School Award – Chennai

The Green Schools of India Award Chennai for the year 2014 was given to the N.S.N. Matriculation Higher Secondary School, Chitlapakkam, Chennai. Shri Hans Raj Verma, IAS, Principal Secretary, Department of Environment & Forests, Government of Tamil Nadu gave away the award.

Research and Surveys

CPREEC carried out ambient air quality and noise level surveys at 3 places – Nelamangala in Bengaluru Rural district, Hassan and Tumkur district headquarters in Karnataka. Microbial contents present in the air (bacteria and fungi) were also analysed at the above locations in Karnataka.

CPREEC analysed microbial contents in Milk (cow and buffalo milk procured from vendors) in Chennai city. In addition to the above, CPREEC also analysed water samples collected from various river basins of Tamil Nadu. CPREEC carried out a study on salt water intrusion along the Chennai coast and analysed ground water samples.

Green Campus

To promote environmental thinking as a base for healthy living among college students and to monitor environmental resources through a systematic environmental management approach, CPREEC, as a pilot project, organized air and water quality monitoring involving college students of Chennai. The students carried out air quality, water and noise level surveys. Analysis of air micro flora in different locations was also carried out.

Envis Centre

CPREEC's ENVIS Centre on Conservation of Ecological Heritage and Sacred Sites of India has expanded the existing database on various aspects of Indian ecological heritage with primary and secondary sources. The ENVIS newsletter ECOHERITAGE.COM was published in the prescribed format and four issues were brought out.

National Green Corps (NGC)

Workshops were organized for selected district NGC teacher-coordinators in the state of Andhra Pradesh, Telangana, Karnataka, Kerala, Odisha, Tamil Nadu and the Union Territory of Puducherry.

National Nature Camping Programme (NNCP)

CPREEC organized twenty nature camps in the states of Tamil Nadu, Karnataka, Odisha and Union Territory of Puducherry for the NGC students.

E-waste Management

CPREEC conducted a series of workshops on E-Waste Management for bulk consumers and recyclers in the states of Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, Kerala, Odisha, Maharashtra, Goa and Karaikal in Puducherry. The workshops were organized in collaboration with the concerned State Pollution Control Boards and Pollution Control Committee.

National Environment Awareness Campaign (NEAC)

National Environmental Awareness Campaign (NEAC) Regional Committee meeting of Eastern & Southern Region was organized at Chennai and Bhubaneswar.

CPREEC also developed a booklet on Combating Desertification for distribution to the participating agencies.

CITES – Capacity Building Workshop

CPREEC in collaboration with the Ministry of Environment, Forests & Climate Change (MoEFCC), Government of India and Humane Society International (HIS) organized the Capacity building workshop on Implementation of CITES Appendix II Listings of Sharks and Manta Ray Species at Chennai on August 26th to 28th, 2014. The workshop was funded by CITES, Switzerland and European Union.

Dr. M.S. Swaminathan, Chairman, CPREEC inaugurated the workshop and addressed the national and international participants from CITES Secretariat, Geneva, Bangladesh, Sri Lanka, Myanmar, Malaysia, Thailand, Maldives, Indonesia, Seychelles, Italy and others. Officials from MoEFCC, New Delhi, Departments of Environment and Forest and Department of Fisheries in the coastal states and UTs of India and representatives from ZSI, CMFRI, MPEDA, FSI, TRAFFIC India also attended the workshop.

Kindness Kids Programme

Kindness Kids Programme – a project funded by the Animal Welfare Board of India was carried out by CPREEC this year by organising workshops for teachers and orientation programmes for students in Andhra Pradesh, Tamil Nadu, Karnataka and Puducherry, thereby extending the scope of environmental education; the link between their food and environmental damage as well as the importance of kindness to animals. Competitions were organized for the participating school children.

Go-Vegetarian Programme for School Students

To popularize the benefits of vegetarianism among school students funded by Humane Society International (HIS), CPREEC implemented a programme titled Go-Vegetarian programme. 50000 students of Std VI, VII and VIII from various schools in Ooty, Chennai, Hyderabad, Bhubaneswar and Karaikal and Puducherry were motivated.

Plastic Waste Minimization Programme

Awareness education programmes through street play on the ill effects of plastics were conducted in schools and public places of Cuddalore, Tiruvannamalai,

Vellore and Villuppuram districts of Tamil Nadu, supported by the department of Environment, Government of Tamil Nadu.

Third Indian Biodiversity Congress (IBC 2014)

CPREEC co-organized the Third Indian Biodiversity Congress (IBC 2014) at the SRM University, Kattankulathur, Chennai along with CISSA, Thiruvananthapuram and SRM University, Kattankulathur from 18 to 20 December, 2014.

Hon'ble Dr. K. Rosaiah, Governor to Tamil Nadu inaugurated the Congress on December 18th and addressed the gathering. Several distinguished environmentalists and environmental activists presented papers and spoke.

Public Works Department, Government of Tamil Nadu

CPREEC organized orientation programmes for school students in the river basins of Tamil Nadu funded by the Public Works Department. CPREEC also organized mobile exhibitions at selected schools and colleges in the river basins of Tamil Nadu.

Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru

The Centre for Ecological Sciences, Indian Institute of Science (IISc), Bengaluru, is conducting research, education, extension & training for field managers in the broad area of ecology with special emphasis on the Western Ghats with practical application in conservation and sustainable development of natural areas of Western Ghats.

Achievements

The Centre has continued to do cutting–edge research in diverse areas of ecology and evolutionary biology that range from the social behaviour of single-celled organisms such as slime moulds to the largest land mammals, the Asian elephant, and from the chemistry to the molecular ecology of species interactions, besides questions concerning planetary issues such as climate change and published 47 refereed papers in reputed international and national journals, a book on Asian Elephants and 7 popular articles in addition to 3 chapters in books and 5 book reviews. The Centre organized International and National level conferences and symposia like the Students Conference on Conservation Science and the unique meeting for young ecologists of the country called the 'Young Ecologists Talk and Interact' (YETI). Seventeen scientists from abroad and different parts of India visited the centre and interacted with the faculty members and students.

Ecology of Invasive Plants

Lantana camara, a shrub of Central and South American origin, has become invasive across dry forests worldwide. The effect of the thicket-forming habit of L. camara as a dispersal and recruitment barrier in a community of native woody seedlings was examined in a 50-ha permanent plot located in the seasonally dry forest of Mudumalai, southern India. Sixty 100-m2 plots were enumerated for native woody seedlings between 10–100 cm in height. Of these, 30 plots had no L. camara thickets, while the other 30 had dense thickets. The frequency of occurrence and abundance of seedlings were modeled as a function of dispersal mode (mammal, bird or mechanical) and affinities to

forest habitats (dry forest, moist forest or ubiquitous) as well as presence or absence of dense L. camara thickets. Furthermore, frequency of occurrence and abundance of individual species were also compared between thickets and no L. camara. At the community level, L. camara density, dispersal mode and forest habitat affinities of species determined both frequency of oc`currence and abundance of seedlings, with the abundance of dry-forest mammal-dispersed species and ubiquitous mechanically dispersed species being significantly lower under L. camara thickets. Phyllanthus emblica and Kydia calycina were found to be significantly less abundant under L. camara, whereas most other species were not affected by the presence of thickets. It was inferred that, by affecting the establishment of native tree seedlings, L. camara thickets could eventually alter the community composition of such forests.

Fig-48. *Lantana camara - In warmer, moister areas it often becomes dominant in regenerating pastures*

Acoustic biodiversity monitoring

The Centre is developing acoustic sampling as a tool to identify and monitor species in tropical evergreen forests, with an emphasis on crickets, birds and bats. One of the aims is to compare the efficacy of listener-based psychoacoustic sampling with instrument- based recordings of the same. Recently, a new acoustic entropy-based diversity index has been proposed based on ambient noise recordings but this has not been validated against measurements of species diversity using more standard methods. In the past year, the study was carried out in Kodagu district of Karnataka, which has a lot of evergreen forest cover. Instrument recordings of the dawn chorus were carried out simultaneously with listener-based point counts. The acoustic diversity index was found to be problematical when compared with psychoacoustic sampling. The Centre is currently evaluating an alternative song recognition software, Songscope, which uses a pattern recognition algorithm, for its efficacy in acoustic species identification

Chemical Ecology

The Centre investigated day–night differences in fruit odours in two species of figs, Ficus racemosa and Ficus benghalensis. The volatile bouquet of fruit of F. racemosa that are largely dispersed by bats and other mammals was dominated by fatty acid derivatives such as esters. In this species in which the ripe fig phase is very short, and where the figs drop off soon after ripening, there were no differences between day and night in fruit volatile signature. The volatile bouquet of fruit of F.

benghalensis that has a long ripening period, however, and that remain attached to the tree for extended periods when ripe, showed an increase in fatty acid derivatives such as esters and of benzenoids such as benzaldehyde at night when they are dispersed by bats, and an elevation of sesquiterpenes during the day when they are dispersed by birds. The Centre has the data to suggest that the volatile signal produced by fruit can show diel differences based on the activity period of the dispersal agent.

Implementing Organizations along with details of responsibilities

The Centre for Ecological Sciences is functioning under the Administrative control of Indian Institute of Science, Bangalore. The Centre maintains field stations near Mudumalai Wildlife Sanctuary, and in Uttara and Dakshin Kannada in the Western Ghats to facilitate field research in areas which include community and habitat ecology, molecular genetics and conservation biology, large mammal and forest ecology, and climate change. The projects range from theoretical to laboratory to field-based research with the different approaches being used in a complementary manner.

Centre for Mining Environment (CME), Indian School of Mines, Dhanbad

Centre for Mining Environment (CME) was inducted as a Centre of Excellence in 1987 on a project mode. The Centre has been mainly engaged in R&D activities and the associated research publication, and involved in issues of academic interest pertaining to mining and environment.

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

Sálim Ali Centre for Ornithology and Natural History (SACON) was established in 1990 as a fully funded Centre of Excellence under the Ministry, with the following objectives:

- design and conduct research in Ornithology covering all aspects of Biodiversity and Natural History;
- develop and conduct regular courses in Ornithology and Natural History;
- create a data bank on Indian Ornithology and Natural History; and
- disseminate knowledge relating to Ornithology and Natural History for the benefit of people

Centre for Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi, Delhi

Introduction

Realizing the need for action research and capacity building in the areas of restoration ecology and ecosystem management with a view to develop innovative technologies and creative solutions for addressing environmental and ecological issues resulting from developmental activities and other anthropogenic mediated factors, the Ministry of Environment & Forests (MoEF), Government of India has been supporting the Centre of Excellence Programme at the Centre For Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi.

Activities undertaken

The Centre of Excellence Programme of MoEFCC at Centre for Environmental

Management of Degraded Ecosystems (CEMDE), University of Delhi has been engaged in (i) Ecological restoration of mined out areas in coal fields of Coal India Limited through ecotechnologies, (ii) Management of invasive alien species, (iii) Restoration and management of grasslands in protected areas, (iv) Long-term monitoring of already restored ecosystems, (v) Changing Flora and Ecology of Delhi, and (vi) Interface Programme.

Madras School of Economics (MSE), Chennai

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. The MOU was extended during the Eleventh Five Year Plan, which was also decided to be continued in the Twelfth Five Year Plan. This Centre of Excellence is under the administrative charge of the Economic Cell. The Senior Advisor in the Ministry serves as a member on the Governing Board of MSE.

Under the Central Sector Scheme of Centres of Excellence, Plan funds are allocated to CoE-MSE annually as per its Action Plan drawn up on the recommendations of the Steering Committee constituted under the MOU. The funds are released to the Centre in project specific mode to meet approved expenditures on research studies, Workshops, Seminars, etc. and for the maintenance of its website. Two Steering Committee Meetings of CoE-MSE were held in 2014-15 i.e; on 17th April, 2014 and 20th December, 2014 respectively.

Progress

During 2014-15, the Centre has been assigned the following tasks:

- 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.
- **Dissemination Papers:** Out of the four Dissemination Papers identified by the Steering Committee for 2014-15, two dissemination papers 'Behavioral Economics & Environment' by Dr. L. Venkatachalam; and 'Urbanization & Environment' by Dr. Zareena Begum have been published.
- **CoE Newsletters:** "Green Thoughts" (biannual publication) - Out of the two issues assigned to the Centre in 2014-15, one issue was brought out by the Centre.
- **Visiting Researcher Fellowship Programme:** The objective of this programme as outlined in the Vision Document, 2012-17 of CoE-MSE is to invite at least one researcher per year to spend a couple of months at the Centre. The programme was approved in the year 2008.

  Dr. Pranab Mukhopadhyay, Professor, Economics Department, Goa University visited the Centre during October-November, 2014. He has given a seminar on 'Economic Growth and Ecological Sustainability in India' at MSE on 26th November, 2014. He will be submitting

working paper on this topic by February 2015. Two MSE working papers have been published on the basis of work done by Visiting Researchers at the Centre during 2014-15 which include (a) Perspectives on Valuation of Biodiversity by Dr. M.S. Suneetha and (b) Group Inequalities and Scanlan's Rule: Two Apparent Conundrums and How we might Address them' by Dr. Peter J. Lambert and S. Subramanian.

– **Environmental Economics Website -** The Centre's state-of-the-art website http://coe.mse.ac.in has been updated to make it more user-friendly. Efforts have been made to augment the database on environmental economics literature. A number of Indian studies have also been added to the database. The website is serving as one-stop destination for users interested in environmental economics related issues in India. Under various sub-disciplines of environmental economics and resource economics, about 7,500 articles published in referred journals have been categorized. This searchable database enables the users to access information and the abstract of the publications and also provides scope for carrying out comprehensive literature review.

  For the financial year 2014-15, preparation of two bibliographic notes was part of work plan (i) 'Water Pollution Impacts' and (ii) 'Biofuels' out of which note on 'Water Pollution Impacts' has been completed.

– **Training Programmes -** The Vision Document, 2012-17 of CoE-MSE also envisages conducting of at least one training program per year on issues related to Environmental Economics, either through funding from the Ministry or other sources. For the current year 2014-15, the Centre organized a three-day training program on 'Environmental Fiscal Reforms: International Experience and Relevance for India' for the officers of the eastern states including Odisha, Bihar and West Bengal during 30th October – 1st November 2014 at Jadavpur University, Kolkata. The training program was inaugurated by the Senior Adviser, MoEFCC. The Centre had submitted its report to the Ministry on successful completion of the training program, in the second week of December 2014.

Foundation for Revitalisation of Local Health Traditions (FRLHT), Bengaluru

The Centre of Excellence on Medicinal Plants and Traditional Knowledge at FRLHT, Bangalore was initiated during 2002-03 to bring to the focus and address various issues related to conservation and sustainable utilization of medicinal plants. In the course of its activities the Centre has created a national Bio-cultural herbarium of medicinal plants and an Ethno-medicinal garden, both of which have very rich collections of medicinal plants. Besides, the Centre engages in: a) Pharmacognostic studies on the controversial plant raw drug groups in trade, b) Building capacities of different stakeholder groups in respect of various issues related to medicinal plants, through capacity building courses, workshops and training, c) Preparing a GIS based Atlas of distribution maps of medicinal plants to help forest managers in planning conservation action, d) Well-referenced educational CD-ROMS on medicinal plants used in Siddha, Unani and Homoeopathic

systems of medicine.

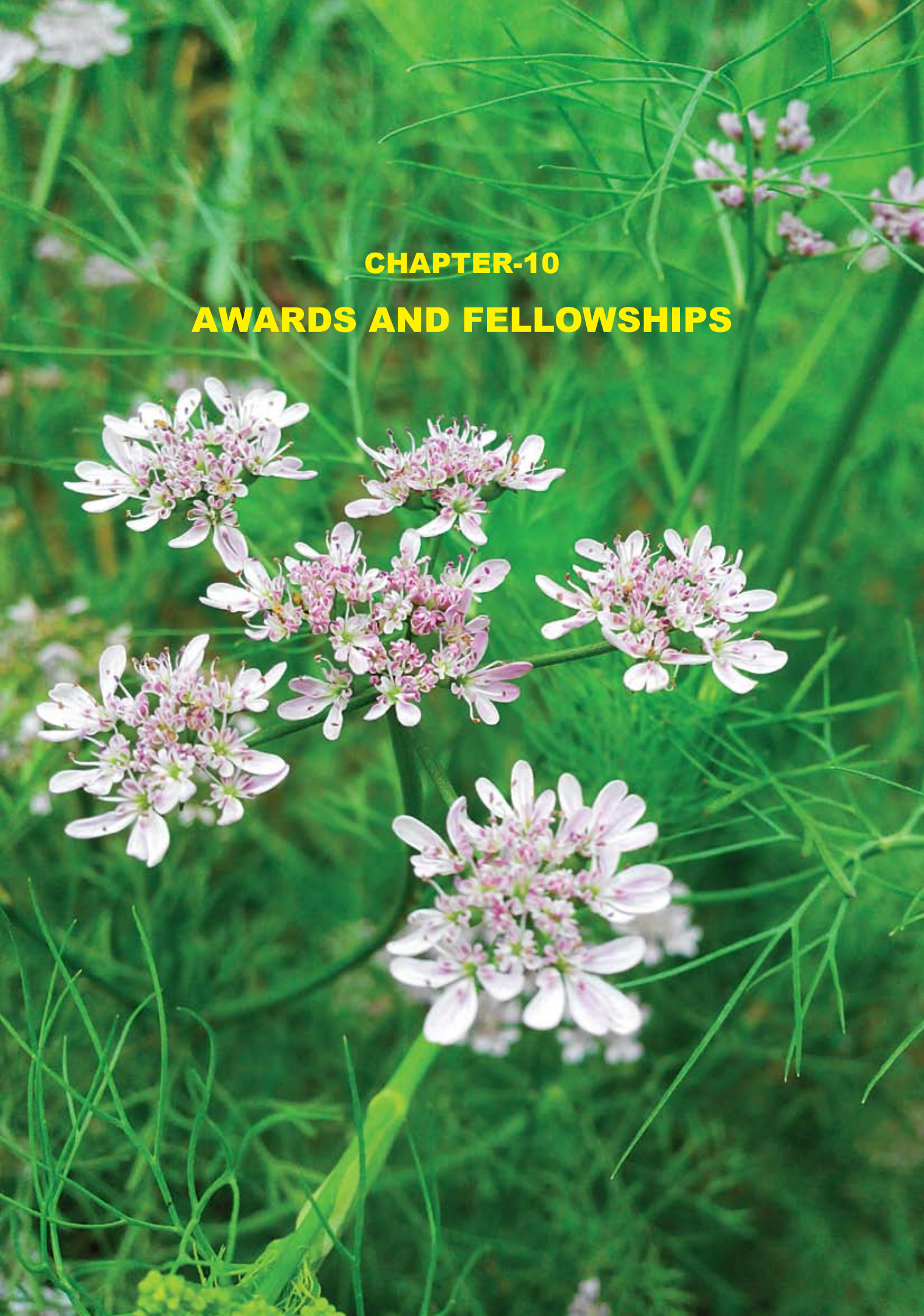
Tropical Botanic Garden and Research Institute (TBGRI), Thiruvananthapuram

Tropical Botanic Garden and Research Institute (TBGRI) was established by Government of Kerala as an autonomous R&D organization in 1979 to facilitate conservation and research on tropical plant resources in general and of the country and the Kerala state in particular. The Institute was brought under the society established by the State Government namely "Kerala State Council for Science, Technology and Environment" (KSCSTE) in 2003 and the institute maintains a 300 acre conservatory garden for the wild tropical plant genetic resources of the country, besides a well integrated multidisciplinary R&D system dealing with conservation, management and sustainable utilization of tropical plant resources. The Institute was recognized as a National Centre of Excellence in ex-situ conservation of tropical plants in 1997 and a number of significant achievements have been made by the Institute.

Centre for Animals and Environment, CARTMAN, Bengaluru

The Project on Centre of Excellence for Animals & Environment (CAE) awarded by the Ministry to CARTMAN, Bengaluru in 2000 and discontinued after two years for administrative reasons was resumed during 2009.

The main objective of the Project is to study the mutual dependence and inter-relationship between the Animals (LIVESTOCK) and Environment (Plant Life) and initiate steps to preserve environment and to improve the health and welfare of animals by making them more productive. Another activity envisaged is to eliminate pollution of environment caused by City based Abattoirs by providing alternate locations where animals are born and reared. This would also result in development of rural areas by retaining the Value added in the process in villages and nearby towns.



