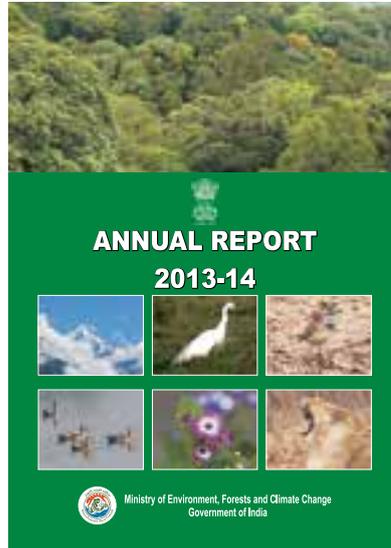




# ANNUAL REPORT 2013-14



(<http://moef.gov.in>)



**Ministry of Environment, Forests and Climate Change  
Government of India**

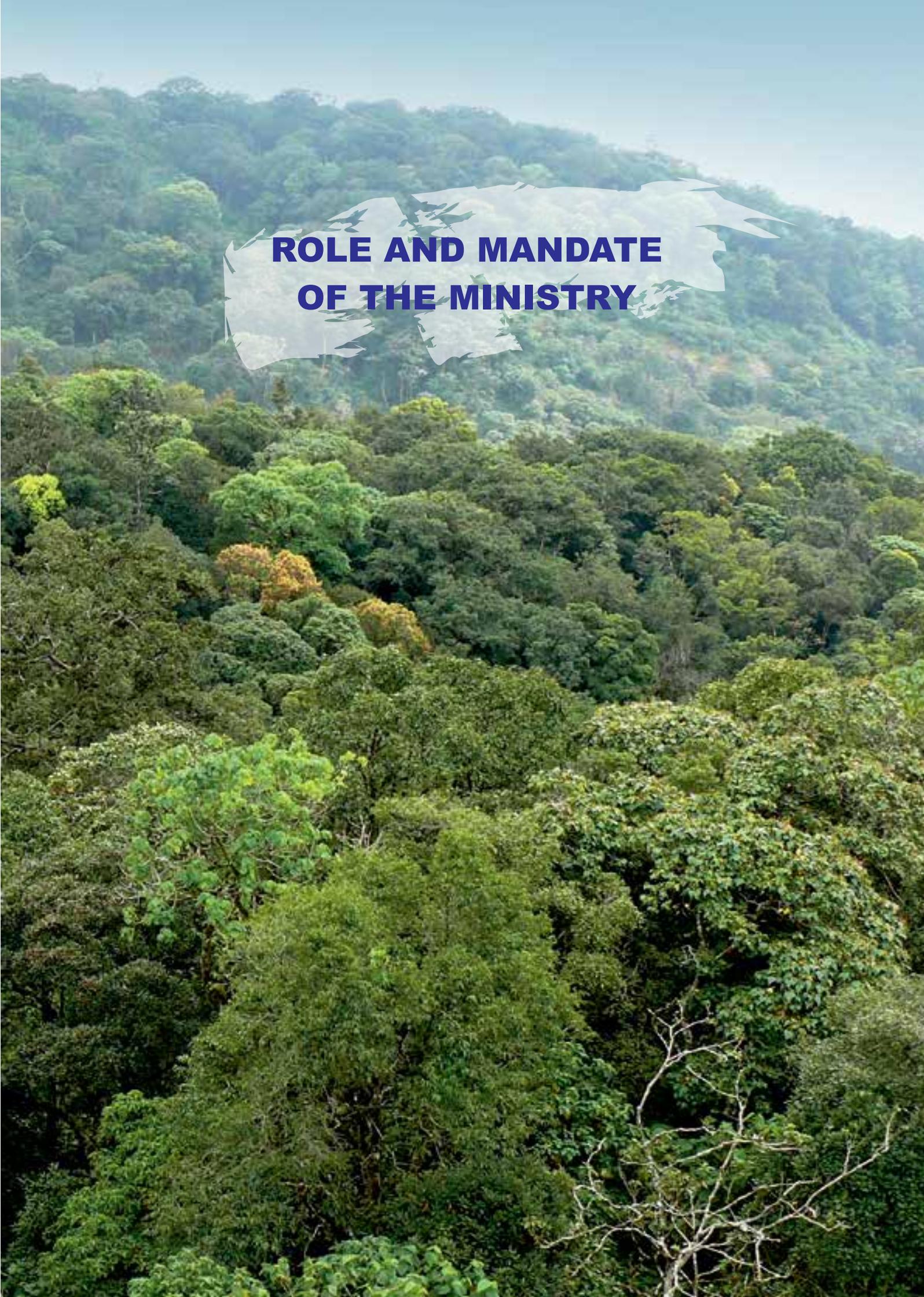






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An aerial photograph of a vast, dense tropical forest. The trees are mostly green, with some patches of yellow and orange, suggesting a dry season or specific tree species. The forest covers rolling hills and valleys. A white, torn-paper-like graphic is overlaid in the upper center, containing the text.

# **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 the environment, and
- Ensuring the welfare of animals.

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





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

## Mandate of the Ministry

### Allocation of Business

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



- Andaman and Nicobar Islands Forest and Plantation Development Corporation Limited.
- Prevention of Cruelty to Animals.
- Matters relating to pounds and cattle trespass.
- Gaushalas and Gausadans.
- The Prevention of Cruelty to Animals Act, 1960 (59 of 1960).
- The National Environment Tribunal Act, 1995 (27 of 1995).
- The National Environment Appellate Authority Act, 1997 (22 of 1997).
- The Water Prevention and Control of Pollution Act, 1974 (6 of 1974).
- The Water (Prevention and Control of Pollution) Cess Act, 1977 (36 of 1977).
- The Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981).
- The Indian Forest Act, 1927 (16 of 1927).
- The Wildlife (Protection) Act, 1972 (53 of 1972).
- The Forest (Conservation) Act, 1980 (69 of 1980).
- The Environment (Protection), Act, 1986 (29 of 1986).
- The Public Liability Insurance Act, 1991 (6 of 1991).

**CHAPTER-1**  
**NATURAL RESOURCES -**  
**SURVEY AND EXPLORATION**



## Survey of Flora

### Botanical Survey of India

#### Introduction

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

#### Primary objectives of BSI

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

#### Secondary objectives

- Revisionary/Monographic studies on selected plant groups.
- Qualitative analysis of nutritive value of ethno-food plants and other economically useful species.
- Capacity building in plant taxonomy through refresher courses and post M.Sc. certificate course.



**Fig-1.** Water Lilly (*Nelumbo nucifera*)

- Environment Impact Assessment of areas assigned to BSI for study.
- Develop and maintain Botanical Gardens, Museums and Herbaria.
- Preparation of Seed, Pollen and Spore Atlas of Indian Plants.

#### Activities undertaken so far

- Survey and exploration of about 70 per cent of the total geographical areas of the country has been completed for vascular plants. This has resulted into a Repository of over three million National Reference Collections of plant specimens with 19100 type specimens.
- One new family, 36 new genera and 1,104 new species, subspecies, varieties have been discovered as new to science.
- Inventorying of about 1,700 Rare, Endangered and Threatened (RET) species.
- Live collection of over 1.5 lakh plants in Indian Botanic Garden, Botanic Garden of Indian Republic and associated botanic gardens and National Orchidaria of regional offices.



- Flowering plants of 7 Biosphere Reserves, 32 National Parks and 23 Tiger Reserves have been documented till date.
- EIA studies on the impact of over 100 developmental projects on flora have been completed.
- Traditional knowledge, on plants, associated with all tribes belonging to 41 districts of Bihar Jharkhand, Karnataka, Orissa and Rajasthan, and over 114 tribes belonging to Andaman & Nicobar, Andhra Pradesh, Arunachal Pradesh, Assam, Jammu & Kashmir, Madhya Pradesh, Chhattisgarh, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttaranchal and West Bengal have been documented. 17 books of Ethnobotany have been published by BSI till date.
- Over 110 research scholars have been trained in different aspects of plant systematics, leading to the award of Doctorate degree by various Indian Universities.
- Over 3 million herbarium specimens of India & nearly 2 lakhs of them from different adjoining countries and rest of the World in 12 internationally recognized herbaria. These includes 16 thousand type specimens (original material based on species new to science and
- Over 18 thousand exhibits, tannins, dyes, oils, fibres, timbers, medicinal, beverages, vegetables, food, and tribal artifacts in Kolkata and all Research Centres.
- Publications made so far
  - Flora of India series 1: Flora of India (9 vols.); Fascicles of Flora of India (24 vols.).
  - Flora of India series 2: State/UT Flora [complete for 16 States/UTs (29 vols.), partially complete for 9 states (12 vols.)].
  - Flora of India series 3: District (26) Flora (34 vols.).
  - Flora of India series 4: Red Data Book of Indian Plants and Red List species of India (5 vols.) and 140 titles dealing with various thematic topics related to Indian flora.
  - Periodicals: 'Records of the Botanical Survey of India' (23 vols.); 'Bulletin of the Botanical Survey of India' (55 vols.); *Vanaspati Vani* (22 vols.) and ENVIS Newsletter (18 vols.).

## Progress/achievements made during the year (up to Dec., 2013)

### A. Botanical Exploration & Inventorisation of Plant diversity

#### Field tours and Herbarium consultation tours

Seventy Five field tours for collection of plant specimens/materials for floristic, ethnobotanical and pharmacognostical studies on flowering and non-flowering plants were undertaken by different regional centre and units of BSI covering the following regions, including four biodiversity hotspot, viz. the Himalaya, the Indo-Burma, Sundaland and the Western Ghats-Sri Lanka. These include 26 protected areas and 07 Sacred Groves. In addition, 09 tours for the collections of live germplasm were also undertaken in these areas.

- **Western Himalaya:** Uttarakhand (*in and around Sonanadi Wildlife Sanctuary, Namik and Hiramani glacier valleys, Pithoragarh, Kumaon*);
- **Eastern Himalaya:** Arunachal Pradesh (*Lohit district, Changlang district and Kamlang Wildlife Sanctuary*); Sikkim (*Shingba Rhododendron Sanctuary and*

- different areas of North Sikkim & South Sikkim);
- **North-East India:** Assam (*Laokhowa Wildlife Sanctuary*); Mizoram (*Murlen National Park*);
  - **Arid – Semi Arid:** Haryana (*Sultanpur National Park and Kalesar National Park*); Gujarat (*Shoolpaneshwar Wildlife Sanctuary, Dang District*); Rajasthan (*Jamwa Ramgarh Wildlife Sanctuary*);
  - **Gangetic Plains:** Uttar Pradesh (*Upper Ganga Ramsar Site*); Bihar & Jharkhand (*Koderma Wildlife Sanctuary, Palkot Wildlife Sanctuary, Gautam Buddha Wildlife Sanctuary, Vikramshila Gangetic Dolphin wildlife Sanctuary, Rajmahal hills, Pakur, Godda, Sahibganj, Dumka and Deogarh districts*); West Bengal (*Buxa Wildlife Sanctuary, Jaldapara Wildlife Sanctuary*); Orissa (*Koraput, Jajpur and Balasore*);
  - **Deccan Peninsula:** Chattisgarh (*Surguja & Korba area*); Andhra Pradesh (*Mamillapalli and Maddimadugu sections of Kadapa range of Seshachalam Biosphere Reserve, Amarabad, Mannanur, Achampet and Lingal ranges of Achampet division of Nagarjunasagar Srisaillam Wildlife Sanctuary*);
  - **Western Ghats:** Maharashtra (*Koyana Wildlife Sanctuary, Chandoli Wildlife Sanctuary for ferns, Junnar, Harishchandragarh, Ganesh kind, Karzat, Matheran, Sanjay Gandhi National Park, Alibag and Phansad Wild Life Sanctuary for follicolous fungi*); Karnataka (*Sharavathi valley Wildlife Sanctuary, Shimoga and Biligirirangaswamy Temple Wildlife Sanctuary*); Tamil Nadu (*Srivilliputhur Wildlife Sanctuary*);
  - **Coastal Region:** Kerala (*Coastal area and Malabar Wildlife Sanctuary*);
  - **Andaman & Nicobar Islands:** S. Andaman (*Rani Jhansi Marine National Park*);

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

During these field tours, 9,541 (incl. 1976 of non-flowering plants) specimens were collected, out of which 8,204 specimens were identified into 4,201 species, subspecies and varieties. This resulted into the discovery of 28 species and 01 variety as new to science; 39 species and 01 subspecies as new to India and 122 new distributional records for different geographic regions/ states.

#### **Plants collected after more than 50 years**

- ***Dendrobium treutleri*** (Hook.f.) Schuit. & Peter B.Adams (Orchidaceae) was collected from Dullong Reserve Forest, Lakhimpur district, Assam in 2012 after a lapse of 122 years after its first collection in 1890 by Treutler from Sikkim. The species is introduced and growing in botanical garden of BSI/ERC/Shillong.
- ***Salix obscura*** Andersson (Salicaceae) has been collected from Lachung Valley in North Sikkim in 2006 and again in 2008 after a gap of nearly 121 years since its



**Fig-2.** *Bergenia ciliata*

## New Discoveries (New to science)

### Species/Varieties (Angiosperms – 20; Lichen – 1; Fungi – 8)

<i>Caloplaca gyrophorica</i> Jagadeesh, Y. Joshi & G.P. Sinha .....	Teloschistaceae
<i>Chrysoplenium arunachalense</i> M. Bhaumik .....	Saxifragaceae
<i>Colocasia boyceana</i> R. Gogoi & S. Borah .....	Araceae
<i>Colocasia dibangensis</i> R. Gogoi & S. Borah .....	Araceae
<i>Colocasia lihengiae</i> R. Gogoi & S. Borah .....	Araceae
<i>Eragrostis collinensis</i> C.P. Vivek, G.V.S. Murthy & V.J. Nair .....	Poaceae
<i>Eragrostis minor</i> Host var. <i>rajasthanensis</i> C.P. Vivek, G.V.S. Murthy & V.J. Nair .....	Poaceae
<i>Eriocaulon kannureense</i> Sunil et al. ....	Eriocaulaceae
<i>Galium kulluense</i> An. Kumar, Ranjan & S.C. Srivastava .....	Rubiaceae
<i>Impatiens lohitenensis</i> Gogoi & Borah .....	Balsaminaceae
<i>Inonotus rywardenii</i> J. R. Sharma and D. Mishra .....	Hymenochaetaceae
<i>Kamalomyces mahabaleshwariensis</i> R. Dubey & A.M. Neelima .....	Tubeufiaceae
<i>Lemna landoltii</i> Halder & Venu .....	Lemnaceae
<i>Macrosolen andamanensis</i> Lal Ji Singh .....	Loranthaceae
<i>Muhlenbergia rakchamesis</i> . S. Arumugam, G.V.S. Murthy & V.J. Nair .....	Poaceae
<i>Musa indandamanensis</i> Lal Ji Singh .....	Musaceae
<i>Musa markkui</i> R. Gogoi & S. Borah .....	Musaceae
<i>Musa puspanjaliae</i> R. Gogoi & Hakkinen .....	Musaceae
<i>Poronia radicata</i> M.E. Hembrom, A. Parihar & K. Das .....	Xylariaceae
<i>Pternopetalum arunachalense</i> M. Bhaumik & P. Satyanar. ....	Apiaceae
<i>Russula dubdiana</i> K. Das, Atri & Buyck .....	Russulaceae
<i>Russula sharmae</i> K. Das, Atri & Buyck .....	Russulaceae
<i>Russula sikkimensis</i> K. Das, Atri & Buyck .....	Russulaceae
<i>Sonerila veldkampiana</i> , Ratheesh et al. ....	Melastomataceae
<i>Stachybotrys citri</i> R. Dubey & A.K. Pandey .....	Dematiaceae
<i>Striga scottiana</i> Jeeva, Shyn. Brintha & Rasingam .....	Scrophulariaceae
<i>Strobilomyces sikkimensis</i> K. Das .....	Boletaceae
<i>Toxicodendron bimannii</i> Barbhuiya .....	Anacardiaceae
<i>Volutella rauwolfii</i> R. Dubey & A.K. Pandey .....	Dematiaceae

#### **New records for India (Species / Varieties)**

<i>Acarocybellina arengae</i> (Matsush.) Subram .....	Ascomycota
<i>Acrolejeunea pusilla</i> (Steph.) Grolle & Gradst. ....	Lejeuneaceae
<i>Argostemma timorense</i> Miq. ....	Rubiaceae
<i>Centratherum punctatum</i> Cass. subsp. <i>punctatum</i> .....	Asteraceae
<i>Ceratostylis radiata</i> J.J. Sm. ....	Orchidaceae
<i>Cololejeunea chenii</i> Tixer .....	Lejeuneaceae
<i>Cololejeunea pluridentata</i> P.C. Wu & J.S. Lou .....	Lejeuneaceae
<i>Cordia boissieri</i> A. DC. ....	Boraginaceae
<i>Cyrtosia nana</i> (Rolfe ex Downie) Garay .....	Orchidaceae
<i>Dendrophthoe glabrescens</i> (Blakely) Barlow .....	Loranthaceae
<i>Galium asperifolium</i> var. <i>lasiocarpum</i> W.C. Chen .....	Rubiaceae
<i>Gastrodia javanica</i> (Bl.) Lindl. ....	Orchidaceae
<i>Hymenochaete murina</i> Bres .....	Hymenochaetaceae
<i>Ichnanthus pallens</i> (Sw.) Munro ex Benth. ....	Poaceae
<i>Inocutis texana</i> (Murrill) S. Martínez .....	Hymenochaetaceae
<i>Inonotus juniperinus</i> Murrill .....	Hymenochaetaceae
<i>Inonotus obliquus</i> (Ach. ex Pers.) Pilát .....	Hymenochaetaceae
<i>Inonotus ochroporus</i> (Van der Byl) Pegler .....	Hymenochaetaceae
<i>Inonotus porrectus</i> Murrill .....	Hymenochaetaceae
<i>Inonotus tamaricis</i> (Pat.) Maire .....	Hymenochaetaceae
<i>Juncus kangdingensis</i> K.F. Wu .....	Juncaceae
<i>Juncus longiflorus</i> (A. Camus) Noltie .....	Juncaceae
<i>Juncus milashanensis</i> A. M. Lu & Z. Y. Zhang .....	Juncaceae
<i>Juncus setchuensis</i> Buchenau .....	Juncaceae
<i>Mutinus bambusinus</i> (Zoll.) E. Fisch. ....	Phallaceae
<i>Ornithochilus yingjiangensis</i> Z. H. Tsi .....	Orchidaceae
<i>Pavetta glenei</i> Hook. f. ....	Rubiaceae
<i>Phallus atrovovatus</i> Kreisel & Calonge .....	Phallaceae



<i>Phellinus calcitratus</i> (Berk. & Curt.) Ryv.....	Hymenochaetaceae
<i>Phellinus sanctigeogii</i> (Pat.) Ryv.....	Hymenochaetaceae
<i>Physopella hiratsukae</i> (Syd.) Cummins & Ramachar .....	Dematiaceae
<i>Pseudolepicolea fryei</i> (Pers.) Grolle & Ando .....	Pseudolepicoleaceae
<i>Radula retroflexa</i> Taylor.....	Radulaceae
<i>Rubus cooperi</i> D.G. Long .....	Rosaceae
<i>Rubus polyodontus</i> Hand.-Mazz. ....	Rosaceae
<i>Rubus quinquefoliolatus</i> T.T. Yu & L.T. Lu.....	Rosaceae
<i>Streblus elongatus</i> (Miq.) Corner. ....	Moraceae
<i>Tylophilus pseudoscaber</i> (Secretan) Smith & Thiers .....	Boletaceae
<i>Vernonia amygdalina</i> Delile.....	Asteraceae
<i>Vizellaole ariae</i> Swart .....	Ascomycetes

**New Record for Region / State**

**Himalayas**

<i>Cololejeunea nilgiriensis</i> G.Asthana & S.C.Srivast. ....	Lejeuneaceae
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**North Eastern Region**

<i>Brachiaria semiundulata</i> (Hochst.) Stapf.....	Poaceae
<i>Clelostoma tenuifolium</i> (L.) Garay .....	Orchidaceae
<i>Clerodendrum paniculatum</i> L.....	Verbenaceae
<i>Salix psilostigma</i> Andersson.....	Salicaceae

**Andaman & Nicobar Islands**

<i>Acriopsis liliifolia</i> (J.Koenig) Ormerod .....	Orchidaceae
<i>Apostasia wallichii</i> R. Br.....	Orchidaceae
<i>Cheilolejeunea trapezia</i> (Nees) Kachroo & R.M.Schust .....	Lejeuneaceae
<i>Cololejeunea floccosa</i> (Lehm. & Lindenb.) Schiffn. ....	Lejeuneaceae
<i>Cololejeunea latilobula</i> (Herzog) Tixier .....	Lejeuneaceae
<i>Cololejeunea planissima</i> (Mitt.) Abeyw.....	Lejeuneaceae
<i>Cololejeunea pseudoplagiophylla</i> P.C.Wu & J.S.Lou .....	Lejeuneaceae
<i>Cololejeunea udarii</i> G.Asthana & S.C.Srivast. ....	Lejeuneaceae
<i>Colura leratii</i> (Steph.) Steph.....	Lejeuneaceae
<i>Cosmostigma racemosum</i> (Roxb.)Wight.....	Asclepiadaceae
<i>Cryptostylis arachnites</i> (Blume) Hassk.....	Orchidaceae
<i>Dendrocnide sinuata</i> (Blume) Chew .....	Urticaceae
<i>Drepanolejeunea pentadactyla</i> (Mont.) Steph. ....	Lejeuneaceae
<i>Eleocharis acutangula</i> (Roxb.) Schult .....	Cyperaceae
<i>Frullanoides tristis</i> (Steph.) Slageren.....	Lejeuneaceae
<i>Laporteia interrupta</i> (L.) Chew .....	Urticaceae
<i>Lejeunea tuberculosa</i> Steph.....	Lejeuneaceae
<i>Lopholejeunea sikkimensis</i> Steph. var. <i>tenuicostata</i> SushilK.Singh & D.K.Singh.....	Lejeuneaceae
<i>Nephelaphyllum pulchrum</i> Blume .....	Orchidaceae
<i>Plagiochila himalayana</i> Schiffn. ....	Plagiochilaceae

**Arunachal Pradesh**

<i>Acanthocoleus gilvus</i> (Gottsche) Kruijt.....	Lejeuneaceae
<i>Asplenium obscurum</i> Blume .....	Aspleniaceae
<i>Clelostoma tenuifolium</i> (L.) Garay .....	Orchidaceae
<i>Colocasia lihengiae</i> C.L. Long & K.M.Liu .....	Araceae
<i>Drepanolejeunea pulla</i> (Mitt.) Grolle.....	Lejeuneaceae
<i>Dryopteris cochleata</i> (Buch.-Ham. ex D.Don) C.Chr. ....	Dryopteridaceae
<i>Frullania apiculata</i> (Reinw., Blume & Nees) Dumort. ....	Frullaniaceae
<i>Heteroscyphus coalitus</i> (Hook.) Schiffn.....	Lophocoleaceae
<i>Heteroscyphus flaccidus</i> (Mitt.) A. Srivast. & S.C. Srivast.....	Lophocoleaceae
<i>Impatiens siculifer</i> Hook.f. ....	Balsaminaceae
<i>Jackiella javanica</i> Schiffn. ....	Jackiellaceae
<i>Juncus amplifolius</i> A. Camus .....	Juncaceae
<i>Juncus articulatus</i> L. ....	Juncaceae
<i>Juncus benghalensis</i> Kunth.....	Juncaceae
<i>Juncus brachystigma</i> Sam. ....	Juncaceae
<i>Juncus cephalostigma</i> Sam. ....	Juncaceae
<i>Juncus chrysocarpus</i> Buchenau .....	Juncaceae
<i>Juncus clarkei</i> Buchenau.....	Juncaceae

<i>Juncus himalensis</i> Klotzsch .....	Juncaceae
<i>Juncus khasiensis</i> Buchenau.....	Juncaceae
<i>Juncus kingii</i> Rendle .....	Juncaceae
<i>Juncus leptospermus</i> Buchenau .....	Juncaceae
<i>Juncus leucanthus</i> Royle ex D. Don.....	Juncaceae
<i>Juncus nepalicus</i> Miyam. & H. Ohba .....	Juncaceae
<i>Juncus purpusillus</i> Sam.....	Juncaceae
<i>Juncus rohtangensis</i> Goel & Aswal .....	Juncaceae
<i>Juncus thomsonii</i> Buchenau.....	Juncaceae
<i>Juncus trichophyllus</i> W. W. Sm.....	Juncaceae
<i>Juncus uniflorus</i> W. W. Sm.....	Juncaceae
<i>Juncus wallichianus</i> J. Gay ex Laharpe .....	Juncaceae
<i>Juncus allioides</i> Franch.....	Juncaceae
<i>Lejeunea eifrigii</i> Mizut. ....	Lejeuneaceae
<i>Lejeunea pallide-virens</i> S. Hatt.....	Lejeuneaceae
<i>Lejeunea princeps</i> (Stephani) Mizut. ....	Lejeuneaceae
<i>Leptochilus decurrens</i> Blume forma <i>lanceolatus</i> .....	Polypodiaceae
<i>Lophocolea sikkimensis</i> Herzog & Grolle .....	Lophocoleaceae
<i>Luzula oligantha</i> Sam. ....	Juncaceae
<i>Microsorium zippelli</i> (Blume) Ching .....	Polypodiaceae
<i>Parakaempferia synantha</i> A. S. Rao & D. M. Verma .....	Zingiberaceae
<i>Plagiochila chinensis</i> Steph.....	Plagiochilaceae
<i>Plagiochila detecta</i> M. L. So & Grolle.....	Plagiochilaceae
<i>Plagiochila elegans</i> Mitt. ....	Plagiochilaceae
<i>Plagiochila parvifolia</i> Lindenb.....	Plagiochilaceae
<i>Porella caespitans</i> (Steph.) S. Hatt. ....	Porellaceae
<i>Porella acutifolia</i> (Lehm. & Lindenb.) Trevis.....	Porellaceae
<i>Porella obtusata</i> var. <i>macroloba</i> (Stephani) S. Hatt.....	Porellaceae
<i>Radula madagascariensis</i> Gottsche .....	Radulaceae
<i>Salix psilostigma</i> Andersson .....	Salicaceae
<i>Scapania ciliatospinosa</i> Horik .....	Scapaniaceae
<i>Scapania contorta</i> Mitt.....	Scapaniaceae
<i>Scapania ferruginea</i> (Lehm. & Lindenb.) Gottsche .....	Scapaniaceae
<i>Scapania ligulata</i> Steph. ....	Scapaniaceae
<i>Tricarpelema chinense</i> D. Y. Hong .....	Commelinaceae
<b>Assam</b>	
<i>Clerodendrum paniculatum</i> L.....	Verbenaceae
<b>Bihar</b>	
<i>Solanum diphyllum</i> L.....	Solanaceae
<i>Malva parviflora</i> L.....	Malvaceae
<i>Cyrtococcum patens</i> (L.)A. Camus.....	Poaceae
<b>Goa</b>	
<i>Gymnema khandalense</i> Santapau.....	Apocynaceae
<b>Gujarat</b>	
<i>Cissus elongata</i> Roxb. ssp. <i>elongata</i> Maina .....	Vitaceae
<b>Maharashtra</b>	
<i>Microlepis speluncae</i> (L.) T. Moore .....	Dennstaedtiaceae
<b>Mizoram</b>	
<i>Aglaia perviridis</i> Hiern.....	Meliaceae
<i>Brachiaria semiundulata</i> (Hochst.) Stapf.....	Poaceae
<i>Digitaria ischaemum</i> (Schreb.) Muhl. ....	Poaceae
<i>Digitaria violascens</i> Link.....	Poaceae
<i>Diplazium dilatatum</i> Blume .....	Athyriaceae
<i>Eragrostis curvula</i> (Schrad.) Nees.....	Poaceae
<i>Fissistigma bicolor</i> (Roxb.) Merr. ....	Annonaceae
<i>Lophatherum gracile</i> Brongn. ....	Poaceae
<i>Oplismenus burmanii</i> (Retz.) P. Beauv.....	Poaceae
<i>Phyrra leptostachya</i> L.....	Phrymaceae
<i>Selaginella ciliaris</i> (Retz.) Spring.....	Selaginellaceae
<i>Selaginella vaginata</i> Sprin.....	Selaginellaceae



<i>Setaria verticillata</i> (L.) P. Beauv.....	Poaceae
<i>Themeda arundinacea</i> (Roxb.) A. Camus .....	Poaceae
<i>Themeda caudata</i> (Nees ex Hook. & Arn.) A. Camus.....	Poaceae
<i>Vittaria zosterifolia</i> Willd. ....	Vittariaceae

**Nagaland**

<i>Pertusaria petrophyes</i> C. Knight .....	Pertusariaceae
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**Rajasthan**

<i>Tonospora sinensis</i> (Lour.) Merr. ....	Menispermaceae
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**Sikkim**

<i>Retiboletus ornatipes</i> (Peck) Binder & Bresinsky.....	Boletaceae
<i>Boletus rubripes</i> Thiers.....	Boletaceae
<i>Temnoma setigerum</i> (Lindenb.) R.M.Schust.....	Pseudolepicoleaceae
<i>Bzzania bidentula</i> (Steph.) Steph. ex Yasuda .....	Lepidoziaceae
<i>Dendrobazzania griffithiana</i> (Steph.) R.M.Schust. & W.B.Schofield.....	Lepidoziaceae
<i>Cephaloziella dentifolia</i> Udar & Ad. Kumar.....	Cephaloziellaceae
<i>Cephaloziella magna</i> Udar & V. Nath.....	Cephaloziellaceae
<i>Porella caespitans</i> (Steph.) S.Hatt. var. <i>caespitans</i> .....	Porellaceae
<i>Porella obtusata</i> (Taylor) Trevis. var. <i>macroloba</i> (Steph.) S.Hatt. & Zhang .....	Porellaceae
<i>Radula madagascarensis</i> Steph.....	Radulaceae
<i>Cololejeunea ceratilobula</i> (P.C.Chen) R.M.Schust.....	Lejeuneaceae
<i>Cololejeunea chenii</i> Tixier .....	Lejeuneaceae
<i>Cololejeunea serrulata</i> Steph.....	Lejeuneaceae
<i>Drepanolejeunea pulla</i> (Mitt.) Grolle.....	Lejeuneaceae

**Tamil Nadu**

<i>Dendrophthoe glabrescens</i> (Blakely) Barlow .....	Loranthaceae
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**Uttarakhand**

<i>Ceratocephala falcata</i> (L.) Pers.....	Ranunculaceae
<i>Galium asperifolium</i> var. <i>lasiocarpum</i> W.C. Chen .....	Rubiaceae
<i>Lindelfia longiflora</i> var. <i>levingii</i> (C.B. Clarke) Brand.....	Boraginaceae

**West Bengal**

<i>Pertusaria psoromica</i> A. W. Archer & Elix.....	Pertusariaceae
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last collection from Lachen by Robert Pantling in 1885. Prior to that, the species was originally collected from Lachen by Sir J.D. Hooker in 1849.

- ***Sonerila andamanensis*** Stapf & King (Melastomataceae) has been collected from Saddle Peak National Park in North Andaman in 1976, after a gap of nearly 92 years. It was again collected from Mt. Harriet National Park in South Andaman – the type locality of the species, in 1989. Prior to that the species was last collected from Mt. Harriet in 1884 by King's Collectors.

**B. Documentation of Plant Diversity**

**National Flora (Flora of India)**

Taxonomic description for 142 species of flowering plants (towards family

Memecylaceae & Bignoniaceae; subfamily Cyripedioideae; tribe Vernonieae; subtribe Habenarinae & Sporobolinae and genera *Fimbristylis*, *Festuca* & *Kobresia*) and 36 spp. of nonflowering plants (families Pertusariaceae, Graphidaceae, Hymenochaetaceae and genera *Athyrium*, *Lepisorus*) have been completed. The manuscript of 'Tribe Cercideae subtribe Bauhiniinae (Benth.) Walp.' was submitted for publication and that of subtribe 'Habenarinae in India' and 'Endemic Angiosperms of India' are being finalized.

**Regional/State/District Flora**

Taxonomic descriptions for 1,201 taxa of flowering plants (towards the flora of Landfall Island (Andaman & Nicobar Islands); Lohit, Kameng, Lower Dibang Valley districts (Arunachal Pradesh); *Impatiens* of Arunachal



Pradesh; Flora of Bihar; Flora of Jharkhand; Wetland flora of Bihar from Buxar to Katihar; Grasses & bamboos of E. India; Flora of Upper Ganga Ramsar site; Flora of Chhattisgarh; Grasses of Odisha; Gesneriaceae of NE India; Flora of Uttarakhand, Vols. 2, 3 & 4; Flora of Sikkim, Vol. 2; Endemic orchids of Maharashtra and 172 taxa of non flowering plants towards Algal flora of Jharkhand; Liverworts & hornworts of Mizoram; Liverworts & hornworts of Anjaw and West Siang districts (Arunachal Pradesh); Mosses of Darjeeling district; Lichens of Rajasthan, Kutch and Gujarat; Wild mushrooms of North Sikkim; Wood-rotting Fungi of Rajmahal hills; Wood-rotting Fungi of Koderma WLS; Pteridophytic flora of Sikkim and Maharashtra have been completed. The manuscripts of (i) Flora of West Bengal Vol. II and (ii) Flora of UP, Vol. III were submitted for publication.

#### Flora of Protected Areas

Taxonomic descriptions for 1123 taxa of flowering plants towards Rani Jhansi Marine N.P., Andaman & Nicobar Islands; Gautam Budha WLS, Palkot WLS, Koderma WLS (Jharkhand); Jaldapara WLS, Buxa WLS (West Bengal); Shoolpaneshwar WLS (Gujarat); Seshachalam B.R. and Nagarjunsagar-Srisailem WLS (Andhra Pradesh); Phawngpui N.P., Murlen N.P. (Mizoram); Laukhowa WLS, Ranga, Kokoi & Dulung R.F. (Assam); Siju WLS, Baghmara Pither Plant WLS, Balpakhrum N.P. (Meghalaya); Sultanpur N.P. and Kalesar N.P. (Haryana); Singba *Rhododendron* Sanctuary (Sikkim); Sharavathi Valley WLS (Karnataka), Malabar WLS (Kerala) and Koyana WLS (Maharashtra) have been completed. Manuscripts of (i) Flora of Barnadi WLS (Assam) & (ii) Flora of Great Indian Bustard WLS (Maharashtra) were submitted for publication.

#### C. Documentation of Indigenous 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 Balasore & Koraput districts of Odisha have been recorded. Manuscript 'Traditional knowledge associated with plants of Junagarh district, Gujarat', comprising 241 species, is being finalized.

#### D. Ex-Situ Conservation

- About 3,027 saplings, seeds, propagules belonging to 432 species 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.

#### E. Micro-Propagation of Threatened Species

- Cultures of *Cymbidium tigrinum* and *Ilex khasiana* have been maintained and multiplied. Axenic seed germination of *Armadorum senapatiatum* have been initiated. *In vitro* propagation protocol has been standardized for the callus, multiple shoots, and root induction in *Eremostachys superba*. Callusing has been induced in *Pitosporum eriocarpum*. Seed viability and germination percentage in *Eremostachys superba*, *Pitosporum eriocarpum* and *Indopiptadenia oudhensis* has been studied.

Ultra morphological study of different parts of *E. superba* plants, such as cottony hairs, leaf glandular hairs and stomata, hairs of the apical tuft of seed and pollen has been carried out under SEM.

#### F. Studies of Nutritional Values of Wild Edible Plants of Meghalaya

- Six wild edible plants collected from Meghalaya were analyzed for their nutraceutical potential under the parameters given in Table-1.