CHAPTER-10

AWARDS AND FELLOWSHIPS

Awards

Indira Gandhi Paryavaran Puraskar (IGPP)

In reverential memory of late Prime Minister Smt. Indira Gandhi, the Ministry of Environment, Forests & Climate Change in the year 1987, instituted an award called the 'Indira Gandhi Paryavaran Puraskar' to give recognition to those having made or have the potential to make measurable and major impact in the protection of environment. Presently, the award comprises of two prizes of ₹ 5,00,000/- each under 'Organization Category' and three prizes of ₹ 5,00,000/-, ₹ 3,00,000/- and ₹ 2,00,000/- each 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

A meeting of the Prize committee was held under the chairmanship of Hon'ble Vice President of India on 20 October, 2014 and the awardees of IGPP-2011 and 2012 were selected as below:

Fig-49. *(Left to right) Shri H.K. Pandey, Additional Secretary, Shri Ashok Lavasa, Secretary, MEFCC and Shri Sushil Kumar, Additional Secretary on the occasion of IGPP Award ceremony at New Delhi.*

Indira Gandhi Paryavaran Puraskar - 2011	
Organisation (₹ 5.0 lakh)	Indian Farmers' Fertilisers Cooperative Ltd., Phulpur Unit, Uttar Pradesh
Organisation (₹ 5.0 lakh)	128 Infantry Battalion (TA) Ecological, Rajasthan
Individual (₹ 5.0 lakh)	Shri Ramesh Sharma, Bhilainagar, Chhattisgarh
Individual (₹ 3.0 lakh)	Shri Sharda Prasad Singh, Kushinagar, Uttar Pradesh
Individual (₹ 2.0 lakh)	Shri Sachchidanand Bharati, Uttarakhand
Indira Gandhi Paryavaran Puraskar - 2012	
Organisation (₹ 5.0 lakh)	Aaranyak, Guwahati, Assam
Organisation (₹ 5.0 lakh)	Durgapur Steel Plant (DSP), Steel Authority of India (SAIL), Durgapur, West Bengal
Individual (₹ 5.0 lakh)	Shri Biswajit Mukherjee, Chandannagar, West Bengal
Individual (₹ 3.0 lakh)	Shri Jigmet Takpa, Leh, Jammu & Kashmir
Individual (₹ 2.0 lakh)	Smt Seema Redkar, Thane, Maharashtra

The Puraskar was conferred on these awardees in a Ceremony held on 02nd February, 2015, at Ganga Auditorium, Indira Paryavaran Bhavan, New Delhi.

Awards Conferred by the NTCA

Presently, the NTCA confers awards to the tiger reserves in following thematic areas:

- Anti poaching
- Habitat Management
- Village Relocation and resettlement
- Tourism regulation
- Active management
- Management of human-tiger conflict
- Communication Strategy
- Co-occurrence and eliciting local public support

A trophy along with citation is given to the winner tiger reserve in each category based on their nomination with recommendation from the Chief Wildlife Warden of the concerned tiger State.

Indira Priyadarshini Vriksha Mitra (IPVM) Awards

The Indira Priyadarshini Vriksha Mitra (IPVM) Awards were instituted in 1986 to recognize the pioneering and innovative contribution made by individuals and institutions in the field of afforestation/ wasteland development every year.

From the year 2011 the IPVM Awards have been increased from existing four categories (since 2006) to following seven categories:-

1. Individual - Forest Officers
2. Individual - Other than Forest Officers
3. Institutions/Organisations under Government

4. Joint Forest Management Committees (six awards region-wise)
5. Non-profit making Voluntary Organisations (NGOs)
6. Corporate Sector (Private/Public Sector Agencies)
7. Eco-Clubs at School Level (covered under National Green Corps Programme of the Ministry of Environment and Forests)

Note:

i). Awards under category Individuals, both Forest Officers and others, should be in recognition of personal contribution demonstrating extra efforts beyond call of routine duty.

ii) Officials (other than Forest Officers) working in Government Departments including Forest. Department and private individuals will come under category 2.

iii) Six regions for the purpose of IPVM awards to JFMC will be North (Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttarakhandl, Uttar Pradesh and UT of Chandigarh), East (Bihar, Jharkhand, Orissa and West Bengal) West (Goa, Gujarat, Maharashtra, Rajasthan, UT of Dadara & Nagar Haveli, UT of Daman & Diu and UT of Lakshdweep) South (Andhra Pradesh, Karanataka, Kerala, Tamilnadu, UT of Andaman & Nicobar Islands, UT of Pondicherry) Central (Madhya Pradesh and Chhattisgarh) and North East (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura).

- Only one award is given in each category.
- Cash prize of ₹2.5 lakhs along with Medallion and Citation is given for each category.
- Nominations of Government servants/ Govt. Institutions/Organizations are forwarded through the Head of the Department/Organization concerned and those from JFMCs may be forwarded by the PCCF concerned.

Present Status

The IPVM Awards for the year 2010 were conferred on 19th November, 2010.

For the final selection of awardees of IPVM Awards for the calendar year 2011 and 2012, the meeting of Selection Committee chaired by Minister of State (MoEFCC) is yet to be convened.

IPVM Awards for States and Union Territories

The IPVM Awards for States and Union Territories were instituted in the year 2008 for enhancing the percentage of Forest and Tree

Table-28. *Categories under IPVM Awards for States and Union Territories*

Sl. No.	Category	Award
a)	Big State having geographical area of 80,000 Sq. Km and above	₹ 8.00 lakhs (one)
b)	Small State having geographical area below 80,000 Sq.Km.	₹ 5.00 lakhs (one)
c)	Union Territories	₹ 5.00 lakhs (one)

Cover in States/UTs. The Awards are divided into three categories and only one award is given in each category (Table-28).

IPVM Awards for States/UTs were conferred upon on 19th November, 2010. For the final selection for the year 2012, the meeting of selection Committee chaired by Minister of State (MoEFCC) is yet to be convened.

E.K. Janaki Ammal National Award on Taxonomy

In order to encourage work of excellence in taxonomy and also to encourage scholars to work in this field of science, this award, named after the late Prof. E. K. Janaki Ammal was instituted in the year 1999. Late Prof. Janaki Ammal did taxonomic work of outstanding merit and excellence, particularly in the area of cytotaxonomy and has been a source of inspiration to many young scientists.

Initially there was one Award in Taxonomy covering all the three fields viz Botany, Zoology and Micro-organisms and subsequently the scope was enlarged to two Awards, one each for excellence in Plant and Animal Taxonomy. From 2013 onwards, the scope has been further enlarged to three Awards in Taxonomy namely Animal Taxonomy, Plant Taxonomy and Microbial Taxonomy. The three Awards are known as 'E.K. Janaki Ammal National Award in Plant Taxonomy', 'E.K. Janaki Ammal National Award in Animal Taxonomy', and 'E. K. Janaki Ammal National Award in Microbial Taxonomy'. Each award will carry ₹ 1,00,000/- (₹ One Lakh Only) in cash along with a citation, scroll and Medallion. The Awards will be given to the Taxonomists selected by a Selection Committee, under the Chairmanship of Secretary (E&F), constituted for this purpose.

National Awards for Prevention of Pollution and Rajiv Gandhi Environment Award for Clean Technology

The National Award for Prevention of Pollution for the year 2010-2011 were given by Shri Prakash Javadekar, Hon'ble MEF on the occasion of World Environment Day i.e. on 5th June, 2014. The awards were bestowed to the four industries for their commendable efforts towards conservation of energy and water, reduction in waste generation and commitment towards maintaining a safe, clean and healthy environment. Rajiv Gandhi Environmental Award for Clean Technology has not been recommended for any industry for the year 2010-11.

Nominations were invited for the year 2011-12. Thirty three nominations have been received and the evaluation and ground truthing of the same, are being undertaken for consideration of Award Selection Committee.

Awards in the Wildlife Division

Wildlife Division looks after the Rajiv Gandhi Wildlife Conservation Award, Amrita Devi Bishnoi Wildlife Protection Award and fellowships, namely, Dr. Salim Ali National Wildlife Fellowship Award and Shri Kailash Sankhla National Wildlife Fellowship Award instituted by Ministry for outstanding work

in the field of wildlife conservation and protection.

Rajiv Gandhi Wildlife Conservation Award

The Rajiv Gandhi Wildlife Conservation Award is given annually for significant contribution in the field of wildlife conservation which has made, or has the potential to make, a major impact on the protection and conservation of wildlife in the country. Two awards of Rupees One lakh are given to education and research institutions, organisations, forest and wildlife officers/research scholars or scientists/wildlife conservationists.

Amrita Devi Bishnoi Wildlife Protection Award

The Amrita Devi Bishnoi Wildlife Protection Award is given for significant contribution in the field of wildlife protection, which is recognised as having shown exemplary courage or having done exemplary work for the protection of wildlife. Two cash awards of Rupees One lakh is presented to individuals and institutions involved in wildlife protection.

Fellowships

Dr. Salim Ali National Wildlife Fellowship Award and Shri Kailash Sankhla National Wildlife Fellowship Awards

In order to commemorate the memory of the two great wildlife conservationists of the country, Shri Kailash Sankhla and Dr. Salim Ali, the Ministry of Environment and Forests awards these two fellowships alternatively each year. The objective is to inspire and promote the country's wildlife managers and scientists to take up research or experimental projects aimed at conserving the rich wildlife heritage of India. The fellowship is awarded for a period of two years with a stipend of Rupees 20,000/- per month. In addition, an amount of Rupees 1,00,000/- per annum would be paid for meeting secretarial and contingent expenditure including expenditure on books and travel. The fellow is entitled to engage research staff or field investigators to assist them and for this purpose an amount of ₹ 1,500/- per month would be admissible.

Dr.B.P.Pal National Environment Fellowship Award and Pitambar Pant National Environment Fellowship Award

Recognising the importance and urgency of Bio-diversity conservation, Dr.B.P.Pal National Environment Fellowship Award for Biodiversity was instituted in 1993 to further develop, deepen and strengthen the expertise available in the country. Pitambar Pant National Environment Fellowship Award was instituted in 1978 in recognition of meritorious and valuable contribution made in the area of environmental science.

Advertisement inviting applications for Dr.B.P.Pal and Pitambar Pant Fellowship Award for the year 2013-2014 was published. Total of seven nominations have been received.

National Environmental Sciences Fellows Programme

The National Environmental Sciences

Fig-50. *Beautiful scenic view of Phawngpui Mountain, Mizoram*

Fellows Programme is a flagship programme of the Ministry of Environment and Forests for young scientists below the age group of 35 years who are desirous of working in the forefront of environmental Sciences research. The Management Committee of the Programme has been reconstituted under the chairmanship of Dr. K. Kasturirangan, Member (Science), Planning Commission. Three scientists are already working in the areas of Climate Change Mitigation-Adaptation and Ecosystem Services in the context of Green India Mission and REDD+, quantitative framework for conservation planning of dry grasslands at landscape level and community wide seed dispersal patterns in Human-modified Landscapes and prediction of forest cover changes. The Management Committee has shortlisted further three scientists for the National Environmental Sciences Fellows Programme during the year.

Mahatma Gandhi Chair for Ecology and Environment

The Mahatma Gandhi Chair for Ecology and Environment has been set up at the Centre for Biodiversity Studies, Baba Ghulam Shah Badshah University, Rajouri, Jammu and Kashmir. An eminent scholar in the area of biodiversity has been selected and has joined as Mahatma Gandhi Chair at Center

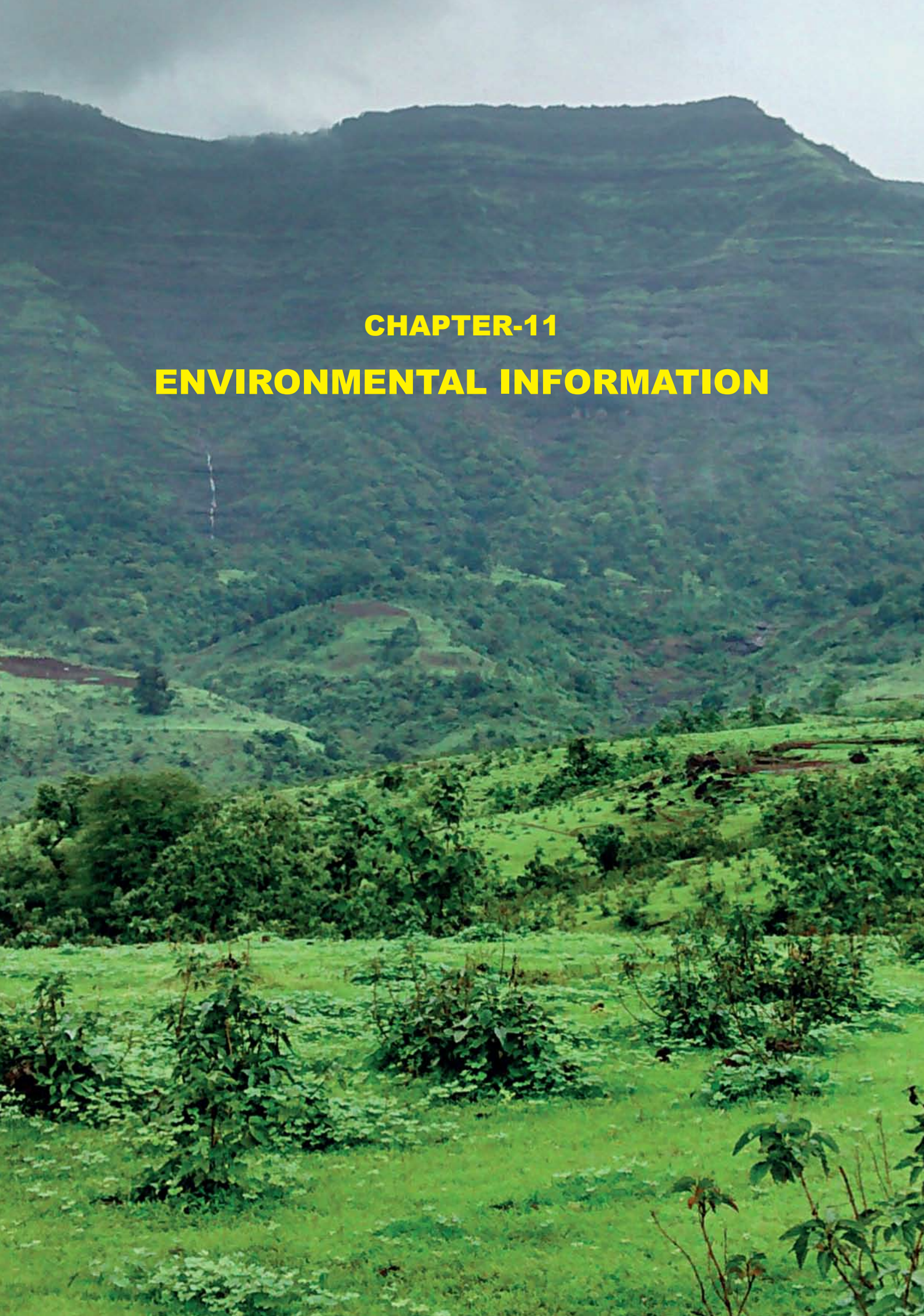
for Biodiversity Studies, Baba Ghulam Shah Badshah University. The Fellow has initiated studies on plant diversity of Rajouri, Poonch and adjoining areas of Pir Panjal Himalayas.

Post-Doctoral Fellowship Programme

The main aim of the Post-Doctoral fellowship programme is to nurture young scientists working in the areas related to environment and ecology under the mentorship of established scientists and to motivate them to undertake good quality scientific research. The target group of this programme is candidates who have completed their Ph.D. or are about to complete their Ph.D. The Post-Doctoral fellowship programme is a new initiative under the XIIth Plan. The Ministry is in the process of launching the Post Doctoral Fellowship programme.

Dr. T. N. Khoshoo Chair in frontier areas of Ecology and Environment

Under the XIIth Five Year Plan the Ministry is launch a new chair in the name of an eminent scientist for undertaking research in frontier areas of ecology and environment. In the second meeting of the Apex Committee on Research in Environment it was decided that the Chair be established in the name of Dr. T.N. Khoshoo, an eminent plant biologist and environment scientist and the ex-Secretary, Department of Environment, Government of India. The focus of the Chair is to enable distinguished scholars to pursue research in frontier areas of ecology and environment at academic institutions/research institutions. The Ministry is in the process of launching the Dr. T.N. Khoshoo Chair.



CHAPTER-11

ENVIRONMENTAL INFORMATION

Environmental Information (EI) Division

Environmental Information (EI) Division of the Ministry is responsible for the formulation, implementation and monitoring of the Environmental Information System (ENVIS) Scheme with a view to making it a single-stop, web-enabled and comprehensive information system. Development and maintenance of India State-Level Basic Environmental Information Database (ISBEID) to help 28 ENVIS Centres at State Governments/ UTs to collect, compile and disseminate State/ UT-wide information on a centralised server is an important component of the Scheme.

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 policy formulation and environment 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. The purpose has been to ensure integration of national efforts in web-enabled environmental information collection, collation, storage, retrieval and dissemination to all concerned, including policy planners, decision-makers, researchers, scientists and the public.

Functionally, it is a decentralized system of Centres mandated to develop a distributed network of subject-specific databases. ENVIS network at present consists of a chain of 68 ENVIS Centres out of which 40 are on subject-specific and 28 on State/ UT related issues. These Centres are hosted by notable organizations/institutions/State/ UT Government Departments/ Universities throughout the country. The Focal Point of

Fig-51. *Northern Region ENVIS Evaluation Workshop, Dehradun*

ENVIS is located in the Ministry and assists the EI Division in coordinating the activities of all the ENVIS network partners.

Review of Performance

– The network presently consists of 68 Centres including one new Centre opened in 2013-14. Independent evaluation of the activities of the Centres at National/ Regional Workshops has also been introduced. The Centres are also appraised by the Scientific Advisory Committee (SAC) chaired by the Secretary (EF&CC).

– 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. Each Centre typically brought out 4 Newsletters and/or a Special Annual thematic publication, based on updated information on environmental parameters.

– ENVIS Focal Point and its partners together responded to more than 50,000 queries during 2014-15 on various subject-areas on environment and its associated fields and provided substantive information to users as far as possible. It provided substantive information mainly on climate change, ozone layer, environmental conservation, water and air pollution, waste management, environmental standards, applicable laws, environmental education and awareness, etc. Wherever information was not readily available, 'Referral Service' was provided to the users concerned.

– ENVIS Portal (URL: http://www.envis.nic.in), connecting all ENVIS Centres, has been upgraded and the process of integration with the network websites has been

Fig-52. *Southern Region ENVIS Evaluation Workshop, Coimbatore*

started. The new comprehensive system will facilitate inter-Centre interaction and disseminate information across subject categories, about major events, activities and updates of the entire network and will also serve as Online Monitoring and Evaluation System for 36 ENVIS Centres, whose websites have been restructured.

– A basic statistical database, namely, India State-Level Basic Environmental Information Database (ISBEID) with 17 environmental 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 on a centralised server, and to fill their gaps in environmental data dissemination. Initially, a pilot project was taken up in two phases covering 12 modules for 9 States. ISBEID has now been extended to all State/UT ENVIS Centres.

– A meeting of the Scientific Advisory Committee (SAC) was held on 7th July 2014. SAC, which consists of 05 official and 05 non-official Members, is mandated to review the functioning of ENVIS Scheme, to suggest new areas in upcoming fields of environmental sciences, and identify appropriate institutions for setting up Centres.

– During the year under review, EI Division conducted an interactive workshop for all Divisions of this Ministry under the Chairpersonship of Special Secretary (EF&CC). EI Division is also undertaking an exercise for strengthening the Environmental Information System (ENVIS) Scheme of this Ministry. In order to further strengthen the ENVIS Scheme, review meetings of the ENVIS Centres are held on regular basis under the Chairmanship of Additional Secretary and Economic Advisor. The first review meeting was held on 25th November, 2014. So far, 6 ENVIS Centres (TERI, CPCB, CMS, WWF-India, SPA, Punjab) have been reviewed in the presence of Subject Division experts and NIC. In order to strengthen and further enrich the quality of information in ENVIS websites, all the Subject Divisions have been requested to furnish additional information that they may require for their decision-making process with respect to theme and suggestions for further improvement of quality of the existing content available in the ENVIS websites.