#### G. Repatriation of Information on Indian Plants housed in Royal Botanic Garden, Kew, Uk (K)

- Images of type specimens of **102** taxa (*Boeica filiformis*, *B. fulva*, *B. hirsuta*, *B. porosa*, *Tetraphyllum bengalense*, *Anaphalis xylophiza*, *Sonneratia griffithii* Kurz, *Pteris vittata* L., *P. longifolia* L., *Cinnamomum filipedicellatum*, *C. heyneanum*, *C. macrocarpum*, *C. riparium*, *C. sulphuratum*, *C. travancoricum*, *C. wightii*, *C. heyneanum*, *C. perrottetii*, *C. walaiwarensis*, *C. sulphuratum*, *Mansonia dipikae*, *Alocasia decipiens*, *Eugenia (Syzygium) discifera*, *Memecylon rivulare*, *M. angustifolium* var. *attenuata*, *M. angustifolium* var. *riparium*, *M. edule* var. *molestum*, *M. elongatum/rostratum*, *M. grande*, *M. leucanthemum*, *M. macrocarpum*, *M. ovoideum*, *M. rostratum*,

*M. sylvaticum*, *M. thomsonii*, *M. wallichii*, *M. wightii*, *M. oleifolium*, *M. ovatum*, *M. caeruleum*, *M. expitellatum*, *M. garcinioides*, *M. globiferum*, *M. grande*, *M. hookeri*, *M. intermedium*, *M. Kurzii*, *M. merguicum*, *M. oleifolium*, *M. ovoideum*, *M. royenii*, *M. sisparensis*, *M. umbellata*, *Santalum album*, *Eulophia obtuse*, *E. mackinnonii*, *Geodorum pulchellum*, *Knema lenta*, *Staurogyne arcuata*, *S. glauca*, *S. spathulata*, *Syzygium rotundifolium*, Holotype of *Horsfieldia irya*, *Knema corticosa* var. *tonkinensis*, *Myristica beddomei* subsp. *Sphaerocarpa*, *Crotalaria alata*, *C. acicularis*, *C. albida*, *C. anthylloides*, *C. bidiei*, *C. bourneae*, *C. capitata*, *C. burhia*, *C. calycina*, *C. clarkei*, *C. conferta*, *C. dubia*, *C. hirta*, *C. leptostachya*, *C. mysorensis*, *C. nana*, *C. oblecta* var. *glabrescens*, *C. occulta*, *C. orixensis*, *C. ovalifolia*, *C. ovalifolia*, *C. scabrella*, *C. priestleyoides*, *C. sessiliflora* subsp. *azarensis*, *C. speciosa*, *C. tecta*, *C. tetragona*, *C. triquetra*, *C. triquetra* var. *tetragona*, *Ficus tomentosa*, *F. scabra*, *F. aquatic* and *F. callosa*, *Stylosanthes guianensis* var. *pauciflora*, *S. viscosa* var. *acutifolia*, *Salacia oblonga*), protologues of **112** species of angiosperms, pteridophytes and bryophytes, copies of **993** pages of literature were supplied to researchers both within and outside BSI. In addition, the Indian Botanical Liason Officer (IBLO)

**Table-1.** Parameters used for study wild edible plants of Meghalaya

Parameter analysed	Name of the Plant	Local name	Parts used
<b>Proximate composition (%)</b> Ash Moisture Crude fibre Crude fat Protein Carbohydrate Energy content	<i>Chenopodium album</i>	Polong	Leaves
	<i>Alternanthera philoxeroides</i>	Kanchi-Sag	Leaves
	<i>Zanthoxylum rhetsa</i>	Chingjal	Leaves
	<i>Cajanus indicus</i>	Bethleng	Leaves
	<i>Medinilla erythrophylla</i>	Shkor blang	Leaves
	<i>Ardisia humilis</i>	Ja-Jew	Leaves



identified **03** species; provided distribution data of **04** species, clarified queries about correct nomenclature of **03** species and updated database of Internal Plant Names Index (IPNI) from time to time. Apart from that, the IBLO also studied more than 300 specimens of Lamiaceae, Magnoliaceae and Myrsinaceae from Indian region in the herbaria of Geneva (G) and Zurich (Z+ZT). He also attended 87 queries from Indian plant taxonomists on identification and nomenclatural issues.

## H. Miscellaneous

### **Maintenance and enrichment of Herbaria in BSI:**

During the period 14,103 specimens were mounted/ remounted, 8,690 specimens were accessioned and 6094 specimens were incorporated in different herbaria..

**Digitisation:** 7507 herbarium specimens were bar-coded and digitized.

**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 16,036 visitors, including scientists, students, teachers and VIPs, visited different botanic gardens, herbaria and museum of BSI. Queries on plant distribution, nomenclature, threatened and endemic taxa of different regions, etc., were attended; 1241 specimens of angiosperms, pteridophytes, bryophytes and fungi, received from students/ scientists outside BSI were identified and photocopies of about 3660 pages of literature were supplied. In addition, antioxidant activities (mg/g) of 10 algae, viz. *Aphanothece pallida*, *A. saxicola*, *Anabena variabilis*, *Lyngbya major*, *Nitella flagelliformis*, *Oedogonium globosum*, *Pithophora oedogonia*, *Rhizoclonium hieroglyphicum*, *Scytonema ocellatum* and *Spirogyra communis* were analysed for total

phenolic content, total flavonoid content, total flavonol content, Radical scavenging activity (IC50) and Reducing power (AAE) in four different extracts (benzene, chloroform, acetone and methanol) outside researchers.

Scientists of AJC Bose IBG, visited the historically famous Panchabati Garden in Dakshineswar Kali Temple, Kolkata on invitation to render suggestions on revival of the garden. Temple authority was suggested on corrective measures.

**Cyber-taxonomy initiative:** In order to develop digital 'Indian Plant Diversity Information System (IPDIS)', BSI has initiated the process for web-launching of all its publications (books, floras, records and journals), archival correspondences (Wallich, Roxburgh, Hooker, etc.) and rare books (not available on any of the biodiversity library sites). Under this programme, so far 2,25,000 pages have been digitized. In addition, development of 'e-flora of India' database, have also been initiated simultaneously.

### Implementing Organisation with details of Responsibilities

- **Headquarters:** Pharmacognosy, Cryptogamy, Ecology, Plant Chemistry, Flora Cell, Palynology and Library at Howrah; Publication Unit & Technical Section at Kolkata.

### Current Projects

#### Pharmacognosy Unit

- Pharmacognostic studies on medicinal Aconites of India

#### Cryptogamic Unit

- Liverwort & Hornwort Flora of Sikkim
- Moss Flora of Darjeeling District, West Bengal



**Table-2.** Statewise Status of projects undergoing during 2012-13

<b>Name of State/UT</b>	<b>Status (Projects undergoing during 2012)</b>
Andaman & Nicobar Islands	1. Flora of Landfall Island Wildlife Sanctuary 2. Flora of Rani Jhansi National Park 3. Foliicolous lichens of Andaman Islands
Andhra Pradesh	4. Flora of Seshachalam Biosphere Reserve, Andhra Pradesh 5. Flora of Nagarjunasagar Srisailem Wildlife Sanctuary, Andhra Pradesh 6. Flora of 650 Sacred Groves of Andhra Pradesh
Arunachal Pradesh	7. Grass Flora of Arunachal Pradesh 8. Flora of Pakhui Wild life Sanctuary, East Kameng 9. Taxonomic Study of family Polypodiaceae of NE India 10. Study of Impatiens of Arunachal Pradesh 11. Flora of East Siang District, Arunachal Pradesh 12. Flora of Lohit District, Arunachal Pradesh 13. Flora of Kamlang Wildlife Sanctuary
Assam	14. Flora of Ranga, Kakoi and Dullung Reserve Forests, Assam 15. Flora of Laokhowa Wildlife Sanctuary
Bihar	16. Wetland flora of Gangetic plains in Bihar from Buxar to Katihar 17. Flora of Gautam Buddha Wildlife Sanctuary 18. Flora of Bihar 19. Flora of Viksarshila Gangetic Dolphin Wildlife Sanctuary, Bihar
Chhattisgarh	20. Flora of Chhattisgarh
Gujarat	21. Ethnobotany of Dang District 22. Flora of Shoolpaneshwar Wildlife Sanctuary, Narmada 23. Lichens of Kutch and Gujarat
Haryana	24. Flora of Sultanpur National Park 25. Flora of Kalesar National Park
Jharkhand	26. Flora of Koderma Wildlife Sanctuary 27. Flora of Palkot Wildlife Sanctuary 28. Wood Rotting Fungi of Koderma Wildlife Sanctuary 29. Flora of Udhwa Lake Bird Sanctuary 30. Algal Flora of Jharkhand 31. Flora of Jharkhand
Karnataka	32. Flora of Sharavathi valley Wildlife Sanctuary 33. Flora of Biligirirangaswamy Wildlife Sanctuary
Kerala	34. Flora of Kerala, Volume V 35. Seaweed Survey of Kerala Coast 36. Flora of Malabar Wildlife Sanctuary, Kozikode
Maharashtra	37. Ferns of Maharashtra 38. Folicolous Fungi of Maharashtra 39. Studies on the Orchids of Maharashtra 40. Flora of Koyna Wildlife Sanctuary



Name of State/UT	Status (Projects undergoing during 2012)
Meghalaya	41. Checklist of flora of Meghalaya 42. Flora of South Garo Hills Dist., Meghalaya 43. Chemical composition & nutritive value of wild edible plants of Meghalaya
Mizoram	44. Bryoflora (Hepaticae & Anthocerotae) of Mizoram 45. Flora of Phawangpui Blue Mountain Peak, Mizoram 46. Flora of Murlen National Park, Mizoram
Orissa	47. Ethnobotany of Orissa 48. Poaceae of Orissa
Rajasthan	49. Flora of Jamwa Ramgarh Wildlife Sanctuary
Sikkim	50. Liverwort & Hornwort Flora of Sikkim 51. Pteridophytic Flora of North Sikkim 52. Studies on Wild Mushrooms of North Sikkim
Tamil Nadu	53. Flora of Srivilliputhur Wildlife Sanctuary 54. Flora of Karaivetti, Vuduvur and Point Calimere Wildlife Sanctuary
Uttar Pradesh	55. Floral Diversity of Upper Ganga Ramsar Site,
Uttarakhand	56. Flora of Uttarakhand
West Bengal	57. Flora of Buxa Wildlife Sanctuary 58. Flora of Jaldapara Wildlife Sanctuary 59. Flora of West Bengal, Volume V 60. Moss Flora of Darjeeling District

**Table-3.** Budget Allocation (₹ in Thousand)

PLAN			NON PLAN		
BE 2013 – 14	Expenditure upto 31.12.2013	Percentage (%)	BE 2012 – 13	Expenditure upto 31.12.2012	Percentage (%)
127500	101075	64	271100	217249	80

- Algal Flora of Jharkhand
- Wood Rotting Fungi of Koderma Wildlife Sanctuary (Jharkhand)

#### Ecology Unit

- A Checklist of Dinophyceae in India

#### Plant Chemistry Unit

- Chemical Composition and Nutritive Value of Wild Edible Plants of Meghalaya
- **Indian Botanic Garden, Howrah:** Established in 1787 at Howrah, the IBG

has an area of ca 273 acres with a National Orchidarium, 25 Lakes and number of conservatories. Initially served as platform for introduction of such commercially important plants, as cardamom, pepper, nutmeg, cotton, tobacco, indigo, coffee, sago, teak, cinchona, rubber, jute, mahogany, etc. It has 2132 species under cultivation including (two living types and) 1092 exotics. Every year over 5 lakh people visit the garden for education, awareness and recreation purposes.



### Current Projects

- Collection, introduction and multiplication of 100 endemic, threatened, medicinal, ornamental and economically important plants
- Indigenous Palms of India
- Bamboos of India: Ex – situ Conservation
- Development of Division No. 25 of AJC Bose IBG.
- Orchids of Tripura & North Bengal
- **Central Botanical Laboratory, Howrah:** Established in 1954 at Kolkata and later shifted to Howrah with Economic Botany, Cytology & Plant physiology section.

### Current Projects

- Ethnobotany of Odisha state
- Revision of the Family Memecylaceae in India
- Ethnomedicinal uses of Fabaceae in India recorded in herbarium and published literature
- Ethnobotanical information recorded in herbarium and literature for treatment of stone.
- **Industrial Section, Indian Museum, Kolkata:** Established in 1887 at Kolkata has 20,000 exhibits of economic plants and plant products arranged in 8 Bays for public awareness; 70,000 herbarium specimens; 18 volumes containing 700 samples of Indian textiles in silk, cotton, muslin and wool, representing one of the 20 sets captioned Textiles Manufactures and Costumes of the People of India, and a 15 volume companion set on Natural Dyes.

### Current Projects

- Collection of economic plant materials for enrichment and replacement of exhibits of the Botanical gallery
- Listing of collections of George Watt deposited at BSIS
- **Central National Herbarium, Howrah:** Established in 1795 at Howrah, holds ca 2.05 million specimens of seed plants, 10,000 type specimens, 12,000 Wallichian specimens and 10,000 non-flowering plants. The unit has been responsible for discovery of 09 genera and 235 species new to science.

### Current Projects

- Editing & Updating of mss. of Flora of West Bengal, Vol. V (Monocot) *Hydrocharitaceae – Poaceae* (37 families)
- Editing of Flora of India, family Acanthaceae
- Flora of Bihar, Volume – I [Introduction, Key to the Families, *Ranunculaceae – Mimosaceae* (ca. 728 species, 62 families)]
- Flora of Jharkhand, Volume – I [Introduction, Key to the Families, *Ranunculaceae – Mimosaceae* (ca. 728 species, 62 families)]
- Flora of Buxa Wildlife Sanctuary, Jalpaiguri, WB. (ca 368.99 sq. km.)
- Flora of Gautam Buddha Wildlife Sanctuary, Bihar & Jharkhand, (ca. 259 sq. km.)
- Flora of Jaldapara Wildlife Sanctuary, West Bengal (ca 216.51 sq km)
- Flora of Koderma Wildlife Sanctuary and Palkot Wildlife Sanctuary, Jharkhand.
- Flora of Udhwa Lake Bird Sanctuary, Jharkhand (ca 5.65 sq. km.)



- Palynotaxonomic studies of *Lauraceae* of India
- Revision of the Genera *Carex* L. and *Kobresia* Willd. in India
- Revision of the Genus *Festuca* in India
- Revision of the Tribe *Vernonieae* in India
- Study on Genera *Jencellus*, *Anosporum*, *Sorostachys* and remaining taxa of *Cyperus* under Flora of India. (ca. 88 taxa)
- Verification of deposition of types at different herbaria of BSI based on names of new taxa published during 1990 – 2004 in some selected journals.
- **Arunachal Pradesh Regional Centre, Itanagar:** Jurisdiction - Arunachal Pradesh. Established in 1977, the circle has 13,500 herbarium specimens, including 34 types representing 20 species discovered as new to science. The associated garden of 48 ha at Sankie View has ca 400 species under cultivation.

#### Current Projects

- Flora of Anjaw District, Arunachal Pradesh
- Flora of West Siang District, Arunachal Pradesh
- Liverworts and Hornworts of West Siang District
- Revision of Family *Aspidiaceae* in N.E. India
- Grass Flora of Arunachal Pradesh
- Flora of Pakhui Wild life Sanctuary, East Kameng
- Taxonomic Study of family *Polypodiaceae* (ca 100 spp.) of North East India

- **Eastern Regional Centre, Shillong:** Jurisdiction – Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura. Established in 1956 at Shillong, the circle has ca 2,71,000 herbarium specimens, including 508 types representing 5 genera and 89 species discovered as new to science. The associated garden of 10 ha at Barapani has ca 800 species under cultivation.

#### Current Projects

- Bryoflora (Hepaticae & Anthocerotae) of Mizoram
- Checklist of flora of Meghalaya
- Flora of South Garo Hills Dist., Meghalaya
- Flora of Barnadi Wild life
- Flora of Ranga, Kakoi and Dullung Reserve Forests, Assam
- Flora of Murlen National Park, Mizoram
- Micropropagation of RET plants of NE India (*Nymphaea* & *Cymbidium*)
- Multiplication and conservation of Rare/ Endangered/Economically important plants in Botanic Garden of BSI-ERC.
- **Sikkim Himalayan Regional Centre, Gangtok:** Jurisdiction – Sikkim. Established in 1979, the circle has 40,000 herbarium specimens, including 6 types representing 6 species discovered as new to science. The associated garden in the campus has ca 200 species, mostly orchids, under cultivation.

#### Current Projects

- Studies on Wild Mushrooms of North Sikkim
- Pteridophytic Flora of North Sikkim
- Flora of Sikkim



- **Central Regional Centre, Allahabad:** Jurisdiction – Madhya Pradesh, Chhatisgarh, Uttar Pradesh. Established in 1962 at Allahabad, the circle has ca 69,000 herbarium specimens, including 03 types. Seventeen species and 07 varieties have been described as new to science from here. The associated garden of 02 ha in the campus has ca 570 species under cultivation.

#### Current Projects

- Flora of Chhattisgarh
- Floral Diversity of Upper Ganga Ramsar Site, Uttar Pradesh
- Lichens of Rajasthan, Kutch and Gujarat
- Revision of Family Rocellaceae in India
- Revision of the tribe Heliantheae in India
- Studies on Family Pertusariaceae in India
- **Botanic Garden of Indian Republic, Noida:** Jurisdiction - National Capital Territory Region of Delhi. 4300 indigenous saplings and 554 seedlings of medicinal plants have been procured different parts of Terai region and Odisha for BGIR. Database on Oil Yielding Plants completed; hard copy format published (2008). Seeds Database initiated.

#### Current Projects

- Development of database of introduced trees of BGIR, NOIDA
- Development of database of medicinal plants
- Development of Database of Seeds of indigenous trees
- Protocol Development for germination of selected tree species

- Ecological survey of BGIR woodlands
- Recording of phenological data of species growing in garden
- **Northern Regional Centre, Dehradun:** Jurisdiction – Uttarakhand, Chandigarh, Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir. Established in 1956 at Dehradun, the circle has ca 1, 21,500 herbarium specimens, including 112 types representing two genera and 66 species discovered as new to science. The associated gardens of 23 ha at Dehradun, Pauri and Khirsu have ca 500 species under cultivation.

#### Current Projects

- Endemic & Threatened Pteridophytic Flora of North Western Himalayas
- Flora of Uttarakhand, Vols. III & IV
- Revision of the Family Bignoniaceae in India
- Revision of the Genus Athyrium in India
- Revisionary studies of genus Adiantum L. in India (c. 31 spp.)
- Flora of Cold Desert of North West Himalayas
- Flora of Sultanpur National Park, Haryana
- Taxonomic Revision of Subtribe Habenariinae (Orchidaceae) in India
- Revision of Indian Hymenochaetaceae
- **Arid Zone Regional Centre, Jodhpur:** Jurisdiction – Rajasthan, Gujarat. Established in 1972 at Jodhpur, the circle has ca 24,800 herbarium specimens, including 17 types representing 09 species discovered as new to science. The associated garden of 06 acres in the campus has ca 185 species under cultivation.

### Current Projects

- Flora of Gujarat, Vol. III
- Ethnobotany of Gujarat (Junagarh District)
- Flora of Jamwa Ramgarh Wildlife Sanctuary, Rajasthan
- Flora of Shoolpaneshwar Wildlife Sanctuary, Narmada, Gujarat
- **Western Regional Centre, Pune:** Jurisdiction – Maharashtra, Karnataka, Goa, Daman, Diu, Dadra & Nagar Haveli. Established in 1955 at Pune, the circle has ca 1,70,000 herbarium specimens, including 571 types representing two genera and 146 species discovered as new to science. The associated gardens of 19.5 ha at Mundhwa and in the campus have ca 400 species under cultivation.

### Current Projects

- Flora of Great Indian Bustard Wildlife Sanctuary, Ahmednagar, Maharashtra
- Ferns of Maharashtra
- Foliicolous Fungi of Maharashtra
- Flora of Sharavathi valley Wildlife Sanctuary, Shimoga, Karnataka
- **Deccan Regional Centre, Hyderabad:** Jurisdiction – Andhra Pradesh, Odisha. Established in 2005 at Hyderabad, the circle has ca 10,000 herbarium specimens.

### Current Projects

- Herbs and Shrubs of Greater Hyderabad
- Flora of Seshachalam Biosphere Reserve, Andhra Pradesh
- Flora of Nagarjunasagar Srisailem Wildlife Sanctuary, Andhra Pradesh
- Flora of 650 Sacred Groves of Andhra Pradesh



Fig-3. *Habenaria panchganiensis* – Endemic to Panchgani, Maharashtra

- Poaceae of Odisha State
- **Southern Regional Centre, Coimbatore:** Jurisdiction – Tamil Nadu, Kerala & Lakshadweep Islands. Established in 1955 at Coimbatore, the circle has ca 2,75,000 herbarium specimens, including 2594 types representing 08 genera and 155 species discovered as new to science. The associated garden of 19 ha at Yercaud and in the campus has ca 1100 species under cultivation.

### Current Projects

- Seaweed survey of South East Coast of India.
- Flora of Kerala, Vols. III, IV & V
- Flora of Malabar Wildlife Sanctuary, Kozikode, Kerala



- 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* and *Tripogon* genera of Poaceae using SEM
- Study of Pollinia of South Indian Orchids using SEM
- **Andaman & Nicobar Regional Centre, Port Blair:** Jurisdiction – Andaman & Nicobar Islands. Established in 1972, the circle has 22,000 herbarium specimens, including 100 types representing two genera and 66 species discovered as new to science. The associated garden of 30 ha at Dhanikheri has ca 200 species under cultivation.

### Current Project

- Flora of Rani Jhansi Marine National Park
- Flora of N. Andaman Isls. (Narcondam, Peacock, Paget and North Reef Isls.)
- Follicolous lichens of Andaman Islands

## Survey of Fauna

### Zoological Survey of India

#### Introduction and Objectives

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. With its headquarters at Kolkata and 16 Regional Centres 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

### Primary Objectives

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

### High priority areas include

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

education for people especially students.

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



**Fig-4.** Water Buffalo at Kaziranga National Park

### Secondary Objectives

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

### Activities undertaken 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 km<sup>2</sup> of geographical area which is approximately 4.90% of the

country. In addition there are 39 Tiger Reserves, 15 Biosphere Reserves, 10 Elephant Reserves, 5 Natural World Heritage sites and 25 Ramsar Wetland sites in India (National Wildlife Database, 2011). Of these, ZSI surveyed and documented 48 protected areas.

- Scientists of ZSI discovered 4,788 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 86,000 species including about 10,000 species of our neighboring countries like Myanmar, Pakistan, Bangladesh, Sri Lanka and also of Thailand.
- ZSI maintains 6 Galleries in the Indian Museum which are: (1) Mammal Gallery, (2) Bird Gallery, (3) Ecosystem Gallery, (4) Reptilia and Amphibia Gallery, (5) Fish Gallery and (6) Insect Gallery (under renovation). Total no. of exhibits displayed in the galleries: 3,833 no. No. of showcases for dry/mounted exhibits: Mammal Gallery: 31 no, Ecosystem Gallery: 13 no, Bird Gallery: 36 no, Reptile Gallery: 5 no,



- Amphibia Gallery: 1 no, Fish Gallery: 17 no. Exhibits displayed in the jars (*i.e.* Wet collections): Mammal Gallery: 8 no, Reptile Gallery: 31 no, Amphibia Gallery: 24 no, Fish Gallery: 34 no. Type materials displayed in the Galleries: 2 no. *Balaenoptera edeni* Anderson: 1 no and *Balaenoptera musculus* Linnaeus: 1 no.
- Status survey of Coral Reefs, Coral associated Organisms, Indian Golden Gecko, Indian Horse Shoe Crabs and Golden Langur were carried out.
  - Taxonomic studies pertaining to Protozoa, Helminthes, Mollusca, Annelida, Cnidaria, Porifera (Sponges), Echinodermata, Insecta, Arachnida, Pisces (Fishes), Amphibia, Reptilia, Aves (Birds) and Mammals were carried out during the XI<sup>th</sup> Five Year Plan along with Trichotaxonomic studies on Mammals and molecular studies on Freshwater turtles.
  - Based on the survey and taxonomic work carried out so far, ZSI has already published faunal documents pertaining to the States (including Union Territories) of Orissa (4 volumes), Lakshadweep (1 volume), West Bengal (12 volumes), Meghalaya (10 volumes), Andhra Pradesh (8 volumes), Delhi (1 volume), Tripura (4 volumes), Gujarat (2 volumes), Sikkim (5 volumes), Manipur (3 volumes), Bihar, including Jharkhand (1 volume), Nagaland (1 volume), Arunachal Pradesh (2 volumes), Mizoram (2 volumes), Madhya Pradesh including Chhattisgarh (3 volumes), Goa (1 volume), Tamil Nadu (2 volumes), Uttarakhand (3 volumes), Maharashtra (2 volumes), Andaman and Nicobar Islands (1 volume) and Karnataka (1 volume) under the State Fauna Series.
  - ZSI has published 1439 books / Journals viz., Records of the Zoological Survey of

India 450; Occasional papers 352; Memoirs of ZSI 84; Annual Report 43, Handbooks/ Pictorial Guides 50; Special Publications 48; Fauna of India (including British India) 131; Conservation Area Series (Protected Area Network) 48; State fauna Series 67; Ecosystem Series 30; Status Survey of Endangered Species 10; Bibliography of Indian Zoology 35; Animal Discoveries 6; Technical Monograph 68 (Discontinued Publication); Zoologiana 5 (Discontinued Publication) and Bulletin of ZSI 12 (Discontinued Publication).

## Performance/ Achievements/ Progress made during the year

### Faunal explorations and surveys

**Mountain Ecosystem:** Two surveys were undertaken to Spiti valley, Himachal Pradesh

**Estuarine ecosystem:** Five surveys were undertaken in Diamond harbor, West Bengal; Narmada and Tapti Estuary, Gujarat and Pennar estuary, Andhra Pradesh.

**Marine/Island ecosystem:** Six extensive surveys were undertaken in Kerala coast; Gulf of Kachchh, Gujarat; Gulf of Mannar and Palk Way, Tamil Nadu.

**Biosphere Reserve/ Conservation areas:** Eight surveys were undertaken in Sunderbans Biosphere Reserve, West Bengal; Southern Western Ghats Biosphere Reserve, Kerala; Gulf of Mannar Marine Biosphere Reserve, Kerala and Gulf of Kachchh Biosphere Reserve, Gujarat.

**National Parks:** Nine surveys were undertaken in Bhitarkanika NP, Odisha; Mahatma Gandhi Marine NP, Andaman & Nicobar Island; Nameri NP, Assam; Rajaji NP, Uttarakhand and Silent Valley NP, Kerala.

**Wildlife Sanctuaries:** Twenty four surveys were undertaken in Chail Wildlife Sanctuary, Himachal Pradesh; Dharanghati WLS, Himachal Pradesh; Dibrusaikhawa WLS, Assam; Kalakad Mundanthurai WLS, Tamil Nadu; Kalatop-Khajjar WLS, Himachal Pradesh; Ralamandal and Kheoni WLS, Madhya Pradesh; Malabar WLS, Kerala; Itanagar WLS, Arunachal Pradesh; Nauradehi WLS, Madhya Pradesh; Nongkhylllem WLS, Meghalaya; Malabar WLS, Kerala; Phansad WLS, Maharashtra; Sajnekhali WLS, West Bengal; Singhori WLS, Madhya Pradesh; Sultanpur WLS, Haryana and Veerangana Durgavati WLS, Madhya Pradesh during the year.

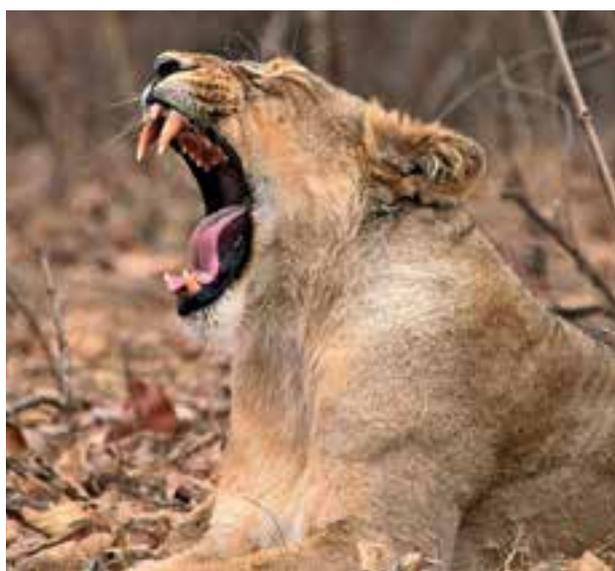
**States and Union territories:** Under the state fauna programme forty three surveys were undertaken in several districts of Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal.

**Status Survey:** Seven surveys in Coral reefs, Coral associated Organisms, Indian Golden Gecko, Indian Horse Shoe Crabs and Golden Langur were carried out.

### Some Important Research studies undertaken

- Optical Characterization of Corals– A collaborative project with Space Application Centre, Ahmedabad.
- Improving quality of Reefs through Transplantation/Restoration of Corals at Gulf of Kachchh (*Sponsored by World Bank*).
- Survey and monitoring the health of coral reefs of India, National Coral Reef Research Institute (NCRI) (*Sponsored by MoEF*).

- Diversity and Distribution of Corals and their Associated Fauna of Rani Jhansi Marine National Park, Andaman (*Sponsored by MoEF*).
- Monitoring the Coral Reefs of Andaman and Nicobar Islands (*Sponsored by: Department of Environment and Forests, Andaman and Nicobar Administration*).
- Lead Institution-Great Nicobar Biosphere Reserve (*Sponsored by MoEF*).
- Faunal Diversity of Great Nicobar Biosphere Reserve (*Sponsored by MoEF*).
- Rapid EIA studies on the road alignment from Shastri Nagar to Indira Point, Great Nicobar Island (*Sponsored by Border Roads Task Force, Ministry of Defense, Govt. of India*).
- Preparation of Management Action Plan for Lohabarrack Crocodile Sanctuary, South Andaman (*Sponsored by DoEF, Andaman and Nicobar Administration*).
- Status survey on Holothurians of A&N Islands (*Sponsored by DoEF, Andaman and Nicobar Administration*).
- Rapid EIA studies on runway extension in Campbell Bay, Great Nicobar and Sibpur,



**Fig-5.** Asiatic lion (*Panthera leo persica*) at Gir National Park



North Andaman (*Sponsored by Indian Navy, Ministry of Defence, Govt. of India*).

- Strengthening of Marine Aquarium and Regional Centre at Digha, West Bengal (*Sponsored by World Bank*).

### Special Collaborative Projects

- ‘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).
- Molecular Systematics and Phylogeny of Economically Important Thrips.
- Molecular Identification of Tabanid (Tabanidae: Diptera) vectors for Surra disease.
- Foraging ecology of White-bellied Heron, *Ardea insignis* in Namdapha Tiger Reserve, Arunachal Pradesh.

### Research Activities

**Discoveries of New Taxa / Species:** During the surveys 90,191 examples of various groups of animals were collected. Altogether 23,456 examples belonging to 1,206 species were identified by the scientists of ZSI Headquarters and regional centres. In addition 40 species new to science have been described during the year and 6 species were added new to the fauna of India.

### Species New to Science discovered in 2013

Two new species of Cnidaria

- *Favites monticularis* Mondal, Raghunathan & Venkataraman
- *Ctenactis triangularis* Mondal & Raghunathan

Thirty two new species of Insects

- *Bracon agathon* Sheeba & Narendran
- *Bracon charien* Sheeba & Narendran
- *Bracon dachaon* Sheeba & Narendran
- *Bracon daris* Sheeba & Narendran
- *Bracon decor* Sheeba & Narendran
- *Bracon heteron* Sheeba & Narendran
- *Bracon keralense* Sheeba & Narendran
- *Bracon koridor* Sheeba & Narendran
- *Bracon molycaon* Sheeba & Narendran
- *Bracon nexperon* Sheeba & Narendran
- *Bracon procnis* Sheeba & Narendran
- *Bracon stom* Sheeba & Narendran
- *Eurytoma chinnarensis* Narendran & Sureshan
- *Cleonymus kamijoi* Sureshan & Dhanya Balan
- *Diapara nigriscuta* Sureshan
- *Diapara thirumalai* Sureshan
- *Diapara debanensis* Sureshan
- *Diapara hayati* Sureshan
- *Diapara venkati* Sureshan
- *Diapara nigra* Sureshan
- *Gastracanthus indicus* Sureshan & Dhanya
- *Foenatopus idukkiensis* Sureshan & Narendran
- *Epiclerus viridipetiolatus* Narendran
- *Subancistrocerus venkataramani* Girish Kumar



- *Ormyrus perseae* Girish Kumar, Sheela & Narendran
- *Velia (Cesavelia) mitrai* Basu, Subramanian & Polhemus
- *Aphelocheirus (Aphelocheirus) thirumalai* Basu, Subramanian & Saha
- *Idionyx gomantakensis* Subramanian, Rangnekar & Naik
- *Metrocoris morsei* Jehamalar & Kailash Chandra
- *Metrocoris shillongensis* Jehamalar & Kailash Chandra
- *Ochterus nicobarensis* Jehamalar & Kailash Chandra
- *Rhamphothrips bhattii* Kaomud Tyagi & Vikas Kumar

One new species of Crustacea

- *Travancoriana granulate* Pati & Sharma

Three new species of Nematode

- *Rhabdias himalayanus* Rizvi, Burse & Bhutia
- *Rhabdias dehradunensis* Rizvi, Burse & Bhutia
- *Steinernema dharanaii* Kulkarni, Rizvi, Vikas Kumar, Paunekar & Mishra

Two new species of Pisces

- *Balitora jalpalli* Raghavan, Tharian, Ali, Jadhav & Dahanukar
- *Haploxyphys bengalensis* Mohapatra, Ray & Vikas Kumar

Six New records of Insects recorded from India in 2013

- *Trigonoderus pulcher* Walker
- *Pareuchaetes pseudoinsulata* Rego Barrows
- *Olepa duboisi* Orhant
- *Macotasa orientalis* (Hampson)
- *Poliosia binotata* (Hampson)
- *Anax panybeus* Hagen

## Taxonomic studies

The research work carried out on the fauna collected from different states, protected areas and important ecosystems are as follows:

### Fauna of States

The details of number of species identified from different surveys of different States and Union Territories are given in Table-4.

### 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

- Organized a training programme on "Application of Scanning Electron Microscopy in Animal Taxonomy" on 17<sup>th</sup>-18<sup>th</sup> July, 2013 for the Scientists and Scientific Assistants held at Zoological Survey of India, Headquarters, Kolkata.
- Organized a training programme on "GIS in Faunal Studies & Databasing and Digitization of Faunal Collections" on 15<sup>th</sup>-16<sup>th</sup> January, 2013 for the Scientists and Scientific Assistants held at Zoological Survey of India, Headquarters, Kolkata.
- Celebrated International Biodiversity Day on 22<sup>nd</sup> May, 2013: Release of the book- Endemic Animals of India by Prof. M.S Swaminathan at National Biodiversity Authority (NBA), Chennai and Release of the book- Mangroves in India by Hon'ble Secretary, MoEF at New Delhi.
- Celebrated World Environment Day on 5<sup>th</sup> June, 2013: Release of Animal Discovery, 2012 by Hon'ble Minister Smt. Jayanthi Natarajan, MoEF at New Delhi.



**Table-4.** Group-wise number of species identified from different States/UTs

States/ UTs	Protozoa	Rotifera	Coelenterata	Platyhelminthes	Nemertea	Nematoda	Annelida	Collembola
Andaman & Nicobar			1133	38	17			
Andhra Pradesh	6	3	10					
Arunachal Pradesh	6							
Assam	30							
Gujarat					11			
Haryana						6		
Himachal Pradesh	12					10		5
Jharkhand								4
Madhya Pradesh				2				
Maharashtra							5	
Meghalaya							43	
Punjab						86		
Tamil Nadu	20	36						
Uttarakhand						30	10	
West Bengal				11				
<b>Total</b>	<b>74</b>	<b>39</b>	<b>1143</b>	<b>51</b>	<b>28</b>	<b>132</b>	<b>58</b>	<b>9</b>

States/ UTs	Lepidoptera	Hymenoptera	Diptera	Hemiptera	Coleoptera	Odonata	Isoptera	Arachnida
Andaman & Nicobar	88	2	8			3		4
Andhra Pradesh	10	20			47		11	
Arunachal Pradesh	28						8	
Assam	6						12	
Bihar	12							
Chhattisgarh				72				
Haryana				11				
Himachal Pradesh				4	79	8	14	
Jharkhand	32							
Karnataka				1				
Madhya Pradesh	65			8	4			14
Maharashtra	5	6		115	6	10		
Meghalaya				81				
Odisha			4					
Punjab	12							
Rajasthan		12		2				
Uttarakhand	66							
Uttar Pradesh					47			
West Bengal				1				
<b>Total</b>	<b>363</b>	<b>40</b>	<b>12</b>	<b>295</b>	<b>183</b>	<b>21</b>	<b>45</b>	<b>18</b>

State/UTs	Crustacea	Mollusca	Echinodermata	Pisces	Amphibia	Reptilia	Aves	Mammalia
Andaman & Nicobar	60	502	107	234	23	65	446	4
Andhra Pradesh	31	73		2				
Arunachal Pradesh				114			6	
Bihar		31						
Gujarat		9						
Himachal Pradesh	1	12				6		
Jharkhand		40						
Karnataka		30		25				
Kerala	41	3						
Lakshadweep Island	19							
Madhya Pradesh		16						14
Maharashtra	1	12		40				
Meghalaya	6	5		33	6			
Mizoram	14	13						
Odisha	6							
Punjab					18	9	88	12
Rajasthan				52	3	14	144	13
Tamil Nadu	157	31	1			4		
West Bengal				59				
<b>Total</b>	<b>336</b>	<b>777</b>	<b>108</b>	<b>559</b>	<b>50</b>	<b>98</b>	<b>684</b>	<b>43</b>

## Fauna of Protected Areas

The details of number of species identified from Protected Areas are given in Table-5.