– All ENVIS Centres have been instructed to send a copy of all their publications/ newsletters to Officers of the level of Deputy Secretary and above in MoEFCC. Lists of such officers of the MoEFCC along with communication addresses have also been shared with all ENVIS Centres.

– As per the Scheme Guidelines of ENVIS, 4 Workshops are to be conducted in a year. The first Regional Workshop for FY 2014-15 was held during 12th-13th January, 2015 at FRI, Dehradun. The Workshop evaluated the functioning of the 22 ENVIS Centres (northern region) not only to consider their continuance 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 first day of the Workshop was completely dedicated for online content review of the ENVIS centre by eminent experts. All the 22 centers were divided into three groups and each group was

evaluated by an independent committee consisting of at least two experts. For evaluation exercise every Centre was given 40 minutes on an average. During the evaluation process all the centers demonstrated their website content, publication and new initiatives. Second day of workshop began with demonstration of Bhuvan portal by Dr. P.G Divakar, Deputy Director, National Remote Sensing Centre (NRSC). NRSC demonstrated how Bhuvan portal resources may be used for land use mapping, urban planning, resource mapping, etc. He emphasized that features of Bhuvan portal may be used by State and Thematic ENVIS Centers for further dissemination of information. Around 50 participants from ENVIS Centres of northern region participated in the workshop while 8 experts cutting across various backgrounds and experiences attended the event. The second Regional Workshop for evaluating the functioning of the 15 ENVIS Centres of southern region was held during 5th-6th February, 2015 at IFGTB, Coimbatore and the third one for evaluating the 13 ENVIS Centres of western region was held during 16th-17th February, 2015 at NEERI, Nagpur. Demonstration of Bhuvan portal was also organized during the second day of these two Workshops. A fourth Regional workshop for eastern and north eastern region is slated to be held in March 2015.

– The Indira Gandhi Paryavaran Puraskar was instituted by the Ministry of Environment and Forests in the year 1987 in reverential memory of the late Prime Minister Smt. Indira Gandhi. 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 silver lotus trophy. Five awardees each of Indira Gandhi Paryavaran Puraskar (IGPP)-2011 & 2012 were selected by the Prize Committee chaired by the Vice President of India in

Fig-53. *Western Region ENVIS Evaluation Workshop, Nagpur*

its meeting held on 20th October 2014. The Puraskar was conferred on these awardees on 02nd February, 2015. EI Division offers secretariat support to the IGPP Award Committee and acts as the processing Division in the Ministry on all matters connected with the subject.

Progress of expenditure during the year

In terms of physical performance, as compared to extension of support to 64 ENVIS Centres in 2013-14, as on 15 January 2015, 63 Centres have been supported. This has also entailed visit by EI Division officers to the ENVIS Centres of Foundation for Revitalization of Local Health Traditions (FRLHT), Environment Management and Policy Research Institute (EMPRI) Bengaluru, Forest Research Institute at Dehradun and ENVIS Centres in Delhi for verification of the performance of the Centre concerned against the mandated annual activities.

Statistical Cell

The statistical cell in the Ministry has provided statistical inputs to different Division of the Ministry and also to liaise with other Central Ministries/States/various organizations. During the year, the Cell provided inputs for various publications of Central Statistical Organizations, on environment and forests and various other Ministries.

Statistical Advisor has been nominated by the Ministry to act as Nodal officer for the Development Information System (DevInfo), a database system for monitoring human facilitate data sharing at the country, regional and global levels across government departments, UN organization, civil society organizations and development partners. It is funded by eight UN organizations.

Important activities undertaken during the year

- Preparation of Report to the People on Environment, Forests and Climate Change
- Preparation of Annual Report
- Preparation of State Environment Reports & other hot spots
- Preparation of Status of National Environment Report
- Furnishing statistical information to various Ministries/ departments on environment
- Matters related to RTI
- Matters related to Parliament
- Information to PC Division related to budget
- Frunishing material to various central/ state government agencies and research organisations
- Coordination works related to statistical cell

Non-Governmental Organization (NGO) Cell

A Non-Governmental Organization (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 Planning Commission and other Government Ministries to create a database of various NGO's working in the field of environment and the associated areas. Besides replying to Parliament Questions, the NGO Cell also handles RTI application.

CHAPTER-12

LEGISLATION AND INSTITUTIONAL SUPPORT

Policy and Law

The Policy and Law Division is implementing the Scheme "Establishment of Environment Commission and Tribunal" and providing legislative and institutional support to other thematic divisions whenever there is a need for any amendment to Environment (Protection) Act, 1986 and National Green Tribunal Act, 2010.

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 including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.

It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The Tribunal shall not be bound by the procedure laid down under the code of Civil Procedure, 1908, but shall be guided by principles of natural justice.

The Tribunal's dedicated jurisdiction in environmental matters shall provide speedy environmental justice and help reduce the burden of litigation in the higher courts. The Tribunal is mandated to make an endeavor for disposal of applications or appeals finally within six months of filing of the same.

Presently, the Tribunal has five places of sitting with headquarter at Delhi, Pune, Kolkata, Bhopal and Chennai are the other four zonal Benches of sitting of the Tribunal. All the Benches have become operational. In addition, there are 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. Judicial Members of the Tribunal are drawn from Judiciary while Expert Members are experts in physical and life sciences, engineering and law including persons having practical knowledge and administrative experience in the field of environmental policy and regulation. In addition to the Chairperson, seven Judicial and Expert Members are presently working in the Tribunal.

Since its inception and upto 31.10.2014, the Tribunal has received a total of 6613 Cases. A total of 4047 cases have been disposed off and 2556 cases are pending.

Economic Cell

Economic Cell of the Ministry is headed by the Economic Adviser working under the supervision of the Senior Adviser. It is responsible for the following areas of work:

- All matters pertaining to the Cabinet/ Cabinet Committees (Cabinet Notes), and Committee of Secretaries, and also providing comments on policy matters received from various Ministries.
- 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.

– Providing material for Economic Survey of M/o Finance, Finance Minister's Budget Speech, etc.

Fig-54. *Purple sunbird (Nectarinia asiatica) male, West Bengal*

– Nodal Division for handling and coordinating all matters which have underlying economic issues referred by the Ministry of Finance.

– Nodal Division to monitor implementation of specific announcements in the Union Budget concerning Ministry of Environment, Forests & Climate Change.

– Secretariat for the Sectoral Committee to Review the Release and Utilization of the Grants-in-Aid for State Specific Needs recommended by the Thirteenth Finance Commission.

– Compliance under the Fiscal Responsibility and Budget Management Act, 2003.

– Gender Budgeting issues.

– Parliament Questions on policy matters.

Trade and Environment

Trade and Environment Division of the Ministry is headed by the Economic Adviser working under the supervision of the 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 during 2014-15

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 and contributing to the on-going multilateral negotiations under the Doha Development Agenda (DDA) of the Agreement on the

Establishment of the World Trade Organisation (WTO), in particular, the negotiations under trade in goods and services and domestic regulations. This included, for instance, assessment of the proposed European Union's Regulation on Ship Recycling, especially its potential for impact on domestic ship breaking industry. In addition, issues emerging from the lack of availability of data in services which hinders policymaking in the area as well as adversely affects bilateral and multilateral trade negotiations in services were also taken up in the context of environmental services. Certain classification issues relating to environmental services in the context of WTO's questionnaire on Services are presently under scrutiny.

Economic Adviser (EF&CC) has been nominated to represent this Ministry in Trade Policy Review -2015 exercise of Government of India's Report. 2nd Task Force on Transaction Cost in international trade constituted by Minister of Commerce & Industry has finalized its report. 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.

Apart from the above during 2014-15, the Division has initiated a study on 'Availability of environmental goods/technologies and its implications for environmental protection' in collaboration with Madras School of Economics, Chennai. It has also coordinated with Subject Divisions of this Ministry dealing with issues related to ecology; environment, forests and wildlife to finalize the stand of MoEFCC in upcoming Foreign Trade Policy 2014-19.

The Division has also contributed to the meeting of the High Level Working Group on Intellectual Property Rights' under the India –US Trade Policy Forum held in November, 2014.

The Division has been compiling a time series data on 'Environmental Goods Imports & Exports of India' with the help of database of Directorate General of Commercial Intelligence & Statistics (DGCI&S), Kolkata.

CHAPTER-13

CLIMATE CHANGE

Climate Change

The Earth's climate has always changed and evolved. Some of these changes have been due to natural causes but others can be attributed to human activities such as deforestation, atmospheric emissions from industry and transport, which have led to gases and aerosols being stored in the atmosphere. These gases are known as greenhouse gases (GHGs) because they trap heat and raise air temperatures near the ground, acting like a greenhouse on the surface of the planet.

Recent research indicates that the climate system is influenced by human activity and has led to warming of climate system since 1950.

Intergovernmental Panel on Climate Change (IPCC)

IPCC since its inception has produced five assessment reports in the year 2014, 2007, 2001, 1995 and 1990 and several other special reports. IPCC recently released Fifth Assessment Report (AR5) on Climate Change. India was engaged with the IPCC in analyzing and critically examining the work being done under three Working Groups of the IPCC. The Summary for Policymakers of the IPCC Working Group-I AR5 titled "Climate Change 2013: The Physical Science Basis" was released in September 2013. Working Group-II report of the AR5 on "Climate Change Impacts, Adaptation and Vulnerability" and Working Group-III report of the AR5 on "Mitigation of Climate Change" were released in March and April 2014 respectively. The synthesis report comprising of key findings emerging from the three Working Groups of AR5, was published by IPCC in October, 2014. The Synthesis report of the Fifth Assessment Report has indicated that

- Human influence on the climate system is clear, and recent anthropogenic emissions of GHG are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.
- Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen. Oceanic uptake of carbon dioxide (CO2) resulted in acidification of oceans Warming of 0.85 0C increased during 1882-2012 and sea level rose by 0.19 m during 1901-2010.
- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.
- Multi-model results show that limiting total human-induced warming to less than 2°C relative to the period 1861-1880 with a probability of more than 66% would require cumulative CO2 emissions from all anthropogenic sources since 1870 to remain below about 2900 GtCO2 (with a range of 2550-3150 GtCO2 depending on non-CO2 drivers). About 1900 GtCO2 had already been emitted by 2011.
- Climate change will amplify existing risks and create new risks for natural

and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development.

- Many aspects of climate change and associated impacts will continue for centuries, even if anthropogenic emissions of GHG are stopped. The risks of abrupt or irreversible changes increase as the magnitude of the warming increases.
- Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change. Substantial emissions reductions over the next few decades can reduce climate risks in the 21st century and beyond, increase prospects for effective adaptation, reduce the costs and challenges of mitigation in the longer term, and contribute to climate-resilient pathways for sustainable development.
- Effective decision making to limit climate change and its effects can be informed by a wide range of analytical approaches for evaluating expected risks and benefits, recognizing the importance of governance, ethical dimensions, equity, value judgments, economic assessments and diverse perceptions and responses to risk and uncertainty.
- Without additional mitigation efforts beyond those in place today, and even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread, and irreversible impacts globally (high confidence). Mitigation involves some level of co-benefits and of risks due to adverse side-effects, but these risks do not involve the same possibility of severe, widespread, and irreversible impacts as risks from climate change, increasing the benefits from near-term mitigation efforts.
- Adaptation can reduce the risks of climate change impacts, but there are limits to its effectiveness, especially with greater magnitudes and rates of climate change. Taking a longer-term perspective, in the context of sustainable development, increases the likelihood that more immediate adaptation actions will also enhance future options and preparedness.
- There are multiple mitigation pathways that are likely to limit warming to below 2°C relative to pre-industrial levels. These pathways would require substantial emissions reductions over the next few decades and near zero emissions of CO2 and other long-lived GHGs by the end of the century. Implementing such reductions poses substantial technological, economic, social, and institutional challenges, which increase with delays in additional mitigation and if key technologies are not available. Limiting warming to lower or higher levels involves similar challenges, but on different timescales.
- Many adaptation and mitigation options can help address climate change, but no single option is sufficient by itself. Effective implementation depends on policies and cooperation at all scales, and can be enhanced through integrated responses that link adaptation and mitigation with other societal objectives.

- Global mean sea-level rise will continue during the 21st century, very likely at a faster rate than observed from 1971 to 2010. For the period 2081-2100 relative to 1986-2005, the rise will likely be in the ranges of 0.26 to 0.55 m for RCP2.6, and of 0.45 to 0.82 m for RCP8.5 (medium confidence). Sea level rise will not be uniform across regions. By the end of the 21st century, it is very likely that sea level will rise in more than about 95% of the ocean area. About 70% of the coastlines worldwide are projected to experience a sea-level change within ± 20% of the global mean.
- Emissions scenarios leading to GHG concentrations in 2100 of about 450 ppm CO2-eq or lower are likely to maintain warming below 2°C over the 21st century relative to pre-industrial levels.15 These scenarios are characterized by 40% to 70% global anthropogenic GHG emissions reductions by 2050 compared to 201016, and emissions levels near zero or below in 2100.
- It was also reported that reduction of emissions from fossil fuel of 90% or more below 2000 level between 2040-2070.

India's actions on Climate Change

The Ministry is currently preparing India's Third NATCOM and first Biennial Update Report (BUR), containing updates of earlier reported national GHG inventories, including a national inventory report and information on mitigation actions, needs and support received. The 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 GHG inventories and information on mitigation actions, financial, technical needs and support received and an update to India's Second NATCOM. The first BUR will encompass information on National Circumstances, GHG Inventories, 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 as requested and to the extent possible.

National and State Action Plan on Climate Change

The meeting of PMCCC was held on 19.1.2015 for reviewing the progress of National Missions, wherein the proposals for new Initiatives/ Missions on Wind Energy, Health, Waste to Energy, Coastal Areas, refocusing of Water and Agriculture Missions, revisions of targets and deliverables of the existing missions and suggestions on financing of the Missions and SAPCCs were endorsed.

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 sectoral activities to address climate change. So far, 31 States namely Andaman and Nicobar, Andhra Pradesh, 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

have prepared and submitted document on SAPCC to the MoEFCC. MoEFCC is also closely following up with the remaining four states which have not submitted their SAPCCs. So far, 20 SAPCCs have been endorsed by the National Steering Committee on Climate Change. The total proposed budget for implementing SAPCC by all states is ₹ 11,33,691.75 crores.

Clean Development Mechanism

India has been a significant gainer from the Clean Development Mechanism (CDM). The CDM defined in Article 12 of the Kyoto Protocol, allows a country with an emission reduction or emission-limitation commitment under the Kyoto Protocol to implement an emission-reduction project in developing countries. The carbon markets have been established to facilitate reduction of carbon/ GHG emissions at the global level through sale and purchase of carbon credits. Clean Development Mechanism (CDM) represents a significant component of the global carbon market. Considering the potential of CDM projects in India, the Government and industries have been proactive in the international carbon market since the beginning of CDM in 2003. By end of 2014, 1541 out of total 7,589 projects registered by the CDM Executive Board 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%). The National CDM Authority (NCDMA) in the Ministry has accorded Host Country Approval to 2941 projects facilitating possible investment of about ₹ 579,306 crores. These projects are in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste, renewable energy and forestry which spread across the country (covering all states in India).

In the second commitment period number of CDM projects has come down drastically. In 2012, there were 3227 projects registered with UNFCCC and in 2013 only 307 projects registered under CDM. Interestingly, in 2013, India has registered 115 projects which are highest by any country. In 2014, the NCDMA has accorded Host Country Approval to 76 projects and India registered 56 projects with UNFCCC in 2014.

Proposals to augment the demand for carbon credits and stabilize markets at a reasonable price level are being negotiated. This includes proposals to create new market mechanisms that can cover all countries within and beyond Kyoto Protocol, within an appropriate framework. While CDM will continue during the period from 2013-2020, the manner in which it will coordinate with the new mechanisms or get integrated with them for an effective carbon market is still an open question.

India's voluntary contributions

India has announced its domestic goal of reducing emission intensity of output by 20-25% by 2020 compared with 2005 level. This will be fulfilled through implementation of National Missions and other initiatives during 12th and 13th F.Y. P.

National Adaption Fund

A 'National Adaptation Fund' with an initial corpus of ₹ 100 crores has been set up to support adaptation actions to combat the challenges of climate change in the agriculture, water, forestry, etc sectors in the country. A draft memo for SFC has been prepared and is under consideration.

Cooperation with bilateral and multilateral donors on Climate Change

The Ministry has been implementing several projects with the assistance of bilateral and multilateral funding agencies such as GIZ, DFID and UNDP. Since 2002, GIZ has been supporting the Climate Division of MoEFCC in strengthening the Designated National Authority (DNA), support in Clean Development Mechanism (CDM) Host Country Approval and supporting the international climate change negotiations under United Nations Framework Convention on Climate Change (UNFCCC). Further, a project on Nationally Appropriate Mitigation Actions (NAMAs) is also operational to support the MoEFCC with the coordination and implementation of the response to climate change in the context of NAMAs in waste and forestry sectors.

Further, an Indo-German development project financed by the German Federal Ministry for Economic Cooperation and Development (BMZ) titled 'Climate Change Adaptation in Rural Areas of India (CCA RAI)' was implemented in four states- representing India's differing agricultural-climatic zones namely, Madhya Pradesh, Rajasthan, Tamil Nadu and West Bengal. The project was completed on December 31, 2014. A follow on project tilted 'Climate Change Adaptation in India' is proposed which will implement adaptation activities in the country. The project is likely to be operational from April, 2015.

UNDP & MoEFCC started a 5-year project titled "Strengthening climate change sensitive planning and implementation" in 2013 with an overarching aim to strengthen institutional & stakeholders' capacities for coordination, implementation and monitoring climate change actions at different levels; and to facilitate/support partner states to identify and implement high-impact priority strategies outlined in their SAPCCs.

A project titled 'Climate Change Innovative Programme (CCIP), has also been initiated by the MoEFCC and Department for International Development (DFID) with an aim to support State Governments for implementation of the SAPCC. The project is being implemented in 6 States of India namely Bihar, Orissa, Assam, Chhattisgarh, Maharashtra and Kerala

Negotiations under the United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC was one of the key outcomes of the Rio Earth Summit in 1992. This is the only international climate policy forum aiming to stabilize the concentration of heat-trapping GHG at level that will prevent dangerous interference with the climate system. Developed countries were to take the lead, by reducing their emissions to 1990 levels by 2000, and by providing technology, finance and capacity building support to developing countries. Five years later i.e. in 1997, the Convention was strengthened with a Kyoto Protocol, where developed countries took legally binding obligations to cut their emissions by 5.2% below 1990 levels by 2008-2012 in aggregate, as the first step towards much larger emission cuts in the future. Developing countries, whose per capita emissions were just a fraction of those in the rich countries, were not obliged to take binding emission reduction obligations. The UNFCCC at its 13th COP held in 2007 adopted a Bali Road

Fig-55. *Hon'ble Minister Shri Prakash Javadekar while addressing High level segment in COP-20, Lima*

Map to propel action on the shared vision, mitigation, adaptation, technology and financing. Copenhagen Accord was adopted by Parties in 2009 during its 15th COP included long-term goal of limiting average global temperature to not more than 2 degree Celsius above pre-industrial levels. This also attracted voluntary pledges by Parties to reduce the emission gap. In 2010, Parties adopted Cancun Agreement which includes a most comprehensive package, to address the long-term challenge of climate change collectively and comprehensively over time by taking concrete action to speed up the global response. In 2011, meeting held in Durban took decisions to draw up the blueprint for a fresh universal legal agreement to deal with climate change beyond 2020. In 2012, UN Climate Change Conference held in Doha, governments consolidated the gains of the last three years of international climate change negotiations and opened a gateway called Doha Climate Gateway for enhanced ambition and action on all levels. The 20th Conference of Parties (COP) of the UNFCCC and 10th Meeting of Parties to Kyoto Protocol (CMP) took place in Lima, Peru from 1st December to 14th December 2014. The major focus of 20th Conference of Parties held at Lima was following:

– Finalization of elements of the draft negotiating text for 2015 Paris agreement in view of the Durban decision to finalize a "protocol, legal agreement or an agreed outcome with legal force", applicable to all, by December,2015.

– Identification of information to be submitted with the Intended Nationally Determined Contributions (INDCs) in pursuance of the Warsaw COP (2013) decision wherein it was decided that countries that were ready to do so would submit the INDCs by March, 2015 and other countries would submit their INDCs as early as possible; and

– Enhancement of pre-2020 actions which was part of the Warsaw mandate to be taken forward in Lima.