## Development of National Zoological collections:

- The ZSI as a National repository of Zoological collections maintains identified species belonging to all animal groups in the country. The National Zoological collections were further enriched by the addition of 90,191 examples of specimens (unnamed) and 23,456 identified specimens pertaining to 1,206 species.

## Publications

- **Records of Zoological Survey of India:** Vol.112, Part-4 and Volume. 113, Part-1 and 2.

- **Occasional Papers:** No. 336 and 352.

## Special Publications

- Animal Discoveries-2012
- Mangroves in India
- Endemic Animals of India
- Abstract and Programme on National Biodiversity Conference

## Handbook/Pictorial Guides:

- Common Echinoderms of A & N Islands.
- Grasshoppers of Western Himalayas.
- Major Hemipteran Predators of India

## State fauna Series: Fauna of Karnataka

## Conservation Area Series:

- Kumbalgarh Wildlife Sanctuary.
- Kalesar National Park and Wildlife Sanctuary.

**Table-5.** Group-wise number of species identified from Protected Areas

Protected Areas	Taxa / Species identified
<b>Phansad WLS (Maharashtra)</b>	6 species of Scolopendromorpha, 20 species of aquatic coleoptera, 11 species of Mantodea, 9 species of Hemiptera and 2 species of Scorpionida were identified.
<b>Malabar WLS (Kerala)</b>	1 species of Mantodea, 4 species of Dermaptera, 10 species of Odonata, 2 species of butterflies, 3 species Reptilia were identified.
<b>Veerangana WLS (Madhya Pradesh)</b>	40 species of Odonates and 3 species of scorpions were identified.
<b>Sultanpur NP &amp; WLS (Haryana)</b>	48 species of soil Nematods and 1 species of amphibian were identified.
<b>Govind WLS &amp; NP (Uttarakhand)</b>	37 species of Nematods were identified.
<b>Chail WLS (Himachal Pradesh)</b>	9 species of annelid, 13 species of Orthoptera, 2 species of butterflies, 28 species of fishes and 3 species of amphibians were identified.
<b>Kalatop-Khajjiar WLS (Himachal Pradesh)</b>	35 species of Lepidoptera and 2 species of fishes were identified.
<b>Singhori WLS (Madhya Pradesh)</b>	33 species of Odonates and 2 species of scorpions were identified.
<b>Sunderban Biosphere Reserve (West Bengal)</b>	23 species of Orthoptera, 13 species of Odonates, 8 species of bugs, 16 species of wasps and 5 species of Lepidoptera were identified.
<b>Nongkhylllem WLS (Meghalaya)</b>	20 species of fishes and 7 species of amphibians were identified.
<b>Kalakad Mundanthurai WLS (Tamil Nadu)</b>	3 species of reptiles were identified.
<b>Bhitarkanika NP (Orissa)</b>	28 species of anurans were identified.
<b>Itanagar WLS (Arunachal Pradesh)</b>	3 species of butterflies and 1 species of spider were identified.
<b>Nauradehi WLS (Madhya Pradesh)</b>	44 species of Odonates, 9 species of moths, 4 species of fishes and 9 species of mammals were identified.
<b>Gulf of Mannar Marine Biosphere Reserve (Kerala)</b>	45 species of bryozoans and 27 species of hermatypic corals were identified.
<b>Kheoni WLS (Madhya Pradesh)</b>	21 species of moths were identified.
<b>Rajaji NP (Uttarakhand)</b>	2 species of nematode was identified.
<b>Ralamandal and Kheoni WLS (Madhya Pradesh)</b>	16 species of Lepidopterans were identified.
<b>Dharanghati WLS (Himachal Pradesh)</b>	7 species of protozoans were identified.
<b>Dibrusaikhawa WLS (Assam)</b>	17 species of protozoans were identified.
<b>Nameri NP (Assam)</b>	21 species of rhizopods were identified.



### Wetland Ecosystem Series:

- Faunal Diversity of Khijadia Lake and Bird Sanctuary.
- Faunal Diversity of Aquatic Invertebrates of deeper Beel.

**Fauna of India Series:** Fauna of Dermaptera (Insecta) Part-3

### Comparison of achievements/ progress made in 2013-14 vis-a-vis that in 2012-13 (for on-going programmes/schemes/projects)

Comparison of achievements/ progress made in 2013-14 vis-a-vis that in 2012-13 (for on-going programmes/schemes/projects) is given in Table-6.

### State/UT-wise Status (wherever applicable)

There are 28 States and 7 Union territories in the country. Based on the survey and taxonomic work carried so far, ZSI has published faunal documents pertaining to the states (including Union Territories) of Andhra Pradesh (eight volume), Andaman and Nicobar Islands (one volume), Arunachal Pradesh (two volume), Bihar (including Jharkhand (one volume), Delhi (one volume), Goa (one volume) Gujarat (two volume), Karnataka (one volume), Lakshadweep (one volume), Madhya Pradesh including Chhattisgarh (three volume), Maharashtra (two volume), Manipur (three volume), Meghalaya (ten volume), Mizoram

(two volume), Nagaland (one volume), Orissa (four volumes published), Sikkim (five volume), Tamil Nadu (two volume), Tripura (four volume), Uttarakhand (three volume) and West Bengal (twelve volume).

### Regulatory Acts/ Rules governing the programme, highlighting the promulgation of new Acts/ Amendments to existing ones, if any:

The Regulatory Acts/Rules governing the programme of The Zoological Survey of India are (i) Indian Wildlife (Protection) Act, 1972 with the objective of effectively protecting the wild life of the country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. The objectives of this Act are to provide protection to the listed endangered fauna and ecologically important protected areas in the country. In addition, ZSI providing (a) status survey of endangered species (b) identification and supporting protection of endangered Wildlife to Wildlife Crime Control Bureau (WCCB), Customs and Forest Department (c) providing Faunal Diversity of Protected Areas and (ii) The Biological Diversity Act, 2002, which recognizes the sovereign rights of states to use their own Biological Resources. The Act aims at the conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner and through a just process or purposes.

**Table-6.** Comparison of achievements/ progress made in 2013-14 vis-a-vis that in 2012-13 (for on-going programmes/schemes/projects)

Sl. No.	Physical targets	Achievement during the Financial year 2012-13		Achievements during the Financial year 2013-14 (Till 15 <sup>th</sup> January, 2014)	
		Targets	Achievements	Targets	Achievements
1.	Surveys conducted	100	127	100	105
2.	Publication	26	26	26	31
3.	Species identified	1500	1628	1500	1206



**Fig-6.** Indian jackal (*Canis aureus indicus*) at Dudhwa National Park

ZSI is supervising in providing information for People's Biodiversity Rights as well as safe guarding designated faunal Repository of the Country.

### Budget allocation and Progress of Expenditure during 2013-14

Budget allocation and Progress of Expenditure during 2013-14 is given in Table-7.

### Implementing organizations along with details of responsibilities.

Zoological Survey of India, its Head quarter located at Kolkata, West Bengal and its sixteen regional centres located at different parts of the country are as follows:

- North Eastern Regional Centre (NERC), Shillong, Meghalaya (1959)
- Western Regional Centre (WRC), Pune, Maharashtra (1959)
- Central Zone Regional Centre (CZRC), Jabalpur, Madhya Pradesh (1960)

**Table-7.** Budget allocation and Progress of Expenditure during 2013-14 (up to 15.01.2014)

Allocation of RE	Major Head wise Allocation 2013-14		Major Head wise Expenditure
<b>Plan</b> <b>Rs. 186100000</b>	<b>Headquarter Office</b>		
	Dir. & Admn.	33540000	28079148
	Research	47960000	45631923
	Investigation	5900000	5707529
	<b>Regional Office</b>		
	Dir. & Admn.	51600000	36293414
	Research	41900000	32633106
	Investigation	5200000	4178536
	<b>Total Plan</b>	<b>186100000</b>	<b>152523656</b>
<b>Non-Plan</b> <b>Rs. 192800000</b>	<b>Headquarter Office</b>		
	Dir. & Admn.	37812000	22432574
	Research	76171000	61498583
	Investigation	908000	539431
	Training	1599000	1099885
	<b>Regional Office</b>		
	Dir. & Admn.	27638000	16849902
	Research	48672000	39482110
	Investigation	0	0
	<b>Total Non-Plan</b>	<b>192800000</b>	<b>141902485</b>
<b>Total Rs. (Plan+ Non-Plan)</b>		<b>378900000</b>	<b>294426141</b>



- Desert Regional Centre (DRC), Jodhpur, Rajasthan (1960)
- Northern Regional Centre (NRC), Dehra Dun, Uttarakhand (1960)
- Southern Regional Centre (SRC), Chennai, Tamil Nadu (1961)
- Gangetic Plains Regional Centre (GPRC), Patna, Bihar (1965)
- High Altitude Regional Centre (HARC), Solan, Himachal Pradesh (1968)
- Marine Biology Regional Centre (MBRC), Chennai, Tamil Nadu (1973)
- Andaman and Nicobar Regional Centre (ANRC), Port Blair (1977)
- Freshwater Biology Regional Centre (FBRC), Hyderabad, Andhra Pradesh (1979)
- Sunderban Regional Centre (SRC), Canning, West Bengal (1979)
- Estuarine Biology Regional Centre (EBRC), Gopalpur-on-Sea, Ganjam, Orissa (1980)
- Western Ghat Regional Centre (WGRC), Kozhikode, Kerala (1980)
- Arunachal Pradesh Regional Centre (APRC), Itanagar, Arunachal Pradesh (1983)
- Marine Aquarium cum Regional Centre (MARC), Digha, West Bengal (1989)

### Budget allocation and Progress of Expenditure during 2012-13; XII Plan Outlay

Budget allocation and Progress of Expenditure during 2012-13; XII Plan Outlay is given in Table-8.

**Table-8.** Budget allocation and Progress of Expenditure during 2012-13; XII Plan Outlay is given in

(₹ Crore)

Plan				Non-Plan			
BE 2012-13	RE 2012-13	Exp. Upto 31.12.2012	(%)	BE 2012-13	RE 2012-13	Exp. Upto 31.12.2012	(%)
15.32	18.41	13.13	85	16.35	17.91	14.69	90

### Empowerment of Women/weaker Sections matters

The ZSI has constituted a Women's Complaint Committee in which female and male members have been included as per Supreme Court Guidelines. The committee deals with the complaints of Sexual Harassment at Work Place. Till date no complaint about Sexual Harassment has been received.

### Updated list of autonomous, attached, sub-ordinate and Regional offices under the administrative purview of the Division; along with appraisal of the functioning of each in relation to their objectives.

The headquarters of ZSI is based at Kolkata and have 16 Regional Centres across the country covering all the bio-geographic regions of the country. The various regional centres under the administrative purview of ZSI are area or ecosystem specific.

### Agreements with countries/International Organizations.

Zoological Survey of India has signed an agreement of co-operation with the Institute for Tropical Biology and Conservation, University of Malaysia, Sabah, Malaysia.

### Forest Resources and Survey

#### Survey and Utilisation (SU) Division

Survey & Utilization (SU) Division deals with the matters related to Forest Survey of India (FSI), Dehradun, Andaman & Nicobar Forest & Plantation Development Corporation

Ltd. (ANIFDCL), Port Blair, all State Forest Development Corporations, Export & Import of wood and wood products, Forest Certification, Sustainable Forest Management, International Tropical Timber Organization, National Forestry Database Information System, Sustainable Forest Management (SFM) Cell among the other matters.

### Important Activities Undertaken

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

## Forest Survey of India (FSI)

### Introduction

Forest Survey of India (FSI), an organization under Ministry of Environment & Forests, Government of India is engaged in the assessment of the country's Forest resources on a regular interval. Establishment on June 1, 1981, the Forest Survey of India succeeded the "Preinvestment Survey of Forest Resources" (PISFR), a project initiated in 1965 by Government of India with the sponsorship of Food and Agriculture Organization (FAO) and United Nations Development Programme (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. The main objectives of FSI are as follows:

### Objectives of FSI

- To assess the forest cover of the country through Remote Sensing technology, analyse the changes and prepare State of Forest Report biennially.
- To conduct inventory in forests and non-forest areas at national level and develop database on wood volume and also estimate tree cover.
- To function as a nodal agency for collection, compilation, storage and dissemination of spatial database on forest resources.
- To conduct training of forestry personnel in application of technologies related to resources survey, remote sensing, Geographical Information System (GIS), etc.
- To strengthen research & development infrastructure in FSI and to conduct research on applied forest survey techniques.
- To Support State/UT Forest Departments (SFD) in forest resources survey, mapping and inventory.
- To undertake forestry related special studies/consultancies and custom made training courses for SFD's and other organizations on project basis.

### 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

### Organizational Set-up

The Forest Survey of India is headquartered at Dehradun and has four zonal offices located at Shimla, Kolkata, Nagpur and Bangalore. The organization is headed by a Director General who is assisted by two Joint Directors at headquarters who are looking after the National Forest Data Management Centre (NFDMC) and the Training & Forest Inventory (TFI) wings and supported by Deputy Directors, Assistant Directors and other technical staff. Each zonal office is headed by a Regional Director supported by Deputy Director and other technical staff. The Headquarters as well

as the Zonal offices work in close coordination to carry out the various activities of FSI.

The activities at the headquarters includes forest cover assessment, producing maps, designing methodology for national inventory, data processing, producing State of Forest Reports and other reports, conducting training coordination and monitoring the activities of Zonal offices. On the other hand activities of Zonal offices concentrate mainly on field inventory. Recently forest cover mapping work has also been given to Zonal offices.

### Forests Cover Mapping & Tree Cover

Forest Survey of India (FSI) assessed forest cover of the country by interpretation of satellite data on a two-year cycle and presents the information in the form of 'India State of Forest Report'. With the release of the 'India State



**Fig-7.** Beautiful scenic view of forest cover in Himachal Pradesh



of forest Report 2011' so far 12 cycles of forest cover assessment have been completed since 1987. Work for the 13<sup>th</sup> cycle is under progress. In addition to forest cover, assessment of tree cover of the country is also being carried out using the Trees Outside Forests (TOF) inventory data.

### **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 levels. In addition to inventory of forests, Trees outside Forests (TOF) resources are also inventoried concurrently to provide a national estimate of growing stock of TOF on a two year cycle. About 10,000 sample plots are laid out in TOF areas. In the recent past TOF resources have gained importance because of their increasing role in meeting the needs of wood based industries and society. The outcome of the TOF inventory is estimation of growing stock in TOF areas, estimation of production of wood from TOF and tree cover.

The data collection work for Investment Survey of Forest Resources (ISFR) 2013 has already been completed and data checking and data processing is also completed. Report writing work is under progress. The inventory of forest and TOF in selected 30 districts for 2012-13 is completed.

### **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, Geographical Information System (GIS), Global Positioning System (GPS), Differential Global Positioning System (DGPS) and inventory techniques. About 129 forestry personnel have been trained in different courses since April 2013 to December 2013.

### **Training on estimation of carbon tools and technologies by USDA Forest Service in USA.**

A group from FSI visited in different places in United States of America (USA) to get an exposure on estimation of carbon stock in forest. The training comprised of theoretical lectures and field visit. Under the field visit actual plots were laid down in different forest types. The training was found to be very useful and some of their techniques are being now piloted in India.

### **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) in 2004, FSI estimated forest carbon of only 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. A report on carbon stock in India's forest has been published by FSI giving details of carbon stock in different states.

### Regional Consultation

With the new dimensions being added to the resource management practices in the country, there is inevitable need to work in close association with the State Forest Departments (SFDs). Consequently, regional consultations were held at Kolkata, Bangalore, Nagpur and Dehradun during January-February 2012 in which senior officers of the respective SFDs were present. The focus of these consultations was on the following:

- Establishment of National Forestry Information System;
- Near real time monitoring of forest fires;
- Alignment of forest inventory work of FSI with working plan exercise in the SFDs.

### National Forest Information System (NFIS)

This is a vision to acquire and disseminate information from autonomous sources in support of sustainable forest management. It is a set of conventions for shared information management by independent parties as network nodes via web enabled service. Its main objectives are to provide ready access to the most current, consistent and reliable forest resources information on spatial and non-spatial data base on forest cover and forest types and other forestry layers of the country. This will be available on web enabled interactive Geographic Information support system (GIS).

This will help in planning, implementation and real time monitoring of different schemes. It will act as an effective administrative tool for transparency aiding in socially inclusive and responsive public service. The types of information would include forest growth and classification in the country over a time line, health and assessment of forests for varied stress factors and climate monitoring and carbon sequestration in forests.

The Decision Support System (a subset of NFIS), under preparatory stage presently, will provide information of forest cover, forest type and biodiversity richness of recorded forests of the country. It will also provide information about the Protected Areas including corridors for all the states of the country. All the information shall be accessible through FSI Geoportal.

### Real Time Monitoring of Forest Fires

Since year 2004, Forest Survey of India has been monitoring forest fire across the country on near time basis using MODIS satellite data (Moderate-Resolution Imaging Spectrometer) and GIS based technology.

From year 2012, FSI under a collaboration program with NRSC/ISRO, National Remote Sensing Centre started disseminating fire signals on Real Time basis. Under the program, signals received from NRSC were filtered, followed by value addition and disseminated to State Forest Departments. In addition, the signals were being 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 have been a major achievement in fire monitoring exercise.

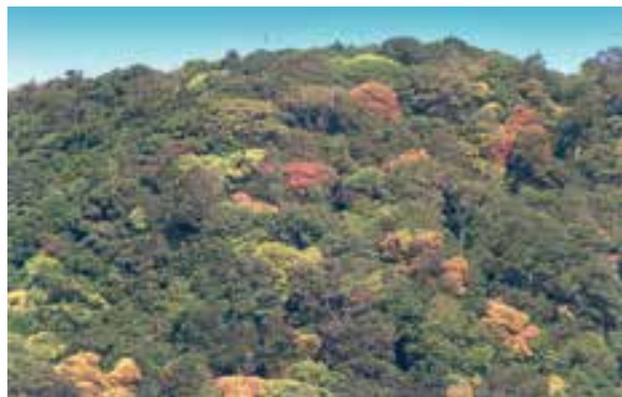
## Project for Forest Cover Mapping and Inventory of Forest/Tree Resources in Nagaland

In order to help Nagaland state, which has forest cover of 12,868(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 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.

Forest Survey of India has imparted field training to forestry personnel of the state on these aspects to enable them to carry out the field work while arrangement for quality controls and quality assurance done by FSI. The data processing and image processing work completed by FSI. The outcome of the 18 month project were district wise forest cover map, forest type map, shifting cultivation map, slope map aspect map, drainage map, DEM map, relief map, road map, settlement map and forest cover draped digital elevation model at 30 m interval. In addition, an inventory report for the forest as well as non forest areas also prepared for Nagaland state.

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

In order to help Nagaland state, which has forest cover of 12,868(77.61% of the states geographical area) for preparation of Working



**Fig-8.** A view of Dense Evergreen Forest

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 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.

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## CAMPA and e-green watch

A Workshop on e-Green Watch for Compensatory Afforestation and Fund Management and Planning Authority (CAMPA) nodal officers of State Forest Departments was held on 21.01.2013 at Forest Survey of India, Dehradun. The workshop was a follow up to a series of meetings and workshops held between the Ministry of Environment & Forests (MoEF), Forest Survey of India (FSI), State Forest Departments (SFDs) and National Informatics Centre (NIC). The meeting was chaired by Sh. A.K. Wahal, Director General, Forest Survey of India and attended by other officials like Dr. R.B.S Rawat, PCCF, Uttarakhand, Sh. D. Sharma, PCCF, Chhattisgarh and other senior officers from different States Forest Departments of the country along with representatives from NIC, Delhi and Bhopal. Director General, Forest Survey of India stressed that the monitoring being planned through e green watch web portal of FSI utilizing the geospatial data from the states was the need of the hour as it would bring about transparency into the system besides improving the qualitative output. In all, 21 senior officers from 17 States of the country participated in the workshop.

Another Workshop on e-Green Watch for CAMPA (Compensatory Afforestation and Fund Management and Planning Authority) officials of State Forest Departments was organized for two days i.e. 14th –15th February, 2013 at Forest Survey of India, Dehradun. This workshop was a follow up to the previous Workshop held on 21<sup>st</sup> January, 2013. It aims was to train the officials attached to the nodal officers who are actually involved in the data entry operations. The meeting was chaired by Shri A.K. Wahal, Director General, Forest Survey of India and attended by officials from 24 States Forest Departments of the country

along with representatives from NIC, Delhi and Bhopal. In all, 45 participants from 24 States of the country participated in the workshop.

After the February 2013, workshop a Standard Operating Procedure (SOP) for digitization of forest boundaries for working plans was prepared and sent to SFDs by e-mail.

The layers have been uploaded for 5 pilot states on FSI portal, are Forest Cover Map, Forest Type Map, time series data (LISS-III) for years 2004, 2006, 2008. Six states were added later on, out of which Forest Cover Map and Forest Type Map layer have been uploaded for four States on FSI Portal i.e, Maharashtra, Uttar Pradesh, Chhattisgarh and Odisha to monitor the polygons under different schemes

e-Green Watch was operationalized by Odisha on 31<sup>st</sup> August, 2013. FSI and NIC participated in that occasion, a training on GPS was conducted by FSI, Dehradun in Odisha from 25<sup>th</sup> of Sept. to 29<sup>th</sup> Sept. 2013. FSI, resource persons trained around 168 officers of Odisha State Forest Department.

e-Green Watch was operationalized by Punjab on 7<sup>th</sup> Nov. 2013 and training was provided to Punjab State Forest officials comprising of about 100 persons in Mohali, Chandigarh. FSI and NIC participated at that occasion.

e-Green Watch was operationalized by Himachal Pradesh at Shimla on 8<sup>th</sup> Nov. 2013 and training was provided to Himachal Pradesh State Forest officials comprising of 30 persons in Shimla. FSI and NIC participated at that occasion.

## Web GIS based Decision Support System

The committee on Allocation of Natural Resources (CANR) which was setup in

pursuance of decision of the Group of Ministers (GoM) on "Measures that can be taken by the Government to tackle corruption" *inter-alia* recommended as: *The committee recommends evolving a scheme for reformed linked capacity building of state forest departments with a view to improving accessibility of information, improving the predictability and reducing the time taken for clearances."*

The Ministry after examination of recommendation observed that in pursuance to the order passed by the Hon'ble Supreme Court in the Lafarge matter, the Forest survey of India (FSI) has been assigned the work for creation of a GIS based decision support database containing information on qualitative, quantitative and administrative attributes of forests and external factors having direct or indirect bearing on quality, quantity and management of forests, organized in geo-referenced platforms to facilitate informed, unbiased, and expeditions decisions on management of forests in general, and implementation of the Forest (Conservation) Act, 1980 in particular. Once the decision support database is prepared, it will be made available to the State/UT Governments. Availability of the database will significantly improve accessibility of information, improve the predictability and reduce the time taken at the State/UT level to process the forest clearance applications.

A meeting was held on 24rd April 2013 regarding development of online software. The actual work on the development of the software started in the first week of May, 2013

### **National Spatial Data Infrastructure (NSDI)**

National Spatial Data Infrastructure (NSDI) is a national program monitored by NSDI division of Department of Science and

Technology to build consensus on harmonizing the available country-wide spatial data base to a common set of standards, parameters and to minimize the imparity in data themes among various institutions, organizations across the country. NSDI aims at encouraging collection, aggregation and distribution of spatial data on different themes on a common defined set of standards and formats by different mapping agencies in India. This endeavor of DST is aimed at creating a portal from which users may directly access and buy all kinds of spatial data generated by Indian mapping agencies.

Considering the importance of forest cover in maintaining ecological balance, FSI as an institute under ministry of environment and forests is continuously producing a state of forest report on biennial basis using satellite based remote sensing technology. Metadata Creation in version 2.0 has been completed and has been submitted to NSDI for uploading on NSDI portal.

The Web Server (Application Server) and Database Server have been installed and established as FSI node at Forest Survey of India, headquarters Dehradun. The server would be repository for the entire forestry database that would be available to users through internet. Preparation of data content standard for vegetation theme of FSI was prepared and submitted to NSDI. Web Map Service (WMS) services have also been prepared for Forest Cover of the entire country (state wise) and have been uploaded on NSDI portal. WMS services of India Forest Type Map have been created and uploaded on NSDI portal.

### **Inventory of TOF in Uttarakhand**

Project on inventory of Trees Outside Forest (TOF) in five district of Uttarakhand namely Dehradun, Pauri Garhwal, Nanital,



Udhamsingh Nagar and Haridwar has been taken by FSI in collaboration with Uttarakhand State Forest Department. The data collection work is completed. The data checking and data processing work is under progress.

### **Inventory of TOF Haryana Project**

Forest Survey of India (FSI) has taken a project of Inventory of TOF in all districts of Haryana. This project is also a collaborative project in which field work will be done by Haryana state forest department and other work such as data entry data checking, data processing and report writing will be done by FSI. The data collection work under the project is partially completed.

### **Intensification of Forest Management Scheme (IFMS)**

Forest Survey of India (FSI) has been entrusted with the task of conducting a third party monitoring and evaluation of project "Intensification of Forest Management Scheme (IFMS)" of MoEF. The project assignment consists of monitoring and evaluation of the works of the scheme and preparation of final report portraying complete and comprehensive analysis of effectiveness of activities implemented under the different components of scheme by State Forest Departments (SFDs). The aim of third party evaluation is to evaluate relevance, impact and highlight the changes which are required in the scheme to further improve the effort of Forest Protection. As the field work has already been completed. Mid-term report in this regard has been submitted to MoEF. Final report is under preparation and likely to be submitted by March 2014.

### **Network of Regional Offices**

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 Forest 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.

- Approval of diversion of forest land to the extent of 5 hectares (except mining and regularization of encroachment) and to process cases between 5 hectares to 40 hectares (and mining and regularization of encroachment cases) in consultation with the State Advisory Groups;
- 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.

#### **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.
- Approval of diversion of forest land to the extent of 5 hectares (except mining and regularization of encroachment) and to process cases between 5 hectares to 40 hectares (and mining and regularization of encroachment cases) in consultation with the State Advisory Groups;

- 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/UTs 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-a'-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 Organization involved in implementation of programmes relating to environment; and
- 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.
- 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.
- Verification of nominees for Indira Gandhi Paryavaran Puruskar and other Awards of the Ministry;
- Attending the Court Cases pertaining to the Ministry of Environment and Forests
- Attend to Right to Information (RTI) Applications, general complaints pertaining to environment and forest issues.
- Such other work as may be assigned from time to time.

#### 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.



**Fig-9.** *Cleome chelidonii* – Endemic to Andhra Pradesh & Madhya Pradesh

**Table-9.** The details of Headquarter and jurisdiction of the Regional Offices

S. No.	Headquarter of Regional Office	States 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

The Headquarters Unit in the Ministry at New Delhi is responsible for supervision and coordination of 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 (22 for Headquarters, 36 for Regional Office Shillong and 34 each for Regional Office Bangaluru, 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 the number of cases received and number of cases disposed of by the Regional Offices under the Forest (Conservation) Act, 1980 during the year 2012-13 and 2013-14 (upto 31 December 2013) is given in Table-10.

### Other activities undertaken

- The Regional Office, Shillong conducted a training programme on 28.05.2013 on the issue of uploading of Forest Clearance and Environment Clearance Projects for North Eastern States in the website of Ministry of Environment and Forests through National Informatics Centre (NIC), New Delhi
- The Regional Office, Shillong organized 2<sup>nd</sup> quarter meeting of Nodal Officers on 13.07.2013
- The Regional Office, Shillong also conducted a training Program on "E-Green



**Table-10.** Number of cases received and number of cases disposed of by the Regional Offices under the Forest (Conservation) Act, 1980 during the year 2012-13 and 2013-14 (upto 31 December 2013)

S. No.	Name of Regional Office	FCA			
		2012-2013		2013-2014	
		No. of cases received	No of cases approved	No of cases received	No of cases approved
1	Bangalore	72	65	46	70
2	Bhubaneswar	70	15	48	25
3	Bhopal	201	116	120	85
4	Chandigarh	729	454	450	452
5	Lucknow	326	195	278	185
6	Shillong	91	02	64	23
<b>Total</b>		<b>1489</b>	<b>847</b>	<b>1006</b>	<b>840</b>

watch and monitoring of Forest Clearance for North Eastern States” held on 24<sup>th</sup> and 25<sup>th</sup> of October, 2013 at Imphal with technical support of NIC, New Delhi.

**Financial Achievements:** A statement showing financial targets and achievements for the year 2013-14 is given in Table-11.

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

– Forest Certification has emerged as a voluntary market-driven mechanism in support of Sustainable Forest Management (SFM). Certification initiatives rely on consumers exercising purchasing choice in favour of products labelled as originating from forests certified to have been sustainably managed. Certification and Eco-labeling are the new mantras to enhance the product positioning for a

premium price on one hand and ensuring better forest management practices on the other hand.

- The Ministry constituted a National Working Group / Governing Body to frame the policy guidelines for forest certification for timber and Non-timber forest products. For this purpose, three Committees were constituted to prepare a road map and the necessary criteria and processes for the development of National Certification mechanism in the country. These committees were merged into single committee namely the ‘**National Forest Certification Committee**’ for the development of Certification Criteria, Certification Process and Accreditation Criteria & Process towards Forest Certification of timber, Non-timber Forest Products under the Chairmanship of

**Table-11.** Financial targets and achievements for the year 2013-14 (upto 31.12.2013)

Revenue head		Capital head	
BE (2013-2014)	Expenditure	BE (2013-14)	Expenditure
29.15	11.17	0.50	0.50



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

- Six meeting of the above committee was held during the period from 2008 to 2010 has already held. In the last meeting, it was decided that Chairman will submit a report on forest certification. The Chairman has submitted his report. As per the report, it is recommended to establish a multi-stakeholder non-State Indian Forest Certification Council with due policy and resource support of the Govt. *ab-initio*. The goal should be focused on adopting an appropriate Certification Scheme in order to delay no more to get into the arena of forest certification and to holistically leverage the forest and related resources, products and services through a full-fledged sustainable forest management certification system in place.
- Further, it is also stated in the report that **Forest Certification governing body is to be established with a clear mandate to develop and govern the Indian scheme. Resources should be guaranteed for the start-up period of initial 3 years, after which the scheme should be, and shall become, self-financing. The institutional mechanism should be such that there is ready access to existing knowledge in the country on the development of standards and scheme governance, sovereignty for the forest certification board and its stakeholders, equitable choice of the members of the governing board from the government and non-governmental organization, civil society including academic and research institutions, and a collegiums of eminent persons with expertise and knowledge of forest certification, apart**

**from representatives from industry, traders, local communities and forest dwellers. India should go forward to develop its own national certification scheme which is fully governed in India and "owned" by Indian stakeholders.**

Not only this guarantees India and Indians that they will be making decisions about their forests and related resources, but also that they will be mutually recognized partners to other certification schemes rather than a "subsidiary" or a "branch" of an international organization.

The report was submitted the following decision for consideration of MoEF:-

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

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



firm up the concept of the envisaged Indian Forest Certification Council.

The Hon'ble Minister of Environment & Forests has approved 'in principal' setting up of Indian Forest Certification Council. Accordingly, a draft Cabinet Note was prepared for establishment of Indian Forest Certification Council. The above Cabinet Note is under submission for examination/approval in the Ministry. Thereafter, the Cabinet Note will be circulated to all concerned Ministries for their comments.

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

Non-Timber Forest Products (NTFPs) have tremendous potential and role in the economic, social, cultural and traditional life style of millions of forest dependent people throughout the length and breadth of the world. The subsistence and the livelihood of the tribal and local people largely depends on NTFPs. India has rich heritage of traditional systems and knowledge about the Non-timber forest products including medicinal plants. Indian scholars like Charak, Sushruta, etc have produced remarkable treaties on Indian medicinal plants. NTFPs have thus, provided subsistence to the forest dependent communities in India since time immemorial, but it came into great or prominence in the last two decade due to preference for natural product based medicines, cosmetics, dyes and chemicals, pesticides, fodder, fibre etc. However, as on date there is no data on the no. of species being collected from our forest, the quantum as the manner of collection. This raises serious concerns from the point of view of sustainable bio diversity.

The main objective of the scheme is to carry out assessment, monitoring and

evaluation studies in the broad areas of forest trade, production and disposal of NTFP in the country. Some of the topics identified for carrying out studies under the above scheme are:

- Price related issues of Non-Timber Forest Products especially in context of Import-Export of forestry products and domestic potential.
- Survey of the Removals of fuel-wood and Non-wood Forest Products from the forest areas.
- Survey of Removals of Head-loads from the forest areas.
- Study on the feasibility of establishment of Regulated Timber Market (hats) in select Towns (major timber sale points) etc.
- Production and consumption studies in forestry sector mainly NTFPs.
- Socio-economic dimensions of NTFPs for the livelihood and socio-economic benefit of the people.
- Identification of number of species being collected, its periodicity and its marketability.

Different States are having different priorities for the NTFPs as they have different economic roles to play in the livelihood and socio-economic amelioration of various communities. Some NTFPs have been nationalized whereas a large number of NTFPs are being allowed to be collected as usufruct rights of the tribal and other such communities living inside or in the vicinity of the forests. Due to the lack of any authentic data about the available NTFP resources, it is very difficult to formulate any policy regarding prices, establishment of markets and other such mechanism to safeguard the interest of the people who collect and trade them. Moreover,



the tremendous contribution of NTFPs towards the Gross Domestic Product (GDP) has remained unreported. It is therefore, highly essential to assess the NTFP resources which can be done with a coordinated programme at the national level with the active participation of the States. This Scheme is aimed at achieving these objectives.

Although, Planning Commission has suggested that the Ministry of Tribal Affairs, Govt. of India, shall be the nodal and administrative Ministry for operationalizing the Minimum Support Produce. It has also been suggested that accordingly the Allocation of Business Rules of the Ministry of Tribal Affairs be amended to include the subject **“Minimum Support Price (MSP) for Minor Forest Produce (MFP) and other related matters.”** The broad role and responsibility of the Ministry of Tribal Affairs will be to set up a Central Price Fixation Commission, to arrange additional budgetary provision and release funds to State Nodal Department / Procurement Agency for this purpose.

However, the Planning Commission has given the responsibility to the Ministry of Environment & Forests for information regarding data related to MFP such as:-

- Regeneration of dwindling MFP Resources
- Quick assessment of condition of 12-14 important MFPs
- Making available planting material
- Training on sustainable productivity
- Management plans and working plans of MFPs to be drawn up in a transparent manner in consultation with Gram Sabhas

### **Other Works of the Division under mandate that may be mentioned are:**

#### **- Export & Import of forestry products and Tariff structure forestry items**

The Division deals with the formulation of guidelines and directions for domestic and international trade in forest produce and the necessary regulation of export and import of forest produce as per the Foreign Trade Policy as well as the applied Tariff rates. The Division also deals with the issue of NOC for grant of export license for export of wood and wood products for the application received through Directorate General of Foreign Trade, New Delhi. This include Sandalwood, Red Sanders etc.

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

The International Tropical Timber Organisation (ITTO) was established during 1983 and is governed by the International Tropical Timber Agreement (ITTA). The ITTO is a commodity organisation bringing together the producer and consumer member countries to discuss and exchange information and develop policies of all aspects of the World Tropical Timber Economy. The Headquarter of ITTO is at Yokohama, Japan. There are 60 member countries, out of which 33 are Producer member countries and 27 Consumer member countries. India belongs to the group of the producing member countries. The ITTO's membership represents 90% of world trade in tropical timber and 80% of the world's tropical forests.

The ITTO members in 1990 agreed to strive for International Trade of Tropical Timber from sustainably managed forests by the century's end. This commitment became known as the 'Objective 2000' and a large part of the



ITTO programme of projects and activities are devoted to its achievement. It remains a central goal of the Organisation, supported by renewed efforts to raise the capacity of government, industry and communities to manage their forests and add value to their forest products, and to maintain and increase the transparency of the trade and access to international markets.

The International Tropical Timber Agreement (ITTA), 1994 is being replaced by a successor agreement, i.e. the ITTA 2006. India as a signatory to ITTA 1994 has ratified and deposited the instrument of ratification with the UN Secretary General in New York on 25<sup>th</sup> July, 20/08.