The major outcomes of the 20th CoP included the following:-

It was agreed that the new agreement will address all the elements that is mitigation, adaptation, finance, technology

development and transfer, capacity building and transparency of action and support in a balanced manner. The recognition that all elements need to be addressed in a balanced manner is a key outcome of the Conference as there were efforts by some Developed Countries to undermine the basic tenets of the Convention.

It was decided that countries should not backslide from current pledges. This is especially relevant in view of the action of some countries, which had gone back on their Kyoto Protocol commitments. The Lima Conference urged that the contribution of countries has to be more than their current commitments. It was ensured that countries can include adaptation, finance, technology transfer etc also in their INDCs in addition to mitigation and there should not be any "ex-ante assessment" to be undergone.

It was decided to accelerate action on enhancing the pre-2020 actions like early ratification of the Kyoto Protocol second commitment period, revisiting of targets and conditionalities associated with it and provision of finance, technology and capacity building support by developed countries to developing countries in consonance with Warsaw decisions.

On the issue of finance, it was decided that developed country parties will provide and mobilise enhanced financial support to developing country parties for ambitious mitigation and adaptation action. It was also decided to urge contributors to confirm pledges in the form of fully executed contribution agreements taking note of the fact that at least 50% of pledges made till November, 2014 should be reflected as fully executed contribution agreements by 30th April, 2015.

Cooperation with other countries

India has been closely coordinating with members of G77, China, BASIC (Brazil, South Africa, India and China) and Like Minded Developing Countries (LMDCs), put forth the argument that developed countries should implement their commitments and take actions to reduce emissions in accordance with the principle of 'common but differentiated responsibilities and respective capabilities' as enshrined in the UNFCCC.

The 19th (Brazil, South Africa, India and China) BASIC Ministerial Meeting on Climate Change was held in Sun City, South Africa, on October 10, 2014. The meeting was attended by H.E. Ms. Edna Molewa, Minister of Environmental Affairs of South Africa, H.E. Mr. Xie Zhenhua, Vice Chairman of the National Development and Reform Commission of China, H.E. Mr. Ashok Lavasa, Secretary of the Ministry of Environment, Forests and Climate Change of India and H.E. Ambassador José Antonio Marcondes de Carvalho, Under Secretary-General for the Environment, Energy, Science and Technology of the Ministry of External Relations of Brazil.

Ozone Cell

– 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 ozone layer absorbs all the harmful UV-B radiations emanating from the Sun. It protects plant and animal life from UV-B radiation. The UV-B radiation has the potential to cause skin cancer, eye cataract, suppress body's immune system, decrease crop yield etc., which led to the adoption of the Vienna Convention for the Protection of the Ozone Layer in 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987. India is a Party to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer and it's all the amendments.

Regulatory Measures

– The Ozone Depleting Substances (Regulation and Control) Rules, 2000 prohibit the production and consumption of Chloroflurocarbons (CFCs), Carbon Tetrachloride (CTC) and Halons except use of pharmaceutical grade CFCs under Essential Use Nominations (EUN) in manufacturing of Metered Dose Inhalers (MDIs) for Asthma and Chronic Obstructive Pulmonary Disease (COPD) patients. Further, the use of methyl bromide has been allowed in developing countries including India upto 1.1.2015 as per the Montreal Protocol schedule except Quarantine and Pre shipment (QPS) applications.

– The Ozone Depleting Substances (Regulation and Control) Rules, 2000 have been amended to align with the accelerated phase-out of Hydrochloroflurocarbons (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 notified in the Gazette of India in March, 2014.

– The Amendment Rules, 2014 control production and consumption of HCFCs from the date of publication of Amendment to the Ozone Defleting Substances (Regulation and Control) Rules, 2000 as per the accelerated phase-out schedule of HCFCs. Introduction of quota system for production and supply to the domestic market of HCFC-22 for non-feedstock application for the domestic producers. The Amendment Rules, 2014 prohibit import of pre-blended polyols containing HCFCs and blends containing Ozone Defleting Substances including Group VI Substances from January 2013. The Rules also prohibits 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 were continued during the financial year 2014-2015.

Activities undertaken

– Data on production, consumption, export and import of ODSs was collected from various sources, collated and submitted to

the Secretariat for the Vienna Convention and the Montreal Protocol (The Ozone Secretariat) as per Article 7 of the Montreal Protocol and the Country Program Progress Report (CPPR) to the Secretariat of the Multilateral Fund (MLF) for the implementation of the Montreal Protocol.

– Organization of Technology and Finance Standing Committee (TFSC) meetings for recommending ODS phase-out projects for submission to the MLF Secretariat and recommending projects for fiscal incentives.

– No Objection certificates for 97 enterprises were issued to Directorate General of Foreign Trade (DGFT) for import and export of ODSs and ODS based equipments.

– India-US Task Force on Hydroflurocarbons (HFCs) has met several times and has made significant progress especially in enhancing the understanding of the stakeholders and clarification on key issues relating to phase-down of HFCs.

– The two leaders during their bilateral summit, Hon'ble Prime Minister of India Mr. Narendra Modi and the Hon'ble President of the United States of America Mr. Barack Obama held in September, 2014 in a joint statement, recalled previous bilateral and multilateral statements on the phase-down of HFCs. They recognized the need to use the institutions and expertise of the Montreal Protocol to reduce consumption and production of HFCs, while continuing to report and account for the quantities reduced under the United Nations Framework onvention on Climate Change (UNFCCC). They pledged to urgently arrange a meeting of their bilateral task force on HFCs prior to the next meeting of the Montreal Protocol to discuss issues such as safety, cost, and commercial access to new or alternative technologies to replace HFCs.

– A meeting of the India-US Task Force on HFCs was held on 13th and 14th October, 2014 under the Co-Chairmanship of Mr. Susheel Kumar, Additional Secretary (SK), Ministry of Environment, Forests & Climate Change (MoEFCC) and Mr. Daniel A. Reifsnyder, Deputy Assistant Secretary for Environment & Sustainable Development, Department of State, USA. The meeting decided that continuation of the dialogue on HFCs in one or two more meetings of the Task Force to resolve all the issues/concerns raised by the industry.

– Since the approval of the HCFC Phase-out Management Plan (HPMP) Stage-I, a number of activities have been conducted by the Ozone Cell, MoEFCC in close cooperation with the implementing agencies and stakeholders. The interagency meeting was held as early as in September, 2012 to discuss the implementation modalities of HPMP Stage-I. Subsequently, Stakeholders Consultative Meeting on Amendment of ODS Rules was organized in October, 2012 to seek inputs from the stakeholders on the proposed amendment to the Ozone Depleting Substances (Regulation and Control) Rules, 2000. A Stakeholders Workshop was organized in February, 2013. The Workshop was well attended by the stakeholders especially the industry representatives from foam

manufacturing, Refrigeration and Air-conditioning (RAC) manufacturing and RAC servicing sectors. On this occasion, the HPMP Stage-I was also launched.

– Conversion projects from HCFCs to non-ODS technologies are being successfully implemented in domestic refrigeration, continuous sandwich panel and discontinuous sandwich panel sub-sectors by United Nations Development Programme (UNDP) as lead implementing agency.

– Systems houses are successfully developing pre-blended polyols using low-Global Warning Potential (GWP) blowing agents with the technical and financial assistance from the HPMP Stage-I.

– A number of Training of Trainers workshops on good servicing practices have been organized to create a pool of trainers for training the technicians in the RAC sector in the country. The training workshops have also been organized for RAC servicing technicians across the country which has successfully trained 9784 technicians through 352 training programs.

– The Executive Committee (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 United Nations Environment Programme (UNEP) and GIZ, Proklima, Government of Germany as cooperating agencies. The HPMP Stage-II would address phase-out of HCFCs in various sector of foam manufacturing including XPS, various sub-sector of 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 Stage-II of HPMP will be addressing a large number of Micro, Small and Medium Enterprises (MSMEs) especially in foam manufacturing sectors as large HCFC consuming enterprises have already been addressed under HPMP Stage-I. However in case of RAC sector, both large HCFC consuming as well as MSMEs will be addressed under HPMP Stage-II wherever safe, technically proven, commercially viable and environment friendly, non-ODS technologies are available.

– The following workshops were conducted during 2014 :

– A National Awareness Workshop on HPMP Stage-I Servicing Sector was organized in New Delhi in association with GIZ Proklima and UNEP Compliance Assistance Program (CAP), Regional Office for Asia and the Pacific (ROAP), Bangkok on 27th January, 2014.

– UNEP OzonAction under the guidance of Ozone Cell, MoEF& CC in collaboration with Indian Society for Heating, Refrigeration and Air-Conditioning Engineers (ISHRAE) and United States Environment Protection Agency (USEPA) organized a Technology Roadshow and Industry Roundtable at Pragati Maidan, New Delhi from 27th February to 1st March, 2014 during ACREX India 2014. The Technology Roadshow as well as the Industry Rountable were well attended by

the Industry both from India and abroad especially from USA. The Roundtable deliberated the various technologies to HCFCs.

- Organized a Stakeholders Workshop on 28th July, 2014 in New Delhi where a large number of stakeholders especially from industry, industry associations, research and development organizations and implementing agencies participated in the workshop. The preparation of HPMP Stage-II was launched on this occasion.
- Organized two Awareness Workshops on Phase-out of CFCs in MDIs in association with UNEP. One at SRM University, Chennai on 19th August, 2014 and another at Sanjay Gandhi Postgraduate Institute (SGPGI) of Medical Sciences, Lucknow on 25th August, 2014 with the objective to create awareness for sustaining the phase-out of CFCs in this critical medical application. Both these workshops were well attended by the physicians and pharmaceutical representatives who are the key stakeholders for promoting CFC-free MDIs among the asthma and COPD patients.
- A number of Regional Awareness Workshops for the RAC Servicing Sector under HPMP Stage-I 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.

Achievements

- India has met the following compliance targets either on or ahead of the control schedule of the Montreal Protocol:-
  - A verification-cum-review of progress made by each of the manufacturers was undertaken by the MLF through an independent expert along with UNDP to ascertain the implementation of CFC phase-out in the manufacturing of MDIs in February, 2014. It was reported that CFCs have been phased-out in manufacturing of MDIs in the country.
  - India has already phased-out 94% of the Ozone Depleting Potential (ODP) weighted level (in terms of ODP tonnes) of production and consumption of all the chemicals controlled by the Montreal Protocol which is quite similar to the global phase-out scenario.
- 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.
- The 72nd meeting of the Ex-Com held in May, 2014 has approved the preparation of HPMP Stage-II for India with UNDP as the lead implementing agency in association with UNEP and GIZ, Proklima, Government of Germany as cooperating agencies.
- Successful renewal of Institutional Strengthening (IS) project for the period of two years 2015 and 2016 with a funding of US $373,230 by the 72nd Ex-Com held in May, 2014. The project is

being implemented by UNDP as lead implementing agency.

- The Ex-Com of the MLF so far has approved a total of 303 projects involving MLF funding of US $279,212,203 to the Indian industry for phase-out of production and consumption of 58,980 ODP tonnes of the ODSs in India.
- The Ozone Cell, MoEFCC organized the 20th International Day for the Preservation of the Ozone Layer on 16th September, 2014 at Hyderabad. The theme for the 20th International Day for the Preservation of the Ozone Layer for year 2014 was: "Ozone Layer Protection: The Mission Goes On". The Montreal Protocol on Substances that Deplete the Ozone Layer has so far been successful in meeting some of its targets on phasing out ODSs. As a result, the abundance of ODS in the atmosphere is declining and the ozone layer is expected to recover around the middle of this century. There are, however, some remaining challenges to phase out of ODS. This year's theme seeks to galvanize all stake holders to increase their efforts to address the challenges. A large number of stakeholders and school children participated in the event.
  - Ms. Tina Birmpili, The Executive Secretary, Ozone Secretariat was the Guest of Honor, for the 20th International Day for the Preservation of the Ozone Layer.
- A meeting of the India-US Task Force on HFCs was organized in Delhi on 13th and 14th October, 2014 under the Co-Chairmanship of Mr. Susheel Kumar, Additional Secretary (SK), MoEFCC and Mr. Daniel A. Reifsnyder, Deputy Assistant Secretary for Environment & Sustainable Development, Department of State, USA.
- The Joint 10th Conference of the Parties (COP) to the Vienna Convention and 26th MOP to the Montreal Protocol was held in Paris from 17th to 21st November, 2014 at the UNESCO Centre, Paris. The COP/MOP decided US $507.5 million towards the replenishment of the MLF for the implementation of the Montreal Protocol for the triennium 2015-2017 on the understanding that US $64 million of that budget will be provided from anticipated contributions due to the MLF and other sources for 2012-2014, and that US $6 million will be provided from interest accruing to the Fund during 2015-2017.
- India has been elected as a Member of the Ex-Com of the MLF for the implementation of the Montreal Protocol for the year 2015.
  - There were two proposals for the consideration of the Parties of the 26th MOP for amendment of the Montreal Protocol on substances that deplete the Ozone Layer for phase down of HFCs under the ambit of the Montreal Protocol, one submitted jointly by Canada, Mexico and USA and another submitted by Federated States of Micronesia (FSM). Both these proposals were on same subject and almost similar except with some difference in the phase down schedule.
  - After detailed discussion, the Parties to the 26th MOP agreed to

continue the informal discussions on mechanisms for the sustainable phase-out of HCFCs in Article 5 parties, as well as all issues related to the management of HFCs in all parties, and how to address HFCs management in the year 2015.

- Hon'ble Minister of State for Environment, Forest and Climate Change (Independent Charge) Mr. Prakash Javadekar made the Statement on behalf of India. Hon'ble Minister said that India has made huge contribution to the success of the Montreal Protocol and thanked the bilateral and multilateral agencies, industries and the MLF of the Montreal Protocol. He also said that India took pro-active steps and not only successfully phased out CFCs and other ODSs like CTC and halons in time, but the phase out of HCFCs is proceeding with due diligence. He further addressed the challenges still in the phase out of HCFCs, particularly in the RAC sector.
- A Ministerial Round Table discussion was organized on 21st November, 2014. During the Ministerial Round Table session, Hon'ble Minister proposed to "respect" developing countries and allow them to phase these out in line with their Intended Nationally Determined Contributions (INDCs). Stating that "Politics of consensus only wins. You can't force anything on the world community," he proposed to the developed countries to be flexible in tackling the issue of HFCs and working on developing a consensus towards a path forward. Re-emphasising that the Government of India led by Hon'ble Prime Minister Mr. Narendra Modi is giving utmost priority to the needs of the poorest man in India including initiatives being taken for clean air, clean water and clean energy, Hon'ble Minister proposed the need for World Collaborative Research (WCR) funded by the Green Climate Fund. The Round Table witnessed a collaborative attitude amongst the participants.

United Nations Convention to Combat Desertification

Desertification Cell for United Nations Convention to Combat Desertification (UNCCD) reporting and other enabling activities.

Brief objective

- Coordination with 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).

Achievements

– Celebrating the World Day to Combat Desertification on 17th June 2014 in New Delhi : The World Day to Combat Desertification (WDCD) is celebrated every year on 17th June. The WDCD highlights the benefits of mainstreaming sustainable land management policies and practices into our collective response to climate change. WDCD 2014 was organized in New Delhi by the Desertification Cell at the Ministry of Environment, Forests and Climate Change in association with ICFRE. The theme of this day was "Ecosystem-based Adaptation" with the slogan 'Land Belongs to the Future, Let's Climate Proof It'. On the occasion, Shri Prakash Javadekar, Hon'ble Minister of State (Independent Charge), Ministry of Environment, Forests and Climate Change, Government of India highlighted desertification, loss of biodiversity and climate change as the greatest challenges to sustainable development. Shri Javadekar mentioned that the loss of grasslands and forest cover are the principal cause of land degradation as they make soil vulnerable to wind and water erosion.

  India can strive to become Land Degradation Neutral by 2030 with collective efforts of the various Ministries, people and other stakeholders. On the occasion, Hon'ble Minister released a short documentary on Sustainable Land and Ecosystem management (SLEM) project in India prepared by Indian Council for Forestry Research and Education (ICFRE) and also felicitated Mr. Jadav Payeng from Assam, Mr. Ranaram Bishnoi from Rajasthan and the Foundation for Ecological Security, an organization based in Gujarat, for their outstanding contributions in restoring degraded land and ecosystems.

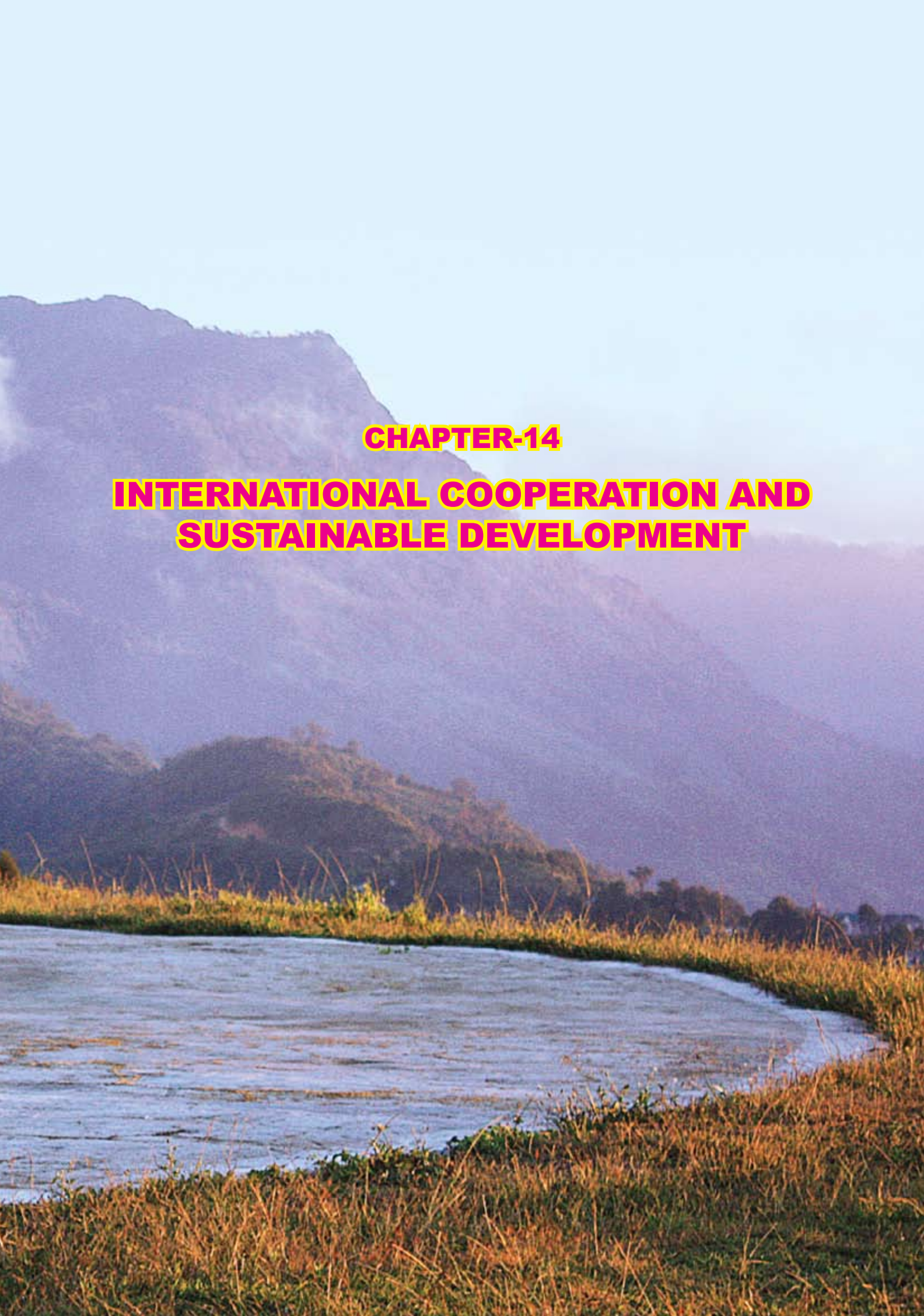
– India's 6th National Report to the UNCCD : India is a signatory to the UNCCD. As a party to the Convention, India meets it obligations through implementation of various programmes and reporting the progress to the UNCCD secretariat periodically. India submitted its 6th National Report to UNCCD in July 2014. The 6th National Report was prepared using the Performance Review and Assessment of Implementation System (PRAIS). The process of preparation of the report involved data collection and synthesis of important programmes undertaken by the various ministries of Government of India, research institutes, and civil society organisations. Several national level consultations were also held to review the text and invite inputs from the stakeholders.