#### – **International Tropical Timber Council (ITTC)**

The governing body of the ITTO is the International Tropical Timber Council, which is composed of all the organization's members. The council is supported by four Committees namely

- ❖ Committee on Economic Information and Market Intelligence
- ❖ Committee on Reforestation and Forest Management
- ❖ Committee on Forest Industry
- ❖ Committee on Finance and Administration

In the Current Financial Year 2013-14, the Ministry has released US \$ 41,844 to ITTO being arrear for Calendar Year 2011, US\$ 1,69,704 being full annual contribution for Calendar Year 2013 and US\$ 30,387 as part payment towards annual contribution for Calendar Year 2012 from the funds of ₹ 1.50 cores provided by International Cooperation (IC) Division for the above purpose.

#### – **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.

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During the current year, a meeting was called in the Ministry with the representative of IIFM on the above three report and as per discussion in the Ministry, IIFM, Bhopal has submitted concise reports to the Ministry which is under examination. The FRI, Dehradun has also submitted its report to the Ministry on 'Revision of National Working Plan Code'. The above report was circulated to all state/UT forest departments and regional office of the Ministry for their comments. The Ministry has conducted the National workshop on Draft Revised National Working Plan code submitted by FRI, Dehradun on 16<sup>th</sup> May, 2013 under the chairmanship of DGF&SS. The workshop was attended by more than 60 participants representing many of the States and Union Territories as well as National Institutes. On the basis of comments/suggestions received in the workshop the Draft National Working Plan code has been revised and the same is under submission for approval. The Ministry has prepared a Draft Cabinet Note for



establishment of Indian Forest Certification Council. The above Cabinet Note is under submission for examination/approval in the Ministry.

– **Asia Regional Bamboo and Rattan Workshop**

The Asia Regional Bamboo and Rattan Workshop organized by Ministry of Environment and Forests (MoEF), Government of India, in collaboration with the International Network for Bamboo and Rattan (INBAR) from 10th -13th December in New Delhi. The Hon'ble Minister of Environment and Forests has inaugurated the above workshop. The workshop was attended by the representatives by the States Forest Department and representative from INBAR member countries. The workshop provided an opportunity to exchange and disseminate the overall scientific and technical human resource potential for green growth and inclusive development based on Bamboo and Rattan resources in the Asia region. The deliberation at the workshop has helped to charter a road map for the bamboo and rattan Sector for the next decades.

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

Andaman & Nicobar Islands Forest & Plantation Development Corporation Limited (ANIFPDCL) is a Government of India Public Sector Undertaking, created in 1977 with the broad objectives of development and managing forestry plantations on the Islands. During the year 2001-02, the Hon'ble Supreme Court of India vide its order dated 10.10.2001 and 07.05.2002 has imposed various restrictions on felling and sale of timber from naturally grown trees in Andaman & Nicobar Islands. Due to this, even the obligatory expenses of

the Corporation, like the payment of salaries, wages etc. were possible only due to the sanction of interest bearing loans every year from the Govt. of India since 2003-04. During the year 2012-13, an amount of ₹11.00 crore was sanctioned and released to ANIFPDCL as an interest bearing loan for making payment of salaries, wages, etc.

The Budget Provision made by Ministry of Finance for the current financial year 2013-14 for loan to ANIFPDCL, Port Blair is only for ₹ 1.00 Crore against earlier provision of ₹11 crore. The Ministry has also sanctioned and released the Budget Provision of ₹1.00 crore to ANIFPDCL, Port Blair. As the amount is too meager of meet the requisite demand, the matter was taken up with Ministry of Finance. With the approval of Ministry of Finance, the Ministry has sanctioned an amount of ₹ 10.00 Crores to ANIFPDCL, Port Blair towards payment of Salary & Wages towards employees/workers of the Corporation.

The Ministry has also prepared a Cabinet Note for revival plan for ANIFPDCL, Port Blair through transfer of ownership from Ministry of Environment & Forests to Andaman & Nicobar Administration with effect from 1st April, 2014. The above Draft Cabinet Note was approved by Hon'ble MEF and same was circulated to all concerned Ministries/Departments to furnish their comments. However, later on the Andaman & Nicobar Administration did not agree to the revival proposal of the ANIFPDCL, Port Blair contained in the Cabinet note largely in the light of orders of Hon'ble Calcutta High Court and instead suggested for closure of the Corporation. Therefore, the Ministry with the approval of Hon'ble MEF has requested the Andaman and Nicobar Administration to submit the detailed proposal for closure of the Corporation. The same is awaited.



**CHAPTER-2**  
**CONSERVATION**

## Environmental Conservation

### Conservation and Management of Mangroves & Coral Reefs

#### Introduction

The Ministry of Environment and Forests 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 (Table-12).



**Fig-10.** Supporting roots of Rhizophora species mangroves

#### Mangroves

Mangroves are plants that survive salinity, tidal regime, strong wind velocity, high temperature and muddy anaerobic soil – a combination of conditions hostile for growth and perpetuation of other plants. They are found in the inter-tidal zones of sheltered shores, estuaries, creeks, backwaters, lagoons, marshes and mud-flats. Mangrove forests are also known as 'Tidal Forests', 'Coastal Woodlands', 'Walking Forest in the Sea', 'Root of the Sea' and 'Oceanic Rain Forests'. Mangroves are the only tall tree forest on the earth, lying between land and sea in tropical and subtropical regions of the world. The mangroves are structurally and functionally unique to have a well developed aerial roots, viviparous germination with water-dispersed propagules, absence of understory, absence of growth rings in the wood, adapted to high salinity, and highly efficient in nutrient retention. The mangroves play prime role in supporting the fishery resources and biodiversity; supplying the forest products such as wood, charcoal, medicine, honey, tourism; removing the pollution from air, water and land; and, protecting the coast against wind, waves, flood and natural calamities.

India has a total mangrove cover of 4,662.56 km<sup>2</sup> i.e. 0.14% of the country's land area, 3% of the global mangrove area, and 8% of Asia's mangroves. Assessment of mangrove area and extent is being done using remote sensing techniques by the Forest Survey of India since 1987. The 1987 assessment, carried at a scale of 1:1,000,000 estimated the overall mangrove area within the country as 4,046 sq km. Since then, these assessments have been continued on a two year cycle. The assessment scale was further refined to 1:250,000 from 1989 to 1999 and 1:50,000 from 2001 onwards. The assessment of 2009 (using 2007 imageries) indicates the mangrove cover in the country to be 4,639 sq km, which is 0.14% of the country's

**Table-12.** Mangrove Sites in India

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

total geographic area. Based on reflectance characteristics, the mangroves are classified into very dense (canopy density more than 70%), moderately dense (canopy density between 40-70%) and open categories (canopy density between 10-40%). The very dense mangroves comprise 1,403 sq km (30.1% of mangrove cover), moderately dense 1658.12 sq. km (35.6%) while open mangroves cover an area of 1,601.22 sq. km (34.3%).

About 59% of the mangrove cover is on the east coast along the Bay of Bengal, 28% on the west coast bordering the Arabian Sea, and 13% on the Andaman and Nicobar Islands. India's mangroves can be broadly categorized into deltaic, backwater-estuarine and insular types. Deltaic mangroves are found along the east coast within the deltas of the Ganges, Brahmaputra, Mahanadhi, Krishna, Godavari and Cauvery Rivers. Estuarine mangroves are found on the west coast in the estuaries of the Indus, Narmada and Tapti Rivers. They are also growing in the backwaters, creeks and neritic inlets of these areas. Insular type mangroves are found in the Andaman and Nicobar Islands. Their growth is supported by tidal estuaries, lagoons and rivulets.

The total number of species recorded in mangroves of India is around 4011 which include 39 mangrove tree species associated with 920 plant species and 3091 animal species. No other country in the world has recorded so many species to occur in the mangrove forests. Globally mangroves are disappearing at 0.66% per year; but, in India, mangrove cover increased by 58 sq. km (2005-07) and 23.34 sq. km (2009-11).

### Coral Reefs

The Indian reef area is estimated to be 2383.87 km<sup>2</sup>. Coral reefs are the skeletons of

stony coral polyps cemented together. Coral reefs form the most dynamic ecosystem, providing shelter and nourishment to marine flora and fauna. They are the protectors of the coastlines and the coastal populations mostly depend on the coral reef ecosystems wherever they are present. The term 'coral' has been used to describe a variety of invertebrate animals of the Phylum Cnidaria including hard and soft corals. However, 'coral' is most often used as the common name for hard corals of the Order Scleractinia. The four major coral reefs areas identified for intensive conservation & management in India are: i) Gulf of Mannar, ii) Gulf of Kachchh, iii) Lakshadweep and iv) Andaman and Nicobar Islands. The emphasis is more on preventive aspects through monitoring and surveillance as the restoration work is both costly and time consuming. The Ministry provides financial assistance to the State Forest Departments for all the four identified coral reef areas for conservation and management of coral and associates. Besides, the Ministry also supports R&D activities with emphasis on targeted research on coral biodiversity, its management and various aspects of pollution in these areas.

### Objectives

- Conservation and management of mangroves and coral reefs;
- Eco-restoration and afforestation in potential and also in degraded coastal areas;
- Maintenance of genetic diversity especially of threatened and endemic species; and
- Creation of awareness on importance of these ecosystems leading to their conservation; and
- Sanctioning of approved annual MAPs of identified Mangrove and Coral Reef sites.



### Activities undertaken so far

The Ministry provides financial assistance under the Scheme for 'Core' and Ancillary' activities in 80:20 ratio. Core and Ancillary activities for mangroves are:

- Survey, assessment and Demarcation;
- Afforestation & Restoration of Mangroves;
- Alternate and Supplementary Livelihoods;
- Protection and monitoring;
- Restoration and regeneration measures;
- Biodiversity conservation;
- Capacity building – Staff training and skills;
- Shelter belt development;
- Sustainable resource development
- De-silting
- Weed control;
- Pollution control;
- Environmental Education & Awareness
- Impact assessment through concurrent & terminal evaluation.

### Core and Ancillary activities for coral reefs are:

- Survey, assessment and Demarcation;
- Capacity building – Staff training and skills;
- Protection and Monitoring;
- Biodiversity conservation;
- Sustainable resource development
- Restoration and regeneration measures;
- Community participation in conservation;
- Alternate/Supplementary Livelihoods and Eco-development activities;

- Environmental Education & Awareness; and
- Impact assessment through concurrent & terminal evaluation.

### Progress/Achievements made during 2013-14

An amount of ₹5.24 crore has been released to various coastal State Govts/UTs under the Scheme during 2013-14.

### Comparison of progress vis-à-vis that achieved in previous years (in case of ongoing schemes) supported by time-series graphs and charts, etc.

Years	2010-11	2011-12	2012-13	2013-14
₹ in Lakh	670.27	704.00	710.00	524.00

According to the Forest Survey of India (FSI) Report titled 'India State of Forest Report (2011)', there has been a net increase of 23.56 km<sup>2</sup> of mangrove cover in the Country in the year 2011, as compared to the 2009 assessment and 56.0 km<sup>2</sup> in the year 2009, as compared to the 2007 assessment. This can be attributed to increased plantations and regeneration of mangroves.

In the first assessment, the estimated extent of the mangrove cover was 4,046 km<sup>2</sup> which was carried out at 1:1 million scale. Subsequently, from 1989 to 1999, the mangrove covers were assessed regularly on a two-year cycle at 1:250,000 scale. Assessment from 2001 onwards has been carried out at 1:50,000 scale. The very dense mangrove comprises 1403 km<sup>2</sup> (30.10% of the mangrove cover), moderately dense mangrove is 1658.12 km<sup>2</sup> (35.57%), while open mangroves cover an area of 1600.44 km<sup>2</sup> (34.33%).

### State-wise status (wherever applicable)

According to the Forest Survey of India (FSI) Report titled 'India State of Forest Report

(2011)’, the mangrove cover in the Country is 4662.56 km<sup>2</sup> which is 0.14% of the Country’s total geographical area. State/UT-wise

mangrove cover as assessed by FSI in different assessments through the years is given in the Table-13.

**Table-13.** State/UT-wise status of mangrove cover

(Area in km<sup>2</sup>)

S. No.	State/UT	Assessment Year												Change w.r.t. 2009
		1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2009	2011	
1	Andhra Pradesh	495	405	399	378	383	383	397	333	329	354	353	352	-1
2	Goa	0	3	3	3	3	5	5	5	16	16	17	22	5
3	Gujarat	427	412	397	419	689	901	1031	911	916	991	1,046	1058	12
4	Karnataka	0	0	0	0	2	3	3	2	3	3	3	3	0
5	Kerala	0	0	0	0	0	0	0	0	8	5	5	6	1
6	Maharashtra	140	114	113	155	155	124	108	118	158	186	186	186	0
7	Odisha	199	192	195	195	195	211	215	219	203	217	221	222	1
8	Tamil Nadu	23	47	47	21	21	21	21	23	35	36	39	39	0
9	West Bengal	2,076	2,109	2,119	2,119	2,119	2,123	2,125	2,081	2,120	2,136	2,152	2155	3
10	A&N Islands	686	973	971	966	966	966	966	789	658	635	615	617	2
11	Daman& Diu	0	0	0	0	0	0	0	0	1	1	1	1.56	0.56
12	Puducherry	0	0	0	0	0	0	0	1	1	1	1	1	0
	<b>Total</b>	<b>4,046</b>	<b>4,255</b>	<b>4,244</b>	<b>4,256</b>	<b>4,533</b>	<b>4,737</b>	<b>4,871</b>	<b>4,482</b>	<b>4,448</b>	<b>4,581</b>	<b>4,639</b>	<b>4662.56</b>	<b>23.56</b>

**Regulatory Acts/Rules governing the programme and promulgation of new acts, if any, alongwith the details.**

Mangroves and Coral Reefs are protected through a range of regulatory measures such as Environment Protection Act (1986), the Coastal Regulation Zone Notification (2011) and IPZ 2011 issued under the said Act, the Indian Forest Act (1927) and the Forest (Conservation) Act, 1980. The protection of mangroves is also ensured through the monitoring of compliance of conditions imposed while according Environmental Clearance by Regional Offices of the Ministry and State Pollution Control Boards (SPCBs) and through the enforcement of emission and effluent standards by industries and other entities by the SPCBs.

The following three tier monitoring system has been developed:

- National, National Committee on ‘Mangroves and Coral Reefs’ under the

Chairmanship of Secretary (E&F) has been constituted;

- State Level Steering Committees have been constituted by the concerned coastal States/UTs. These Committees are chaired by Chief Secretaries/Additional Chief Secretaries/Principal Secretaries of Department concerned, with subject matter departments/academicians/



**Fig-11.** Coral (*acropora humilis*) with mucus strands in Agatti Island, Lakshadweep



stakeholders/representative from Central Government serving as members. The SLSC approves the annual Management Action Plans and also reviews conservation activities undertaken from time to time; and

- A third party independent evaluation is undertaken at the end of the plan period.

### Budget Allocation of the Scheme during the year and Progress of Expenditure

An amount of ₹5.24 crore has been released to various coastal State Govts/UTs under the Scheme during 2013-14.

### Implementing organizations alongwith details of responsibilities

The State Forests Department of all the coastal States/UTs is responsible to implement the MAPs being funded under the CSS on Conservation and Management of Mangroves and Coral Reefs. The research projects are being implemented by recognized Universities and Research Institutions etc.

### Mangroves for the Future - India

- Mangroves for the Future (MFF) is a unique partner-led initiative to promote investment in coastal ecosystem conservation for sustainable development. It provides a collaborative platform among the many different agencies, sectors and countries who are addressing challenges to coastal ecosystem and livelihood issues, to work towards a common goal.
- MFF builds on a history of coastal management interventions, before and after the 2004 Indian Ocean tsunami, especially the call to continue the momentum and partnerships generated by the immediate post-tsunami response. Initially focused on the country's worst-

affected by the tsunami, India, Indonesia, Maldives, Seychelles, Sri Lanka, and Thailand, MFF has expanded to include Bangladesh, Cambodia, Pakistan and Viet Nam. MFF will continue to reach out to other countries in the region that face similar issues, with an overall aim to promote an integrated ocean wide approach to coastal zone management.

- The initiative uses mangroves as a flagship ecosystem, but MFF is inclusive of all coastal ecosystems including coral reefs, estuaries, lagoons, sandy beaches, sea grasses and wetlands. Its long-term management strategy is based on identified needs and priorities for long-term sustainable coastal ecosystem management. These priorities emerged from extensive consultations with over 200 individuals and 160 institutions involved in coastal management. MFF's objectives are supported by 15 Programmes of Work (PoWs) grouped under three pillars of **Apply Knowledge, Empower Civil Society, and Enhance Governance**.
- MFF seeks to achieve demonstrable results in influencing regional cooperation, national programme support, private sector engagement and community action. This will be achieved using a strategy of generating knowledge, empowering institutions and individuals, to promote good governance in coastal ecosystem management.
- Learn more at: [www.mangrovesforthefuture.org](http://www.mangrovesforthefuture.org).

### Mangroves for the Future, in India

The mandate for coordinating and overseeing MFF's national activities lies with the National Coordination Body (NCB) in each member country, which acts in coordination

with existing mechanism for managing coastal areas. The NCB of India was constituted on 22 October 2007 under the chairmanship of Mr. B.S. Parsheera, special Secretary, MOEF, and Government of India. The NCB comprises 14 members representing government, research organisations and private sector.

NCB India developed a National Strategy and Action Plan (NSAP) for MFF implementation in India that reflects national priorities for sustainable coastal development. This 'living' document was prepared by two national consultants, Prof. Kathiresan, an expert on coastal zone management and Mr. Sukhdev Thakur, a renowned forester. The NSAP promotes conservation and management of coastal and marine biodiversity in three important aspects: Coastal Restoration, Coastal Livelihoods, and Integrated Coastal Zone Management. The NSAP identifies five coastal states for priority work, including West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, and Gujarat.

### Small Grants Facility (SGF)

SGF projects aim to support local community action for the restoration and management of coastal ecosystems and their use on a sustainable basis. Apart from providing environmental and livelihood benefits locally, SGF projects also offer practicable *models* to inspire policy-making and give voice to local disadvantaged players, especially women. Projects support emerging theories and new multi-disciplinary approaches that indicate the importance of assessing and actively managing the complex processes that enhance and undermine resilience, as well as the socio-economic drivers and governance systems that shape the use of marine and coastal resources. Thus, SGF projects also contribute concrete measures to ensure participation, gender equity, and increased resilience and secure

livelihoods for marginalized communities. In this way, projects link household and community levels to the dynamics of policy and decision-making regarding coastal area planning and investments.

To date MFF has implemented 16 SGF projects, and is in the process of implementing 5 more. Implementing partners are granted up to USD 25,000 for a project period up to 18 months. List of sectioned and completed projects are given in Annexure-III & IV. List of Ongoing projects under MFF is given in Table-14. For more details visit [www.mangrovesforthefuture/india](http://www.mangrovesforthefuture/india).

### Large Grant Facility (LGF)

LGF projects are larger and longer, with funding ranging up to USD 300,000. The LGF project in India, 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. For more details visit [www.mangrovesforthefuture/india](http://www.mangrovesforthefuture/india)

### Regional Projects

MFF regional projects, implemented by two or more countries, consolidate existing knowledge on best practices in coastal resource management, and conduct research on emerging issues to acquire new knowledge.

**Table-14.** List of Ongoing projects under MFF

S. No.	Project	Implementing Partner	Budget (USD)
1	Rehabilitation of degraded seagrass area in Tuticorin coast of Gulf of Mannar, Tamil Nadu, to support long term conservation of seagrass habitats	Suganthi Devadason Marine Research Institute (SDMRI)	23,389
2	Developing a practicable model through corporate-community participation for successful mangrove restoration activities in Kachchh, Gujarat	Gujarat Institute of Desert Ecology (GUIDE)	18,664
3	Education for coastal and marine biodiversity conservation through schools	Center for Environment Education (CEE)	25,877
4	Strengthened capacity of children, communities, and local government by better preparedness and mitigation of climate change and disaster risks in Kendrapara district, Odisha	Save the Children	19,016
5	Participatory community engagement and education for conservation of mangroves in Palk Bay areas of Ramanathapuram district in Tamil Nadu	Society for People, Education and Economic Development (SPEED)	16,943

The regional project between Sri Lanka and India on the **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 the 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 the 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 the successfully implementing larger conservation programmes, which will be backed by strong policy, legislation and political will.

The project will also complement the regional body of knowledge and facilitate knowledge transfer by ensuring the accessibility of currently available scientific and local knowledge, as well as tools and methodologies to the national and sub-national contexts, practitioners and decision-makers. The project will come to an end in mid-2014. For more details visit [www.mangrovesforthefuture/india](http://www.mangrovesforthefuture/india) Mangroves for the Future India

### Knowledge and Communications Initiatives

MFF India undertakes outreach initiatives with an aim to fill the capacity and knowledge gap at the national, state and local levels around coastal and marine ecosystems.

### Publications

MFF has developed knowledge products including a poster on **India's Coastal and Marine Treasure Chest** of marine faunal

diversity, and children's books on **Mangroves: Soldiers of Our Coasts**, and **Coral Reefs: Rainforests of the Ocean**. The MFF blog, **Fishtales** continues to facilitate learning of India's marine and coastal diversity. MFF has also released a documentary on **Mangroves: Guardians of the Coast** to facilitate a better understanding of the importance of mangroves.

MFF India has similarly developed scientific publications **Towards the Conservation and Management of Mangrove Ecosystems in India**, and **Coral Reefs in India – Status, Threats, and Conservation Measures** for scientists, practitioners and policy makers.

MFF's work in India is multi-dimensional – working at project and policy levels, and at all times being informed by the results of action-research and scientific debate; the outcome of these activities are represented in a publication on **Coastal Sustainability: Learnings from MFF (India) projects**.

### Capacity Building

MFF works with stakeholders to help them develop a better understanding of the tools required to work within coastal conservation, through workshops on scientific writing and project cycle management, and seminars on Integrated Coastal Zone Management (CZM).

### Coastal and Marine Awareness Camp

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 27 and 28 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 including mangroves, coral reefs and seagrass beds; these lessons were further enriched by field trips to the Thanjavur beach, the 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. For more information please visit the MFF website at <http://www.mangrovesforthefuture.org/news-and-media/news/india/2013/learning-about-marine-and-coastal/>

### Regional Symposium

MFF facilitated a regional symposium to explore **Ecosystem approaches to the management and conservation of fisheries and marine biodiversity in the Asia region**. Held in Cochin, Kerala between 28 – 30 October 2013 and attended by over 60 participants from 12 countries, the symposium facilitated the sharing of lessons, knowledge and practical science-based solutions for tackling complex issues, to achieve sustainable fisheries. The Symposium discussions explored multiple and integrated management measures including spatial and temporal protection options. Recommendations and proceedings for the Symposium identify practical actions for future collaborations between partners for local and regional policy influence. (Abstract Booklet)

The Food Agriculture Organization (FAO), Bay of Bengal Large Marine Ecosystem project (BoBLME), United Nations Environmental Programme (UNEP), the Southeast Asian Fisheries Development Center (SEAFDAC) and Central Marine Fisheries Research Institute (CMFRI) worked in partnership with MFF

and MoEF, GOI to organize this symposium. A scientific presentation workshop (on 25 and 26 October 2013) and a fieldtrip to the Ashtamudi wetland system (on 31 October and 1 November) were also organized.

## Biosphere Reserves

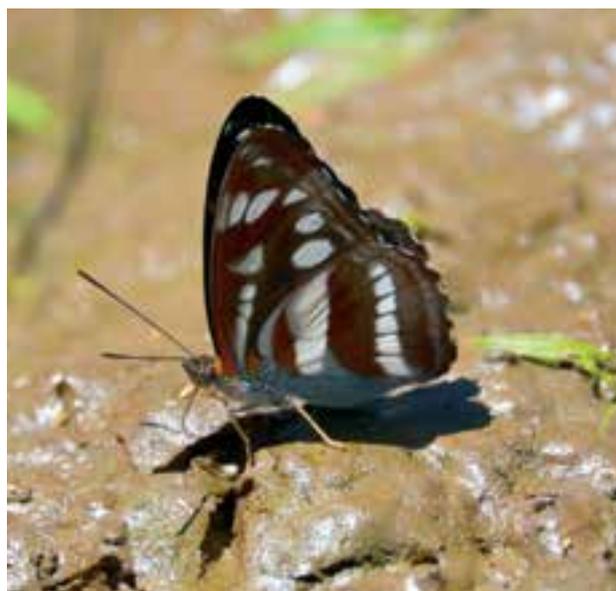
### Introduction and Objective

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 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-15). 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 MoEF 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.



**Fig-12.** Himalyan Sergeant (*Athyma opalina*) in its natural habitat

**Table-15.** List of Designated Biosphere Reserves

S. No.	Name of the BR & total geographical area (Km <sup>2</sup> )	Date of Designation	Location in the State (s)/Union Territory
1	<b>Nilgiri (5520)</b>	1.8.1986	Part of Wynad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani hills in Tamil Nadu, Kerala and Karnataka.
2	<b>Nanda Devi (5860.69)</b>	18.1.1988	Part of Chamoli, Pithoragarh and Almora districts in Uttarakhand.
3	<b>Nokrek (820)</b>	1.9.1988	Part of East, West and South Garo Hill districts in Meghalaya.
4	<b>Manas (2837)</b>	14.3.1989	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darang districts in Assam.
5	<b>Sunderban (9630)</b>	29.3.1989	Part of delta of Ganges & Brahmaputra river system in West Bengal.
6	<b>Gulf of Mannar (10500)</b>	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	<b>Great Nicobar (885)</b>	6.1.1989	Southern most island of Andaman and Nicobar Islands.
8	<b>Similipal (4374)</b>	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	<b>Pachmarhi (4981.72)</b>	3.3.1999	Part of Betul, Hoshangabad and Chhindwara districts in Madhya Pradesh.
12	Khangchendzonga (2619.92)	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 Thiruvananthapuram, Kollam and Pathanamthitta districts in Kerala.
14	<b>Achanakmar-Amarkantak (3,835.51)</b>	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.



## Progress/Achievements made during the year

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

Additional information in respect of Periodic Review 2011 Report of Gulf of Mannar BR, ten years after its inclusion in the World Network of Biosphere Reserves of UNESCO has been conveyed to the MAB Programme, UNESCO, for recommendation of the International Advisory Committee for Biosphere Reserves and thereafter to accept the same by the International Coordination Committee of the MAB Programme, UNESCO.

The concerned States/UT Governments will submit a Comprehensive Management Action Plans from 2014-15 onwards. This Plan is for 3-5 years duration along with annual requirements of funds. The concerned States/UT can utilize the services of Space Application Centers, for keeping track of impact of restoration measures in the core area of the Biosphere Reserve. The livelihood opportunities generated in the buffer of transition zones of the BR, must be sustainable.

Further, a dynamic website for the Biosphere Reserves both in the Ministry as well as at State/UT level will be developed. The websites at the State level shall be appropriately linked with that of the Ministry.

## Comparison of progress vis-a-vis that achieved in previous year (in case of ongoing scheme)

The statement showing comparison is given in Table-16.

## 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.

## Budget allocation for the Scheme during the year and progress of Expenditure

An amount of ₹7.00 crore was allocated and the expenditure incurred upto January, 2014 is ₹ 605.53 lakh.

Implementing organizations along with details of responsibilities:

Implementing organizations are the concerned State(s)/UT Government

**Table-16.** Comparison of progress vis-a-vis that achieved in previous year

S. No.	Activity	2012-13	2013-14 (as on 31.1.2014)
1	Number of Management action plans sanctioned for implementation in the BRs	8	8
2	Completed research projects	1	--
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	2	1



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

## **Biodiversity Conservation**

### **Introduction & objectives**

Under the scheme on the Biodiversity Conservation, 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 Convention on Biological Diversity (CBD) is one of the key agreements adopted during the Earth Summit held in Rio de Janeiro in 1992. The three objectives of the CBD are: conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits arising out of the use of genetic resources. Pursuant to the ratification of the CBD by India on 18 Feb 1994, several steps were initiated to meet the commitments under the Convention, and to realize the opportunities offered by the Convention. These efforts were aimed at bringing the legislative, administrative and policy regimes in tune with the three-fold objectives of the CBD. India enacted the Biological Diversity

Act in 2002 to give effect to the provision of this convention. Under this Act, a National Biodiversity Authority (NBA) has been set up in October, 2003 in Chennai. In 2000, a Cartagena Protocol on Biosafety (CPB) was adopted under the aegis of the 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.

### **Activities undertaken so far**

#### **Convention on Biological Diversity and CoP- Presidency**

- India successfully hosted the eleventh meeting of the Conference of the Parties (COP 11) to the Convention on Biological Diversity (CBD) held from 8-19 October 2012, in Hyderabad, India, following the sixth Meeting of the Parties to the Cartagena Protocol on Biosafety (COP/ MOP 6). The event provided India with an opportunity to consolidate, scale-up and showcase our strengths on biodiversity. The meetings were presided over by Ms. Jayanthi Natarajan, Minister for Environment and Forests, India as the President of CoP-11. The High Level Segment was inaugurated by the Prime Minister of India. The Prime Minister in his speech announced, inter alia, India's ratification of the Nagoya Protocol. The Prime Minister also launched the



- 'Hyderabad Pledge', wherein he announced that the Government of India has decided to earmark a sum of US \$ 50 million during India's Presidency of CoP to strengthen institutional mechanism, enhance the technical and human capabilities for biodiversity conservation in India, and to promote similar capacity building in other developing countries. With this pledge, India became the first Champion under the Hyderabad Call for Biodiversity Champions launched on CBD's website.
- This was the largest ever such conference organized in India. Thousands of delegates representing 175 countries, other governments, UN agencies, intergovernmental, non-governmental, indigenous and local community organizations, academia and the private sector participated in CoP-11. CBD CoP-11 adopted 33 decisions on a range of strategic, substantive, administrative, financial and budgetary issues.
  - Hosting of CoP/MoP-6 and CoP-11 by India is an important milestone, and has been hailed as one of the biggest politico-scientific events in the world. India played an active role in content development and outcome of the conference. In the run-up to CoP-11, special efforts were made to create awareness and local capacity building on biodiversity related issues. A special mention deserves to be made regarding the brand Ambassador of CoP-11, namely, the Science Express Biodiversity Special, a 16 coach train exhibiting India's biodiversity that was flagged off on World Environment Day on 5th June, 2012. This innovative train has played an important role in creating mass awareness on biodiversity. Many visiting delegates expressed desire for something similar in their countries.
  - With the successful hosting of CoP-11, in her two-year Presidency till CoP-12 in October, 2014, India is guiding and steering the implementation of the decisions of CoP-11, and also supporting capacity building initiatives for other developing countries, in addition to strengthening the ongoing efforts for biodiversity conservation at the national level,
  - As incoming Presidency of CoP-11, India also hosted the second meeting of Intergovernmental Committee on Nagoya Protocol (ICNP-2) in New Delhi from 2-6 July 2012 at Vigyan Bhawan in New Delhi. Over 500 participants representing Governments, intergovernmental and non-governmental organizations, local authorities, indigenous and local communities, research community and the private sector participated in this meeting.
- Biological Diversity Act, 2002**
- At the national level, National Biodiversity Authority (NBA) has been established by Government of India in October, 2003 at Chennai (Tamil Nadu) under Section (8) of the Biological Diversity Act. The State Biodiversity Boards (SBB) are to be established by the State Governments and Biodiversity Management Committees (BMCs) to be constituted by the local bodies.
  - The NBA is a body corporate established in accordance with the provisions of Sec.8 of the Biological Diversity Act, 2002, at Chennai w.e.f. 1st October 2003. It is an autonomous, statutory and regulatory organization which is intended to implement the provisions of Biological Diversity Act, 2002.



**Fig-13.** Lesser Three ring (*Ypthima inica*) from Kalatop Wildlife Sanctuary, Himachal Pradesh

- All the Twenty-eight States have so far set up the State Biodiversity Boards (SBBs). -Sixteen states viz. Arunachal Pradesh, Andhra Pradesh, Assam, Gujarat, Rajasthan, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Sikkim, Tripura, Uttar Pradesh and West Bengal have notified the state specific rules in accordance with Section 63(1) of the Act.
- 33,229 BMCs have been constituted by the local bodies in 24 states viz., Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Punjab, Sikkim, Tamilnadu, Tripura, Uttarkhand, Uttar Pradesh and West Bengal.
- So far twenty seven meetings of the Authority were held and important decisions were taken on different matters. Several applications were received and are at various stages of processing during the period.
- In pursuance of Section 38 of the Act relating to notification of threatened species, the Ministry has notified species which are on the verge of extinction for three States, namely, Bihar, Tamil Nadu, Tripura, Andaman & Nicobar and Manipur, during last year, taking the number of States to 16.
- The UNEP – GEF & MoEF, 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 viz., Andhra Pradesh, Gujarat, Himachal Pradesh, Sikkim and West Bengal. The duration of the project is 3 years (April 2011-March 2014). State level launch of the project were held in Andhra Pradesh (Nov 2011), West Bengal (Dec 2011), Gujarat (Feb 2012), Himachal Pradesh (July 2012) and Sikkim (Dec 2012).
- Work was continued under the UNDP project on Strengthening the institutional structures to implement the Act in Madhya Pradesh and Jharkhand.
- Work was also continued for developing a full scale project on established of a Centre for Biodiversity Policy and Law (CEBPOL) at NBA, Chennai, with technical support from Norway. Ministry has conveyed no objection regarding the appointment of a service provider for this project.
- Funds have been accessed from GEF through a direct access project entitled “Strengthening the enabling environment for biodiversity conservation and management in India” to provide assistance in meeting the national reporting requirements to CBD by India which includes, revision of National Biodiversity Strategy and Action Plan (NBSAP) and preparation of fifth National Report for



Biodiversity. Implementation of the project has been started.

## Performance / Achievements made during the year

### Convention on Biological Diversity (CBD) and CoP-Presidency

- MEF in her capacity as the President of CoP-11 attended the Seventh Trondheim Conference held in Trondheim, Norway from 27- 31 May 2013, at the invitation of the Norwegian Minister for Environment; along with an Indian delegation. As was decided in the Trondheim meeting, the outcomes of Conference along with a request to expedite ratification of Nagoya Protocol on ABS were transmitted through a covering letter jointly signed by MEF, Norwegian Minister for Environment and CBD Executive Secretary, to Ministers in charge of all countries.
- India as President of CoP-11 chaired the first meeting of CoP Bureau held in Trondheim on 31<sup>st</sup> May and 1<sup>st</sup> June 2013, and second meeting held in Montreal on 6<sup>th</sup> October, 2013.
- India as President of CoP-11 is working with the CBD Secretariat for expediting ratifications of Nagoya Protocol on ABS, so that the Protocol enters into force during India's Presidency. Towards this, a letter jointly signed by MEF as the CoP President and CBD Executive Secretary was sent to all countries. Further Indian Missions have been approached through MEA to take up the matter with respective countries.
- India as President of CoP-11 chaired the meeting of CBD's Working Group on Article 8j on traditional knowledge held in Montreal from 7-11 October, 2013.
- India successfully hosted three meetings of CBD in Chennai during December, 2013, viz.
  - Second meeting of High Level Panel on Global Assessment of Resources for Implementing Strategic Plan for Biodiversity 2011-2020 from 2-4 Dec.2013;
  - Second Meeting of the Expert Group of Biodiversity for Poverty Eradication and Development from 4-6 December, 2013 from 2-4 December, 2013
  - Sub-regional capacity building workshop for East, South and South East Asia from 3-6 December, 2013.
  - It has been decided to adopt logo of CoP-11 as the new logo of the Ministry of Environment and Forests. Further action in this regard is being taken.
  - A publication on 'Hosting of CoP-11: A Pictorial Presentation', with Foreword by the MEF has been brought out.
  - Contributed USD 90,000, towards meeting of CBD's Working Group on Article 8j on Traditional Knowledge held from 7-11 October 2013 in Montreal.
  - Contributed USD 10,000 towards India's support to International Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) for the year 2013, as CoP President.
  - In the run-up to CoP-11, special efforts were made to create awareness and local capacity building on biodiversity related issues. The brand Ambassador of CoP-11, namely, the Science Express Biodiversity Special (SEBS), a 16 coach train exhibiting India's biodiversity was flagged off on World Environment Day on 5th June 2012. Travelling across India to cover 57 stations,



- the train received 2.2 million visitors. This innovative train played an important role in creating mass awareness on biodiversity.
- Process is under way for establishment of National Biodiversity Museum, and Garden at Hyderabad on the site where Prime Minister unveiled the commemorative Pylon and planted the first tree on behalf of India. Agreement for preparing Detailed Project Report for the Museum was signed on 27 December, 2013.
  - Ambassadors of the countries who were not able to plant trees during CoP-11 at the site of commemorative Pylon for the proposed Biodiversity Garden, have been invited through MEA to visit Hyderabad for planting trees, in coordination with a nodal officer identified by the State Government of Andhra Pradesh.
  - Action is underway to prepare national targets in line with the Strategic Plan for Biodiversity for updating the National Biodiversity Action Plan, and for preparation of India's Fifth National Report to the CBD. Towards this, a zero draft of the document was prepared and discussed in a National Consultation on 30th July, 2013. Thereafter a meeting of the Technical Review Committee was held on 27 December, 2013. Further action to finalize the documents is being taken.
  - Activities are being undertaken to strengthen the institutional capacity of National Biodiversity Authority and State Biodiversity Boards and constitution of Biodiversity Management Committees to enable them to undertake developmental and regulatory activities, as per the mandate of Biological Diversity Act. People Biodiversity Registers are also being prepared by Biodiversity Management Committees in all the States and Union Territories for documenting Traditional Knowledge of local people.
  - International Day for Biodiversity with the theme Water and Biodiversity was celebrated on 2<sup>nd</sup> May 2013. A poster on the theme was also released..
- ### Biological Diversity Act, 2002
- 27th Authority meeting held on 24 to 25th January, 2014.
  - So far 78 applications received during first half of financial year which are at various stages of processing. Further, during this period NBA placed 77 applications (which include applications received during previous years) before Expert Committee for examination. Of which, 14 applications recommended for approval and 29 recommended for closure. Six agreements entered during first half year
  - The first meeting of the National Repositories was held on 8th April 2013 at Hyderabad.
  - On 18th July, 2013 at New Delhi - NBA organized - interaction meeting with Consultative Group on International Agricultural Research (CGIAR) Centre operating on India with an aim of harmonious implementation and interfacing of BD Act, Nagoya Protocol and the ITPGRFA.
  - A discussion meet on BD Act and PPVFRA was held on 17th July, 2013 at New Delhi.
  - A two day workshop organised in Himachal Pradesh for the various Stake holders in April 2013.
  - NBA has supported in preparation of 110 PBRs which are at various stages of completion.