– Consultative meetings for preparation of India's New National Action Programme to Combat Desertification : India is in the process of preparing its New National Action Programme to Combat Desertification (NNAP-CD) in alignment with the UNCCD 10-Year Strategy (2008-2018) adopted during COP-8 in 2007 to enhance 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, takes into account the issues of desertification, land degradation and drought (DLDD) across the arid, semi-arid and dry sub humid environment. Accordingly the NAP of the country is to be realigned considering the emerging issues such as climate change and biodiversity conservation since the ratification of UNCCD in 1996.

– Landscape Yatra in Satpura region of Madhya Pradesh in February 2014: The Satpura Landscape Yatra, was a maiden attempt by the Ministry, to constitute a multidisciplinary group of Yatris from the spheres of science, policy and practice, to embark on a journey to observe, assimilate and analyze the on-ground difficulties and everyday challenges of the local communities, while also benefitting from the knowledge and experience of the collective. A three day Satpura Landscape Yatra was organized by Madhya Pradesh Forest Department. 30 people (mostly from different M.P State government departments, but also representative from local civil society organizations, social workers, research students, multi-lateral organizations and officials from the Ministry, local community members) participated in the Yatra.

The aim of the Yatra was to embark on a journey through an identified landscape, undertaken with multi-disciplinary team(s) including local community representatives, with overall goal of ensuring well-being of nature, people and self; by restoring/ strengthening connection. The main objectives of the Yatra were involvement of different agencies of the Governments, public and private and some Government agencies, NGOs/CBOs, Academic, peoples' representatives, media etc. in science, policy and practice, and to connect with nature and with self.



CHAPTER-14

INTERNATIONAL COOPERATION AND SUSTAINABLE DEVELOPMENT

International Cooperation and Sustainable Development

International Co-operation & Sustainable Development (IC&SD) Division within the Ministry coordinates all issues related to international environmental cooperation and sustainable development including sustainable development goals. The IC & SD Division is the nodal Division for United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), the World Bank 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, etc.

The Division also handles bilateral country to country co-operation in the areas of environment protection. The Division supports annual contributions to various UN and other international bodies, like Environment Fund of UNEP, Convention on Biological Diversity (CBD), UNFCCC, UNCCD, SAARC, SACEP, Integrated Mountain Development (ICIMOD), INBAR, ITTO, General Trust Fund for Biosafety Protocol, Male Declaration, Ramsar Convention, Wetlands International, etc.

Progress/Achievements during the year

United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) had organized first Session of the United Nations Environment Assembly in Nairobi, Kenya from 23-27 June, 2014.

The Minister of State (Independent Charge) for Environment, Forest and Climate Change had led the Indian Delegation, comprising of officers from this Ministry including representatives High Commission of India, Nairobi, to attend the first session of United Nations Environment Assembly (UNEA). The High Level Segment focused on two themes viz. "Sustainable Development Goals and Post-2015 Development Agenda, including Sustainable Consumption and Production" and "Illegal trade in Wildlife". The Minister emphasized in the High Level Segment that while the environmental dimension is extremely important and India has taken a number of steps for environment protection, we need to take a balanced view with regard to economic, social and environmental issues with a view to ensuring sustainable development.

On the sidelines of the High Level Segment of UNEA, the Minister held bilateral meetings with Executive Director, UNEP and Ministers/ Heads of delegations from USA, Germany, United Kingdom, Egypt, Jamaica, Iran, Kenya & Burundi. During the bilateral meetings, Minister informed Executive Director UNEP & respective Ministers/Heads of Delegations about the new initiatives taken by the Indian Government under the leadership of Hon'ble Prime Minister especially in the field of environment and sustainable development. He re-assured them that India would play a positive and constructive role in various multi-lateral negotiations. In the bilateral meetings, the existing bilateral cooperation in different areas of environment as well as opportunities for future cooperation/ collaboration was discussed. Views were also exchanged on ongoing international negotiations at different

forums related to sustainable development, climate change and biodiversity, and also on new innovations in technology.

Government of India provides annual financial contribution of US $ 100,000 to the UNEP Environment Fund.

UNEP's International Resource Panel and Steering Committee

Constituted in 2007 by the UNEP, the International Resource Panel (IRP) is a scientific panel of experts that supports science-based policy making on resource use and green economy strategies for providing scientific assessments and expert advice.

Global Environment Facility (GEF) India

The GEF's Small Grants Program works exclusively with NGOs and CBOs providing project grants up to `20 lakhs to undertake activities in identified priority sectors.

South Asian Association for Regional Cooperation (SAARC)

The South Asian Association for Regional Cooperation (SAARC), which is an intergovernmental body, was established in 1985 with the aim to provide a platform for the people of South Asia to work together in a spirit of friendship, trust and understanding so that the process of economic and social development in Member States could be accelerated. The SAARC has eight countries as its members, viz., Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka.

With a view to provide directives and mandate for regional co-operation under the SAARC, the SAARC Secretariat organizes meeting of the Heads of State or Government once a year or more often as and when considered necessary by the Member States known as SAARC Summit. So far 18th SAARC Summits was held on 22-27 November, 2014 at Kathmandu, Nepal.

The following events relating to the 18th SAARC Summit were held in November 2014:

- Forty-ninth Session of the Programming Committee (Kathmandu, 22 November, 2014);
- Forty-first Session of the Standing Committee (Kathmandu, 23-24 November, 2014);
- Thirty-sixth Session of the Council of Ministers (Kathmandu, 25 November, 2014);
- Eighteenth meeting of the Heads of State or Government (Kathmandu, 26-27 November, 2014).

During the reporting year, SAARC Secretariat has organized workshops/ meetings/ conferences including the following in which this Ministry was represented:

- 8th Meeting of Governing Board of SAARC Forestry Centre on 4-5 August, 2104 in Thimphu, Bhutan.
- Expert Group Meeting on Integrating 'Payment for Environmental Services' (PES) in Mountain Ecosystem Management in the SAARC Region from 06-07 August, 2014 in Thimphu, Bhutan.
- Training on 'Multi-disciplinary Oceanographic Observation for Coastal Zone Management', Goa, from 03-14 August, 2014.

SAARC - UNEP Cooperation:

South Asian Association for Regional Cooperation (SAARC) and United Nations Environment Programme (UNEP) signed a Memorandum of Understanding (MoU) on 13 June 2007 to provide a formal framework for co-operation between the two organizations in the area of environmental protection and sustainable use of natural resources of the region.

Capacity Building Workshop on Air Quality Management

The Ministry has hosted 'SAARC-UNEP Capacity Building Workshop on Air Quality Management in South Asia', in New Delhi on 16-19 December, 2014, in collaboration with UNEP and Central Pollution Control Board (CPCB), New Delhi.

The objectives of the workshop was to provide an overview of the latest science regarding the impact of air pollution in SAARC countries, review of current practices for monitoring, reporting, quality control and management, review of main barriers to air pollution monitoring and management and to identify regional solutions to combat air pollution. The workshop was attended by 24 participants from SAARC Member States apart from MOEFCC, CPCB and UNEP representatives.

Participation in Meetings/ Conference/ Workshops organized by UN/ International Agencies

During the reporting year, the Ministry deputed officers to take part in the following meetings/ conference/ workshops:

- 11th Asia Pacific Roundtable for Sustainable Consumption and Production from 19-20 May, 2014 and Regional Workshop on Sustainable Public Procurement and Harmonization of Eco-Labelling from 21-22 May, 2014 held in Bangkok, Thailand.
- UNEP's Global Intergovernmental and Multi-stakeholder Consultation on the 6th Global Environment Outlook Report (GEO-6) held in Berlin, Germany on 21-23 October, 2014.
- UNEP's Regional Workshop on Sustainable Public Procurement and Eco Labelling held in Beijing, China on 24-25 September, 2014.

Bilateral Cooperation

Ministry of Environment, Forests & Climate Change has entered into bilateral cooperation agreements with a number of countries such as Norway, Sweden, France, Finland, Canada, Bangladesh, Egypt, Morocco, Brazil etc. Most of these agreements are operated though the Joint Working Groups. These agreements provide a mechanism for international interactions and consultation in the field of environment.

Activities undertaken during the year

- The 8th meeting of the India – European Union Joint Working Group on Environment was held at Brussels, Belgium on 10-11 April, 2014. The Indian delegation, led by Mr. Shashi Shekhar, Additional Secretary participated in the meeting. The meeting, among others, discussed issues pertaining to water management, waste management, industrial pollution, biodiversity, mercury, chemicals, etc.
- A bilateral meeting between Mr. Prakash

Javadekar, Minister of State (I/C) for Environment, Forest & Climate Change and Mr. Datuk Seri G. Palanivel, Minister for Natural Resources & Environment, Malaysia was held at New Delhi on 30th June, 2014 wherein issues pertaining to environment and climate change were discussed.

Fig-56. *Hon'ble MEF&CC Mr. Prakash Javadekar and Dr. Barbara Hendricks, German Federal Minister for Environment, Nature Conservation, Building and Nuclear Safety at New Delhi*

- A Memorandum of Understanding between the Government of the Republic of India and the Government of the Federative Republic of Brazil on Cooperation in the Field of Environment was signed on 16th July, 2014 during the visit of the Hon'ble Prime Minister of India to Brazil. As a follow up action, a Joint Working Group in this regard is being constituted.
- A bilateral meeting between Mr. Prakash Javadekar, Minister of State (I/C) for Environment, Forest & Climate Change and Dr. John P. Holdren, Director and PCAST, USA was held at New Delhi on 18th November, 2014 wherein issues pertaining to Environment and Climate Change were discussed.
- Bilateral meeting between Mr. Prakash Javadekar, Minister of State (I/C) for Environment, Forest & Climate Change and Dr. Barbara Hendricks, German Federal Minister for Environment, Nature Conservation, Building and Nuclear Safety was held on 28th January, 2015.

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), French Development Agency (AFD), World Bank (WB), GIZ(Government of Germany) etc.

The projects help for promoting afforestation, biodiversity conservation, rehabilitation of degraded forest areas, water and soil conservation measures, farm forestry, agro forestry, community development and institutional capacity development with the

aim to increase forest and tree cover as well as to augment availability of fuel wood and fodder, improve 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. These projects also help in livelihood activities through convergence with other line departments and other government 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.

At present, there are 14 EAPs under implementation. Out of these, thirteen are State Sector Forestry Projects being implemented in States and one is a Central Sector project titled "Capacity Development for Forest Management and Training of Personnel" being implemented in 11 States. 12 State Sector Projects and the Central Sector Project are being funded by JICA and one State Sector Project is being funded by AFD. The total outlay of all these projects is ₹7474 Crores. JICA projects are implemented in the States of West Bengal, Rajasthan, Tamil Nadu, Sikkim, Uttar Pradesh, Gujarat, Tripura, Himachal Pradesh, Orissa, Karnataka and Haryana. French Development Agency (AFD) project has started in Assam. Details of projects under implementation, their components, project cost, project period and project objectives etc. are given in the Annexure-V.

Projects under consideration for external assistance:

The following forestry projects have been included for consideration under the Rolling Plan for FY 2015-16 for external funding:

Under consideration by Japan International Cooperation Agency (JICA):

- Odisha Forestry Sector Development Project – Phase-II , Odisha
- Karnataka Sustainable Forest Management and Biodiversity Conservation (KSMFBC) 3rd Phase Project –
- Himachal Pradesh Forest Ecosystem Management & Livelihood Project

Under consideration by World Bank

- Sundarban Resilient & Integrated Development Govt. of West Bengal-phase-II

Under consideration by GIZ(Govt. of Germany)

- Himachal Pradesh Forest Eco-Systems Climate Proofing project.

Projects under appraisal/ clearance stage for external assistance:

The following projects are proposed to be forwarded to external agencies for consideration in 2015-16:

- Nagaland Afforestation and Eco-development project–
- PALAS - Project for Advancement of Livelihood and Forestry for ecological security" in the State of Jharkhand.
- Sustainable Management of Community Forests and Biodiversity Conservation for Livelihood Improvement in Meghalaya.

CHAPTER-15

ADMINISTRATION AND CIVIL CONSTRUCTION

Administration and Civil Construction

Personnel Administration

Following the re-organization of the scientific Departments/Ministries during 1986 and the consequent upon de-linking of the Group 'A' scientific posts from the purview of the Union Public Service Commission (UPSC) and introduction of Flexible Complementing Scheme (FCS), P.III Section was specifically concerned and created in the Ministry to function as a separate, distinct, centralized and confidential unit for the purpose of recruitment (through Direct Recruitment/Deputation) as well as promotion under FCS in the Group 'A' Scientific posts of the Ministry (proper), its Regional Offices and all the Attached/ Subordinate Offices having such posts.

Promotion

During the year 2014-15, P.III Section has processed the cases of Promotion of Scientists of this Ministry, including its attached and subordinate offices, under FCS which are as follows:-

- 17 cases of Promotion form the grade of Sc. 'B' to Sc. 'C'
- 97 cases of Promotion form the grade of Sc. 'C' to Sc. 'D'
- 15 cases of Promotion from the grade of Sc. 'E' to Sc. 'E'
- 11 cases of Promotion from the grade of Sc. 'E' to Sc. 'F'
- 01 cases of Promotion from the grade of Sc. 'E' to Sc. 'G'

Recruitment Rules

During the year 2014-15, the amendments to the old Recruitment Rules in respect of Scientists of this Ministry including its attached and subordinate offices i.e. Department of Environment, Forests and Wildlife Scientific Group 'A' posts Rules, 1987 have been carry out by P.III Section and new Recruitment Rules i.e. Ministry of Environment, Forests and Climate Change, Scientific Group 'A' Posts Recruitment Rules, 2015 dated 23rd January, 2015 have been published in the Extraordinary Gazette of India.

Indian Forest Service (IFS) Cadre Management

Mandate

- The Indian Forests Service (IFS) Cadre Management Division is enjoined upon to handle the business of the Ministry as the Cadre Controlling Authority for the Indian Forest Service (one of the three All India Service).
- The total authorized cadre strength of the Indian Forest Service as on 1st January, 2014 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. Main Activities of the IFS Cadre Management are:

- Determination of vacancies and framing of rules for Direct Recruitment and allocation of cadres to IFS probationers.
- Determination of vacancies for induction of State Forest Service Officers by promotion into Indian Forest Service, coordination of Selection Committee Meeting, Determination of Year of Allotments Seniority.

Fig-57. *Black-Buck (Antilope cervicapra) at Tal Chhapar Wildlife Sanctuary, Rajasthan*

- Review of cadre and revision in the composition and strength of IFS in various cadres.
- Selection/ appointment of IFS officers to various posts under Central Staffing Scheme of the Ministry and to various autonomous bodies including Indian Council of Forestry Research & Education, Dehradun; Indian Institute of Forests Management, Bhopal and Wildlife Institute of India, Dehradun.
- Facilitation of Selection /Appointment of IFS officers against the Central Staffing Scheme of Department of Personnel & Training (DoPT).
- Finalization of various service matters like inter-cadre transfers, inter – cadre deputation, cadre clearance for placements/training and post-retirement benefits to the officers.
- Management of AGMUT cadre including promotions, transfers, postings and other service matters.
- Publication of Civil List of IFS Officers.

Achievements

- The IFS Cadre Management Division of the Ministry deals with the broad items of work relating to the Indian Forest Service.
- Direct Recruitment to the Indian Forests Service.
- Allocation of IFS Probationers to various State cadres.
- Up-to- date Civil List of IFS officers is available on the website of this Ministry at www.ifs.nic.in besides, vacancy circulars, training programme circulars, Rules and Regulations concerning IFS, Annual Confidential Report (ACR) availability status of IFS officers are also hosted on this site for the benefit of the members of the Service. 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 up gradation.

- Out of Eighty Four candidates offered appointment to IFS on the basis of Exam 2013, Sixty Four are undergoing mandatory Training at IGNFA, Dehradun. Five candidates have been granted extension of one year and remaining candidates have not joined the service.
- Seventy six IFS Probationers of 2012 Examination are undergoing Mandatory training at Indira Gandhi National Forests Academy, Dehradun.
- Forty Seven State Forest Service officers were included into the Indian Forest Service under IFS (Appointment by Promotion) Regulations, during April–December, 2014.
- Thirteen IFS officers joined at various levels under the Central Staffing Scheme of the Ministry and ten IFS officers joined under the Central Staffing Scheme of the Department of Personnel & Training.

– Cadre review of IFS of Bihar, Punjab, Madhya Pradesh, Rajasthan & Kerala is under process for approval of Cadre Review Committee.

– Around 60 Court Cases pending in various Courts across the Country were liquidated.

– Around 320 Court Cases relating to the issues of Indian Forest Service are pending in various Tribunals / Courts all over the Country.

– For the first time Court case data has been computerised using the software on Court case monitoring system. Efforts are on to make full use of this software for monitoring of Court cases.

Vigilance

The Vigilance Division is responsible for examination and processing of the disciplinary cases, appeals, reviews and memorials preferred by Indian Forest Service (IFS) Officers, examination of complaints and maintenance/ scruitinization of Annual Immovable Property Returns (AIPRs). 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.

The Division carries out necessary consultation with the Central Vigilance Commission (CVC), Union Public Service Commission (UPSC) and Department of Personnel & Training (DOPT) as per laid down rules/procedures in corruption and disciplinary cases. The Vigilance Division also interacts with Central Bureau of Investigation (CBI) in various matters. The Division further deals with the Cases filed in Supreme Court/ High Courts and various Benches of Central Administrative Tribunal relating to disciplinary matters.

During the year, 19 disciplinary proceedings cases, 06 appeal cases and 10 prosecution cases were dealt with the Vigilance Division. Court cases were pursued in the respective Courts/CAT Benches. 84 numbers of applications/appeals were received under RTI Act and replies sent in all the matters.

Vigilance Awareness Week was observed in the Ministry during the year from 27th October to 1st November, 2014. The theme

for the year was "Combating Corruption – Technology as an enabler". A pledge was administered by the Secretary (E,F&CC) to the officers & staff to promote integrity and transparency in all spheres of activities and to work unstintingly towards eradication of corruption.

Parliament

The Parliament Division in the Ministry is responsible for co-ordination of all parliament matters related to the Ministry of Environment, Forests and Climate Change. During the year 2014-15, a total number of 775 Parliament Questions pertaining to various aspects of environment were answered by the Ministry (498 questions in the Lok Sabha, out of which 40 were starred and 458 were un-starred. A total of 277 questions were asked in the Rajya Sabha, out of which 32 were starred and 277 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 MoEFCC and other Ministries pertaining to various environmental issues. Graphical representation of the Parliament Questions replied by the Ministry during 2014-15 both in Lok Sabha and Rajya Sabha are given in Fig-56 and Fig-57.