- NBA through UNEP GEF ABS project developed a model PBR for Yeragollapahad grama panchayat, in Warangal District, Andhra Pradesh.
- Five model PBRs are under preparation and NBA has supported in preparation of 110 PBRs which are at various stages of completion.
- A First National Level Meeting on "Valuation of Bio resources for Operationalizing ABS Mechanism" organized by NBA in July 2013.
- 23rd Meeting of expert committee on ABS for processing applications held in April 2013.
- 24th Meeting of expert committee on ABS held in May 2013.
- 25th Meeting of expert committee on ABS held in June 2013.
- 26th Meeting of expert committee on ABS held on August 2013.
- 27th meeting of expert committee on ABS held in November, 2013.
- 4th Expert committee meeting on Agrobiodiversity was held on 8th & 9th April, 2013 at Hyderabad.
- Expert Committee/Key Stake holder consultation on 'Strategies for up-scaling domestic and International Trade in Herbal Products & Medicinal Plant Resources' as part of the preparation of an "Intersectorial Strategy and Action Plan for the Management of Medicinal Plant Resources of India in the 12th FYP" was held on 26th April, 2013 at Chennai.
- A total grant of ₹52,84,005/- was made to 15 SBBs for the celebration of IB Day on May 22, 2013.
- One day meetings with few SBBs were held on 31st July 2013 in Chennai and 1st August 2013 in Pune to discuss the constitution of BMCs and preparation of PBR.
- Regarding Centre for Biodiversity Policy & Law a Technical Assistance Contract was signed between NBA and Norwegian Environment Agency in April 2013 and Norway and India have identified 10 thematic areas to collaborate.
- National Stakeholder consultation on preparation of fifth national Report of the Convention on Biological Diversity and Updation of National Biodiversity Action Plan, in July 2013 at New Delhi.
- A set of 12 Draft National Biodiversity Targets has been developed.
- A Draft 5th National Report has been prepared and circulated for comments.
- Prototype for developing National CHM has been prepared for designing National CHM.
- NBA through UNEP GEF - MoEF ABS Project constituted BMC's in Andhra Pradesh (11), Gujarat (10) and Himachal Pradesh (30). They were nurtured in the area of Biological Diversity Act with special reference to ABS.



**Fig-14.** Emerald Dove (*Chalcophaps Indica*) – at Dudhwa National Park



## Comparison of Progress vis-à-vis that achieved in previous years

**Table-17.** Comparison of Progress vis-à-vis that achieved in previous years

Sl.	2011-12	2012-13	2013-14
1	Following the decision of the tenth Conference of the Parties (CoP-10) to the CBD held in Nagoya, Japan in October 2010, accepting India's offer to host the next CoP to the CBD, preparations for organization of CoP-11 was initiated. Necessary clearances from political and security angles were obtained from the Ministries of External Affairs and Home Affairs, respectively.	India had successfully organized CoP-II at Hyderabad	<ol style="list-style-type: none"> <li>MEF in her capacity as the President of CoP-11 attended the Seventh Trondheim Conference held in Trondheim, Norway from 27- 31 May 2013</li> <li>India as President of CoP-11 chaired the first meeting of CoP Bureau held in Trondheim on 31st May and 1st June 2013, and second meeting held in Montreal on 6th October, 2013.</li> <li>India as President of CoP-11 chaired the meeting of CBD's Working Group on Article 8j on traditional knowledge held in Montreal from 7-11 October, 2013</li> <li>Agreement for preparing Detailed Project Report for the Museum was signed on 27 December, 2013.</li> </ol>
2	After Cabinet's approval, the Nagoya Protocol was signed by India on 11th May, 2011. Thereafter, action has been initiated for ratification of this Protocol	India had ratified Nagoya Protocol on 9 <sup>th</sup> October, 2012 after obtaining Cabinet's approval	India as President of CoP-11 is working with the CBD Secretariat for expediting ratifications of Nagoya Protocol on ABS, so that the Protocol enters into force during India's Presidency. Towards this, a letter jointly signed by MEF as the CoP President and CBD Executive Secretary was sent to all countries. Further Indian Missions have been approached through MEA to take up the matter with respective countries
3	<p>19<sup>th</sup> Authority Meeting conducted in May 2011;</p> <p>20<sup>th</sup> Authority meeting conducted in June 2011;</p> <p>21<sup>st</sup> Authority meeting conducted in August 2011;</p> <p>22<sup>nd</sup> Authority meeting conducted in November 2011.</p> <p>23<sup>rd</sup> Authority meeting conducted in February 2012</p>	<p>24<sup>th</sup> Authority meeting held on 23.5.12</p> <p>25<sup>th</sup> Authority meeting held on 18.9.2012</p> <p>26<sup>th</sup> Authority meeting held on 16.1.2013</p>	27 <sup>th</sup> Authority meeting held on 24 to 25 <sup>th</sup> January, 2014



4	Supported to the tune of ₹14.30 Lakhs to the State Biodiversity Boards for celebrating International Day for Biological Diversity 2011.	Supported to the tune of ₹42.33 Lakhs to the State Biodiversity Boards for celebrating International Day for Biological Diversity 2012	International Day for Biodiversity with the theme Water and Biodiversity was celebrated on 2 <sup>nd</sup> May 2013. A poster on the theme was also released.  A total grant of ₹52,84,005/- was made to 15 SBBs for International Day for Biodiversity celebration
5	So far, 1121 PBRs have been documented in ten states.	So far, 1332 PBRs have been documented in eleven states.	So far, 1901 PBRs have been documented in fourteen states  NBA has supported in preparation of 110 PBRs which are at various stages of completion.  NBA through UNEP GEF ABS project developed a model PBR for Yeragollapahad grama panchayat, in Warangal District, Andhra Pradesh  Five model PBRs are under preparation.
6	So far in 14 States BMCs have been constituted	So far in 20 states BMCs have been constituted	So far in 24 states BMCs have been constituted
7	So far the species which are on the verge of extinction has been notified in the 14 states	So far the species which are on the verge of extinction has been notified in the 15 states and 1 UT (A&N).	So far the species which are on the verge of extinction have been notified in the 15 states and 1 UT (A&N).

2

### 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.

### Budget allocation and progress of expenditure during 2012-13; XII Plan Outlay

Annual Plan (2013-14) Approved Outlay 71.98(BE) and 42.31 (RE), 30 (approx) Actual Expenditure as on 31<sup>st</sup> December, 2013.

### Implementing agencies, along with details of responsibilities

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



## Biodiversity Conservation Scheme

### Introduction

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); and the biosafety component includes activities relating to Genetic Engineering Appraisal Committee and Cartagena Protocol on Biosafety.

### Genetic Engineering Approval Committee (GEAC)

The Ministry of Environment and Forests (MoEF), under the Environment (Protection) Act, 1986 has notified the "Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells, 1989" (Rules, 1989) The rules also cover application of hazardous microorganisms which may not be genetically modified. Hazardous microorganisms include those which are pathogenic to animals as well as plants.

The Genetic Engineering Appraisal Committee (GEAC), the apex body under the Rules, 1989 has the mandate to approve large scale trials and environmental release of Genetically Modified Organisms (GMOs) and ensure that research; development and testing of GMOs prior to environment release are conducted in a safe and scientific manner through appropriate implementation of Rule 1989 and biosafety guidelines.

### Cartagena Biosafety Protocol

The Cartagena Protocol on Biosafety (CPB) was negotiated under the aegis of the Convention on Biological Diversity (CBD) and

adopted on 29th January 2000. India is a party to the Protocol. The Protocol has come into force on 11<sup>th</sup> September 2003. As of date 166 countries are Parties to the Protocol.

The main objective of the Protocol is to ensure safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effect on the conservation and sustainable use biological diversity, taking into account risk to human health.

### 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

### Activities undertaken so far

#### Genetic Engineering Appraisal Committee (GEAC)

All GMOs and products thereof are regulated under Rules 1989 of EPA, 1986. Activities undertaken for implementation of Rules 1989 since inception till March 2013 include:

- Convene monthly GEAC meetings as per schedule for review of applications pertaining to GM technology. So far 117 meetings of the GEAC have been convened.
- Status of GEAC approvals is as follows:



- 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 corn, rice, tomato, potato, castor, rubber, cotton, brinjal, mustard, groundnut, sorghum, okra, wheat, watermelon, papaya, sugarcane, banana etc.
- 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 is in progress since 2002. Central Institute of Cotton Research, Nagpur has been notified as the nodal agency to conduct the post release surveillance.
- A workshop on 'National Consultation on Insect Resistance Management (IRM strategy) in Bt cotton was also 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. Biology documents for other crops have been initiated. .
- Draft guidance document for information/ data generation and documentation for safety assessment of GE Plants during biosafety research level trials -I (BRL-I) and biosafety research level trials-II (BRL-II) has been prepared and is awaiting GEAC approval.
- Ex-ante socio-economic study on Bt brinjal was conducted through NCAP. Report submitted to GEAC.
- Extensive capacity building activities for biosafety assessment and awareness and efficient management of field trials of GM crops at 19 State Agriculture Universities have been completed.



- Review of Rules 1989 to harmonize with the obligations under Cartagena Protocol on Biosafety has been initiated
- To enhance biosafety awareness, electronic 'Biosafety Newsletter' has been introduced. Four issues have been circulated across 4000 stakeholders. The online version is available on the GEAC website (<http://moef.nic.in/divisions/csurv/geac/information.html>).
- Streamlining of the biosafety management system in India through review of existing policies, development of biosafety guidelines, and development of biology guidelines etc has been initiated. These include :
  - Strengthening the monitoring mechanism of confined field trials of regulated GE plants.
  - Preparation of ERA guidelines for environmental risk assessment of genetically engineered crops.
  - 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).
  - Biology documents for Rubber and Indian mustard is under preparation. Further eight more crops such as chickpea, pigeon pea, sorghum, papaya, mustard, tomato, rubber and potato were identified and shortlisted for preparation of biology documents.
  - Development of GEAC website has been completed. The overall structure of the website has been approved and the audit process completed prior to launching of the website.
- Exhaustive counter affidavits have been prepared for several court cases.

### **Cartagena Biosafety Protocol**

- The Cartagena Biosafety Protocol has come into force on 11<sup>th</sup> September 2003. The Conference of the Parties serving as the meeting of the Parties to the Protocol (COP-MOP) currently meets every two years in conjunction with the regular meetings of the Conference of the Parties (COP) to the Convention on Biological Diversity. Six meetings of the COP-MOP have been held so far. The Seventh meeting of COP-MOP is scheduled in South Korea in October, 2014.
- The Sixth meeting of COP-MOP was hosted by India at Hyderabad from October 1-5, 2012. The meeting was presided over by Ms. Jayanthi Natarajan, Minister for Environment and Forests, as the President of CoP-11. The event provided India with an opportunity to consolidate, scale-up and showcase our initiatives and strengths on biosafety.
- Approximately 1300 participants representing nearly 100 Parties to the Protocol and other governments, UN agencies, intergovernmental and non-governmental organizations, academia and industry attended CoP-MoP 6. The CoP-MoP 6 meeting adopted 16 decisions on: compliance; the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress (the Supplementary Protocol); subsidiary bodies; cooperation with other organizations, conventions and initiatives; the Biosafety Clearing-House (BCH); capacity building; the roster of experts; monitoring and reporting; assessment and review; notification requirements; handling, transport, packaging and identification



(HTPI) of living modified organisms (LMOs) (Article 18); unintentional transboundary movements of LMOs (Article 17); financial mechanism and resources; socio-economic considerations; risk assessment and risk management; and the budget. As of date COP-MOP has adopted 113 decisions.

- 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 COP-MOP meetings.
- As a follow-up to the COP-MOP decisions, several initiatives including capacity building and awareness programs to facilitate compliance have been undertaken. The preparatory Regional Meetings/Workshops hosted by India prior to COP-MOP-6 include the following:
  - Workshop on Capacity-Building for Research and Information Exchange on Socio-Economic Impacts of Living Modified Organisms under Cartagena Protocol on Biosafety, 14-16 November 2011.
  - Asia-Pacific Regional Workshop on the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety, 17-18 November 2011.
  - Asia Sub-Regional Training of Trainers' Workshop on the Identification and Documentation of Living Modified Organisms, 21-25 November 2011.
  - South-Asia Conference on Current Approaches to the Environmental Risk Assessment (ERA) of Genetically Engineered Crops was organised jointly with South Asia biosafety Program, DBT and MoEF, 16-18 May 2011 at New

Delhi. The conference was attended by about 180 participants from various stakeholder groups such as members of regulatory bodies; policymakers; scientists from industry, research institutions and universities; students and other organizations.

- In compliance with the reporting requirements, India has submitted its first and second National Reports on implementation of CPB. The national reports were finalized following a consultative approach.
- Several consultative meetings of experts and stakeholders have been convened prior to each COP-MOP meeting to finalize the country position and negotiating briefs.

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

The fifth meeting of COP MOP to the Cartagena Protocol on Biosafety (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 Nagoya Kuala Lumpur Supplementary Protocol, which is being considered as a milestone achievement in multilateral environmental negotiations.

India has signed the Supplementary Protocol on October 11, 2011. As of date 51 countries are signatories to the Supplementary Protocol and 10 countries have ratified the Supplementary Protocol. The Protocol will enter into force on the ninetieth day after the date of deposit of the 40th instrument of ratification, acceptance, approval or accession.

The study to probe the legal implication of ratification of the Supplementary Protocol and

to identify legislative amendments required in the domestic law has been completed. The process of seeking Cabinet approval for ratification has been initiated.

An international workshop on ABS and Liability and Redress in the context of CPB for capacity building of Africa region held in February, 2013 at Bangalore

### Capacity building

As a Party to the CPB, MoEF 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, handling, transport, packaging and identification of LMOs, socio economic considerations and public awareness with an aim to ensure adequate protection of human health and biodiversity from potential harm arising from all LMO-related activities. The FSP document received GEF approval on 8.8.2011 pursuant to which project initiation activities were taken up.

SFC for the Phase-II Capacity Building Project on Biosafety" to strengthen the biosafety management system in India through GEF-UNEP assistance has been approved. The inception workshop and 1st meeting of the Steering Committee was convened wherein the Project Design and Annual Work Plan was approved. The Phase II Capacity Building Project on Biosafety commenced and Project Coordination Unit (PCU) was set up.

To enhance awareness among various stakeholders; three training workshops on use of Biosafety Clearing House (BCH) as a tool for providing information on LMOs was organized with GEF –UNEP assistance.

### Progress/Achievements made during the year

- GEAC has been reconstituted. One meeting of the GEAC was held on April, 2013. Holding of further meetings of the GEAC have been deferred in view of the issues pending before the Hon'ble Supreme Court.
- The Phase II Capacity Building Project on Biosafety has commenced. Project Coordination Unit (PCU) has been set up. Biotech Consortium India Limited has been appointed as the PUC for the project. Consultants and Experts for implementing various activities of the project have been identified.
- Guidance document for generation of biosafety data, environmental risk assessment guidelines, strengthening the pre and post release monitoring mechanism, notification of accredited laboratories for LMO detection etc. have been initiated as part of the Phase II Capacity Building Project on Biosafety.
- Two reports of the Technical Expert Committee constituted by the Supreme Court have been received - one report from 5 Member TEC and another from sixth member, Dr. R.S. Paroda. The matter is also pending final decision of the Supreme Court. The Union of India is in the process of filing a counter affidavit in respect to each of recommendations made in the two reports of T EC.
- Cabinet Note for 'Ratification of the Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress' has been circulated to all the concerned Ministries / Departments. Comments from few departments are awaited.
- Development of Biology documents in respect of 8 crops namely, chickpea, pigeon



- pea, sorghum, papaya, mustard, tomato, rubber and potato is in progress.
- Development of the State of Art GEAC website has been completed. Audit of the website by NIC has been completed and is ready for launching.
  - Guidance document for generation of biosafety data, environmental risk assessment guidelines, strengthening the pre and post release monitoring mechanism, notification of accredited laboratories for LMO detection etc. have been initiated as part of the Phase II Capacity Building Project on Biosafety.
  - Indian delegation attended Asia Regional National Project Coordinators Meeting of UNEP held from 1<sup>st</sup> to 5<sup>th</sup> July, 2013 at Ulaanbaatar, Mongolia to discuss experience and challenges faced in execution of UNEP-GEF biosafety project.
  - South Asia Biosafety Conference jointly with DBT and SABP was convened during 18-20 September, 2013. India participated in the ASIA BCH Workshop in Siem Reap, Cambodia from November 18 to 20, 2013 organized by Korea Biosafety Clearing House (KBCH) in partnership with UNEP.
  - Indian experts have participated in the online discussion forum and other preparation meetings on various thematic areas pertaining to COP MOP 7 agenda.
  - India chaired the online and regional real time conferences on socio economic considerations for Asia- Pacific.

### **Comparison of Progress vis-à-vis that achieved in previous years**

The comparison of progress vis-à-vis that achieved in previous years is given in Table-18.

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

Under the Environment (Protection) Act, 1986, the Rules for Manufacture, Use/ Import/ Export & Storage Of Hazardous Micro Organisms/ Genetically Engineered Organisms or Cells, 1989 were notified by MoEF through Notification No. 621 in Official Gazette of Govt. of India on December 5, 1989.

The implementation of Rules 1989 is being administered by the Ministry of Environment and Forests (MoEF) and Department of Biotechnology (DBT). These rules define the competent authorities and composition of such authorities for handling of various aspects of the rules. Presently there are six Competent Authorities i.e. The Recombinant DNA Advisory Committee (RDAC), Institutional Biosafety Committee (IBSC), Review Committee on Genetic Manipulation (RCGM), Genetic Engineering Appraisal Committee (GEAC), State Biotechnology Coordination Committee (SBCC), District Level Committee (DLC). While RDAC has an advisory role, IBSC, RCGM and GEAC are involved in regulations and SBCCs and DLCs are involved in monitoring.

### **Budget allocation and progress of expenditure during 2012-13**

Annual Plan (2013-14) Approved Outlay (₹ in Crore) 40.50 (RE) 71.98 (BE) Expenditure so far; ₹ 30 crore approx. as on date.

### **Implementing agencies**

Rules 1989 is implemented by MoEF, Department of Biotechnology (DBT), Ministry of Science and Technology. MoEF is primarily responsible for conservation and protection of environment, ensuring environmental and human health safety before release of

**Table-18.** Comparison of Progress vis-à-vis that achieved in previous years

S. No.	2011-12	2012-13	2013-14
1	7 meetings of the GEAC were organized.	1 meetings of the GEAC was organized. The GEAC is in the progress of being re-constituted.	GEAC has been reconstituted.  One meeting of the GEAC was held on April, 2013. Holding of further meetings of the GEAC have been deferred in view of the issues pending before the Hon'ble Supreme Court.
2	Biology documents in respect of 4 crops namely, Okra, Rice, Cotton, maize has been published.	Pursuant to the successful development of biology documents for cotton, rice, brinjal, okra and maize, during the previous review period, development of biology documents for Rubber and Indian mustard is under preparation. Further eight more crops such as Tomato Potato Sorghum Groundnut Chickpea Castor Papaya and Pigeon pea were identified and shortlisted for preparation of biology documents.	Development of Biology documents in respect of 8 crops namely, chickpea, pigeon pea, sorghum, papaya, mustard, tomato, rubber and potato is in progress.
3	Draft guidance document for data generation and documentation during safety assessment of GM Crops during field trials of GM crops has been prepared and is awaiting GEAC approval.	Measures to strengthen the monitoring mechanism of confined field trials of regulated GE plants and Preparation of ERA guidelines for environmental risk assessment of genetically engineered crops have been initiated.	Guidance document for generation of biosafety data, environmental risk assessment guidelines, strengthening the pre and post release monitoring mechanism, notification of accredited laboratories for LMO detection etc. have been initiated as part of the Phase II Capacity Building Project on Biosafety.
4	The development of new GEAC website and development of backend biosafety database to operationalize the new biosafety website was completed and reviewed. Amendments proposed were initiated	Development of GEAC website has been completed. The overall structure of the website has been approved and the audit process has been initiated prior to launching of the website.	Development of the State of Art GEAC website has been completed. Audit of the website by NIC has been completed and is ready for launching.
5	GEF-UNEP Capacity building Project on Biosafety (Externally Aided Project) - received GEF approval on 8.8.2011.	SFC for the project has been approved. The inception workshop and 1 <sup>st</sup> meeting of the Steering Committee was convened wherein the Project Design and Annual Work Plan was approved. Selection of agency to host PCMU is in progress.	The Phase II Capacity Building Project on Biosafety has commenced.  Project Coordination Unit (PCU) has been set up. Biotech Consortium India Limited has been appointed as the PUC for the project.  Consultants and Experts for implementing various activities of the project have been identified.



S. No.	2011-12	2012-13	2013-14
6	<p>Three training workshops to enhance awareness among various stakeholders on use of BCH as a tool for providing information on LMOs was organized with GEF-UNEP support.</p> <p>Organized preparatory regional workshops prior to COP-MOP-6 on Socio-economic impact of LMOs, Supplementary Protocol on liability and Redress in respect of damage from transboundary movements of LMOs, LMO detection and Environmental Risk Assessment (ERA) of Genetically Engineered Crops.</p>	<p>Two consultative meetings for finalizing the country position for CoP-MoP-6 at Hyderabad were convened.</p> <p>CoP-MoP-6 was successfully completed in October, 2012.</p> <p>During COP-11 Presidency, an international workshop on ABS, TK and Liability and Redress in the context of CPB for capacity building of Africa region is scheduled in February, 2013 at Bangalore</p>	<p>Indian delegation attended Asia Regional National Project Coordinators Meeting of UNEP held from 1<sup>st</sup> to 5<sup>th</sup> July, 2013 at Ulaanbaatar, Mongolia to discuss experience and challenges faced in execution of UNEP-GEF biosafety project.</p> <p>South Asia Biosafety Conference jointly with DBT and SABP was convened during 18-20 September, 2013.</p> <p>India participated in the ASIA BCH Workshop in Siem Reap, Cambodia from November 18 to 20, 2013 organized by Korea Biosafety Clearing House (KBCH) in partnership with UNEP.</p> <p>Indian experts have participated in the online discussion forum and other preparation meetings on various thematic areas pertaining to COP MOP 7 agenda.</p> <p>India chaired the online and regional real time conferences on socio economic considerations for Asia- Pacific.</p> <p>India will also be represented in the AHTEG meeting in Seoul, Korea on 17-21 February, 2014 which is expected to examine the outcomes of the online forums on socio-economic considerations of LMOs;</p> <p>The agenda and information document for COP MOP 7 is yet to be received.</p>
7	<p>Four consultative meetings to validate second National Report were convened.</p> <p>The second National Report on implementation of CPB was submitted in December 2011.</p>	<p>Preparation for the third National Report as a follow-up to the COP-MOP 6 decision would be initiated in due course</p>	<p>Preparation of the 3<sup>rd</sup> national report will commence in the third quarter of 2014 on the basis of COP-MOP 7 decisions.</p>
8	<p>The process for review of Rule, 1989 is in progress.</p>	<p>Review of biosafety regulation in India is in progress.</p> <p>Interim Report of the Technical Expert Committee constituted by the Supreme Court and recommendations of the Standing Parliament Committee on Agriculture and the Scientific Advisory Council on Biotechnology on Agriculture of the Prime Minister to strengthen the biosafety regulations in India have been received.</p>	<p>Two reports of the Technical Expert Committee constituted by the Supreme Court have been received - one report from 5 Member TEC and another from sixth member, Dr. R.S. Paroda.</p> <p>The matter is also pending final decision of the Supreme Court.</p> <p>The Union of India is in the process of filing a counter affidavit in respect to each of recommendations made in the two reports of T EC.</p>



S. No.	2011-12	2012-13	2013-14
		The interim report was not accepted by the Ministry and detailed objections were file in Supreme Court by Union of India.	
9	India became a signatory to the Nagoya Kula Lumpur Supplementary Protocol on 11 <sup>th</sup> October, 2011.  A study has been commissioned to probe the legal implication of ratification of the Supplementary Protocol and to identify legislative amendments required in the domestic law.	The study to probe the legal implication of ratification of the Supplementary Protocol and to identify legislative amendments required in the domestic law has been completed and reviewed in two consultative meetings.  The process of seeking Cabinet approval for ratification has been initiated.	Cabinet Note for 'Ratification of the Nagoya Kula Lumpur Supplementary Protocol on Liability and Redress' has been circulated to all the concerned Ministries / Departments. Comments from few departments are awaited.  Follow up action is in progress.

genetically modified organisms (GMOs) and products thereof. The mandate of the DBT is to promote biotechnology, provide services in areas of research, infrastructure, generation of human resource and formulation of guidelines and protocols for safety assessment of GMOs.

Under the Rule, approval for research and development of GMOs are being regulated by RCGM, administered by Department of Biotechnology (DBT). Whereas, experimental trials and environmental release of GMOs are appraised and approved by GEAC administered by MoEF.

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

#### **Introduction**

Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP) Project, being implemented as a Centrally Sponsored Scheme, aims at biodiversity conservation and participatory rural livelihood improvement in select landscapes including wildlife protected areas and surrounding

production land in different biogeographic zones of India. Development of Joint Forest Management and eco-development in some States are models of new approaches to provide benefits to both conservation and local communities. The project intends to build on these models and expand lessons to other globally significant sites in the country to strengthen linkages between conservation and livelihoods of forest based communities as well as to enhance the local and national economy. The project is being implemented at two landscapes: (i) Askot, Uttarakhand; and ii) Little Rann of Kachchh, Gujarat; three Field Learning Centres (FLCs) (iii) Gir Wildlife Sanctuary, Gujarat (iv) Periyar Tiger Reserve (PTR), Kerala (v) Kalakad Mundanthurai Tiger Reserve (KMTR), Tamil Nadu and (vi) a National Capacity Building Centre at Wildlife Institute of India, Dehradun.

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.

The Project was launched on July 2011 for a duration of six years. The total outlay of the project is US\$ 31.02 million (around Rupees 139.59 crore) with the following financiers:

Cost	Financiers
US \$ 15.36 million (69.12 cr)	- IDA
US \$ 08.14 million (36.63 cr)	- GEF
US \$ 06.59 million (29.65 cr)	- GOI and States
US \$ 0.93 million (4.19 cr)	- Beneficiaries
<i>1 US\$ has been calculated @ Rs. 45.</i>	

### Activities Undertaken

- Five World Bank Missions so far – almost twice a year.
- Review Meeting on 4-5 January 2013 at Wildlife Institute of India, Dehradun.
- APO finalisation workshop on 17-18 April 2013 at New Delhi.
- National Workshop on Landscape Approaches for Biodiversity Conservation and Rural Livelihood Improvement on 8-9 July 2013 at India Habitat Centre, New Delhi.
- National and Site Level Workshops on Inter-linkages with the Line Departments for Mainstreaming Biodiversity Conservation on 19-20 September 2013 at Indian Institute of Management, Ahmedabad and Bajana, Surendra Nagar, respectively.
- Field Review by Deputy Director and Monitoring & Evaluation Specialist of the Project in September 2013 at Little Rann of Kachchh.
- Field Review by Dr. Ashish Kumar, Deputy Director in November 2013 at Periyar and KMTR FLCs.
- Shri Hem Pande, Additional Secretary visited Askot Landscape two times during last six months and held meetings of all concerned officers including District Collectors of Pithoragarh and Almora Districts.
- Shri Shashi Shekhar, Additional Secretary and Dr. J.R. Bhatt, Adviser visited LRK Landscape during December 2013.

### Achievement during the year

- Formulation of Societies at project sites and Signing of MoUs with Implementing Agencies in four different states namely, Gujarat, Kerala, Tamil Nadu and Uttarakhand.
- Finalisation of two new Landscape sites (Agasthyamalai in Tamil Nadu & Kerala; and Satpura in Madhya Pradesh & Maharashtra) through a country-wide consultation process wherein >100 experts from various institutions and NGOs participated.
- 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.
- Biological Indicator study in Askot Landscape is underway along with development of monitoring protocols and initiation of participatory monitoring.
- A side event organised at CBD-CoP 11 at Hyderabad in October 2012.
- Trainings of staff for preparing micro-plans through Model Micro-plans at both landscapes.



- 75 micro-plans are ready in LRK landscapes, and of them, Entry Point Activities have been started in 48 villages around Wild Ass Sanctuary
- 16 Project personnel, along with 2 RFOs and 9 Foresters are assisting DFO
- Various meetings, workshops related to livelihood and biodiversity conservation
- Learning centres have prepared several draft manuals and resource material
- Award of contract for 'Landscape level Mapping' between Landscape Society and GEER Foundation is in final stages.

#### **Budget allocation and expenditure during 2013-14**

The budget allocation of the scheme was ₹500.00 lakhs (Plan) against which an expenditure of ₹371.25 lakh has been incurred till 31.12.2013.

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

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

of 21<sup>st</sup> century, the issue of 'taxonomic impediments' needs to be addressed urgently.

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

- Survey, collection 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 imported 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

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

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

24. Insects: miscellaneous order
25. Arachnida
26. Oomycetes and cellular slime moulds
27. Protozoa and sporozoa
28. Annelida
29. Meiofauna
30. Research in animal biosystematics and advanced training in taxonomy

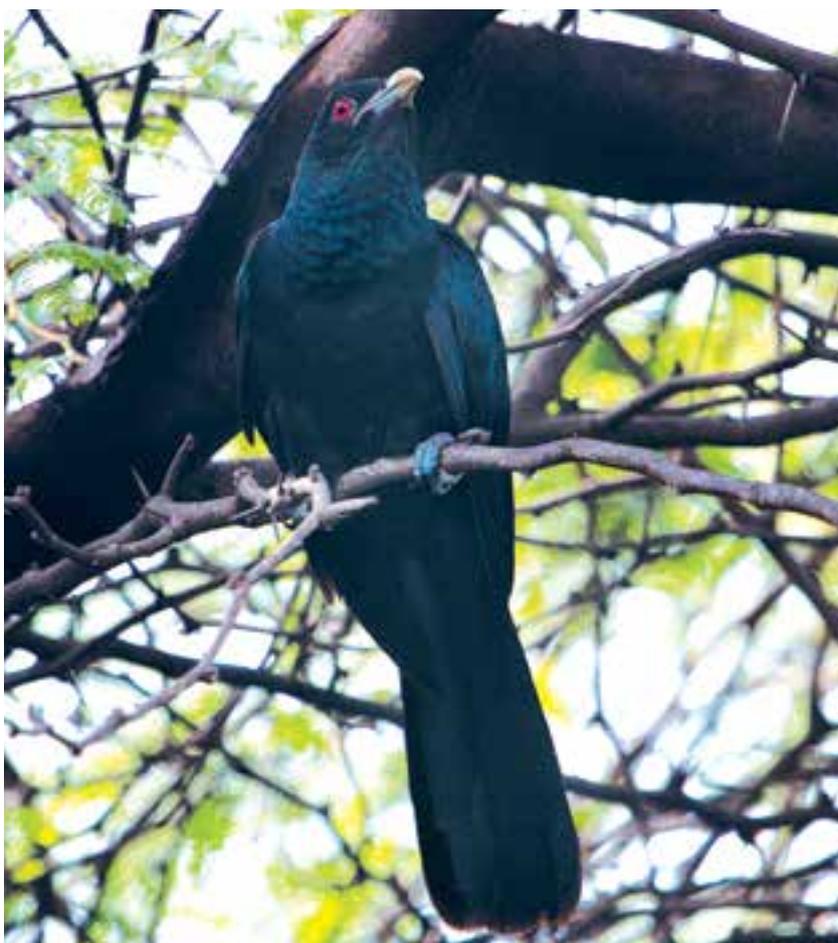
Of the aforesaid 30 thematic areas, only 15 could be implemented so far. The work of the thematic areas of AICOPTAX was assigned to 15 coordinators along with 61 collaborators. The coordinators also oversee and monitor the activities for achieving the aims and objectives outlined in the thematic areas. The remaining 15 thematic areas are in the process of being taken up for investigation under AICOPTAX in phased manner.

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



**Fig-15.** Evergreen Himalayan fir (*Abies spectabilis*)

Survey and exploration – Tours undertaken	1323
Number of collections added to national Reference collections	53715
Number of species identified/characterized/ Described	12789
Documentation of flora and fauna (with descriptions)	6759
Human resource development/training in Biosystematics Number of persons trained in taxonomy	450
Number of students enrolled for Ph.D	105
<b>New Discoveries</b>	
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
<b>Publications: Book</b>	7
Research Papers	335
Book chapters	61
Popular articles	14
Papers accepted for publication	118
Training/awareness Workshops organized	12



**Fig-16.** Common Cookoo Bird

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

#### **Progress/Achievements during the year**

Twelve research projects in the following thematic areas have been approved by the Apex Committee on Research in Environment and would be implemented through the respective Coordinating and Collaborating Centres:



**Fig-17.** River Kingfisher (*Alcedo atthis*) – Keoladeo National Park

- Crustacea
- Coleoptera
- Hymenoptera
- Arachnidae

An expert group was constituted for 3rd party evaluation of the AICOPTAX Scheme during XIth Plan period.

### **Budget Allocation and Progress of Expenditure during the year**

During the year 2013-14, so far an amount of ₹1.69 crore against a total allocation of ₹1.70 crore under grant-in-aid head has been released to BSI for disbursement to the coordinating and collaborating centres/institutions for implementation of approved research projects.

### **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 reintroduce said plants in natural habitats in collaboration with State Forest Department on project basis.

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



**Table-19.** List of organizations provided assistance for maintenance of Lead Botanic gardens during 2013-14

S. No.	Name of the grantee Organization
1.	Calicut University, Kerala Dr M.Sabu, Professor, Department of Botany, University of Calicut, Calicut, Kerala -673635
2.	Tejpur University, Tejpur, Assam Dr Alok Kumar Buragonian, Professor, Department of Molecular Biology and Biotechnology, Tezpur University, Napaam, Sonitpur , Assam -784028
3.	G.B. Pant Institute of Himalayan Environment and Development, Uttarakhand Dr Ranbeer Singh Rawal, Scientist-E Biodiversity Conservation and Management, G.B. Pant Institute of Himalayan Environment and Development, Uttarakhand Kosi Katarmal, Almora-263643 UK
4.	University of Agricultural Sciences, GKVK campus Bangalore Dr MD Ranjana, Professor and Curator, Botanical Garden and Herbarium, University of Agriculture Sciences GKVK Campus Bangalore -560065 Karnataka
5.	Office of the Divisional Forest Officer, Silviculture Division, Arunachal Pradesh Forest Research & Development Agency, P O . 159, Itanagar 791 111, Arunachal Pradesh
6.	Mangalore University, Mangalagangothri – 574199, Konaje, Karnataka. Dr Krishna Kumar G. Reader, Department of Applied Botany, Mangalore University, Mangalagangothri, MANGLORE 57419, Kanaje , Karnataka.
7.	Kerala Forest Research Institute, Kerala Director KFRI, Peechi-680653 Thrissur, Kerala-680653
8.	University of Agricultural Sciences, GKVK, Bangalore Dr MD Ranjana , Professor and Curator, Botanical Garden and Herbarium , University of Agriculture Sciences GKVK Campus Bangalore -560065 Karnataka
9.	Shivaji University, Kolhapur Dr SR Yadav, Principal Investigator, Department of Botany, Shivaji University Kolhapur -416004 (MS) India
10.	Raibarely Botanical Garden UP Divisional Director, Social Forestry Division, Raibraely UP

conservation of rare endangered, threatened endemic plants. Under the scheme, 363 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.

The Ministry has reconstituted the Expert Group on the scheme in December, 2012.

The Expert Group identifies and recommends proposals received for financial assistance under the scheme and also monitors and reviews progress of the sanctioned projects.

Based on the criteria prescribed in the guidelines, 'Lead Gardens' are being developed in different phyto-geographic zones of the country to provide necessary expertise for smaller gardens. These gardens are expected to be equipped with modern facilities to enable them to perform their responsibilities.



The projects under the scheme are implemented by various Government/Autonomous/Non-Government Organizations maintaining Botanical Gardens and Centres of Ex-situ Conservation. The progress made by these Botanic Gardens is periodically monitored by the Botanical Survey of India which also helps in identification of rare endangered, threatened and endemic plants requiring ex-situ conservation. As per the recommendation of Standing Finance Committee, now the Botanical Survey of India is being the implementing agency for the scheme.

## Forest Conservation

### Background

The Forest (Conservation) Act, 1980 came in to effect from October 25, 1980 which provides for prior approval of the Central Government for diversion of forest lands for non-forestry purposes. In the national interest and in the interest of future generations, this Act, therefore, regulates the diversion of forest lands to non forestry purposes. The objective of the Act is to regulate indiscriminate diversion of forest lands for non forestry uses and to maintain balance between developmental needs of the country and the conservation of natural heritage. The guidelines are issued under the Act from time to time, to simplify the procedures, to cut down delays and to make the process transparent.

### Procedure for Forest Clearance

Heads of the Regional Offices of the Ministry situated at Bengaluru, Bhopal, Bhubaneswar, Lucknow, Shillong and Chandigarh are empowered to grant approvals under the Forest Conservation Act (FCA) for diversion of forest land for non-forestry purposes up to 5 hectare in each case (except for mining and regularization of encroachments),

and to process and make recommendations to the Ministry in cases between 5 hectare and 40 hectare in consultation with the State Advisory Committee. The proposals involving areas more than 40 ha., are to be submitted by the State Governments to the Ministry, and they are examined by the Forest Advisory Committee (FAC), constituted under the Forest (Conservation) Act, 1980 and meets once a month. The present composition is as below:

(i)	Director General of Forests & Special Secretary, Ministry of Environment & Forests	Chairman
(ii)	Additional Director General of Forests, Ministry of Environment & Forests	Member
(iii)	Additional Commissioner (Soil Conservation), Ministry of Agriculture	Member
(iv)	Dr. Ullas Karanth, Centre for Wildlife studies, Bengaluru	Member
(v)	Mr. Mahesh Rangarajan,	Member
(vi)	Dr. Amita Baviskar, Associate Professor, Institute of Economic Growth, New Delhi	Member
(vii)	Inspector General of Forests (Forest Conservation), Ministry of Environment & Forests	Member-Secretary

In the cases where area is more than 100 ha. each, a site inspection by the officers of Regional Office is mandatory before the proposal is examined by the FAC. Keeping in view the recommendations of the FAC, the Ministry makes final decision on diversion proposals stipulating appropriate mitigation measures.

In case a proposal involves diversion of forest land located within a protected area notified in accordance with the provisions of the Wildlife (Protection) Act, 1972, approval of the Standing Committee of the National Board of Wildlife (NBWL) and Hon'ble Supreme Court



**Fig-18.** Evergreen forest cover

is required to be obtained by the concerned user agency before grant of approval under the FC Act. Similarly, in case the forest land proposed for diversion is located within the duly notified eco-sensitive zone around the boundary of a protected area, EIA of the project needs to be placed before the Standing Committee of NBWL. In case eco-sensitive zone has not been notified, 10 km distance from the boundary of such protected area shall be treated as eco-sensitive zone.

To meet development needs of the country, during last 33 years of the existence of the Act, Central Government accorded 23,965 approvals involving diversion of 11,78,195 hectares of forest land. Category-wise breakup of approvals accorded for diversion of forest land diverted for non-forest purpose, as on 12.12.2013, is given in Table-20.

The FC Act is a standing example of the political will of the nation to preserve its precious forest and wildlife wealth. Implementation of the 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 period from 1951-52 to 1975-76 prior to enactment of the Act down to approximately 36,000 hectares per annum during 33 years since the Act came into force, during which the Central Government accorded approvals under the Act for diversion of 1.167 million hectares of forest land for non-forest purpose with adequate mitigative measures, such as creation and maintenance of compensatory afforestation, realization of Net Present Value (NPV), preparation and implementation of wildlife conservation plan etc.



The MoEF is taking following measures to further strengthen the present system for grant of approvals under the FC Act by the Central Government.

Developmental of a GIS based decision support database to facilitate objective and informed decisions on proposals seeking prior approval of Central Government under the FC Act.

Setting up of four new Regional Offices at Dehradun, Ranchi, Nagpur and Chennai, in addition to six existing Regional Offices located at Bengaluru, Bhopal, Bhubaneswar, Chandigarh, Lucknow and Shillong and strengthening of the existing six Regional

Offices, to facilitate detailed/in-depth scrutiny of the proposals involving diversion of forest area more than 5 hectares and up to 40 hectares and all proposals relating to mining and encroachments up to 40 hectares and also to more frequent and intensive monitoring of compliance to conditions stipulated in approvals under the FC Act accorded by the Central Government.

Constitution of Regional Empowered Committee under Chairmanship of the senior most officer not below the rank of the Chief Conservator of Forest, appointed by the Central Government in the Ministry of Environment and Forests at its Regional Offices to deal with

**Table-20.** Category-wise breakup of approvals accorded for diversion of forest land diverted for non-forest purpose (as on 12.12.2013)

Category	No. of Proposals	Area Diverted (Ha.)
Defence	250	48,685
Dispensary/ Hospital	40	115
Drinking Water	1565	3,457
Encroachments	64	3,68,432
Forest Village Conversion	16	41,170
Hydel	501	1,17,467
Irrigation	2120	1,29,910
Mining	1757	1,64,153
Railways	282	8,897
Rehabilitation	48	18,464
Road	6358	51,346
School	143	2,711
Thermal Power Plant	57	6,934
Transmission Line	2425	38,360
Village Electrification	50	178
Wind Power	77	4,286
Others	8209	1,72,629
<b>Total</b>	<b>23,965</b>	<b>11,78,195</b>



the forest conservation matters under the FC Act, and having Conservator of Forest (Central) and three non-official members to be selected from the eminent experts in forestry and allied disciplines as its members, at each of the six existing and four proposed Regional Offices of the MoEF, to facilitate detailed/in-depth scrutiny of the proposals involving diversion of forest area more than 5 hectares and up to 40 hectares and all proposals relating to mining and encroachments up to 40 hectares; and

Formulation of a policy for inspection, verification and monitoring containing a detailed framework for verification of information submitted furnished by the user agency in the applications submitted by them to obtain approval under the FC Act and monitoring of conditions stipulated in approvals accorded under the FC Act.

The MoEF has also requested the States and Union Territories to draw time bound plan for preparation of geo-referenced district forest maps as directed by the Hon'ble Supreme Court in their Judgement dated 6<sup>th</sup> July, 2011 in IAs No. 1868 etc. In Writ Petition (Civil) No. 202 of 1995 in the matter of T.N. Godavarman Thirumulpad versus Union of India and others.

The MoEF is also formulating Rules to stipulate more realistic time-lines for processing of proposals seeking prior approval of Central Government under section 2 the FC Act, at each level in the Central and the State/ Union Territory Governments.

### **General approval of Diversion of Forest Land for small public utility proposals**

To boost the development of underdeveloped area including tribal areas, Ministry accorded general approval under Section-2 of the Forests (Conservation) Act, 1980 for underground laying of electric cable

and wires to individual household, drinking water supply/ water pipelines, telephone lines which involve felling of trees not exceeding 50 numbers per project and are outside the National Parks and Sanctuaries and are laid along the road. The approval is valid till further orders.

As a special measures to boost development of basic infrastructure in Left Wing Extremism (LWE) affected districts in the country, the general approval for diversion of the forest land for the specified public utility development projects has been further relaxed upto 5 hectares in each case, for a period of five years i.e. till 31<sup>st</sup> December, 2015 in 117 LWE Districts. The State Governments have been given power to issue specific approvals and conditions governing such approvals have been specified.

### **Strict Compliance of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**

The guidelines dated 03.08.2009 issued under the Forest (Conservation) Act, 1980 envisage strict compliance of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. The Ministry is ensuring that the forest land is diverted only after the rights, if any, under this Act, are settled.

The MoEF vide its letter dated 05.02.2013 read with 05.07.2013, on representations received from various Ministries to exempt projects like construction of roads, canals, laying of pipelines/optical fibres and transmission lines etc. where liner diversion of forest land in several villages are involved, from the requirement of obtaining consent of Gram Sabha, as stipulated in the MoEF's letter dated 03.08.2009 wherein the MoEF



issued detailed guidelines on submission of evidences for having initiated and completed the process of settlement of rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, in consultation with the Ministry of Tribal Affairs relaxed its advisory dated 03.08.2009 regarding compliance of FRA, 2006 for linear projects to the extent that unless recognized rights of primitive tribal groups/ pre-agricultural communities are being affected, linear projects are exempted from the requirement of obtaining consent of the concerned Gram Sabha(s) as stipulated in clause (c) read with clause (b), (e) and (f) in second para of the MoEF's said letter dated 03.08.2009.

### Mechanism for Compensatory Afforestation

To mitigate impacts of diversion of forest land on the ecology, environment, biodiversity and overall forest cover in the country, the Central Government while according approvals under the Forest (Conservation) Act, 1980 for diversion of forest land stipulates appropriate conditions. In addition to the requirement that the User Agency provides land in compensation, at prescribed scales, it is also made incumbent on them to provide compensatory levies which are in the nature of funds for Compensatory Afforestation/ Additional Compensatory Afforestation/ Penal Compensatory Afforestation/ Safety Zone treatment / Catchment Area treatment/ Net Present Value of forest land diverted. Forest area which are notified as part of national parks/ sanctuaries are allowed to be diverted only with the express approval of the Supreme Court of India and the User Agency is required to pay 5 times/ 10 times of the Net Present Value of the forest land diverted in such cases.

The funds received as compensatory levies in lieu of diversion of forest land, are

held in the name of the respective State CAMPAs [Compensatory Afforestation Fund Management and Planning Authorities] and are managed by the Ad-hoc Compensatory Afforestation Fund Management and Planning Authority. The funds are being kept outside the Consolidated Fund of India. The total funds held in FDs in nationalized Banks as of now are of the order of about ₹31,000 crores including accumulated interest, of which the principal component is about ₹24,000 crores. The funds are released to States on the basis of the Annual Plans of Operation to be submitted by them, with the approval of the State level Steering Committee constituted in terms of the State CAMPA Guidelines which have been approved by the Hon'ble Supreme Court of India and headed by the respective Chief Secretaries and within the annual limit of ₹1,000 crores fixed by the Apex Court.

Towards monitoring and evaluation of the progress and the result of utilization of funds, the following steps have been taken:

- An e-based system for real time monitoring of the works undertaken utilizing CAMPA funds has been assigned to the National Informatics Centre. Of the five States who were taken up in the Pilot phase [Andhra Pradesh, Karnataka, Manipur, Sikkim and Tripura] the Project has been launched in Andhra Pradesh and Karnataka. In the remaining Pilot States, and also the other States in the country, is under consideration;
- A 'Quarterly Progress Report', to be sent by all States/ UTs at the end of every quarter has been prescribed. Releases to State CAMPAs are being made subject to satisfactory reflection of the utilization, in these 'returns';

# 2



- Instructions have been issued to all States/UTs that the GIS coordinates of all works undertaken utilizing CAMPA funds has to be furnished before further releases can be considered;
- Video Conferences are held with all States and UTs and one was held exclusively for CAMPA on 1<sup>st</sup> October, 2013.

The details of funds available in the principal accounts of various States/UTs and the share of each State/UT for the year 2013-14 is shown in Table-21.

Based on the comments received from various Ministries/ Departments and observations/ recommendations of the C&AG, the MoEF formulated a revised draft CAMPA Order, 2014 containing provisions for constitution of Regular Compensatory Afforestation Fund Management and Planning Authorities. Salient features of the draft CAMPA Order, 2014 are as follows:

- The National CAMPA and the State CAMPAs will be authorities as provided in Section-3 of the Environment (Protection) Act, 1986;
- The "National Compensatory Afforestation Fund" and the "State Compensatory Funds" shall be non lapsable, non alienable, dedicated, interest bearing fund in the name of the National CAMPA or the concerned States respectively. However, to minimize interest burden on the exchequer, the National Compensatory Afforestation Fund Planning Authority and the State Compensatory Afforestation Fund Planning Authority may invest surplus funds available in the National Compensatory Afforestation Fund and the State Compensatory Afforestation Fund respectively, as may be assessed

by the Central Government and the State Government respectively, subject to such guidelines as may be issued by the Governing Body of the National Compensatory Afforestation Fund Management and Planning Authority.

- Main function of the National CAMPA is to provide policy, technological/ scientific support; accord technical, administrative and financial approval to Annual Plan of Operations (APO) of the respective State CAMPAs; monitor and evaluate the works executed by State CAMPAs and execute specific schemes having country-wide implications such as setting up of institutes, societies, centres of excellence in the field of forest and wildlife, pilot schemes, standardization of codes/ guidelines, etc., for the forest and wildlife sector.
- Corpus of accumulated funds presently available with the ad-hoc CAMPA will first be transferred to National CAMPA, which in turn will transfer ninety five percent of the accumulated funds to the concerned State CAMPAs. The balance five percent funds will be utilized by the National CAMPA to meet its administrative and other expenses, monitor and evaluate activities of State CAMPAs and to execute specific schemes as indicated in para above with approval of the National CAMPA Advisory Council.
- State specific activities for compensatory afforestation, catchment area treatment plan, wildlife conservation plan and other activities for conservation, preservation and development of forest and wildlife, from NPV funds will be undertaken by the State CAMPA as per the APO duly approved by the National CAMPA.
- Funds to be realised from the user agencies in respect of the forest land diverted in

**Table-21.** Statement showing proposed allocations of CAMPA funds to States/UTs against Annual Plans of Operation for the year 2013-14

Sl. No.	State/UT	Principal fund (31.03.2013)	Funds to be allocated
1	Andaman & Nicobar Islands	10,58,94,172.00	50,00,000.00
2	Andhra Pradesh	1857,64,32,255.48	92,00,00,000.00
3	Arunachal Pradesh	959,72,17,047.74	47,50,00,000.00
4	Assam	265,14,08,641.84	13,00,00,000.00
5	Bihar	223,00,60,533.57	11,00,00,000.00
6	Chandigarh	1,76,78,781.00	8,50,000.00
7	Chhattisgarh	2230,44,81,054.39	110,00,00,000.00
8	Dadra & Nagar Haveli	5,10,36,831.00	25,50,000.00
9	Daman & Diu	71,10,100.00	3,50,000.00
10	Delhi	31,37,86,238.00	1,50,00,000.00
11	Goa	130,23,75,656.58	6,50,00,000.00
12	Gujarat	565,58,04,299.00	28,00,00,000.00
13	Haryana	398,89,84,011.60	19,50,00,000.00
14	Himachal Pradesh	1075,23,30,961.00	53,50,00,000.00
15	Jammu & Kashmir	190,12,99,997.28	9,50,00,000.00
16	Jharkhand	1959,14,00,244.87	97,50,00,000.00
17	Karnataka	699,99,87,288.00	34,50,00,000.00
18	Kerala	23,80,67,591.58	1,50,00,000.00
19	Madhya Pradesh	1794,33,59,138.00	89,50,00,000.00
20	Maharashtra	1563,75,83,167.50	78,00,00,000.00
21	Manipur	94,19,60,156.00	4,50,00,000.00
22	Meghalaya	104,01,10,822.00	5,00,00,000.00
23	Mizoram	65,53,03,719.00	3,00,00,000.00
24	Nagaland	14,622.00	-
25	Odisha	3635,22,60,892.00	180,00,00,000.00
26	Punjab	437,47,74,479.15	21,50,00,000.00
27	Rajasthan	698,94,35,407.85	34,50,00,000.00
28	Sikkim	191,68,32,862.00	9,50,00,000.00
29	Tamil Nadu	44,46,46,943.00	2,00,00,000.00
30	Tripura	75,71,55,616.00	3,50,00,000.00
31	Uttar Pradesh	577,47,09,489.86	28,50,00,000.00
32	Uttarakhand	1237,04,20,569.65	61,50,00,000.00
33	West Bengal	79,52,36,473.00	3,00,00,000.00
<b>Total</b>		<b>21227,91,60,061.94</b>	<b>1050,37,50,000.00</b>



their favour will henceforth be credited by the State Government directly to the State CAMPA. Five percent of these funds received by the State CAMPA during a year, will however, be transferred to the National CAMPA to meet administrative and other expenses of the National CAMPA and to execute activities indicated above.

### **Good practices adopted to ensure transparency**

Good practices have been adopted to ensure transparency in the system of forestry clearances. Monitoring mechanism for grant of the forestry clearances has been strengthened. Agenda and minutes of Forest Advisory Committee Meetings, important Guidelines and modifications are being regularly placed and updated on Ministry's website. The status of all proposals received in the Ministry is also available in the public domain.

The Ministry is also starting a web-based system of Online Monitoring of Forest Clearances. The Online Monitoring of Forest clearances is a work flow based application being developed for monitoring the proposals submitted by User Agencies for seeking forest clearances for diverting forest land for non-forestry purposes. This software application will be used by all State Forest Departments, Regional Offices and headquarter at Ministry of Environment & Forests to feed and update the data pertaining to their level. This software application will contain a database of all forest land diversion proposals submitted to the Ministry.

### **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 including court cases, RTI applications and Parliament Matters concerning the above.

### **Progress/Achievements made during the year**

- 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.

### **List of autonomous, attached and regional offices with updates under the administrative control of Division**

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

- The Indian Council of Forestry Research and Education (ICFRE) an autonomous organization under the Ministry of Environment & Forests, and its Institutes/Centres namely:-
  - Forest Research Institute, Dehradun
  - Arid Forest Research Institute, Jodhpur
  - Forest Research Centre, Hyderabad



- Forestry Research & Human Resource Development Centre, Chhindwara
- Himalayan Forest Research Institute, Shimla
- Institute of Forest Genetics and Tree Breeding, Coimbatore
- Institute of Forest Productivity, Ranchi
- Institute of Wood Science and Technology, Bengaluru
- Rain Forest Research Institute, Jorhat
- Tropical Forest Research Institute, Jabalpur
- Forest Survey of India (FSI), Dehradun and its following four Zonal Offices as indicated below:-
  - Central Zone, Nagpur
  - Eastern Zone, Kolkata
  - Northern Zone, Shimla
  - Southern Zone, Bengaluru
- Wildlife Crime Control Bureau (WCCB) and its Regional Offices at:-
  - Chennai, Southern Region
  - Kolkata, Eastern Region
  - Mumbai, Western Region,
  - Jabalpur, Central Region
  - New Delhi, Northern Region
- Directorate of Forest Education (DFE) including following State Forest Colleges;-
  - Central Academy for State Forest Service, Dehradun (Uttarakhand)
  - Central Academy for State Forest Service, Coimbatore (Tamil Nadu)
  - Central Academy for State Forest Service, Burnihat (Assam)
  - Eastern Forest Rangers College, Kurseong (West Bengal)
- National Zoological Park (NZN), New Delhi
- Indira Gandhi National Forest Academy (IGNFA), Dehradun

## Strengthening of Forests Division

### Introduction

The Government of India had set up five Regional Offices of the Ministry of Environment & Forests vide Resolution No. 37-3/85-FP dated 07.04.1986 at Bengaluru, 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 provision 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 Headquarter unit as part of the Secretariat in the Ministry of Environment and Forests at New Delhi to facilitate more frequent inspections and indepth 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;
- Approval of diversion of forest land to the extent of 5 hectares (except mining and regularization of encroachment cases) in consultation with the State Advisory Groups;
- 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-a-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; and



- 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.
- Verification of nominees for Indira Gandhi Paryavaran Puraskar 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.

#### 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.

- Such other work as may be assigned from time to time.

The Headquarter in the Ministry at New Delhi is responsible for supervision and coordination of all the activities in relation to the functions assigned to the Regional Offices as enumerated above under the overall control of the Secretary, MoEF.

The total sanctioned strength of Regional Office Headquarters in the Ministry and ten Regional Offices is 341 (22 for Headquarters, 36 for Regional Officer 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).

**Table-22.** Headquarter and jurisdiction of the Regional Offices

Sl. No.	Headquarter of Regional Office	State and UTs under jurisdiction
1	Bengaluru	Karnataka, Kerala, Goa and Lakshadweep
2	Bhopal	Dadra & Nagar Haveli, Daman & Diu, Gujarat and Madhya Pradesh
3	Bhubaneswar	Odisha 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

### 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 hectare 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 the number of cases received and number of cases disposed off by the Regional Offices under the Forest (Conservation) Act, 1980 during the year 2012-13 and 2013-14 (upto 31 December 2013) is given in Table-23.

### Other Activities undertaken

The details of some of the important activities undertaken/ meetings held during 2013-14 (upto 31 December, 2012) are as follows:

- The Regional Office, Shillong conducted a training programme on 28.05.2013 on

the issue of uploading of Forest Clearance and Environment Clearance Projects for North Eastern States in the website of Ministry of Environment and Forests through National Informatics Centre (NIC), New Delhi.

- The Regional Office, Shillong organized 2<sup>nd</sup> quarter meeting of Nodal Officers on 13.07.2013.
- The Regional Office, Shillong also conducted a training programme on "E-Green watch and monitoring of Forest Clearance for North Eastern States" held on 24-25<sup>th</sup> October, 2013 at Imphal with technical support of NIC, New Delhi.

### Financial Achievement

A statement showing financial targets and achievements for the year 2013-14 (upto 31.12.2013) is given below:

(₹ in crore)

Revenue Head		Capital Head	
BE (2013-14)	Expenditure	BE (2013-14)	Expenditure
11.05	11.17	0.50	0.50

**Table-23.** Statement showing the number of cases received and number of cases cleared by the Regional Offices under the Forest (Conservation) Act, 1980 during the year

S. No.	Name of the Regional Office	2012-2013		2013-14 (upto 31.12.2013)	
		No. of Cases Received	No. of Cases Approved	No. of Cases Received	No. of Cases Approved
1	Bengaluru	72	65	46	70
2	Bhopal	201	116	120	85
3	Bhubaneswar	70	15	48	25
4	Chandigarh	729	454	450	452
5	Lucknow	326	195	278	185
6	Shillong	91	02	64	23
	Total	1489	847	1006	840



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

### Subjects under Forest Policy & Forest International Cooperation

- National Forest Policy, 1988 including State Forest Policy matters, Policy issues on NTFPs/MFPs, Policies and legislation of other Central Ministries related to forests.
- Indian Forest Act, 1927, State Forest Acts/ other Central Acts. Harmonization of IFA, 1927 with FRA, 2006 and PESA, 1996.
- Facilitating implementation of FRA, 2006 (Nodal Ministry –MoTA).
- Rationalization of felling and transit regulation for trees grown on private land.
- Forests & Climate Change, REDD+, Biodiversity, Desertification in Forestry Wing.
- Coordinating implementation of Non-Legally Binding instruments on Forests.
- Division is Focal Point for UNFF, Committee on Forestry (COFO) of Food and Agriculture Organization (FAO) and Asia Pacific Forestry Commission (APFC) and CIFOR.

- Bilateral/ Multilateral Forest International Cooperation

### Forestry International Cooperation

- Convener of Consultative Group for International Negotiations on forestry matters for formulating the country's views on United Nations Forum on Forests (UNFF), Committee on Forestry (COFO) of Food and Agriculture Organization (FAO) and Asia Pacific Forestry Commission (APFC).
- National Focal Point for UNFF, COFO and APFC and CIFOR. Presently country's views on International Arrangement of Forests – Post 2015 was submitted to UNFFS.
- Bilateral co-operation between India-US, India-China on forestry matter.

### Name of the Scheme/Programme

Nil, since Forest Policy Division does not have any budgetary provisions and financial implications for implementing any schemes. However, under the India-U.S. Cooperation, Forest Policy Division is nodal Division for USAID/India "Forest-PLUS Project" in which USAID's contribution is 27 million US\$ and Government of India's contribution is 9 million US\$. The programme will focus on REDD+ and enhanced carbon sequestration through afforestation, conservation and sustainable management of forests, enhancing climate resilience, capacity building, scientific/ technical cooperation etc. Four landscapes i.e. Madhya Pradesh, Himachal Pradesh, Karnataka and Sikkim are identified for the implementation of Forest-PLUS project.

### Activities undertaken

Forest Policy Division does not have any financial targets and therefore, performance in respect of financial and physical achievements



cannot be quantified. However, brief on the activities undertaken so far on the subject matter pertaining to Forest Policy Division during the year is as under:

- Rationalization of felling and transit regulation for trees grown on Private/Non-Forest land: The Ministry of Environment & Forests has accepted the report submitted by Shri A.K. Bansal Committee regarding study the regulatory regime for felling and transit regulations for tree species grown on non-forest/ private lands.
- The Ministry has been proactively involved in facilitating the Ministry of Tribal Affairs being Nodal Ministry for the implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 commonly known as Forest Rights act 2006.
- The Division is pursuing comprehensive amendments of IFA, 1927 to bring clarity and harmonization with FRA and PESA.
- The Division organized two side events jointly with TERI on Pre-Delhi Sustainable Development Summit, 2014 (DSDS 2014) on (i) Side event on Forest Based Carbon Financing through Voluntary Market on 05.02.2014; and (ii) DSDS Side Event on Towards Realizing Potential of REDD+ in South Asia on 06.02.2014.
- Division coordinated with National Advisory Council an Ministry of Agriculture for providing Ministry's views and comments on the formulation of National Policy on Agroforestry.
- Forest Policy Division has processed the following important subject/ policy matters and furnished the comments of the Ministry on these items:
  - Himachal Pradesh Ceiling on Land Holding (Amendment) Bill, 2012.
  - Panchayats (Extension to Scheduled Areas) (Amendment) Bill, 2013.
  - Review of the Regional Plan 2021 of National Capital Region Planning Board – Revised Chapter on Environment.
  - Amendment to the Government of India (Allocation of Business Rules, 1961) regarding Watershed Management.
  - Review of National Forest Policy, 1988.
  - Review of implementation of “the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989” including atrocities committed against tribals in notation of FRA, 2006”.
  - Implementation of National Policy for Farmers, 2007.
  - Draft Note for the Cabinet containing the proposal to implement the recommendations of National Commission for Denotified, Nomadic and Seminomadic Tribes and the National Advisory Council.
  - Comments on 8<sup>th</sup> East Asia Summit draft Declaration on Food Security East Asia Summit.
  - Issue related to Bamboo Development in India.
  - Materials/ inputs for the South Asia Environment Outlook-2013.
  - On the delineation of role and responsibilities of PRIs for ensuring the role of Panchayats in CSS and preparation of Activity mapping.
  - On the International Arrangements of Forests Post 2015 to UNFF.
  - Prepared Reference Framework Document on REDD+ and draft policy guidelines on REDD+.



- Forest Policy Division has processed following visits for Forest International Cooperation:
- 4<sup>th</sup> UN-REDD Regional lessons learned workshops on 'National Forest Monitoring Systems for REDD+' in Bangkok, Thailand held from 15-17 October, 2013.
- Indian delegation headed by DGF&SS attended the 25<sup>th</sup> Session of Asia Pacific Forestry Commission of FAO held at Rotorua, New Zealand from 5-8 November, 2013.
- Expert Group Meeting on sharing of best practices of sustainable forest management in South Asia organized by SAARC Forestry Centre from 26-28 November, 2013 at Thimpu, Bhutan.
- FAO Expert meeting on considering future trends and scenarios in forest policy making – approaches and tools on 26-27 November, 2013 in FAO Headquarters, Rome.
- Study tour on "Forecasting and Futures Modeling" under the Sustainable Landscape and Adaptation Programme (USAID) 02-10 December, 2013 in USA.
- Technical training on "Forest Carbon Inventory and Remote Sensing" to be held from 02-13 December 2013 in the United States under USAID Project.
- Open Ended Intergovernmental Ad-Hoc Expert Group (AHEG) on the International Arrangement on Forests in Nairobi from 24-28 February, 2014.
- Participation in 32<sup>nd</sup> Asia and the Pacific Regional Conference from 10-14 March, 2014 in Mongolia.

## Forest Protection

### Introduction

Forest Protection Division deals with the following subjects in the Ministry.

- All Issues relating to forest protection.
- Illicit felling of trees, deforestation & encroachment on forests land.
- Pest & disease attack relating to forest protection (excludes research aspect).
- Implementation of the Centrally Sponsored Intensification of Forest Management Scheme.

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

### Intensification of Forest Management Scheme (IFMS)

#### Introduction

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



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.

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

The Annual Work Plans submitted by the State Forest Departments is scrutinized by a Screening Committee consisting of the following members:

Additional Director General of Forests (FC)	Chairman
Deputy Inspector General of Forests (NAEB)	Member
Deputy Inspector General of Forests (RT)	Member
Deputy Inspector General of Forests (WL)	Member
Deputy Inspector General of Forests (FPD)	Member
Director (Finance)	Member
Representative of Civil Construction Unit	Member

### Outcome

The scheme has strengthened the State/ UT forest departments by way of creating infrastructure such as field offices, forest stations, residential facilities for frontline staff;

construction of roads and patrolling paths etc. The Scheme has also helped the State Forest Departments in introduction of modern technology including use of GPS, GIS, PDA and other modern communication technologies for survey and field surveillance and reporting. The Scheme also provides for field vehicles, arms and ammunitions which are equally important to increase the effectiveness of the field functionaries of the Forest Department.

Introduction of advanced technology is helping in bridging the backlog in preparation of working plans. Forest fire control has become progressively effective by way of creation and maintenance of firelines for prevention of forest fires, early detection, reporting and quick mobilization of force for forest fire control. Modern technology has also helped in improving planning for forest fire control and management.

### Continuation of the Scheme in the XII Plan

The Scheme is proposed to be implemented in the XII Plan without any change in its basic structure as implemented in the XI Plan period. Continuation of the Scheme has been approved by the competent authority.

### Performance of the Scheme in the 11<sup>th</sup> and 12<sup>th</sup> Five Year Plan

Performance of the Scheme during the 11<sup>th</sup> Five Year Plan period is represented in the statement in Table-24.

During the year 2012-13 an amount of ₹ 6825.00 lakhs was allotted and Revised Estimate of ₹ 5325.00 lakhs out of which an amount of ₹ 5169.62 lakhs (97.08%) was incurred under the CSS: Intensification of Forest Management Scheme. The Physical achievement as per reports received from the various States / UT Governments for key Forest Protection activities are given in Table-25.

**Table-24.** Performance of IFMS in XI<sup>th</sup> Five Year Plan Period (Expenditure upto 26.12.2013)

Year	Plan Outlay	BE (Rs in lakhs)	RE (Rs in lakhs)	Amount Released (Rs Lakh)
2007-08	₹ 600 Cr for the Plan Period	7165.00	6965.00	6698.50
2008-09		13000.00	7600.00	7461.39
2009-10		7600.00	6800.00	6933.72
2010-11		6500.00	6500.00	5685.35
2011-12		6500.00	6500.00	6336.29
2012-13	₹ 600 Cr for the XII Plan period	6825.00	5325.00	5105.82
2013-14		6825.00	6825.00	5114.18
<b>Total</b>		<b>54415.00</b>	<b>46515.00</b>	<b>43335.25</b>

### Plan Outlay of the Scheme in the XII<sup>th</sup> Five Year Plan

The proposed allocation under the Scheme for the XII Five Year Plan period is ₹ 1200 Cr. An increase in plan size was sought due to the following reasons.

The average expenditure in the last five years is ₹ 6184\* 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 AWP's are prepared after identification of

2

**Table-25.** Performance of IFMS in XI<sup>th</sup> and XII<sup>th</sup> Plan Period

S. No.	Components	Unit	Achievements	
			2012-13	
			Financial (Rs Lakhs)	Physical
1	Creation and maintenance of firelines	Kms	1265.40	47445.22
2	Fire watch towers	Nos	30.00	12
3	Boundary Pillars	Nos	818.49	33868
4	Buildings	Nos	1987.86	235
5	Roads	Kms	98.30	79.30
6	Water storage structure	Nos	179.86	100
7	Fire watchers	Mandays	988.93	548054



gaps for forest protection and specially in the area of Infrastructure development for frontline staff, communication and IT forest fire control.

As the demand for funds for forest protection far outstrips the allocation to the States in the previous years, the division has proposed enhancement of the annual plan size for the scheme to fulfill the following objectives:

- To address the gaps in forest protection as identified by the State Governments.
- Given a fillip to the efforts in creating infrastructure facilities for frontline staff in the time bound manner so that presence of staff in forest area is enhanced leading to better vigil of forests.
- To create a strong system of Forest Fire Control and Management through the National Fire vulnerability map and subsequent mitigation measures, modernization of preventive measures

for fire protection, use of modern communication facilities for forestry personnel and use of modern technology in identifying and accessing status of protection for valuable and vulnerable forest areas.

- To take action for Central of forest invasive species.
- For demarcation of boundary and fixing of boundary pillars which is very essential and needed to be completed immediately in time bound manner.

However, the performance of the Scheme also depends upon the capacity of the States and UTs to execute the scheme and be able to spend the funds within time limit.

#### Performance of the Scheme in 2012-13

The Annual Plan allocation for the year 2013-14 was ₹ 6825 lakhs. State wise allocation of the budget, is given in Table-26.

**Table-26.** State wise performance under IFMS in 2013-14 (upto 26<sup>th</sup> December, 2013)

S. No.	States	Annual Work Programme 2013-14			
		Amount sanctioned 2013-14			1st installment (Net release) 80%
		Central Share 75%	State Share 25%	Total	
1	Andhra Pradesh	263.52	87.84	351.36	38.21
2	Bihar	95.48	31.82	127.30	43.32
3	Chhattisgarh*	660.80	220.27	881.07	253.25
4	Gujarat	432.20	144.07	576.27	345.76
5	Goa	76.46	25.48	101.94	61.17
6	Haryana	153.64	51.22	204.86	122.91
7	H.P	457.570	50.840	508.41	364.41
8	J & K	265.20	29.47	294.67	105.24
9	Jharkhand	496.85	165.62	662.47	254.88
10	Karnataka	426.84	142.29	569.13	324.47



S. No.	States	Annual Work Programme 2013-14			
		Amount sanctioned 2013-14			1st installment (Net release) 80%
		Central Share 75%	State Share 25%	Total	
11	Kerala	337.780	112.590	450.37	254.76
12	Madhya Pradesh	930.20	310.06	1240.26	744.16
13	Maharashtra	167.58	55.86	223.44	134.06
14	Orissa	254.06	84.69	338.75	203.25
15	Punjab			0.00	
16	Rajasthan	229.91	76.64	306.55	145.02
17	Tamil Nadu			0.00	
18	Uttar Pradesh	212.18	70.72	282.90	138.29
19	Uttarakhand	391.38	43.49	434.87	299.33
20	West Bengal			0.00	
<b>Total</b>		<b>5851.65</b>	<b>1702.97</b>	<b>7554.62</b>	<b>3832.49</b>
<b>North Eastern States</b>					
1	Assam			0	
2	Arunachal Pradesh			0	
3	Manipur	368.57	40.96	409.53	294.86
4	Meghalaya	306.04	34	340.04	244.83
5	Mizoram	454.54	50.50	505.04	284.74
6	Nagaland	291.84	32.43	324.27	145.92
7	Sikkim	211.22	23.47	234.69	166.5
8	Tripura	406.100	45.120	451.22	131.8
<b>Total</b>		<b>2038.31</b>	<b>226.48</b>	<b>2264.79</b>	<b>1268.65</b>
<b>Union Territories</b>					
1	A & N Islands	38.82	12.95	51.77	13.04
2	Chandigarh			0	
3	D&N Haveli			0	
4	Daman & Diu			0	
5	Lakshadweep			0	
6	Delhi			0	
7	Puducherry			0	
<b>Total</b>		<b>38.82</b>	<b>12.95</b>	<b>51.77</b>	<b>13.04</b>
<b>Grand total</b>		<b>7928.78</b>	<b>1942.40</b>	<b>9871.18</b>	<b>5114.18</b>

### 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.

### Comparison of achievements/progress 2013-14 vis a vis that in 2012-13

The statement summarizes the performance of IFMS in 2013-14 vis-à-vis in 2012-13 is given in Table-27. The budgetary allocation of the scheme was ₹6825 lakhs during the year 2013-14.