	Budget	Monsoon	Grand Total
Starred	25	15	40
Unstarred	236	222	458
Total	**261**	**237**	**498**

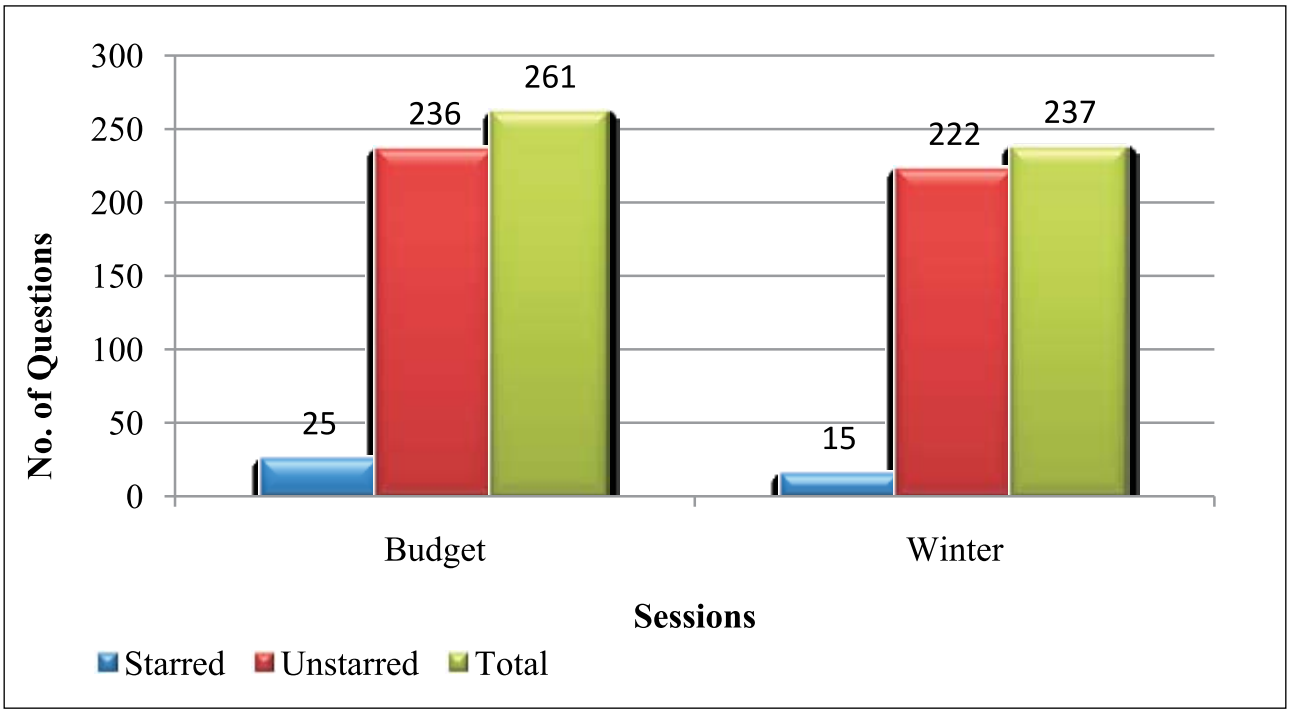


Fig-58. *Number of questions replied by the Ministry in all sessions of Lok Sabha during 2014-2015*

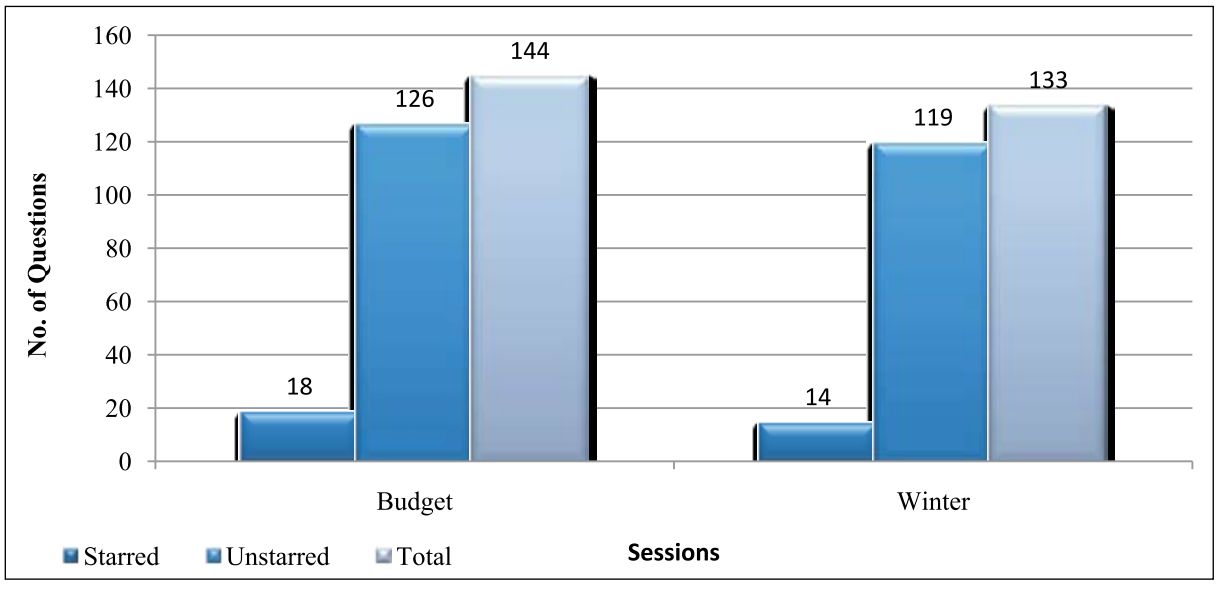


Fig-59. *Number of questions replied by the Ministry in all sessions of Rajya Sabha during 2014-2015*

	Budget	Monsoon	Grand Total
Starred	18	14	32
Unstarred	126	119	245
Total	**144**	**133**	**277**

Every Question/Answer is classified under various sub heads of environment as per the subject list available with the ENVIS Centre, WWF-India. This year subject-wise classified questions in Lok Sabha and Rajya Sabha sums up at 1041 and 610 respectively. After classification, the total number of questions in both Lok Sabha and Rajya Sabha rises in comparison to the unclassified data, because of the fact that a single question can be attributed to more than one subject sub-head.

Statistical representation depicting the subject-wise coverage of total number of questions asked in both the houses of Parliament (Lok Sabha and Rajya Sabha) during the year 2014-15 is given in Table-29 and Table- 30.

The ENVIS Centre, WWF-India has published the compendium of Environment in the Indian Parliament: An Analysis 2013-14 in collaboration with Parliament Section, MoEFCC. The preparation of the Trends & Analysis of the above-mentioned Parliamentary questions replied by the Ministry of Environment & Forests and other Ministries related to Environment is available with the ENVIS Centre at WWF-India. Online accessibility is also available on the Centre's website: http://www.wwfenvis.nic.in

During the year 2014-15, Parliament Section conducted four Department related Parliamentary Standing Committee of Science and Technology, Environment, Forest and Climate Change i.e (i) Review of sets taken by Ministry of Mines, Urban Development, Department of Financial Services & Banks to mitigate pollution dated 9th April, 2014, (ii) Warming and Forecasting of Floods in the context of Climate Change dated 16th October, 2014, (iii) "The Wildlife (Protection) Amendment Bill, 2013" dated 30th April, 2014 (iv) Management of E-Waste

Table-29. *Subject-wise depiction of questions replied by the Ministry in Lok Sabha during 2014-2015*

Subjects	Budget	Winter	Grand Total
Agriculture	15	22	37
Alternative Technologies	8	17	25
Biosafety	2	2	4
Climate Change and Meteorology	17	28	45
Disaster Management	5	3	8
Energy Studies	16	21	37
Environment and Forest Trade	10	4	14
Environmental Conservation	140	57	197
Environmental Education, NGOs and Media	16	16	32
EIA	52	25	77
Forest Conservation	66	73	139
Freshwater and Marine Conservation	35	12	47
Health and Sanitation	20	25	45
Medicinal Plants	2	1	3
Pollution	60	62	122
Water Management	41	32	73
Wildlife Management	66	70	136
Total	**571**	**470**	**1041**

Table-30. *Subject-wise depiction of questions replied by the Ministry in Rajya Sabha during 2014-2015*

Subjects	Budget	Winter	Grand Total
Agriculture	11	9	20
Alternative Technologies	5	8	13
Biosafety	2	2	4
Climate Change and Meteorology	10	15	25
Disaster Management	4	9	13
Energy Studies	9	11	20
Environment and Forest Trade	5	0	5
Environmental Conservation	72	51	123
Environmental Education, NGOs and Media	13	13	26
EIA	26	13	39
Forest Conservation	48	29	77
Freshwater and Marine Conservation	8	10	18
Health and Sanitation	14	26	40
Pollution	36	45	81
Water Management	21	22	43
Wildlife Management	31	32	63
Total	**315**	**295**	**610**

& Electronic Radiation dated 20th November, 2014.

Results-Framework Document (RFD), 2012-13

The Prime Minister approved the outline of a "Performance Monitoring and Evaluation System (PMES) for Government Departments" vide PMO I.D. No.1331721/PMO/2009-Pol dated 11.09.2009. Under PMES, each department is required to prepare a Results-Framework Document (RFD).

The RFD provides a summary of the most important results that a department/Ministry expects to achieve during the financial year. This document has two main purposes: (a) move the focus of the department from process-orientation to results-orientation, and (b) provide an objective and fair basis to evaluate department's overall performance at the end of the year.

The RFD seeks to address three basic questions: (a) What are department's main objectives for the year (b) What actions are proposed to achieve these objectives (c) How would someone know at the end of the year the degree of progress made in implementing these actions i.e., what are the relevant success indicators and their targets.

Vision, Mission, Objectives and Functions of the Ministry as per RFD

Vision:

Conservation of environment and natural resources for the present and future generations in a manner consistent with the aspirations of the country for growth and development.

Mission:

To plan, promote, coordinate and oversee the implementation of environmental and forestry programmes in order to protect the environment and maintain a balance between conservation and development activities.

Objectives:

- Increase the forest and tree cover to 33% of the geographical area of the country (Afforestation and regeneration of degraded Forests)
- Conservation of the existing forests, wildlife and water resources and survey of various areas for identification of new species

  (Protection of Forests, Conservation of rivers, Biodiversity Conservation, Conservation of Wetlands, Wildlife Conservation, Conservation of resources in the eco-sensitive zone, Capacity building, training and research in classical and molecular taxonomy)
- Control of Pollution (Air, Water, Noise and Industrial pollution)

  (Better ambient water quality, Management of hazardous substances and Better Environmental governance)

Functions:

The major functions of the Ministry include:

- Formulation of national policies on management of environment, forests and wildlife;
- Implementation of provisions of related legislations on forests, environment and wildlife, control of pollution of air and water, etc.; and

- Survey and exploration of natural resources particularly of forests, flora, fauna, ecosystems, etc.
- Bio-diversity conservation including that of lakes and wetlands;
- Conservation, development, management and abatement of pollution of rivers which includes National River Conservation Directorate;
- Environmental research and development, education, training, information and awareness;
- Regulation of diversion of forest land for non forestry purposes;
- Environmental Impact Assessment;
- Wildlife conservation, preservation, protection planning, research, education, training and awareness;
- Afforestation and eco-development;
- Prevention of cruelty to animals;
- Administration and Management of subordinate and autonomous institutions of the Ministry; and
- Monitoring of implementation of central sector and centrally sponsored schemes funded by the Ministry.

Performance Evaluation Report of RFD, 2013-14

The Ministry has sent the achievements under RFD for the year 2013-14 to Cabinet Secretariat (PMD) on 22nd September, 2014. The final score assessment for the year is awaited from the Cabinet Secretariat. The target under RFD for 2015-16 is under finalization.

Information Technology and e-Governance

The Government has recognized Information Technology (IT) as a major tool for speedy implementation and monitoring of various schemes and decisions in public interest. Accordingly, Ministry has embarked on a comprehensive exercise to implement various e-Governance activities / projects with the objective of transforming the functioning of the Ministry, and also to transform the way the Ministry serves its various stakeholders.

The broad areas of activities under IT Plan Scheme (as per SFC approved in July, 2013) are as follows:

- Transformation of the process of governance, introduction of e-governance and reinforcing of business process to have intensive and extensive systemic reforms
- Digitization of records of the Ministry and its attached offices
- Establishment of LAN / WAN in the Ministry and its attached offices
- Networking the Ministry with its associated offices through 'Virtual Private Network'
- Introduction of the concept of e-Governance throughout the Ministry and its associated offices
- Development of MIS and Decision Support System
- Training of officers/staff
- Strengthening IT infrastructure of the Ministry and its associated offices.
- Strengthening of e-Governance Division

Achievements

- The IT infrastructure of the Ministry and Zoological Survey of India, Kolkata and its Regional Centres and Units was strengthened.
- Photographic digitization of 20,000 Economic Herbarium at Botanical Survey of India, Kolkata has been completed.
- Placing of infrastructure for IT Related services in the New Indira Paryavaran Bhawan.
- Re-structuring and re-designing of existing website of the Zoological Survey of India (ZSI), Kolkata and Botanical Survey of India (BSI), Kolkata into CMS based website completed.
- Biometric Attendance System implemented in the Ministry in coordination with Administration / GA Division.
- Access Control Card System activated for restricted entry in Indira Paryavaran Bhawan in coordination with Administration / GA Division.
- Monitored the regular updation of material in eSamikSha (http://cabsecmis.gov.in) – a real time, on-line system to review follow-up action.
- Initiated process for implementing e-Office in the Ministry under Digital India Programme.
- Examination of all policy issues pertaining to Information Technology.

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 of stationery, stores, equipments, support services to the officials of the Ministry including transport, communication, general upkeep etc. The Ministry proper has shifted to the new building at Jor Bagh Road, New Delhi. It is a green building with net zero energy consumption. It has the GRIHA-5 star and lead Platinum rating. Other Organizations of MoEFCC like National River Conservation Directorate (NRCD), National Afforestation & Eco Development Board (NAEB), Civil Construction Unit (CCU), National Tiger Conservation Authority (NTCA) and Central Zoo Authority (CZA) are being accommodated at Paryavaran Bhawan, CGO Complex, New Delhi.

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

Work in process

- Review for amendment to Wildlife (Protection) Act, 1972
- Declaration of Eco-Sensitive Zones.
- Formulation of policies and programmes for effective management of human-wildlife conflict.
- Review of National Wildlife Action Plan (2002-2016).

- Amendment of Municipal Solid Waste Rules.
- Amendment of Hazardous Waste Management Rules.
- Amendment of Plastic Waste Rules.
- Finalisation of Construction and Demolition Waste Rules.
- Integration of online monitoring system of Environment Clearance, Forest Clearance and Wildlife Clearance.

Public Grievance Cell

A Public Grievance Cell has been functioning in the Ministry to attend to the complaints of public regarding forestry, environmental matters etc. Presently Dr. M.M. Kutty, Joint Secretary (PG) is the Nodal Public Grievance Officer of the Ministry and Under Secretary (General Coordination) is the designated Assistant Public Grievance Officer in respect of the Ministry. The particulars of the Public Grievance Officer of this Ministry are as under:

Dr. M.M Kutty,
Joint Secretary (PG)
Room No. J-305, 3rd Floor, Jal Block,
Indira Paryavaran Bhawan,
Jor Bagh, New Delhi-110003

The PG Cell receives grievance in two modes namely through Centralized Public Grievance Redress and Monitoring System (CPGRAMS) portal of Department of Administrative Reforms & Public Grievances (DARPG), and directly by post from the public. The grievances received online through PG portal are directly sent online to the various Sections/Divisions of the Ministry for disposal and the grievances received through post are sent to the various Sections/ Divisions of this Ministry for redressal through post.

To run the Centralized Public Grievance portal IDs have been provided to the concerned Sections/ Divisions in the Ministry for quick disposal of grievance/ monitoring and issuing reminders on-line. The dealing hands of the Divisions/ Sections concerned are deputed for training organized by DARPG from time to time to know the operations of cpgrams.

The general public can meet the Public Grievance Officer every Wednesday from 10.00 Am to 1.00 PM. The main function of the Cell is to ensure timely redressal of public grievances by taking up the matter with the authorities concerned such as District Magistrates, Municipal Corporations, Pollution Control Boards, State Governments, etc. Most of grievances relate to:

- Unauthorized industries located in residential areas discharging harmful gases and hazardous effluents in the immediate neighborhood:
- Environmental degradation due to mismanagement of civic amenties like location of waste dump, water logging etc.
- Poor maintenance of open area and parks
- Commercial establishments operating illegally in the residential building causing nuisance to people living in the immediate vicinity.
- Non- settlement of payment of salary dues and retirement dues, benefits like pension etc. to staff.

As on 30th December, 2014, out of total 3780 public grievances, 2305 have been disposed of on line and 1474 grievances remain pending for disposal. The rate of disposal is 61%. Efforts are however, being made by the PG Cell to raise the disposal rate to about 70-75% by issuing periodical reminders to the Divisions/Sections concerned for settlement/ disposal of pending grievances.

Implementation of Official Language Policy

Sustained efforts were made to ensure proper compliance of the Official Language Policy of the Union enshrined in the Constitution of India, the Official Languages Act, the Official Languages Rules, the Annual Programme and orders issued by the Department of Official Language from time to time.

All documents coming under the purview of Sec. 3(3) of the O.L. Act were issued in Hindi and English bilingual form. The letters received in Hindi and representations/appeals signed in Hindi were replied to in Hindi ensuring 100% compliance of Rule 5 and Rule 7 (2) of the O.L. Rules.

Progress of Activities undertaken

Official Language Implementation Committee

Meetings of Official Language Implementation Committee were organised in every quarter under the Chairmanship of Joint Secretary, wherein position of implementation of Official Language Policy in the Divisions/Sections of the Ministry was reviewed.

Hindi Workshop

Hindi Workshops were organised for the Officers and Staff to enable them to carry out their day to day transaction in Hindi.

Inspections

The Committee of Parliament on Official Language inspected our Attached/ Subordinate Offices namely Central Pollution Control Board (CPCB), Delhi and Forest Survey of India (SZ), Bengaluru. In addition to these inspections, nine out of thirty Attached/ Subordinate Offices were also inspected by Joint Secretary/Officer(s) of Official Language Division with a view to review the position of implementing Official Language Policy of the Union.

Publication of Paryavaran Magazine

Paryavaran Magazine in Hindi was published and released by the Addl. Secretary (HKP), MoEFCC during Hindi fortnight.

Hindi Fortnight

Hindi fortnight was organised from 15th to 30th September, 2014 during which various Hindi competitions aimed at increasing progressive use of Official Language Hindi were organised. Employees of the Ministry, NAEB, NRCD and CCU participated the these competitions, out of which 58 officers and employees were honoured with cash prize through A/c Payee Cheques prepared in Hindi as well as commendation certificates by the Secretary to the Govt. of India, Ministry of Environment, Forests & Climate Change.

Civil Construction Unit (CCU)

Civil Construction Unit (CCU), headed by Chief Engineer (Civil), was set up in the Ministry of Environment & Forests in March, 1987 for taking up important works of the Ministry on priority basis.

The works being taken up by CCU consist of construction of office-cum-laboratory

buildings, herbariums, national regional museums of natural history, staff quarters and other building works relating to various units of the Ministry of Environment, Forests and Climate change viz. Botanical Survey of India, Zoological Survey of India, National Museum of Natural History, State Forest Service Colleges, Indira Gandhi National Forest Academy, Forest Survey of India, National Zoological Park, New Delhi and Regional Offices of Ministry located in different part of the country.

Works in eastern, north-eastern and western regions of the country have been entrusted to CPWD. Thus over 70% of the work of the Ministry and its autonomous bodies are being handled by CCU.

In order to avoid use of wood in the buildings constructed by CCU a number of alternatives have been adopted. For doors, windows and cupboards mostly steel sections, pressed steel frames, aluminium sections are being used depending on importance of the buildings.

Similarly, solar energy is being used in various areas like street lighting etc. Solar water heating system for heating water has also been introduced by CCU in the hostel buildings. To affect savings in energy, Compact Fluorescent Lamps (CFLs) / LED bulbs are being used in place of conventional fluorescent lights in houses and guest houses. Important buildings are also being designed on solar passive architecture.

Indira Paryavaran Bhawan

Cost	:	Rs 209 Cr.
Structure	:	G+7 Storeyed plus 3 Basements.
Plinth Area	:	32,000 Sqm.
General Services	:	Central Air Conditioning (HVAC) 440TR.
	:	Lifts, Fire Fighting and Fire Alarm Systems.
	:	DG Sets, UPS, IBMS and CCTV systems.
Special Provisions	:	Roof top Solar PV system 930 Kwp.
	:	Fully Automated Robotic Car Parking.
	:	Modular Furniture and Work Stations.
	:	Sewage Treatment Plant 30KLD capacity.
Start of Construction	:	28.01.2011.
Completion	:	31.10.2013.
Inaugurations	:	28.02.2014.

Architecture Planning and Landscaping

- East West Building orientation and separation of different blocks with connecting corridors and central atrium.
- Out of total 79 trees, only 19 trees cut and 11 transplanted.
- Building Envelope designed to ensure daylight in 75% occupied area.
- Access friendly to differently-abled persons.
- Zero Surface Parking.
- Plantation and grassing in more than 50% area outside the building.
- Circulation roads and pathways made with grass paver blocks to enable ground water recharge.
- Terrace Garden at seventh floor.