**Table-27.** Comparison of performance under IFMS in 2012-13 and 2013-14

(₹ in Lakhs)

Year	BE	RE	Expenditure
2012-13	6825.00	5325.00	5105.82
2013-14	6825.00	6825.00	5093.93

\* Expenditure upto 30<sup>th</sup> November, 2013.

### Implementing agencies along with detail of responsibilities

Implementation of the Scheme is being done as per the MOU signed between the Centre and State. State Forest Department headed by Principal Chief Conservator of Forests is the implementing agency for the Scheme. The main responsibilities of the implementing agencies is to submit Annual Work Plan proposal for sanction to the Screening Committee under the Scheme, supervise and implement the scheme as per the operational guidelines, conduct monitoring and evaluation and submit reports as required under the Scheme guidelines from time to time. The State Government is also required to furnish Utilization Certificate and progress report at the end of the financial year.

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



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

Funds for the Scheme are directly transferred to the State Government for implementation.

### Monitoring and Evaluation

The Division has initiated the third party evaluation of the Scheme through Forest Survey of India, Dehradun for the works undertaken in the XI<sup>th</sup> Five Year Plan period where it is proposed to cover all the states and verify twenty percent of the sample of works undertaken.

Independent third party monitoring of the Scheme for the X<sup>th</sup> Five Year Plan was last done in 2006.

### Wildlife Conservation

#### Introduction

In the Wildlife Divisions of the Ministry, the Additional Director General of Forests (WL) and Director, Wildlife Preservation is the head of the Wildlife Wing. The Wildlife Division 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.

To combat wildlife related crimes, a Wildlife Crime Control Bureau under the Director, Wildlife Preservation has been constituted with 5 Regional Offices viz, Delhi, Mumbai, Kolkata, Chennai and Jabalpur and 3 Sub-regional offices at Amritsar, Guwahati and Ramanathapuram.

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

#### CSS-Integrated Development of Wildlife Habitats

At present India has a network of 670 Protected Areas (102 National Parks, 517 Wildlife Sanctuaries, 47 Conservation Reserves and 4 Community Reserves). State-wise list of Protected Area is given in Table-28.

The Government of India provides financial and technical assistance to the State/ UT Governments for activities aimed at wildlife conservation through the Centrally Sponsored Scheme viz. 'Integrated Development of Wildlife Habitats'. The scheme has following three components:

- Support to Protected Areas (National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves)



**Table-28.** Summary of Protected Area Statistics in India

States/UTs	No of NPs	No. of WLS	No. of Conservation Reserve	No. of Community Reserve	No. of PAs
Andhra Pradesh	6	21			27
Arunachal Pradesh	2	11			13
Assam	5	18			23
Bihar	1	12			13
Chhattisgarh	3	11			14
Goa	1	6			7
Gujarat	4	23	1		28
Haryana	2	8	2		12
Himachal Pradesh	5	32			37
Jammu & Kashmir	4	15	34		53
Jharkhand	1	11			12
Karnataka	5	22	2	1	30
Kerala	6	16		1	23
Madhya Pradesh	9	25			34
Maharashtra	6	35	1		42
Manipur	1	1			2
Meghalaya	2	3			5
Mizoram	2	8			10
Nagaland	1	3			4
Odisha	2	18			20
Punjab	0	13	1	2	16
Rajasthan	5	25	3		33
Sikkim	1	7			8
Tamil Nadu	5	21	1		27
Tripura	2	4			6
Uttar Pradesh	1	23			24
Uttarakhand	6	7	2		15
West Bengal	5	15			20
Andaman & Nicobar	9	96			105
Chandigarh	0	2			2
Dadra & Nagar Haveli	0	1			1
Daman & Diu	0	1			1
Delhi	0	1			1
Lakshadweep	0	1			1
Puducherry	0	1			1
<b>India</b>	<b>102</b>	<b>517</b>	<b>47</b>	<b>4</b>	<b>670</b>



- Protection of Wildlife outside Protected Areas
- Recovery programmes for saving critically endangered species and habitats.

### 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.

### Activities under CSS- 'Integrated Development of Wildlife Habitats'

Activities covered under the Centrally Sponsored Scheme 'Integrated Development of Wildlife Habitats' are as follows:

#### Management Planning and capacity building

- Strengthening wildlife research, education and nature awareness



- Staff development and capacity building
- Monitoring and evaluation
- Management Planning

### Anti-poaching & infrastructure development

- Anti-poaching activities
- Strengthening of infrastructure
- Strengthening Wildlife veterinary care
- Strengthening Staff welfare activities

### Restoration of habitats

- Habitat improvement activities
- Safeguards / Retrofitting measures

### Eco-development and community oriented activities:

- Addressing man-animal conflict

- Strengthening co-existence agenda
- Deciding inviolate spaces and relocation of villages from crucial wildlife habitats
- Fostering ecotourism
- Assistance to activities in Trans-boundary Protected Areas

During 12<sup>th</sup> Plan period, evaluation of 40 PAs are proposed to be carried out by a panel of experts using international protocols during 2012-13 & 2013-14. A list of PAs proposed for evaluation is given in Table-29.

During 12<sup>th</sup> Five Year Plan, total outlay approved for the Scheme is ₹800.00 crores of which ₹73.50 crores has been allocated during 2012-13. State-wise detail of funds released during 2012-13 under this scheme is given in Table-30.

**Table-29.** List of National Parks and Wildlife Sanctuaries to be included in Management Effectiveness (MEE) of PAs 2012-13 & 2013-14

S. No.	State	National Park	Wildlife Sanctuary
<b>Northern Region</b>			
1	Jammu and Kashmir	Dachigam NP	
2	Himachal Pradesh	Simbalbara NP	
3	Uttarakhand		Kedarnath WLS
4	Haryana		Kalesar WLS
5	Punjab		Bir Motibagh WLS
6	Rajasthan		National Chambal WLS
7	Uttar Pradesh		Kishanpur WLS
			National Chambal WLS
<b>Southern Region</b>			
1	Andhra Pradesh		Coringa WLS
			Kolleru WLS
2	Karnataka	Kudremukh NP	
3	Kerala	Silent Valley NP	Peppara WLS
4	Tamil Nadu		Point Calimere WLS
			Srivilliputhur Grizzled Squirrel WLS



S. No.	State	National Park	Wildlife Sanctuary
5	Pondicherry		Oussudu WLS
<b>Eastern Region</b>			
1	West Bengal		Chapramari WLS
			Jorepokhri Salamander WLS
2	Odisha		Bhitarkanika WLS
			Chilika (Nalaban) WLS
3	Bihar		Nakti Dam WLS Vikramshila Gangetic Dolphin WLS
4	Jharkhand		Kodarma WLS
5	Sikkim		Fambong Lho WLS
<b>Western Region</b>			
1	Maharashtra		Great Indian Bustard WLS Karnala WLS
2	Gujarat	Gir NP	Purna WLS
3	Goa		Bondla WLS Bhagwan Mahavir WLS
4	Chhattisgarh	Kanger Vellay NP	
5	Madhya Pradesh		Karera WLS
<b>North-eastern Region</b>			
1	Arunachal Pradesh	Mouling NP	D'Ering Memorial (Lali) WLS
2	Assam		Hollongapar Gibbon WLS
3	Meghalaya	Nokrek Ridge NP	
4	Mizoram	Phawngpui Blue	
		Mountain NP	
5	Nagaland		Fakim WLS
6	Tripura	Clouded Leopard NP	
		Bison (Rajbari) NP	

National Parks	:	11
Wildlife Sanctuaries	:	29
Total Number of PAs Covered	:	40
Total Number of States/UTs Covered	:	28

**Table-30.** Details of funds released under the Centrally Sponsored Scheme  
“Integrated Development of Wildlife Habitats” During 2012-13 & 2013-14

(₹ in Lakhs)

Sl. No.	Name of the State/Uts	2012-13	2013-14
1.	A& N Islands	109.50	150.00
2.	Andhra Pradesh	180.335	00
3.	Arunachal Pradesh	162.3755	220.439
4.	Assam	146.00	138.88
5.	Bihar	64.685	34.8715
7.	Chhattisgarh	449.5655	408.74
8.	Chandigarh	00	00
9.	Dadra & Nagar Haveli	00	00
10.	Goa	148.12	00
11.	Gujarat	517.926	537.84457
12.	Haryana	52.00	00
13.	Himachal Pradesh	318.9668	475.849
14.	Jammu & Kashmir	515.957	485.747
15.	Jharkhand	81.6195	97.7655
16.	Karnataka	434.5018	351.00
17.	Kerala	1210.08	505.782
18.	Madhya Pradesh	467.707	454.354
19.	Maharashtra	425.883	470.772
20.	Manipur	73.925	80.80
21.	Meghalaya	22.08	25.56
22.	Mizoram	96.392	210.334
23.	Nagaland	25.855	15.375
24.	Odisha	368.2084	341.7448
25.	Punjab	00	00
26.	Rajasthan	478.249	430.884
27.	Sikkim	177.579	129.27836
28.	Tamil Nadu	258.479	277.7918
29.	Tripura	00	00
30.	Uttar Pradesh	319.09	323.531
31.	Uttarakhand	220.27	326.282
32.	West Bengal	164.135	184.3735
33.	Delhi	00	00
34.	Daman & Diu	00	00
	<b>Total</b>	<b>7489.4845</b>	<b>6677.99903</b>



During 2013-14 total outlay approved under the Scheme is ₹78.50 crores. State-wise details of funds released during 2013-14 upto December 2013 under this scheme is shown in Table-30.

Out of 16 species identified for the species recovery programme, financial assistance has been provided for nine species. The amount provided to the State/Union Territory in respect of these species is as below:

- **Project Snow Leopard** - (J&K – ₹169.20 lakh, Uttarakhand – ₹86.40 lakh, Himachal Pradesh- ₹164.696 lakh and ₹ 3.20 lakhs to Arunachal Pradesh)
- **Project Hangul** - (J&K – ₹268.56 lakh)
- **Project Vulture** – (Haryana – ₹43.60 lakh, Punjab – 18.40 lakh, Gujarat – ₹12.30 lakh)
- **Project Sanghai Deer** – (Manipur – ₹33.96 lakh)
- **Project Edible nest swiftlet** – (A&N Islands – ₹106.192 lakh)
- **Project Nilgiri Tahr** (Tamil Nadu- ₹ 4.80 lakhs)
- **Project Dugong** (A&N Islands- ₹ 55.54 lakh)
- **Project Lion** (Gujarat- ₹ 1350.40 lakh)
- **Project Wild Buffalo** (Chhattisgarh – ₹ 108.92 lakh)

Financial assistance has also been provided to the States for relocation of communities from within PAs to areas outside. Details of such assistance area as follows:

- ₹ 540.00 lakhs has been released to Chhattisgarh for relocation of 135 families from villages in Barnawapara Sanctuary during 2009-10.
- ₹ 550.00 lakh for voluntary relocation of 55 families during 2011-12 and ₹ 784.00

lakh for voluntary relocation of 98 eligible families during 2012-13 from Wayanad Sanctuary has been released.

- ₹488.00 lakh has been released to Mizoram for relocation of 61 families from Dumpui 'S' village in Thorangtlang Sanctuary 2010-11.
- ₹ 30.00 lakh has been released to Kerala for relocation of 3 families from **Malabar Wildlife Sanctuary during 2011-12.**

### Human-animal conflict:

In India, human-animal conflict is seen across the country in a variety of forms, including monkey menace in the urban centers, crop raiding by ungulates and wild pigs, depredation by elephants, cattle lifting and human death and injury by tigers, leopards and other wild animals. Human-animal conflict occurs both inside Protected Areas as well as outside Protected Areas. The intensity of the conflict is generally more in areas outside Protected Area network than inside.

Recently 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 human-animal conflict is an important part of wildlife management as the co-operation of local population depends largely on winning their support by reducing loss to them by wild animals among many others.



In order to mitigate the human animal conflict, a national workshop on 'Developing Strategies for Mitigation of Human wildlife conflict' was held on 20.8.2013 at New Delhi wherein the matter was discussed and several mitigating measures were suggested. The Division is pursuing to have a separate component under the scheme for managing human-animals conflict.

### **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).

International trade in wild flora and fauna including the species covered under CITES, is regulated by the provisions of the EXIM Policy. Relevant parts of EXIM Policy are based on the legal provisions of the Wild Life (Protection) Act, 1972 and provisions of CITES. The Director (Wildlife Preservation) is designated as the CITES Management Authority and the Regional Deputy Directors (WCCB) are the Assistant Management Authorities for CITES implementation. The function of these offices is to monitor and regulate international trade in wildlife and wildlife articles at the designated ports of exit and entry i.e Mumbai, Kolkata, Delhi, Chennai, Cochin, Amritsar and Guwahati. In addition to the periodic reviews by the regional offices of Wildlife Preservation, an Annual Report is published as per the requirement of CITES. Consequent upon creation of Wildlife Crime Control Bureau, these regional and sub-regional offices have been merged in the Bureau.

The scheme "Strengthening of Wildlife Division and Consultancies" (Control of Wildlife Crime) support the expenses of the Wildlife Crime Control Bureau and its regional offices located in Delhi, Jabalpur, Mumbai, Kolkata and Chennai to ensure adequate manpower and development of infrastructure for better enforcement of Wild Life (Protection) Act, etc. Assistance is also extended to the three sub regional offices at Guwahati, Amritsar and Cochin which were established subsequently to further strengthen the organization.

Besides, research proposals from independent research agencies and institutions on applied aspects of Wildlife Conservation in India are also provided support under this scheme. During 2013-14, three ongoing projects were supported under the scheme.

An amount of ₹ 7.93 crores has been allocated under this Scheme for the year 2013-14 of which ₹6.00 crores has been utilized.

### **Important initiatives taken by the Wildlife Division of the Ministry**

#### **Declaration of Eco-sensitive Zones**

As per the decision of the National Board for Wild Life taken in its 2<sup>nd</sup> Meeting held on 17<sup>th</sup> March 2005, the State Governments were requested to forward site specific proposals for declaration of Eco-sensitive zones around Protected Areas. The Ministry of Environment and Forests framed guidelines for facilitating the State/Union Territory Governments for declaration of eco-sensitive zones around National Parks and Sanctuaries, and issued the same vide O.M. No. 1-9/2007 WL-I dated 9 February 2011. Subsequently, draft notifications with respect to eco-sensitive zones around National Parks and Sanctuaries in the States of Haryana (9 no), Jharkhand (1 no.), Karnataka (1 No.) and Gujarat (4 no.) have been issued. The



final notification of eco-sensitive zone around Sultanpur National Park Haryana and around Dalma Sanctuary, Jharkhand have already been issued.

### Declaration of Critical Wild life Habitats

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was enacted in 2006. The Act has been enacted to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generation but whose rights could not be recorded, and to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. The Rules under the Act have been notified on 1 January 2008.

The Ministry of Environment and Forests had framed 'Implementation Protocol' for determination and notification of Critical Wild Life habitats in National Parks and Sanctuaries, and for facilitating the implementation of the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. The draft 'Implementation Protocol' was hosted on the official website of the Ministry of Environment and Forests inviting comments from the public. After incorporating the comments so received appropriately, the draft protocol was forwarded to the Ministry of Tribal Affairs for their comments/vetting. The Ministry of Tribal Affairs have offered their comments on the draft protocol, which are being examined. The draft protocol would also be placed before the Standing Committee of NBWL for its consideration, before finalizing and circulating to the State/Union Territories.

### International Cooperation

India is a party to five major international conventions related to Wild Life conservation, viz., Convention on International Trade in Endangered Species of wild fauna and flora (CITES), International Union for Conservation of Nature and Natural Resources (IUCN), International Whaling Commission (IWC), United Nations Educational, Scientific and Cultural Organization-World Heritage Committee (UNESCO-WHC) and the Convention on Migratory Species (CMS).

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

In order to regulate international trade in endangered species of Wild Life, the Convention on International Trade in Endangered Species of wild fauna and flora (CITES) was signed in March 1973.

The Government of India signed the Convention in July 1976, which was ratified in October 1976. The Director, Wild Life Preservation has been designated as the CITES Management Authority for India. The enforcement of the provisions of CITES is carried out by the Regional Deputy Directors, Wild Life Crime Control Bureau, who have also been designated as the Assistant CITES Management Authority for India. Apart from the Regional Deputy Directors, the Customs Authorities, State Forest Departments are also involved in the enforcement of the Convention. An amendment to the Wild Life (Protection) Act 1972 has been proposed for integrating the provisions of CITES in the national law for effective implementation of the Convention. The Ministry of Environment and Forests has also constituted a CITES Cell on 10<sup>th</sup> September 2010 to assist the Government of India in CITES implementation. India has taken several



initiatives in recent years at national level to build capacity for better CITES implementation in the country.

Indian delegation has participated in the meetings of the Plants and Animal Committees, the meetings of the Standing Committee and in Conferences of Parties of CITES from time to time. Following specific agendas have been pursued in this convention in recent times.

- The 16<sup>th</sup> Meeting of the Conference of Parties to CITES (CoP-16) was held from 3-14<sup>th</sup> March 2013 at Bangkok and the meeting was attended by Indian Delegation headed by CITES Management Authority of India.
- In CoP 16, India has support the text of the document of "CITES and Livelihoods" which outlines recommendations to Parties to make CITES implementation attractive and rather positive with respect to livelihood needs of the local people and particularly poor rural communities.
- India expressed the need to establish a self-sustaining funding mechanism for the Monitoring the Illegal Killing of Elephants (MIKE) programme in Asia. A drafting group comprising China, Germany, India, Kenya, South Africa, Thailand, Uganda and United States (chair) was formed for improving the wording in Annex 2 of the document CoP 16 doc. 26 (Rev. 1) on Trade in Elephant Specimens.
- With reference to amendments to the 'Amendments of the Appendices', India strongly supported the proposal indicating that the species listed under critically endangered and threatened category of the IUCN's Red list should also be listed in the Appendices of the CITES for monitoring the trade effectively.

- In the CoP 16, India has shown willingness to work with the Nepal Government and other national authorities in monitoring the trade of shahtoosh wool derived from Tibetan antelopes and its illegal poaching. India has also deliberated in the CoP 16 that stringent penal provisions have been provided for any contravention under the Indian Wild Life (Protection), Act 1972.
- India has supported inclusion of box turtles and soft shell turtles in the appendices of CITES and requested the CITES to ascertain the correct conservation status of a species before taking any decision on listing of species including sharks in the Appendices of CITES as such decisions cannot be made on the basis of inadequate or unreliable information, more so when they are likely to impact the livelihoods of millions of poor communities. India also mentioned that there is strong need for undertaking more region specific studies, primarily relating to the status of the concerned species in the Indian Ocean regions, before taking decisions to include sharks in the Appendices of CITES.

### **World Heritage Convention**

India is a member of World Heritage Convention responsible for listing of World Heritage Sites, which include both Cultural and natural sites. The World Heritage Convention is a Convention under the aegis of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Wild Life wing of the Ministry of Environment and Forests is associated with the conservation of the Natural World Heritage sites. Currently, six natural World Heritage Sites have been recognized by UNESCO in India, viz., Nanda Devi National Park, Kaziranga National Park, Manas National Park, Keoladeo National Park, Sundarbans



National Park and serial cluster of 39 sites from Western Ghats spread over 4 States. Apart from these, the Valley of Flowers National Park has also been included in the list of World Heritage Sites as an extension of Nanda Devi National Park. Seven new natural heritage sites, viz., Bhitarkanika Conservation area, Desert National Park, Great Himalayan National Park, Kangchendzonga National Park, Namdhapha National Park, Neora Valley National Park, and Wild Ass Sanctuary, Little Rann of Kutch have been included in the tentative list of World Heritage Site nominations from India.

Indian delegation including representatives of Ministry of Environment and Forests participated in the 37<sup>th</sup> Sessions of the World Heritage Committee meetings held at Phnom Penh, wherein the Great Himalayan National Park was tabled for discussion and requesting India to provide additional information for further consideration in the 38<sup>th</sup> Session that going to held at Doha, Qatar from 15 June - 25 June 2014.

Further, the UNESCO has given in principle concurrence to the proposal of India for establishment of UNESCO Category II Centre for Asia Pacific Region at Wildlife Institute of India, Dehradun.

The first phase of externally aided project was completed which was undertaken with title "World Heritage Bio-diversity Programme for India: Building Partnerships to Support UNESCO's World Heritage Programme". This project is an outcome of a planning grant received from the UNESCO and United Nation Foundation (UNF) and was developed under the guidance of a Project Steering Committee chaired by the Addl. Director General of Forests (WL), MoEF. The total period of the project is 10 years with two phases, viz, Phase-I of four years and Phase-II of six years. The project is being

undertaken in 4 World Heritage Sites of India, viz, Kaziranga National Park, Manas National Park, Nanda Devi National Park, and Keoladeo National Park. The total financial outlay for the first phase of the project was to the tune of US \$ 1.83 million.

The main focus of the Project is on strengthening capacity for effective management; site level management policies and governance; enhance the role of local communities in conservation of biodiversity; enhancing habitat connectivity; restoration of lost attributes; research and monitoring, and identification of potential World Heritage Bio-diversity sites. Currently the project is under the process of developing Funds in Trust (FIT), model for raising funds for supporting the "World Heritage Bio-diversity Programme for India.

### Convention on the Conservation of Migratory Species of Wild Animals (CMS)

The Convention on Conservation of Migratory Species (CMS) or Bonn Convention aims to conserve migratory species throughout their range. The Convention came into force in 1979. India is a signatory to the convention since 1983.

During COP 10, India has also been nominated as a member of the Standing Committee of the Convention with the support from various countries in the Asia. During the COP, the Ministry of Environment and Forests, WWF-India, Wetlands International and BNHS (Bombay Natural History Society) jointly organized a side event on Black-necked Crane urging the range States for regional cooperation for conservation of this unique species found in the Himalayan high altitude wetlands. Conference of Parties is held generally once in three years. Thus COP 11 is expected to be held in 2014.



**Fig-19.** Wintering gull Ruddy Shelduck (*Tadorna ferruginea*) at Chandertal, Lahaul & Spiti, Himachal Pradesh

### International Whaling Commission

The International Whaling Commission (IWC) was set up under the International Commission for the Regulation of Whaling which was signed in Washington on 2<sup>nd</sup> December 1946. The purpose of the Convention is to provide for conservation of whale stocks. The main duty of the International Whaling Commission is to keep under review and revise as necessary the measures laid down in the schedule to the Convention which governs the conduct of whaling throughout the world. These measures, among other things, provide complete protection of certain species, designate specified areas as whale sanctuaries, limit the number of whales which may be taken, prescribe open and closed seasons and designate areas for whaling; prohibit the capture of suckling calves and female whales accompanied by calves.

India has been a member of the International Whaling Commission since 1981 and has played a pro-active and prominent role in bringing about a moratorium on commercial whaling and supporting the Commission in its efforts towards whale conservation. All the Cetacean species (whales, dolphins, etc.) have been included in Schedule I of the Wild Life (Protection) Act, 1972 thereby giving them the highest degree of protection. Apart from this, India has always been supporting the conservation of whales through the establishment of the South Pacific Sanctuary.

### CS- Wildlife Institute of India

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 Government. Details about Wildlife Research and Wildlife Education may kindly see in Chapter-7 & 8 respectively.

## Wildlife Crime Control Bureau (WCCB)

### Introduction

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 organised wildlife crime and also keeping in view the inter-state and international character 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.

Wildlife Crime Control Bureau (WCCB), has been tasked with the following functions under Section 38 (Z), of the Wild Life (Protection) Act, 1972:

- Collect and collate intelligence related to organized wildlife crime activities and to disseminate the same to State and other enforcement agencies for immediate action so as to apprehend the criminals and to establish a centralised wildlife crime data bank;



**Fig-20.** Wild snake saved from a poaching trap



- Co-ordination of actions by various officers, State Governments and other authorities in connection with the enforcement of the provisions of this Act, either directly or through regional and border units set up by the Bureau;
- Implementation of obligations under the various international Conventions and protocols that are in force at present or which may be ratified or acceded to by India in future;
- Assistance to concerned authorities in foreign countries and concerned international organisations to facilitate co-ordination and universal action for wildlife crime control;
- Develop infrastructure and capacity building for scientific and professional investigation into wildlife crimes and assist State Governments to ensure success in prosecutions related to wildlife crimes;
- advice the Government of India on issues relating to wildlife crimes having national and international ramifications, and suggest changes required in relevant policy and laws from time to time.

The Wildlife Crime Control Bureau shall exercise—

- such powers as may be delegated to it under sub-section (1) of section 5; sub-sections (1) and (8) of section 50 and section 55 of this Act; and
- Such other powers as may be prescribed.

The Bureau also assists the Customs in inspection of consignments as per the provisions of the Wild Life Protection Act, CITES and Exim Policy. The Regional Deputy Directors of the Bureau at Delhi, Mumbai,

Kolkata and Chennai are designated as CITES Assistant Management Authorities and tasked with regulation of trade in endangered species of flora & fauna under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

### Activities undertaken so far

In line with its mandate, the Bureau is undertaking the following activities:

- Collection, collation and dissemination of intelligence on wildlife crime and criminals to the central / state agencies concerned for apprehension of criminals.
- Creation of wildlife crime database. Issue alerts and advisories based of data analysis.
- Wildlife Crime Enforcement under the provisions of Wild Life (Protection) Act, 1972:-
  - Detection/ search/ seizures/ apprehensions
  - Investigation of offences detected by the officers of the Bureau
  - Filing complaints in courts in cases detected by the Bureau.
- Capacity Building in dealing with wildlife crimes and investigation of wildlife offences:-
  - Two days capacity building training courses on investigation of wildlife offences and intelligence trade craft for police and forest officials.
  - Sensitization programmes / workshops / seminars for the central and State agencies on issues related to wildlife crimes and identification of wildlife articles.
  - Provide expert resource persons to various training centres and agencies



- for sensitization on wildlife and wildlife crime
- Human Resource Development in WCCB – Deployment of WCCB officials for various training courses for their capacity building as trainers in the relevant fields.
- Coordination and cooperation to combat organised wildlife crimes with trans – border ramifications:
  - Sensitization programmes for other agencies and stakeholders
  - Assistance in investigation of important wildlife offences being investigated by other agencies.
  - Assistance in prosecution of important wildlife crime cases under trial.
  - Assist the Customs in inspection of consignments in respect of violations of WLP Act, CITES and FTP. Assist and advise Customs in identification of wildlife articles and issues related to CITES. Regulate legal trade under CITES.
  - Issue alerts and advisories to the stakeholders on the issues pertaining to wildlife crime enforcement, policy and legislations.
  - Other activities - Enrolment of volunteers to assist WCCB in performance of its mandated tasks pertaining to intelligence collection, capacity building and awareness generation on wildlife and wildlife crime issues.

#### Within country:-

- Inter - agency coordination meetings at national and regional level - to promote effective inter-departmental coordination to control poaching and illegal trade in wildlife and wildlife products; to promote sharing of information and enforcement of provisions of Wild Life (Protection) Act and to curb illegal trans-border trade; and to promote capacity building and sensitization toward wildlife protection issues.
- joint operations with other agencies in wildlife crime enforcement.

#### International cooperation:-

- Liaison with Interpol, CITES Secretariat and concerned foreign authorities.
- Participate in Interpol coordinated multi – national joint operations
- Attend relevant international meetings.
- Sensitization and awareness campaigns on wildlife and wildlife crimes to public and other stakeholders: -
  - Public education and awareness campaigns - including schools/PRI leaders/fairs/ pet markets etc.

#### Performance/Achievements/ Progress made during 2012-13

The key objectives, success indicators and target set for Wildlife Crime Control Bureau for the FY 2013–14, under Results – framework document (RFD); and the achievements under the set targets are given in Table-31.

#### Budget allocation and progress of expenditure during 2012-13

An amount of ₹425.71 lakhs was allocated under the Scheme “Strengthening of Wildlife Division and Consultancies for Special Tasks/ Control of Wildlife Crime” (PLAN & NON - PLAN) for the year 2013 – 14.

**Table-31.** Key objectives, success indicators and target set for WCCB, under Results – framework document (RFD); and achievements during the year.

S. No.	Objective	Weight	Success Indicator	Target	Achievement	Achievement Percentage
1.	Increase of manpower	0.10	No. of posts filled	11	6	54%
2.	To develop effective intelligence network	0.15	No. of alerts/ advisories/ actionable intelligence inputs	26	54	207%
3.	To delineate organized syndicates working in wildlife	0.20	No. of wildlife criminals apprehended and dossiers prepared	50	64 & 335	128%
4.	To assist in investigation of organized wildlife crime	0.10	No. of cases in which assistance rendered	16	33	206%
5.	Capacity building of central and State agencies	0.10	No. of officers and staff of other agencies trained	200	575	287%
6.	Coordination meetings with other agencies	0.10	No. of inter – agency coordination meetings conducted	11	19	172%
7.	Assistance in prosecution of important wildlife cases	0.10	No. of cases monitored and assisted during trial	28	14	50%
8.	No. of detections of violations at the exit points under CITES, WLP Act and FTP	0.15	No. of cases detected at exit points	270	253	93%



**Fig-21.** Green Bee-Eater (Adult And Juvenil)

## CSS- Project Elephant

### Introduction

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

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

Financial and technical support is being provided to major elephant bearing States in the country. The Project is being implemented in 17 States / UTs , viz. Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Odhisa, Tamil Nadu , Tripura , Uttarakhand , Uttar Pradesh, West Bengal and Haryana (where an elephant rescue centre has been set up supported by Project Elephant).

### Important Initiatives taken during the year

- Approval of the continuation of the Scheme for the XII Five Year Plan.

- Preparation for International Elephant congress and Ministerial Meet (E50:50 Meet)
- Management of Captive Elephants through financial support for establishment of Elephant Rehabilitation Centres in Haryana and Karnataka.

### EFC for grants in Aid to State

- Protection of Elephants
- Conservation and development of habitats and corridors
- Eliciting public cooperation and mitigation of human elephant conflict
- Improvement of support services including monitoring, research and training
- Management of Captive Elephant

### Elephant Rescue Centre/ Rehabilitation Centre

Management of Captive Elephants is one of the main target in PE Division during 12<sup>th</sup> Five Year Plan. During the year funds have been provided for establishment of elephant rehabilitation centers in Haryana and Karnataka.



**Fig-22.** Captive Elephants with young generation

### 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 compiled by the different states at an interval of five years, including 2012, are given in Table-32.

### Elephant Reserves

There are now 28 Elephant Reserves that have been notified by the Ministry and by the State so far. The area under these is over about 61830 sq km. The list of ERs with date of Notification and area is given in Table-33. These are being supported under the Scheme Project Elephant.

**Table-32.** Estimated population of wild elephants

State	Elephant Population				
	1993	1997	2002	2007	2012
Arunachal Pradesh	2102	1800	1607	1690	890
Assam	5524	5312	5246	5281	5620
Meghalaya	2872	1840	1868	1811	1811
Nagaland	178	158	145	152	212
Mizoram	15	22	33	12	Nil
Manipur	50	30	12	Nil	Nil
Tripura	100	70	40	59	59
West Bengal (North)	200	276	328	325-375	647
Jharkhand	550	618	772	624	688
Odisha	1750	1800	1841	1862	1930
Chattisgarh	-	-	-	122	247
Uttarakhand (* part of earstwhile U.P.)	828*	1130*	1582	1346	1346
U.P.	47	70	85	380	291
Tamil Nadu	2307	2971	3052	3867	4015
Karnataka	5500	6088	5838	4035	5648-6488
Kerala	3500	3600	3850	6068	5942-6422
Andhra Pradesh	46	57	74	28	41
Maharashtra	-	-	-	7	4
Andaman & Nicobar	35	35	40	NA	NA

*No census was conducted in Meghalaya and Uttarakhand.*

**Table-33.** List of Elephant Reserves in India

Sl. No.	Elephant Range	Elephant Reserve with date of notification	State	Total Area (Sq. Km)
I	Eastern India (South West Bengal- Jharkhand-Orissa)	Mayurjharna ER(24.10.02)	W. Bengal	414
		Singhbhum ER (26.9.01)	Jharkhand	4530
		Mayurbhanj ER (29.9.01)	Orissa	3214
		Mahanadi ER (20.7.02)	Orissa	1038
		Sambalpur ER (27.3.02)	Orissa	427
		Badalkhol-Tamorpingla (15.9.2011)	Chhattisgarh	1048.30
	<b>Total</b>			<b>10671.30</b>
II	North Brahmaputra (Arunachal – Assam)	Kameng ER (19.6.02)	Arunachal	1892
		Sonitpur ER (6.3.03)	Assam	1420
	<b>Total</b>			<b>3312</b>
III	South Brahmaputra (Assam- Arunachal)	Dihing-Patkai ER (17.4.03)	Assam	937
		South Arunachal ER (29-2-08)	Arunachal	1957.50
	<b>Total</b>			<b>2894.50</b>
IV	Kaziranga (Assam- Nagaland)	Kaziranga – Karbi Anglong ER (17.4.03)	Assam	3270
		Dhansiri-Lungding ER (19.4.03)	Assam	2740
		Intanki ER (28.2.05)	Nagaland	202
	<b>Total</b>			<b>6212</b>
V	Eastern Dooars (Assam- W. Bengal)	Chirang-Ripu ER (7.3.03)	Assam	2600
		Eastern Dooars ER (28.8.02)	W. Bengal	978
	<b>Total</b>			<b>3578</b>
VI	E. Himalayas (Meghalaya)	Garo Hills ER (31.10.01)	Meghalaya	3,500
	<b>Total</b>			<b>3500</b>
VII	Nilgiri –Eastern Ghat (Karnataka- Kerala- Tamilnadu-Andhra)	Mysore ER (25.11.02)	Karnataka,	6724
		Wayanad ER (2.4.02)	Kerala	1200
		Nilgiri ER (19.9.03)	Tamilnadu	4663
		Rayala ER (9.12.03)	Andhra	766
	<b>Total</b>			<b>13353</b>
VIII	South Nilgiri (Kerala- Tamilnadu)	Nilambur ER (2.4.02)	Kerala	1419
		Coimbatore ER (19.9.03)	Tamilnadu	566
	<b>Total</b>			<b>1985</b>



Sl. No.	Elephant Range	Elephant Reserve with date of notification	State	Total Area (Sq. Km)
IX	Western Ghat (Tamilnadu- Kerala)	Anamalai ER (19.9.03)	Tamilnadu	1457
		Anamudi ER (2.4.02)	Kerala	3728
	<b>Total</b>			<b>5185</b>
X	Periyar (Kerala- Tamilnadu)	Periyar (2.4.02)	Kerala	3742
		Srivilliputtur ER(19.9.03)	Tamilnadu	1249
	<b>Total</b>			<b>4991</b>
XI	Northern India (Uttaranchal-U.P.)	Shivalik ER (28.10.02)	Uttarakhand	5405
		Uttar Pradesh ER ( 9.9.09)	U.P.	744
	<b>Total</b>			<b>6149</b>
<b>TOTAL</b>				<b>61830.80</b>

### Budget allocation for the Scheme during the year and progress of Expenditure

An amount of ₹ 32.58 crores was allocated and the expenditure incurred upto 31<sup>st</sup> March, 2014 is ₹ 18.82 crores.

### 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.

For carrying out functions of the Central Zoo Authority, two committees namely Administrative Committee under the Chairmanship of Director General of Forests & Special Secy. and Technical Committee under the Chairmanship of Additional Director General of Forests (Wildlife) and Expert Group on Zoo Designing & Expert Group on

Conservation Breeding have been constituted with Member Secretary as 'convener' for advising the authority on improvement of the zoos. The functions assigned to the Authority under the Wild Life (Protection) Act are:

- To specify the minimum standards for housing, upkeep and veterinary care of the animals kept in zoos;
- To evaluate and assess the functioning of the zoos with respect to the prescribed standards or norms;
- To recognize or derecognize zoos;
- To identify endangered species of wild animals for purposes of captive breeding and assigning responsibility in this regard to a zoo;
- To coordinate the acquisition, exchange and loaning of animals for breeding purpose;
- To ensure maintenance of studbooks of endangered species of wild animals bred in captivity;
- To identify priorities and themes with regard to display of captive animals in zoos;



**Fig-23.** Ghariyal at National Zoological Park, New Delhi

- To coordinate training of zoo personnel in India and outside India;
- To coordinate research in captive breeding and educational programmes for the purposes of zoos;
- To provide technical and other assistance to zoos for their proper management and development on scientific lines;
- To perform such other functions as may be necessary to carry out the purposes of this Act with regard to zoos.