Sustainable Building Material

- Walls with Fly ash bricks and light weight & heat insulating AAC blocks.
- Entire concreting, mortars and plasters with PPC (Fly-ash Cement).
- Locally available Stone floorings, claddings, Terrazzo flooring and flooring with broken Marbles and Kota stone.
- High reflectance terrace tiles and PUF insulting for low heat ingress.
- Rockwool insulation of outer walls and concrete surfaces.
- Rapidly renewable Bamboo Jute Composite for door frames & shutters.
- UPVC window with hermetically sales double glass (SHGC: 0.32, U value: 1.5 & VLT 59%).
- Calcium Silicate ceiling Tiles.
- Grass paver blocks in pavements and roads for ground water percolation.
- Low VOC Paints for better indoor air quality.

Fig-60. *Ministry's new office building at Jorbagh Road, New Delhi*

Net Zero Energy

Capacity of power Generation	:	930 KWp.
Annual Energy requirement	:	14 lakh Unit 9KWh.
Annual Energy generation	:	14 lakh Unit 9KWh.
Net Energy Consumption	:	ZERO.
Total area of Solar panels	:	4600m2.
Total are the System	:	i/c catwalks
Photo Voltaic panels	:	Mono Crystalline 20% efficiency.
Nature of Power Generation	:	Grid Interactive.

Energy Effcient System

- Energy Efficient Chilled Beam System of Air Conditioning
- Air conditioning by convection currents rather than air supply through ducts.
- Chilled water circulated right up to the diffuser & (chilled beam).
- Chilled beam has provision for draining out any condensation water.
- More than 50% saving in energy consumption on air conditioning.
- Geo Thermal Heat Exchange System
- Utilises advantage of difference

between ambient temperature and the temperature below ground level.

- Vertical Closed loop system with 32mm dia. HDPE U-loops 180 No's and 80m deep each.
- Reduction of 160TR load on cooling tower and also reduction in consumption of water.
- Regenerative Passengers Lifts
- Energy efficient through conversation of braking energy into Electrical Energy.
- 7 No's Machine Room Gearless Lifts of OTIS make.
- Other Energy Efficiency Measures
- Chillers and AHUs with Variable Frequency Driver (VFDs).
- Heat Recovery System (Dedicated Outdoor Air Units).
- Thermostat controls for HVAC.
- LED lights and Occupancy & Lux Level Sensors, etc.

Water Conservation

- Recycling of waste water through STP (Sewage Treatment Plant).
- Low discharge water fixtures.
- Sensor Urinals & Dual flow Cisterns.
- Low demand plants in landscaping.
- Geothermal Heat Exchange System.
- Rain Water Harvesting.
- Use of curing compound's.

Fully Automated Robotic Car Parking

Parking Capacity	:	330 Cars.
Single car retrieval time	:	3 Minutes(Max).
Total cars retrieval time	:	40 Minutes (6 Cars Lifts).

Works completed during the year

- Indira Paryavaran Bhawan, Jorbagh, Aliganj, New Delhi - The new Indira Paryavaran Bhawan building constructed by CPWD to accommodate the Minister office and staff of ministry of Environment, Forests & Climate Change. The project cost of the work was ₹ 209 crores and plinth area is 32000 sqm. The building has four towers (G+7) including three basements interconnected with each other at fourth floor onwards. The building is fully air-conditioned with chilled beam system and net zero energy building. It has been awarded with TERI GRIHA five star rating and LEEDS Platinum rating. The planning and construction has been done in such a way to harness maximum benefit from nature. Green building material such as use of fly ash and light weight heat insulating AAC blocks have been used. The roof top has self-sufficient power generation of 930 KWp. In order to reduce heat load geo-thermal heat exchange system and recycled water from STP has been used for HVAC system. In order to reduce the power consumption, motion censor and LED light fittings have been used i/c all the fittings and fixtures of toilets have been provided with censors. The passenger lifts are re-generative. The STP recycled water is not discharged into

Fig-61. *United Nations Secretary General Mr. Ban Ki-moon planting Amaltas sapling with Hon'ble MEFCC Shri Prakash Javadekar at IPB premesis*

sewer and recycled for supplying it to cooling tower and horticulture purpose. Three basement parking with automatic robotic parking facility has been provided to ensure zero surface parking.

- Rajiv Gandhi Regional Museum of Natural History (RGRMN), Sawai Madhopur, Rajasthan - RGRMNH is located at Sawai Madhopur in a campus of 6.6 acres. The architectural features of the building matches with the Rajasthani architecture. The total cost of the project was ₹ 41 crores. The museum building is having plinth area of 10478 sqm. including auditorium for 250 persons seating capacity and hostel building to accommodate students visiting the museum from distant places. The proposal for staff quarters is under process for approval.
- Institute of Forest Genetics and Tree Breeding, Coimbatore - The Extension of office-cum-lab building of IFGTB has been completed at ₹ 310 lacs having plinth area of 1118 sqm to accommodate the need of more scientific research for IFGTB. Building has been provided with labs and offices for the scientists. The construction done has merged with existing building with proper connectivity having same features as in the existing building.
- Extension of administrative block for the construction of Lecture Hall and stores for the Sample Cell for IPIRTI at Bangalore - The building cost is ₹ 80.00 Lakhs and the plinth area is 273 sqm. The facility has been created for trainees by constructing additional lecture hall. Audio Visual system, touch screen LED monitors etc. have been provided in the lecture hall to facilitate the trainees.
- Additional construction of education room, Dormitory, Reserve collection room, Library & Eco theatre including electrical installation and fan for RMNH at Mysore - The cost of the building was ₹ 201.00 Lakhs and the plinth area is 546 sqm. Facilities like Education room, dormitory for 30 occupants, Reserve Collection room, Library and Eco theatre etc. have been provided.

Progress

- Strengthening and up-gradation of laboratory in Parivesh Bhawan, CPCB, Arjun Nagar, New Delhi,
- Extension building for auditorium for IFGTB, Coimbatore,
- Construction of Class Room for IIFM, Bhopal.
- Improvement of infrastructure in National Zoological Park (NZP), New Delhi.

CHAPTER-16

PLAN COORDINATION DIVISION

Plan Coordination Division

Plan Coordination Division is responsible for coordination of all Plan Schemes and Programmes of the Ministry of Environment & Forests, and works in close association with Planning Commission 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 the utilization of Plan funds.

Activities undertaken during year 2014-15

The progress of the utilization of Plan funds for Centrally Sponsored Schemes (CSS) and Central Sector (CS) Schemes is reviewed regularly in the Ministry and necessary corrective action is taken to ensure proper and meaningful deployment of resources with a view to build up the capacities of the State Governments in Environment and Forestry and Wildlife sectors as well as implementing agencies.

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 & Forests has been allocated an outlay of ₹ 17,874 crore which works out to 0.41% of the Plan allocation across various Ministries/ Departments as against a share of 0.42% or ₹ 9231.00 crore 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 2014-15

For 2014-15, the outlay was ₹ 2,480.00 crore on the basis of BE (Interim), which has been changed to ₹ 2,043.00 crore, after transferring the Plan Scheme of National River Conservation Plan (NRCP) with an outlay ₹ 557.79 crore (BE Interim) to the Ministry of Water Resources and introducing a new Central Plan Scheme of 'National Mission on Himalayan Studies' with an outlay of ₹ 100.00 crore (BE Regular). Actual Plan expenditure was ₹ 1206.87 crore till 31st December, 2014. At Revised Estimate Stage for FY 2014-15, ₹

Fig-62. *Shiroi Lily (Lilium mackliniae) – State flower of Manipur, flowering at Dzukou valley between Manipur and Nagaland*

2043.00 crore (Budget Estimate) was further reduced to ₹ 1550.00 crore. However as per the Government of India (Allocation of Business) Rules, 1961 notified vide Gazette Notification S.O No. 1986 (E) dated 31st July, 2014, NCRD & NRCP (excluding the river Ganga and its tributaries) is restored to this Ministry. The sectoral summary of the two Annual Plans is given in Table-31.

Table-31. *Sector-wise Summary of Twelfth Plan Outlays/ Actual Expenditure (as on 31st December 2014)*

(₹ 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**
2012-13						
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**
2013-14						
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	7.40	**1811.34**
2014-15						
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 31.12.2014	442.19	-	515.98	237.97	10.73	**1206.87**
Revised Estimates	551.98	84.00	623.37	273.65	17.00	**1550.00**

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).

* National River Conservation Plan, which has been transferred to M/o Water Resources

Significant audit points printed in Audit Reports of 2014

Audit Report No.27 of 2014-Union Government, Scientific and Environmental Ministries/Departments (Compliance Audit)

Ministry of Environment, Forests and Climate Change

Activities of Zoological Survey of India in exploration, identification and monitoring of faunal diversity

Ministry of Environment and Forests redefined the mandate of Zoological Survey of India (ZSI) to align it with the objectives of the international Convention of Biological Diversity (CBD) to which India is a signatory; and also prepared a comprehensive strategic plan covering the period from 1993 to 2020 for exploration, survey, inventorisation and monitoring of the faunal diversity of the country. As of March 2014, ZSI was lagging behind its targets for fulfilling the country's commitments under CBD in all the planned activities.

Exploration, survey and inventorisation of faunal diversity in the selected states, ecosystems and protected areas were not completed on schedule. There was no standard methodology for carrying out surveys and no system for oversight and assessment of the survey work carried out. Area and species wise monitoring of the faunal species had not commenced and no action plan in this regard had been prepared.

The working strength of Taxonomists was far below its sanctioned number. Scarcity of Taxonomists affected the taxonomic studies as only 34 per cent of the species collected were taxonomically identified. Even though Taxonomy was recognised as a highly specialised discipline, ZSI failed to depute its newly recruited scientists for training.

The review of threatened and endemic species was very limited. Of the 10 species targeted for review, status surveys were not initiated for seven species.

(Paragraph 6.1)

Inordinate delay in setting up of National Botanic Garden

Ministry of Environment and Forests failed to enter into a Memorandum of Understanding with NOIDA authority for development of National Botanic Garden on land allotted to it by the latter. Consequently, after incurring expenditure of ₹11.54 crore on development of the National Botanic Garden, status of ownership of the land remained unresolved even after 17 years and the envisaged objective of setting up of National Botanic Garden remained unachieved as of March 2014.

(Paragraph 6.2)

Wasteful expenditure on hiring of office accommodation

Ministry of Environment and Forests failed to utilise 13 out of 17 rooms in hired premises for nearly 29 months, thereby rendering expenditure of ₹91.12 lakh incurred on renovation and rent largely wasteful, besides incurring a liability of ₹4.43 crore towards outstanding dues of rent and interest.

(Paragraph 6.3)

Non-establishment of model facilities for management of Municipal Solid Wastes

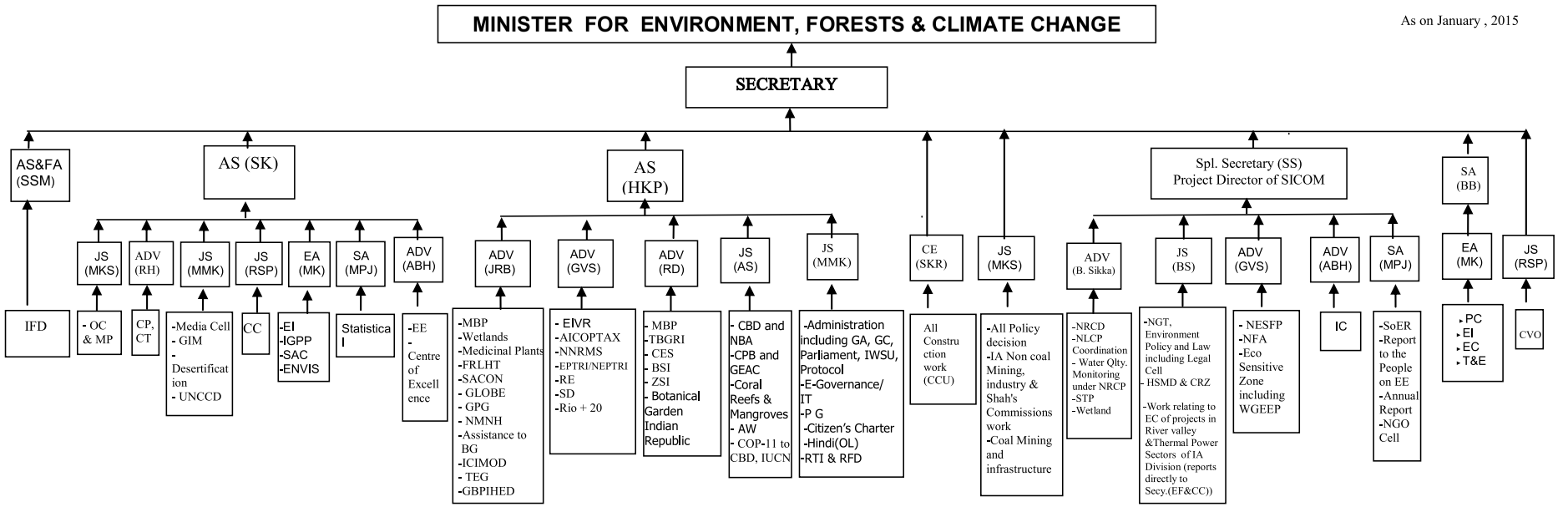
Model facilities for disposal of solid

wastes in 10 states selected under a scheme implemented by Central Pollution Control Board (CPCB) were not set up even after 10 years of initiation of the projects and after incurring expenditure of ₹24.80 crore. There was inadequate monitoring of projects by CPCB and State Pollution Control Boards leading to incomplete work, foreclosure of projects, wasteful expenditure, idling of facilities created and unspent balances remaining idle under the projects. As a result, primary objective of assisting the states and urban local bodies to follow provisions of Municipal Solid Wastes Rules of the Ministry of Environment and Forests remained unachieved.

(Paragraph 6.4)

ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE (DIVISIONS UNDER ENVIRONMENT SECTOR)

As on January , 2015

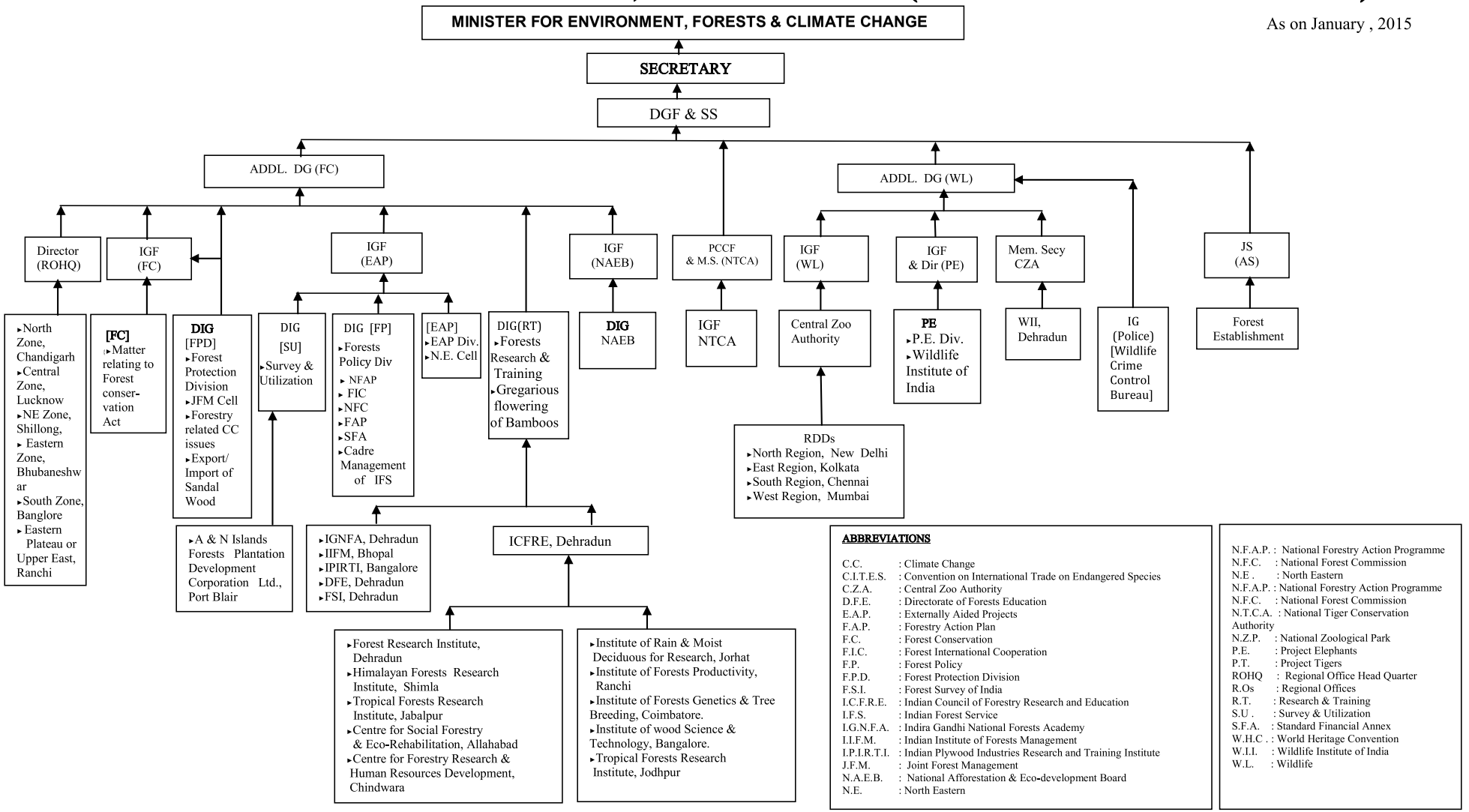


ABBREVIATIONS

A.I.C.O.P.T.AX. : All India Coordinated Project on Capacity Building in Taxonomy
A.W. : Animal Welfare
B.C.S. : Bio-Diversity Conservation Scheme
B.G . : Botanical Garden
B.G.I.R. : Botanical Garden of the Indian Republic
B.S.I. : Botanical Survey of India
C.B.D. : Convention on Biological Diversity
C.B.P. : Capacity Building Project
C.C. : Climate Change
C.C.U. : Civil Construction Unit
C.D.M. : Clean Development Mechanism
C.E.S. : Centre for Ecological Science
C.M.W. : Conservation and Management of Wetlands
C.O.P. : Conference of the Parties
C.P. : Control of Pollution
CPB : Cartagena Protocol on Biosafety
C.P.C.B. : Central Pollution Control Board
CT : Clean Technology
C.R.Z. : Coastal Regulation Zone
C.S.D. : Commission on Sustainable Development
C.V.O. : Chief Vigilance Officer
D.T.E.P.A. : Dahanu Taluka Environment Protection Authority
E.C. : Economic Cell
E.E. : Environment Education
E.I. : Environment Information
E.I.V.R. : Entities of Incomparable Value Regulations
E.N.V.I.S. : Environmental Information System
E.P.T.R.I : Environment Protection Training & Research Institute
E.S.A. : Ecologically Sensitive Areas
F.E. : Forest Establishment
F.R.L.H.T. : Foundation for Revitalization of Local Health Traditions
G.A. : General Administration
G.B.P.I.H.E.D. : G.B. Pant Institute of Himalayan Environment & Development
G.P.G. : Global Public Goods
G.C. : General Co-ordination
G.E.A.C . : Genetic Engineering Approval Committee
G.E.F. : Global Environment Facility
G.I.M. : Greening India Mission
G.L.O.B.E. : Global Learning & Observation to Benefit the Environment
H.S.M.D. : Hazardous Substances Management Division
I.A. : Impact Assessment
I.C. : International Co-operation
I.C.I.M.O.D. : International Centre for Integrated Mountain Development
I.F.C. : Information Facilitation Counter
I.F.D. : Integrated Finance Division
I.F.S. : Indian Forest Service
I.G.P.P. : Indira Gandhi Paryavaran Puraskar
I.N.C.C.A. : Indian Network for Climate Change
I.P.C.C . : International Panel on Climate Change
I.T. : Information Technology
I.U.C.N : International Union for Conservation of Nature
I.W.S.U. : Internal Work Study Unit
L.C. : Legal Cell
M.B.P. : Man and Biosphere Programme
M.G.C.E.&E. : Mahatma Gandhi Chair on Environment & Ecology
N.A.T.C.O.M. : National Communication
N.B.A. : National Biodiversity Authority
N.B.A.P. : National Biodiversity Action Plan
N.C.Z.M.A. :National Coastal Zone Management Authority
N.E.P.T.R.I . : National Environmental Protection Training and Research Institute
N.E.S.P.F. : National Environmental Science Fellows Programme
N.F.A. : National Fellowship Awards
N.G.O. : Non Governmental Organisation
N.G.T. : National Green Tribunal
N.G.R.B.A. : National Ganga River Basin Authority
N.L.C.P. : National Lake Conservation Plan
N.M.C.G. : National Mission on Clean Ganga
N.M.N.H. : National Museum for Natural History
N.N.R.M.S. : National Natural Resources Management Systems
N.R.C.D. : National River Conservation Directorate
N.R.C.P. : National River Conservation Plan
O.C & M.P. : Ozone Cell & Montreal Protocol
O.L. : Official Language
P.C. : Plan Coordination
P&L. : Policy and Law
P.G. : Public Grievances
R.E. : Research in Environment
R.F.D. : Results Framework Document
R.T.I. : Right to Information
R.C. : Rotterdam Convention
S.A.C : Scientific Advisory Committee
S.A.C.O.N. : Salim Ali Centre for Ornithology & Natural History
S.D. : Sustainable Development
S.I.C.O.M. : Society for Integrated Coastal Management
S.O.E.R. : State of Environment Report
S.T.P. : Sewage Treatment Plants
T&E : Trade & Environment
T.E.G. : Thematic Expert Group
T.B.G.R.I. : Tropical Botanical Garden and Research Institute
U.N.C.C.D. : United Nations Convention to Combat Desertification
U.N.E.P. : United National Environment Programme
U.N.F.C.C.C. : United Nationals Framework Convention on Climate Change
VIG : Vigilance
W&RC : Wetland and Ramsar Convention
W.G.E.E.P. : Western Ghat Ecology Expert Panel
Z.S.I : Zoological Survey of India

ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE (DIVISIONS UNDER FORESTRY & WILDLIFE SECTOR)

As on January , 2015



ABBREVIATIONS

C.C.	: Climate Change
C.I.T.E.S.	: Convention on International Trade on Endangered Species
C.Z.A.	: Central Zoo Authority
D.F.E.	: Directorate of Forests Education
E.A.P.	: Externally Aided Projects
F.A.P.	: Forestry Action Plan
F.C.	: Forest Conservation
F.I.C.	: Forest International Cooperation
F.P.	: Forest Policy
F.P.D.	: Forest Protection Division
F.S.I.	: Forest Survey of India
I.C.F.R.E.	: Indian Council of Forestry Research and Education
I.F.S.	: Indian Forest Service
I.G.N.F.A.	: Indira Gandhi National Forests Academy
I.I.F.M.	: Indian Institute of Forests Management
I.P.I.R.T.I.	: Indian Plywood Industries Research and Training Institute
J.F.M.	: Joint Forest Management
N.A.E.B.	: National Afforestation & Eco-development Board
N.E.	: North Eastern
N.F.A.P.	: National Forestry Action Programme
N.F.C.	: National Forest Commission
N.E .	: North Eastern
N.F.A.P.	: National Forestry Action Programme
N.F.C.	: National Forest Commission
N.T.C.A.	: National Tiger Conservation Authority
N.Z.P.	: National Zoological Park
P.E.	: Project Elephants
P.T.	: Project Tigers
ROHQ	: Regional Office Head Quarter
R.Os	: Regional Offices
R.T.	: Research & Training
S.U .	: Survey & Utilization
S.F.A.	: Standard Financial Annex
W.H.C .	: World Heritage Convention
W.I.I.	: Wildlife Institute of India
W.L.	: Wildlife

Annexure-III

Regional Offices of the Ministry of Environment, Forests & Climate Change

S. No.	Regional Office	Phone and Fax Number	Jurisdiction of the Regional Offices
1.	Shri Amarnatha Shetty, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (SZ), Kendriya Sadan, 4th Floor, E&F Wings, 17th Main Road, Koramangala II Block, Bangalore - 560034	Ph. No. 080-25537184, 25537180 Fax No. 080-25537184, 25635901 Email: rosz.bng-mef@nic.in	Karnataka, Kerala, Goa and Lakshadweep
2	Shri Lakhwinder Singh, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, E-5 Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal - 462016	Ph. No. 0755-2465054, 2465496, 2466525 Fax No. 0755-2302432, 2463102 Email: rowz.bpl-mef@nic.in	Dadra & Nagar Haveli, Daman, Gujarat and Madhya Pradesh
3	Dr. Tejinder Singh, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change,, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar – 751023	Ph. No. 0674-2301213, 2302432 Fax No. 0674-2302432 Email: roez.bsr-mef@nic.in	Orissa and West Bengal
4	Shri K.S. Reddy, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (SEZ), Ist and IInd Floor, Handloom Export Promotion Council, 34, Cathedral Garden Road, Nungambakkam, Chennai - 34	Ph. No. 044-28222325 Email: roefccc@gmail.com	Andhra Pradesh, Telangana, Tamil Nadu, Puducherry and Andman & Nicobar Island
5	Shri Harsh Mitter, IFS Addl. Principal Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg, Chandigarh - 160030	Ph. No. 0172-2638135 Fax No. 0172-2638061, 2664589, 2624994, 2638995 Email: ronz.chd-mef@nic.in	Chandigarh, Haryana, J&K and Punjab

S. No.	Regional Office	Phone and Fax Number	Jurisdiction of the Regional Offices
6.	Shri Ajay Kumar, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (NCZ), Pearson Road, P.O. New Forest, Forest Research Institute (FRI) Campus, Dehradun - 248006.	Ph. No. 0135-2750809, 2753010 Email: moef.ddn@gmail.com	Himachal Pradesh & Uttrakhand
7.	Shri D. P. Sinha, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change,, Regional Office (CZ), Kendriya Bhawan, 5th Floor, Sector "H", Aliganj, Lucknow - 226020	Ph. No. 0522-2324025, 2323850, 2763559 Fax No. 0522-2326696, 2324025 Email: rocz.lko-mef@nic.in	Delhi, Rajasthan and Uttar Pradesh,
8.	Regional Office, Ministry of Env., Forest and Climate Change, Regional Office (WCZ), Nagpur	Address same as RO (WZ), Bhopal	Chhattisgarh and Maharashtra
9.	Shri A. N. Sharan, IFS Addl. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (ECZ), Bungalow No. A-2, Shyamali Colony, Ranchi - 834002	Ph. No. 0651-2410007, 2410002 Email: ro.ranchi-mef@gov.in	Bihar and Jharkhand
10.	Dr. Anil Kumar, IFS Add. Principal Chief Conservator of Forests (C), Ministry of Env., Forest and Climate Change, Regional Office (NEZ), Law-U-Sib, Lumbatngen, Near MTC Workshop, Shillong	Ph. No. 0364-2537609 /7340/7395/7278 Fax No. 0364-2536041 Email: ronez.sng-mef@nic.in	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura

Annexure-IV

List of Projects Sanctioned during 2014-15

Environment Research Programme (EnvRP)

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Organization
1.	Genetic diversity of heavy metal resistant endophytic fungi from Easternghats and their application for restoration of contaminated sites".	Dr. T. Vijaya, Associate Professor, Department of Botany, Sri Venkateswara University, Tirupati-517 502, Andhra Pradesh.
2.	Comparative study of ESBL producing and PMQR E.coil and K.pneumoniae from purified tap water and unpurified samples of Yamuna".	Prof. Arif Ali, Dept. Of Biosciences Jamia Millia Islamia, New Delh-25.
3.	Development of efficient processes for biomethanation and bioremediation of cassava sago effluent by nitrogen amendments and Spirulina cultivation under HRAP system for safe recycling."	Dr. K. Kumar, Department of Agricultural Microbiology, Tamil Nadu Agricultural University, Coimbatore-641 003.

Ecosystem Research Programme (EcRP)

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
1.	Effect of plant invasion on biodiversity and forest regeneration in fragmented mountain ecosystems	Dr. Irfan Rashid, Department of Botany, University of Kashmir, Srinagar – 190 006 J&K
2.	Reproductive biology of Scleractinian corals in Andaman and Nicobar Islands	Dr. C. Raghunathan, Scientist-C, Zoological Survey of India, Andaman and Nicobar Regional Centre, Port Blair-744102
3.	Monitoring of biomass stocks and forest community structures in temperate zone of Western Himalya	Dr. Rajesh Thadani, Centre for Ecology, Development & Research, Dehradun
4.	Assessment of population structure, phenology and natural regeneration of Pterocarpus santalinus- endemic endangered and exploited tree species of Southern Eastern Ghats	Dr. M. Sridhar Reddy, Asst. Prof. Dept. of Environmental Sciences, Yogi Venmana University, Kadapa, AndhraPradesh – 516003.

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
5.	Aquatic fungal diversity of the hill-streams of Himachal Pradesh Monographic study and its in-vitro screening for Lignocellulolytic Enzymes	Dr. I.B. Prasher, Deptt. of Botany, Panjab University, Chandigarh.
6.	Foraging ecology and habitat use of wading birds and shorebirds in the mangrove ecosystem of the Andaman islands	Dr. C. Sivaperuman, Zoological Survey of India, Andaman and Nicobar Regional Centre Haddo, Port Blair-744102 Andaman Islands.
7.	Understanding the ecosystem service of pollination in a fragmented seasonal cloud forest in the Western Ghats of Maharashtra	Prof. Renee M. Borges, Centre for Ecological Science, Indian Institute of Science, Banglore-560012
8.	Study of Plant Diversity of Udaipur wetland of West Champaran and its water quality with Conservation being the objective	Dr. R. N. Yadava, Head Botany Department, Ram Lakhan Singh Yadav College, Bettiah-845438, West Champaran, Bihar
9.	Genetic Diversity analysis and conservation of Threatened Salvadora oleoides	Dr. Maneesh Singh Bhandari, Division of Genetics and Tree propagation, Forest Research Institute, Dehradun-248006
10.	Diversity of benthic communities and their response to organic carbon sedimentation in the Vembanad estuary, a tropical Ramsar site in Kerala, India	Dr. V. Salom Gnana Thanga, Department of Environmental Sciences, University of Kerala, Kariavattom-695581
11.	Assessment of Anthropogenic pressure and its impact on Forest and Grassland Ecosystem of Dachigam National Park, J&K India	Dr. Azra Musavi, Department of Economics, Aligarh Muslim University, Aligarh
12.	Assessing the Floristic Diversity and Ecosystem values of selected High altitude wetlands of Indian Trans Himalaya	Dr. K. Chandra Sekar, Biodiversity Conservation and Management Theme, G. B. Pant Institute of Himalayan Environment & Development, Kosi–Katarmal, Almora – 263 643, Uttarakhand, India

National Natural Resource Management System (NNRMS) Scheme

Sl. No.	Title of the Project & Name of Institute
1.	"Natural Resources Assessment of selected Eco-Tourism sites of Gujarat and its associated environments using remote sensing and GIS" M.G. Science Institute, Ahmedabad
2.	"An ecosystem approach for management of Bhindawas and Khaparwas Wetlands, Haryana using geospatial techniques" Centre for Disaster Management, Guru Govind Singh Indraprastha University, New Delhi
3.	"Study of Si fluxes and Nutrient inputs across the Vellar River Basin in the East Coast of India and Assessment of their impacts on Coastal Resources – A Geo-Biochemical Approach (SINUIA)" Department of Earth Sciences, Annamalai University, Tamil Nadu

Annexure-V

A list of Ongoing Forestry Projects with external financial assistance

Sl. No.	Name of the Project	Date of Loan Agreement	Implementing Agency/ State	Loan Amount (in ₹ Crores)	Funding Agency
1.	Assam Project on Forest and Bio-diversity Conservation	Feb 22, 2012	Assam	329.40	French Development Agency
2.	West Bengal Forestry and Biodiversity Conservation Project	March 29, 2012	West Bengal	344.37	Japan International Co-operation Agency(JICA)
3.	Rajasthan Forestry and Biodiversity Project (Phase-II)	June 16, 2011	Rajasthan	884.77	Japan International Co-operation Agency(JICA)
4.	Tamil Nadu Biodiversity Conservation and Greening Project	February 17, 2011	Tamil Nadu	469.62	Japan International Co-operation Agency(JICA)
5.	Sikkim Biodiversity Conservation and Forest Management Project	March 31, 2010	Sikkim	280.41	Japan International Co-operation Agency(JICA)
6.	Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project	March 10, 2008	Uttar Pradesh	468.24	Japan International Co-operation Agency(JICA)
7.	Gujarat Forestry Development Project – Phase II	March 30, 2007	Gujarat	695.27	Japan International Co-operation Agency(JICA)
8.	Tripura Forest Environmental Improvement and Poverty Alleviation Project	March 30, 2007	Tripura	306.54	Japan International Co-operation Agency(JICA)

Sl. No.	Name of the Project	Date of Loan Agreement	Implementing Agency/ State	Loan Amount (in ₹ Crores)	Funding Agency
9.	Swan River Integrated Watershed Management Project	March 31, 2006	Himachal Pradesh	140.28	Japan International Co-operation Agency(JICA)
10.	Orissa Forestry Sector Development Project	March 31, 2006	Orissa	559.71	Japan International Co-operation Agency(JICA)
11.	Tamil Nadu Afforestation project phase-II	March 31, 2005	Tamil Nadu	409.08	Japan International Co-operation Agency(JICA)
12.	Uttarakhand Forest management Project	April 11, 2014	Uttarakhand	682.03	Japan International Co-operation Agency(JICA)
13.	Karnataka Forest Management Biodiversity Conservation	March 31, 2005	Karnataka	633.70	Japan International Co-operation Agency(JICA)

Annexure-VI

List of Projects Completed during 2014-15

Environment Research Programme (EnvRP)

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Organization
1.	Atmospheric Deposition of Nitrogen and Productivity of Winter Cereal Crops in North East India	Dr. Bhagawan Bharali, Department of Crop Physiology, Assam Agricultural University, Jorhat-785015, Assam.
2.	Studies on heavy Metal Contamination vis-à-vis Environmental Health in Peri-Urban Areas of Kolkata.	Prof. Sankar Prasad Bhattacharya, Community for Social Work, 84, Rabindrapally Shyan Nagar, West Bengal-743127.
3.	Development of Molecular markers for the identification of Biological forms of Anopheles stephensi prevalent in arid areas of Rajasthan.	Dr. Karam V. Singh, Desert Medicine Research Centre, Indian Council of Medical Science, New Pali Road, Jodhpur-342005.
4.	Cellular/molecular mechanisms involved for arsenic detoxification and tolerance in rice and Indian mustard varieties	Dr. Meetu Gupta, Deptt. of Biosciences, Jamia Millia Islamia, New Delhi-110025.
5.	Monitoring the influence of outdoor vehicular pollutants concentration on indoor air quality of the buildings located close to urban roadway.	Dr. S.M. Shiva Nagendra, Department of Civil Engg., Indian Institute of Technology Madras, Chennai, Tamilnadu-600036.
6.	Degradation of aqueous organic pollutants by novel advanced oxidation technology combining non thermal plasma and Heterogeneous catalysts.	Dr. Ch. Subrahmanyam, National Institute of Technology Deptt. of Chemistry, Hyderabad.
7.	Persistent Organic Pollutants (POPs) in Sediments and Food Web of Tropical Mangrove Ecosystem at Pichavaram, South India.	Dr. T. Jeyakumar, Chemistry Section FEAT, Annamalai University, Annamalainagar-608 002, Tamil Nadu.
8.	Removal of SO2 and NOx from coal-fired thermal power plant stack gases.	Dr. M.K. Mondal, Development of Chemical Engineering & Technology, Banaras Hindu University, Varanasi, Uttar Pradesh.

Ecosystem Research Programme (EcRP)

Sl. No.	Title of the project	Name of Principal Investigator (PI) & Organization
1.	All India Coordinated Research Project on Reproductive Biology of Four Rare Endangered and Threatened (RET) Tree species of Central and Western Himalaya"	Dr. A.K. Bhatnagar, Department of Botany, University of Delhi
2.	All India Coordinated Research Project on Reproductive Biology of Four Rare Endangered and Threatened (RET) Tree species of Andhra Pradesh	Dr. A. J. Solomon Raju, Associate Professor & Head, Department of Environmental Science, Andhra University, Waltair, Visakhapatnam-530003.
3.	All India Coordinated Research Project on Reproductive Biology of Rare Endangered and Threatened (RET) Tree of Rajasthan	Dr. Rajesh Tandon, Department of Botany, University of Delhi, Delhi-110 007
4.	All India Coordinated Research Project on Reproductive Biology of Four Rare Endangered and Threatened (RET) Tree species in Kashmir Himalaya	Prof. A.H. Munshi, Prof. of Botany and Coordinator P.G Course in Bioresources, Department of Botany, University of Kashmir, Sringaga-190 006, Kashmir
5.	All India Coordinated Research Project on Reproductive Biology of Four Rare Endangered and Threatened (RET) Tree species of Jammu province of J & K state	Dr. Namrata Sharma, Associate Professor, Deptt. of Botany, University of Jammu, Jammu-180006
6.	All India Coordinated Research Project on Reproductive Biology of Four Rare Endangered and Threatened (RET) Tree species of North East India particularly in Arunachal Pradesh and Meghalaya	Prof. N. Venugopal, Professor, Centre for Advanced Studies, NEHU, Shillong-793022.
7.	All India Coordinated Research Project on Reproductive Biology of Four Rare Endangered and Threatened (RET) Tree species of Central and Western Himalaya	Dr. V. Sivaram, Reader in Botany, Bangalore University,Bangalore-560 056
8.	All India Coordinated Research Project on Reproductive Biology of Rare Endangered and Threatened (RET) Tree species of Western Ghats of Karnataka	Dr. R.K. Somashekhar, Department of Environmental Sciences, Bangalore University, Bangalore-560 056
9.	Taxonomy and Ecology of the Himalayan Genus Oxytropis DC (Leguminioseae) in India	Dr. L.B. Choudhury, NBRI, Rana Pratap Marg, Lucknow- 226 001 (UP)

Sl. No.	Title of the project	Name of Principal Investigator (PI) & Organization
10.	Taxonomy, Biodiversity and Habitat Association of Noctuid Moths Lepidoptera: Noctuidae in various conifer forests of Himachal Pradesh	Dr. Pawan Kumar, Scientist-B, Himalayan Forest Research Institute (ICFRE), conifer Campus, Panthaghati, Shimla (H.P.)- 171009

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

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Organization
1.	Distribution of Benefits and Costs among Stakeholders of a Protected area: an empirical study of Great Himalayan National Park (GHNP) in Kullu, Himachal Pradesh	Dr.R.S. Prasher, Dr.Y.S.Parmar University of Horticulture and Forestry, Nauni-Solan, Himachal Pradesh

National Natural Resource Management System (NNRMS) Programme

Sl. No.	Title of the Project & Name of Institute
1.	Habitat characterization at landscape level with special emphasis on Geobotanical Analysis at Achanakmar-Amarkantak Biosphere Reserve Remote Sensing & GIS Centre, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (M.P.)– 485 331.

Annexure-VII

List of wetlands of International Importance from India under Ramsar Convention

S. No	Name of Wetland	State	Date of declaration
1.	Chandrataal	H.P.	08.11.05
2.	Renuka	H.P.	08.11.05
3.	Rudrasagar	Tripura	08.11.05
4.	Uppar Ganga	U.P.	08.11.05
5.	Hokarsar	J&K	08.11.05
6.	Surinsar - Mansar	J&K	08.11.05
7.	Bhitarkanika Mangroves	Odisha	19.08.02
8.	Bhoj Wetland	Madhya Pradesh	19.08.02
9.	Deepor Beel	Assam	19.08.02
10.	East Calcutta Wetlands	West Bengal	19.08.02
11.	Kolleru Lake	Andhra Pradesh	19.08.02
12.	Sasthamkotta Lake	Kerala	19.08.02
13.	Ashtamudi	Kerala	19.08.02
14.	Tsomoriri	Jammu & Kashmir	19.08.02
15.	Vembanad-Kol Wetland	Kerala	19.08.02
16.	Point Calimere Sanctuary	Tamil Nadu	19.08.02
17.	Pong Dam Lake	Himachal Pradesh	19.08.02
18.	Kanjli	Punjab	22.01.02
19.	Ropar	Punjab	22.01.02
20.	Harike Lake	Punjab	23.03.90
21.	Loktak Lake [MR]	Manipur	23.03.90
22.	Sambhar Lake	Rajasthan	23.03.90
23.	Wular Lake	Jammu & Kashmir	23.03.90
24.	Chilika Lake	Orissa	01.10.81
25.	Keoladeo National Park [MR]	Rajasthan	01.10.81

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