### Finance

The Central Zoo Authority has received ₹ 23.00 Crores as against the budget estimation of ₹ 38.01 Crores (National Zoological Park, New Delhi share ₹ 07.50 Crores and North Eastern Region share ₹ 3.80 Crores) which is further revised as to ₹ 32.00 Crores (National Zoological Park, New Delhi share ₹ 06.50 Crores and North Eastern Region share ₹ 3.00

Crores) during the financial year 2013-14 as Grants-in-Aid from Ministry of Environment & Forests, Government of India. Out of this, ₹ 17.62 Crores have been released as Grants-in-Aid to recognized zoos and other organizations as on 20<sup>th</sup> February 2014.

### Accounts and audits

The Annual accounts of the CZA for the year 2012-13 were audited during the month of August, 2013 by an audit team deputed by the office of the Principal Director of the Audit, Scientific Departments, AGCR. The audit department has certified the by the annual accounts of CZA during December, 2013.

Accounts of the Central Zoo Authority for the year 2013-14 will be audited by the Scientific Departments of the Comptroller & Auditor General of India, New Delhi in due course of time.



### Recognition of Zoo Rules, 2009

In order to evaluate the zoos in the country and to provide accreditation and facilitation them, the Recognition of Zoo Rules, 2009 were amended and called as Recognition of Zoo (amendment) Rules, 2013 under the Wild Life (Protection) Act. These rules prescribe measures to be taken in development of zoos; types of housing facilities to be provided for animals; healthcare, hygiene, feeding and overall upkeep of animals; the minimum number of trained personnel to be posted in each zoo; and visitor facilities.

### Evaluation of zoos

The Central Zoo Authority evaluated 2 large, 2 small and 11 mini zoos, 3 rescue centre and 11 circuses as on 31.01.2014.

### Recognition/ de-recognition of zoos

The Central Zoo Authority granted recognition to 2 large, 2 small and 11 mini zoos, 3 rescue centres and 10 circuses as on 31<sup>st</sup> January, 2014. No further recognition was granted to Amar Circus, Kerala. There are 195 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. During the financial year 2013-14, the Central Zoo Authority has released ₹ 12.86 lakhs financial assistance to Biological Park, Itanagar for upkeep and maintenance of Hoolock gibbon Conservation Breeding Centre; ₹ 28.88 lakhs to Kohima, Nagaland Forest Department for the Conservation Breeding facility at old zoo Kohima, Nagaland for Blyth's Tragopan; ₹ 5.588 and ₹ 7.20 lakhs to Nehru Zoological

Park, Hyderabad, Andhra Pradesh for Conservation Breeding Centre for Mouse deer and Vultures respectively. ₹ 13.38 was released to Sepahijala Zoological Park, Agartala, Tripura to meet expenditure on feed and salary for biologist and keeper and other related works. A grant of ₹ 18.25 was released as 1<sup>ST</sup> installment out of total grant of ₹ 44.12 to Padmaja Naidu Himalayan Zoological Park, Darjeeling, and West Bengal for installation of CCTV Systems cameras at Conservation Breeding Centre for Red panda for Enrichment of breeding centre.

Conservation Breeding Programme of the critically endangered vulture species is the flagship programme of the Central Zoo Authority and ratified in its top priority. Keeping in view, the CZA had released ₹ 38.42 lakhs, ₹ 26.70 lakhs and ₹ 18.63 lakhs to Nandankanan Biological Park, Bhubaneswar for development and establishment of lab at Vulture Conservation Breeding Centre, Van Vihar National Park & Zoo, Bhopal for establishment of additional Colony Aviary at Vulture Conservation Breeding Centre and Vulture Conservation Breeding Centre, Pinjore, Haryana for feed and upkeep of the birds respectively. The transfer of F1 generation of vultures from Coordinating Vulture Breeding Centre, Pinjore to participating centre at Nandankanan Biological Park, Bhubaneswar; Nehru Zoological Park, Hyderabad and Van Vihar National Park & Zoo, Bhopal will be made effective.

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.



## Exchange/Transfer of animals by zoos

Eighteen exchange proposals of animals between Indian Zoos and 3 exchange proposals between Indian and Foreign Zoos have been approved by the Authority as on 31.01.2014.

## 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 174 detailed Master (Layout) Plans as on 31<sup>st</sup> January, 2014. The CZA is also reviewing the previously granted approved for Master (layout) Plans of 80 Zoos and Master Plan of the 31 Zoos to ensure the more insight of CZA for better development of the zoos.

During the current financial year; CZA has approved Layout Plan of the 17 Zoos and Master Plan of 4 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 Jaipur Zoo, Jaipur organized a workshop for Zoo Biologist working in various Indian Zoos with a theme "Zoo as a tool for scientific management of animals with special focus on research and publication" during 25<sup>th</sup> -28<sup>th</sup> June, 2013 at Jaipur. Altogether 23 biologists across country participated in the workshop.
- The Central Zoo Authority in collaboration with Nehru Zoological Park and LaCONES (CCMB), Hyderabad and Nandankanan Biological Park, Bhubaneswar, organized workshop on "Conservation Breeding and Species Recovery Planning of Endangered

Species by Zoological Parks" at Hyderabad during 8<sup>th</sup> – 12<sup>th</sup> July, 2013 and 16<sup>th</sup> – 19<sup>th</sup> September, 2013 respectively. The participants of the workshop were the Chief Wildlife Wardens of the concerned states; the Directors of Zoos identified as coordinating zoos for the identified species and scientists with expertise on the ecology and natural history of the species, population management and molecular biology and conservation genetics. Altogether more than 70 participants including Chief Wildlife Wardens, Zoo Directors and Species experts participated in workshop.

- The Central Zoo Authority in collaboration with Conservation Breeding Specialist Group and Padmaja Naidu Himalayan Zoological Park, Darjeeling organized a Workshop on Red Panda Population Habitat Viability Analysis (PHVA) at Siliguri, West Bengal during 26<sup>th</sup> - 29<sup>th</sup> November, 2013.
- The Central Zoo Authority in collaboration with Durrell Wildlife Conservation Trust, UK and Assam State Zoo, Guwahati organized a workshop titled "Building National Capacity for Ex-situ Amphibians Management and Conservation" at Guwahati, Assam during 10<sup>th</sup> -13<sup>th</sup> December, 2013.
- The Central Zoo Authority in collaboration with Sri Chamajendra Zoological Gardens, Mysore organized a workshop titled "Zoos – window to biodiversity" at Mysore, Karnataka during 16<sup>th</sup> -20<sup>th</sup> December, 2013. More than 35 Participants participated in the workshop.
- The Central Zoo Authority provided financial assistance to zoos to organize 2 week training programme at Assam



State Zoological Park, Guwahati, Assam; Kamla Nehru Zoological Park, Ahmadabad, Gujarat; Sri Chamarajendra Zoological Park, Mysore, Karnataka; M. C. Zoological Park, Chhattbir, Punjab; Pt. Govind Ballabh Pant High Altitude Zoo, Nainital, Uttaranchal and Nandankanan Biological Park, Bhubaneswar, Odisha 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 reference to improved animal health and their upkeep". More than 100 zoo keepers will be benefitted from this training programme.

- A Co-ordination meeting on Vulture Conservation Breeding Programme of CZA was organized at NASC Complex of ICAR, New Delhi in collaboration Vulture Conservation Breeding Centre, Pinjore on 28<sup>th</sup> January 2014. More than 20 participants attended the meeting.
- The Central Zoo Authority sponsored Sh. B. P. S. Parihar, Director, Van Vihar National Park & Zoo, Bhopal and Dr. Arvind Mathur, Veterinary Officer, Jaipur Zoo, Jaipur for attending the Endangered Species Recovery Course organized by the Durrell Wildlife Conservation Trust, Jersey, UK during 8<sup>th</sup> - 19<sup>th</sup> July, 2013. The Director, Van Vihar National Park & Zoo, Bhopal could not attend the programme.
- Shri B.S. Bonal, Member Secretary, Central Zoo Authority attended 68<sup>TH</sup> meeting of the World Association of Zoo & Aquariums (WAZA) & Conservation Breeding & Specialist Group (CBSG) held at Orlando, Florida during 10<sup>th</sup> - 17<sup>th</sup> October, 2013.

## Research

The Central Zoo Authority has awarded research project titled "Red panda Nutrition:

Towards an integrated approach" and "Studies on biology, breeding behaviour and aviary practices for improved performances of captive Himalayan pheasants" to Padmaja Naidu Himalayan Zoological Park, Darjeeling with a financial assistance of ₹ 10.19 lakhs and ₹ 9.43 lakhs for duration of two years each, respectively. The Central Zoo Authority had provided financial assistance of ₹ 28.88 lakhs to Conservation Breeding Centre of Blyth's tragopan at Kohima, Nagaland for conducting research studies and construction and maintenance of the Centre.

The Indian Veterinary Research Institute (IVRI), Bareilly has completed the CZA funded research project titled "Standardization of Animal Diets in Indian Zoos". The outcome of the project in the form of a book was distributed among all recognized zoos of the country for record and use in animal management so far as diet is concerned. The book will be the basic guideline/manual for feeding animals in Zoo. The proceedings of the workshop titled "Zoo Designing and Landscape Architecture" has also been published and distributed to the concern zoos for their use.

The Central Zoo Authority is compiling the National studbooks/animal profiles of 44 identified wild animal species taken up under the Conservation Breeding Programme. The Wildlife Institute of India, Dehradun has already updated 12 studbooks out of existing 14 studbooks, and working on 20 new species for developing new studbooks. WII, Dehradun has already submitted the annual progress report of the project for the 1<sup>st</sup> Year.

## Publications

During the current financial year the Central Zoo Authority has published the following publications:



- Calendar for the year 2014 focusing on the theme "Conservation Breeding of Identified Endangered Species in Indian Zoos" which has been widely appreciated.
- The publication of revised edition of the book titled "Zoos in India-2014" incorporating legislation policy, Guidelines and Strategies is in the final stage of printing.
- 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. 2.
- The Annual "Inventory of animals in Indian Zoos 2012-13" is being printed.
- The Central Zoo Authority has updated its brochure which is in the final stage of the printing and soon will be distributed among the concern zoos and during Annual meeting of Conservation Breeding Specialist Group (CBSG) and Annual Conference of World Association of Zoos and Aquarium (WAZA)-2014 scheduled to be held at New Delhi on 30<sup>th</sup> October -2<sup>nd</sup> November 2014 and during 2<sup>nd</sup>-6<sup>th</sup> November, 2014 respectively.

### Improvement of zoos

The Central Zoo Authority convened meeting of the Technical Committee during the current financial year on 11<sup>th</sup> June (66<sup>th</sup> Meeting), 30<sup>th</sup> August (67<sup>th</sup> Meeting) and 11<sup>th</sup> February 2013 (68<sup>th</sup> 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 Conservation Breeding had its sittings on 20<sup>th</sup> May, 2013

(9<sup>th</sup> Meeting), to discuss the various proposal on Conservation Breeding and preparing guidelines on Conservation Breeding Programme.

The Expert Group on zoo designing convened its meeting on 23<sup>rd</sup> April 2013 (40<sup>th</sup> Meeting), 28<sup>th</sup> May, 2013 (41<sup>st</sup> Meeting), 7<sup>th</sup> August 2013 (42<sup>nd</sup> Meeting), 5<sup>th</sup> September (43<sup>rd</sup> Meeting), 04<sup>th</sup> October (44<sup>th</sup> Meeting), 31<sup>st</sup> October 2013 (45<sup>th</sup> Meeting), 3<sup>rd</sup> January 2014 (46<sup>th</sup> Meeting), 29<sup>th</sup> January 2014 (47<sup>th</sup> Meeting), 3<sup>rd</sup> February 2014 and (48<sup>th</sup> 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 follow up of 1<sup>st</sup> Stakeholders Meeting on "Elephants Upkeep in Zoos" was held on 18.03.2013 under the Chairmanship of Addl. DG (WL) followed by meeting for compliance on 25<sup>th</sup> October, 2013 under the chairmanship of Member Secretary, Central Zoo Authority at National Zoological Park, New Delhi.

### Other activities carried out during the year

The Central Zoo Authority has provided an amount of ₹ 396.15 lakhs for maintenance including feed and medicines etc. to 6 rescue centres created at Chennai, Tirupati, Visakhapatnam, Bangalore, Bhopal and Jaipur for lions, tigers, leopards, bears and monkeys rescued from the circuses for rehabilitation.

The Central Zoo Authority released an amount of ₹ 9.94 to National Informatics Centre (NIC) for the execution of the project to develop web based Software to make the process of submission of application by the zoos along with the required draft and evaluation and grant recognition online which is being developed by NIC.



## International Relations

- The Central Zoo Authority has signed a Memorandum of Understanding (MoU) with National Trust for Nature Conservation (NTNC), Nepal to promote and coordinate mutual staff exchanges for training in technical and management aspects of Zoo-related and Conservation and Research matters dated 27.05.2013.
- The Central Zoo Authority has signed a Memorandum of Understanding (MoU) with Wildlife Institute of India, Dehradun and University of California, Davis, USA dated 15.05.2013.
- A process of signing a Memorandum of Understanding (MoU) between the Central Zoo Authority and Smithsonian National Zoological Park, U.S. America on “Exotic and Wild Animal Veterinary Medicine Joint Research Program” has been initiated.
- The Central Zoo Authority is hosting and organizing Annual Meeting of Conservation Breeding Specialist Group (CBSG) and Annual Conference of World Association of Zoos and Aquariums (WAZA)-2014 to be held at New Delhi during 30<sup>th</sup> October-2<sup>nd</sup> November, 2014 and 2<sup>nd</sup>-6<sup>th</sup> November, 2014 respectively. In this concern Sh. B. S. Bonal, Member Secretary, Central Zoo Authority extended invitation to the members and received the WAZA flag from Ms. Jackie Ogden, Disney’s Animal Kingdom as host of the 69<sup>th</sup> Meeting of World Association of Zoo & Aquariums (WAZA) at New Delhi. A Core Committee was constituted for looking after the arrangements for successful organization of these meetings. A website was also developed by CZA to facilitate the members & stakeholders of the meetings.

## National Tiger Conservation Authority (NTCA)

### Introduction

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

### Milestone Achievements / Progress made during the year

#### Legal steps

- Amendment of the Wild Life (Protection) Act, 1972 in 2006 to provide enabling provisions for constituting the National Tiger Conservation Authority and the Tiger and Other Endangered Species Crime Control Bureau.
- Enhancement of punishment for offence in relation to the core area of a tiger reserve or where the offence relate to hunting in the tiger reserves or altering the boundaries of tiger reserves, etc.

#### Administrative steps

- Strengthening of antipoaching activities, including special strategy for monsoon patrolling, by providing funding support to tiger reserve States, as proposed by them, for deployment of antipoaching squads involving ex-army personnel or home guards, apart from workforce comprising of local people, in addition to strengthening of communication and wireless facilities.
- Constitution of the National Tiger Conservation Authority with effect from the 4th September, 2006, for



**Fig-24.** Tiger (*Penthra tigris tigris*) our national animal

strengthening tiger conservation by, *inter alia*, ensuring normative standards in tiger reserve management, preparation of reserve specific tiger conservation plan, laying down annual audit report before Parliament, constituting State level Steering Committees under the Chairmanship of Chief Ministers and establishment of Tiger Conservation Foundation.

- Constitution of a multidisciplinary Tiger and Other Endangered Species Crime Control Bureau (Wildlife Crime Control Bureau) with effect from the 6th June, 2007 to effectively control illegal trade in wildlife.
- The in-principle approval has been accorded by the National Tiger Conservation Authority for creation of two new tiger reserves, and the sites are: Ratapani (Madhya Pradesh) and Sunabeda (Odisha). Final approval has been accorded to Kudremukh (Karnataka), Rajaji (Uttarakhand), Pilibhit (Uttar Pradesh) and Bor (Maharashtra) for declaring as a tiger reserve. The State Governments have been advised to send proposals for declaring the following areas as tiger reserves: (i) Suhelwa (Uttar Pradesh), (ii) Guru Ghasidas

National Park (Chhattisgarh), (iii) Mhadei Sanctuary (Goa), (iv) Srivilliputhur Grizzled Giant Squirrel / Megamalai Wildlife Sanctuaries / Varushanadu Valley (Tamil Nadu) and Dibang Wildlife Sanctuary (Arunachal Pradesh).

- The revised Project Tiger guidelines have been issued to State Governments for strengthening tiger conservation, which apart from ongoing activities, inter alia, include financial support to States for enhanced village relocation or rehabilitation package for people living in core or critical tiger habitats (from ₹ 1 lakh per family to ₹ 10 lakhs per family), rehabilitation or resettlement of communities involved in traditional hunting, mainstreaming livelihood and wildlife concerns in forests outside tiger reserves and fostering corridor conservation through restorative strategy to arrest habitat fragmentation.
- A scientific methodology for estimating tiger (including co-predators, prey animals and assessment of habitat status) has been evolved and mainstreamed. The findings of this estimation and assessment are bench marks for future tiger conservation strategy.
- The 17 tiger States have notified the core/critical tiger habitat (36988.28 sq. km.), and the buffer/peripheral area (29789.06 sq.km.) of all the 44 tiger reserves in the country, under section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.

#### **Financial steps**

- Financial and technical help is provided to the State Governments under various Centrally Sponsored Schemes, such as Project Tiger and Integrated Development



of Wildlife Habitats for enhancing the capacity and infrastructure of the State Governments for providing effective protection to wild animals.

### **International Cooperation**

- India has a bilateral understanding with Nepal on controlling trans-boundary illegal trade in wildlife and conservation, apart from a protocol on tiger conservation with China.
- A protocol has been signed in September, 2011 with Bangladesh for conservation of the Royal Bengal Tiger of the Sunderban.
- A sub-group on tiger and leopard conservation has been constituted for cooperation with the Russian Federation.
- A Global Tiger Forum of Tiger Range Countries has been created for addressing international issues related to tiger conservation.
- During the 14th meeting of the Conference of Parties to CITES, which was held from 3rd to 15th June, 2007 at The Hague, India introduced a resolution along with China, Nepal and the Russian Federation, with direction to Parties with operations breeding tigers on a commercial scale, for restricting such captive populations to a level supportive only to conserving wild tigers. The resolution was adopted as a decision with minor amendments. Further, India made an intervention appealing to China to phase out tiger farming and eliminate stockpiles of Asian big cats body parts and derivatives. The importance of continuing the ban on trade of body parts of tigers was emphasized.
- Based on India's strong intervention during the 62nd meeting of the Standing

Committee of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) at Geneva from 23-27 July, 2012, the Convention on International Trade in Endangered Species of Wild Fauna and Flora Secretariat has issued a notification No. 2012/054 dated the 3rd September, 2012 to Parties to fully implement Decision 14.69 and report to the Secretariat by 25 September, 2012 (Progress made on restricting captive breeding operations of tigers etc.).

- As a part of active management to rebuild Sariska and Panna Tiger Reserves where tigers have become locally extinct, reintroduction of tigers and tigresses have been done. The successful reintroduction of wild tigers in Sariska is a unique exercise and is the first of its kind in the world. A reintroduced tigress has recently littered and two cubs have also been camera trapped. The tiger reintroduction initiative at Panna (MP) has also been very successful and reintroduced tigers are breeding.
- Special advisories issued for in-situ build up of prey base and tiger population through active management in tiger reserves having low population status of tiger and its prey.

### **Creation of Special Tiger Protection Force (STPF)**

- The policy initiatives announced by the Finance Minister in his Budget Speech of the 29th February, 2008, inter alia, contains action points relating to tiger protection. Based on the one time grant of ₹ 50.00 crore provided to the National Tiger Conservation Authority (NTCA) for raising, arming and deploying a Special Tiger Protection Force (STPF), the proposal for the said force has been approved by the



competent authority for 13 tiger reserves. The States of Karnataka and Maharashtra have already created and deployed the STPF.

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

### Recent initiatives

- Implementing a tripartite Memorandum of Understanding (MOU) with tiger States, linked to fund flows for effective implementation of tiger conservation initiatives.
- Special crack teams sent to tiger reserves affected by left wing extremism and low population status of tiger and its prey.
- Chief Ministers of States having tiger reserves affected by left wing extremism and low population status of tiger and its prey addressed for taking special initiatives.
- Steps taken for modernizing the infrastructure and field protection, besides launching 'Monitoring system for Tigers' Intensive Protection and Ecological Status (M-STrIPES)' for effective field patrolling and monitoring.
- Steps taken for involvement of Non-Governmental Experts in the ongoing all India tiger estimation.
- Initiatives taken for improving the field delivery through capacity building of field officials, apart from providing incentives.
- The second round of country level tiger status assessment completed in 2010, with the findings indicating an increase with a tiger population estimate of 1706, lower and upper limits being 1520 and

1909 respectively, as compared to the last country level estimation of 2006, with an estimate of 1411, lower and upper limits being 1165 and 1657, respectively. At present, India has the maximum number of tigers and its source areas amongst the 13 tiger range countries in the world, owing to its long history of conserving the species through Project Tiger (2% of country's geographical area spread out in 44 tiger reserves in 17 States).

- A report on Management Effectiveness Evaluation (MEE) of Tiger Reserves was released on 28th July, 2011, containing the second round of independent assessment based on refined criteria done in 2010-11 for 39 tiger reserves. Out of 39 tiger reserves, 15 were rated as 'very good', 12 as 'good', 8 as 'satisfactory' and 4 as 'poor'.
- Providing special assistance for mitigation of human-tiger conflicts in problematic areas.
- Regional Offices of the National Tiger Conservation Authority are operational at Nagpur, Bengaluru and Guwahati.
- A 'Standard Operating Procedure' for dealing with tiger deaths has been issued, based on advisories of Project Tiger / National Tiger Conservation Authority, with inputs from Wildlife Crime Control Bureau, State officials and experts, fine tuned to meet the present challenges.
- A 'Standard Operating Procedure' for dealing with straying tigers in human dominated landscape has been issued.
- A 'Standard Operating Procedure' for disposing tiger/leopard carcass/body parts has been issued.
- The Revised Cost Estimates for Project Tiger was approved on 11.8.2011 for an upward revision of the cost estimates



- for the ongoing Centrally Sponsored Scheme of Project Tiger during the XIth Plan period from 650 crore to ₹ 1216.86 crore of central assistance to support States in village relocation from core areas of tiger reserves. Several new components were added to the Project, viz.:
- Change in the funding pattern in respect of North Eastern States (90:10)
  - Raising compensation for man-animal conflict to ₹ 2 lakhs
  - Acquisition of private land for making the core/critical tiger habitat inviolate
  - Establishment of Tiger Safari, interpretation/awareness centres under the existing component of 'co-existence agenda in buffer/fringe areas', and management of such centres through the respective Panchayati Raj Institutions
  - Re-introduction of Cheetah
  - Launching of Phase-IV tiger reserve level, continuous monitoring of tigers using camera traps and building up data on photo captures of individual tigers.
  - Launching the creation of a national repository of camera trap photo IDs of individual tigers.
  - In-principle approval for use of CAMPA funds towards village relocation from core areas.
  - Completion of e-surveillance project in Corbett.
  - Comprehensive guidelines under section 38O 1 (c) of the Wildlife (Protection) Act, 1972 issued for Project Tiger and Tourism in Tiger Reserves on 15th October, 2012.
  - Under active management, permission accorded for translocation of two tigresses from Ranthambhore to Sariska (Rajasthan), besides one straying sub-adult male tiger from Panna to Satpura (Madhya Pradesh), and one straying tiger from Pilibhit to Dudhwa Tiger Reserve (Uttar Pradesh).
  - A bilateral arrangement has been recently formalized with Bangladesh on tiger conservation. Our delegations are interacting with Nepal and China within the framework of existing bilateral arrangements. A sub-group on tiger/leopard conservation has been constituted for cooperation with the Russian Federation, which has met recently.
  - Field level workshops for capacity building of field officers to deal with straying tigers have been organized at Tadoba and Dudhwa Tiger Reserves (2013).
  - NTCA teams sent for field appraisal of tiger deaths, Project Tiger implementation etc.
  - Process underway for providing enabling provisions in the Wildlife (Protection) Act, 1972, to strengthen our implementation of the CITES and towards enhancement of penalties for contravention of provisions of the Act.
  - Kawal (Andhra Pradesh), Sathyamangalam (Tamil Nadu), Mukandra Hills (Darrah, Jawahar Sagar and Chambal Wildlife Sanctuaries) (Rajasthan) and Nawegaon-Nagzira (Maharashtra) have been notified by the State Governments as Tiger Reserve.
  - Action has been initiated for the next round (2014) of country level status assessment of tiger, co-predators, prey and habitat, using the refined methodology, in collaboration with tiger States and the Wildlife Institute of India.



- Action has been initiated for the next round (2014) of Independent Management Effectiveness Evaluation of Tiger Reserves.

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

The Wildlife (Protection) Act, 1972, is the main regulatory Act governing the

program. The said Act has been amended in 2006 to provide a separate Chapter (IVB) for strengthening tiger conservation.

### Budget allocation of the Scheme during the year and progress of expenditure

Details of Budget allocation of the Scheme and progress of expenditure are given in Table-34 and Table-35.

**Table-34.** Plan Expenditure under the Centrally Sponsored Scheme of Project Tiger (as on 31.03.2014)

(₹ in crore)

S. No.	Budget Head	BE	RE	Expenditure	Percentage expenditure w.r.t. RE
<b>Project Tiger Scheme</b>					
1.	3601 (assistance to States excluding North Eastern Region) Grants-in-aid General	139.02	138.29	138.29	100
2.	3601 (assistance to States excluding North Eastern Region) Scheduled Tribe Sub Plan	10.00	10.00	10.00	100
3.	3601 (assistance to States excluding North Eastern Region) Scheduled Castes Sub Plan	6.00	6.00	6.00	100
4.	2552 (assistance to North Eastern Region)	20.00	18.00	18.00	100
<b>Object-wise detail</b>					
5.	2406.01.04 (National Tiger Conservation Authority) (Detailed Head) Grants-in-aid General				
	(a) 01.04.31 Grants-in-aid General	06.10	06.10	06.10	100
	(b) 01.04.35 Grants for Creation of Capital Assets	00.00	00.00	00.00	00.00
	(c) 01.04.36 Grants-in-aid – Salaries	00.90	00.90	00.90	100
	<b>Total</b>	<b>182.02</b>	<b>179.29</b>	<b>179.29</b>	<b>100</b>

**Table-35.** Fund release to States during the current financial year 2013-14 under the CSS of Project Tiger (as on 31.03.2014)

(₹ in lakhs)

S. No.	Name of the State	Amount released (including All India Tiger Estimation)
1.	Andhra Pradesh	211.78040
2.	Arunachal Pradesh	757.17053
3.	Assam	808.96650
4.	Bihar	285.08980
5.	Chhattisgarh	583.05600
6.	Jharkhand	251.16800
7.	Karnataka	2016.03180
8.	Kerala	489.29600
9.	Madhya Pradesh	4815.73400
10.	Maharashtra	3453.34830
11.	Mizoram	233.68000
12.	Odisha	786.90000
13.	Rajasthan	512.84800
14.	Tamil Nadu	763.25500
15.	Uttarakhand	384.04500
16.	Uttar Pradesh	525.87600
17.	West Bengal	348.51600
18.	Goa	2.05000
	<b>Total</b>	<b>17228.81133</b>

### Implementing organization along with details

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

### 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.

### Scheme for Provision of Shelter Houses for animals

There are a large number of animals in our country without proper shelter especially in Goshalas/Pinjrapoles. A number of them are not cared for and are left in the streets, either wounded or suffering from various diseases. Though there are shelter houses operating at various places, their number is not adequate and the facilities provided are insufficient. This scheme endeavours to fill this gap and provide requisite services for the care and protection of uncared for animals by making provision for establishment and maintenance of shelter houses to various NGOs, AWOs, Goshalas etc. Under this scheme, the AWOs are assisted to the extent of 90% of the project cost of the construction of a shelter house with a ceiling of ₹ 25 lakhs including 10% contribution to be made by the AWOs. The amount is released in two equal installments.

### Scheme for Animal Birth Control and Immunization of stray dogs

Keeping in view the over population of stray dogs throughout the country and also the increase of human / animal deaths due to rabies, this scheme is being implemented by the Animal Welfare Board of India to facilitate sterilization and immunization of stray dogs through the NGOs including SPCAs throughout the country. The Local Governments/municipal bodies are also showing increased keenness to become stakeholders in the programme. Presently several municipalities (such as Delhi, greater Hyderabad) have entered MOU

with AWBI to tackle the population with the objective to make the country "rabies free". There is an urgent need to expand this scheme to cover more metros & rural areas to address the issue effectively. **Under the scheme, the norms for financial assistance are at Rs. 370/- per dog for pre & post operative care including medicines & ARV and Rs. 75/- per dog for catching and relocation of dog (Total Rs. 445/- per dog).**

### Scheme for provision of Ambulance Services to Animals in Distress

Under this Scheme, ambulance/rescue vehicles are provided to the NGOs/AWOs / gaushalas working in the field of animal welfare. The ambulance services are to be used for the following purposes:

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

Under this scheme the 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.



**Fig-25.** Financial assistance to animal welfare organisations for maintaining the stray animals in distress and for their treatment

### **Scheme for Relief to Animals during Natural Calamities and unforeseen circumstances**

We face natural calamities every year in the form of floods, cyclones, droughts and earthquakes. In such circumstances there is an immediate requirement for the provision of relief to affected animals by providing fodder, adequate shelter, medical attention otherwise the animals would perish. Apart from this, the financial assistance was provided under the scheme under other natural disaster such as Tsunami, earthquake, etc. Financial assistance is extended to AWOs, State Governments/UTs, local bodies working in the affected areas for providing relief to the animals affected during natural calamities and for relief of animals rescued from illegal transportation, slaughter, circuses etc.

Animal Welfare Division also deals with the following:-

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

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

The main objective of the Prevention of Cruelty to Animals Act (PCA), 1960 is to prevent infliction of unnecessary pain or suffering on animals. Accordingly, the Committee for 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.

CPCSEA has registered a total 1734 number of establishments till 31.12.2013, out of which, 47 registrations and 55 renewals were done during current year. CPCSEA supported Conferences and workshops held in Delhi, Himachal Pradesh, Hyderabad, Jammu & Kashmir, Mizoram and Uttarakhand.

### National Institute of Animal Welfare (NIAW)

The National Institute of Animal Welfare (NIAW) has been set up as a subordinate office of the Ministry of Environment and Forests. The objective of NIAW is to impart training and education in Animal Welfare on

a diversified basis comprising, among other things, animal management, their behavior and ethics. The aim is to create an enabling environment for fulfillment of the statutory requirements as laid down in the Prevention of Cruelty to Animals Act, 1960.

NIAW has been conceptualized as an apex body in the field of animal welfare and its broad mandate covers the need to improve animal welfare through education, research and public outreach. The Institute has been operational since January, 2006 and the process of appointment of faculty is underway.

NIAW is conducting different training courses (HAWOs Training / CPCSEA Nominees Training Programme) for the different Stakeholders (CPCSEA Nominees, / Hon. Animal Welfare Officers/B. Pharm interns etc).

Against the total target of 26 training programmes, 23 training programmes have been completed by NIAW as on 31.12.2013.

The details of budget allocation of 2013-14 and progress of expenditure (upto 31.1.2014) are summarized in Table-36.

**Table-36.** Budget allocation and progress of expenditure during 2013-14; XII plan Outlay

(₹ in lakhs)

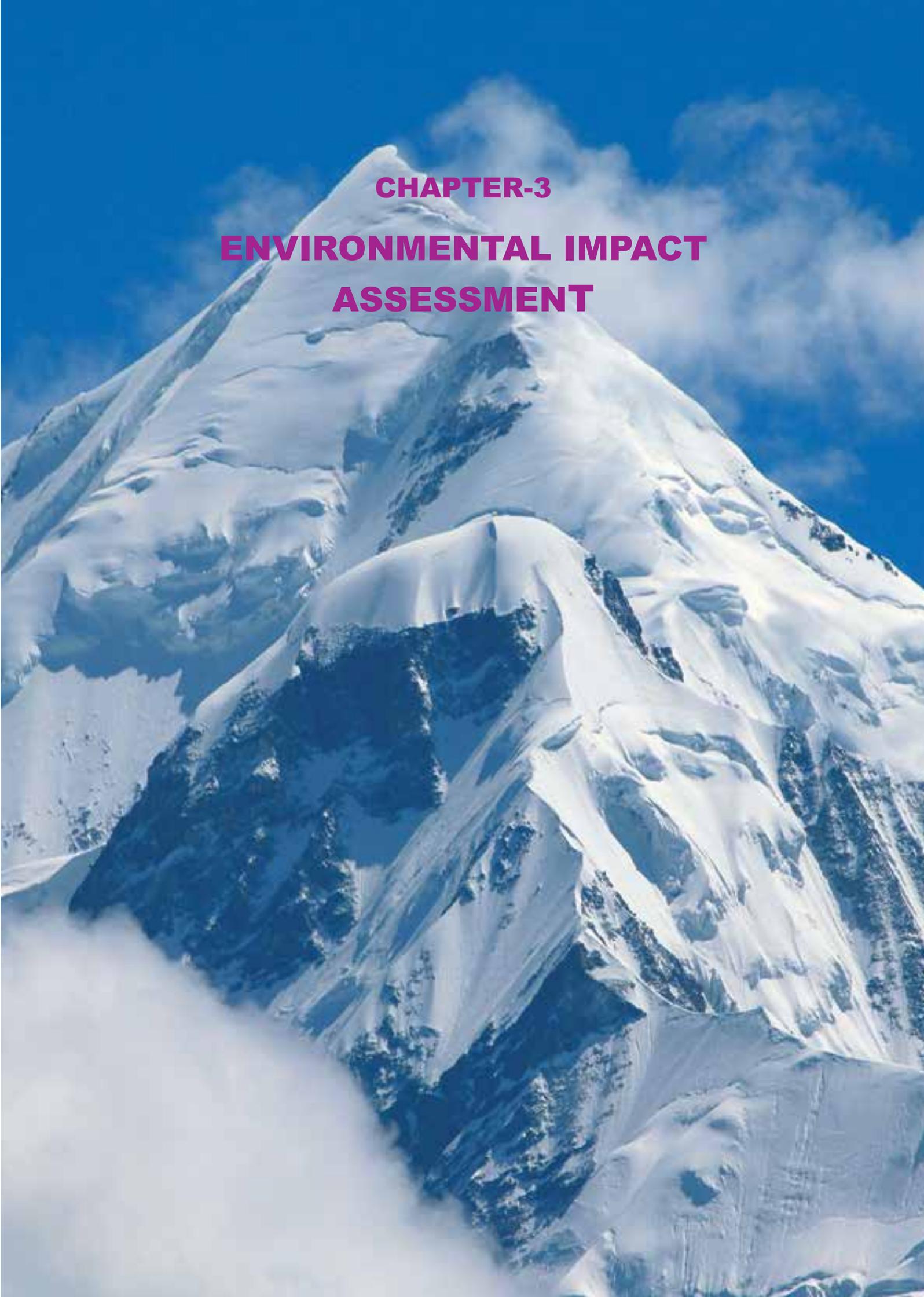
S. No.	Scheme	12 <sup>th</sup> Plan (2012-17 Approved Outlay)	BE 2013-14	RE 2013-14	Amount Released	Balance Amount (Rs.)	Remarks
1.	AWBI Plan	7315	800.00	536.00	400.00	136.00	
2.	Shelter House	6021	800.00	---	---	---	
3.	Ambulance scheme	1973	350.00	9.00	Nil	9.00	
4.	ABC	3000	300.00	---	---	---	
5.	Natural Calamity	150	10.00	10.00	10.00	Nil	
6.	CPCSEA	305	50.00	43.00	43.00	Nil	
7.	NIAW	1236	210.00	142.00	120.08	21.92	Shifted from grant-in-aid to direct payment
	<b>Grand Total</b>	<b>20000</b>	<b>2520.00</b>	<b>740.00</b>	<b>573.08</b>	<b>166.92</b>	



**Table-37.** Budget allocation vis a vis progress of physical achievements (upto 31.12.2013)

(Amount in lakhs)

Scheme	Year 2013-14				Year 2014-15	
	BE 2013-14	RE 2013-14	Quantifiable deliverables	Achievement till 31.12.2013	BE 2014-15	Quantifiable deliverables
AWBI Plan	800.00	536.00	750 AWOs	481 AWOs	800.00	750 AWOs
Shelter House	800.00	---	36 Shelters to be constructed	43 AWOs	600.00	27 Nos. of Shelters
Ambulance scheme	350.00	9.00	77 Ambulances	32 AWOs	350.00	77 Nos. of Ambulances
ABC	300.00	---	75000 operations	47430 Operations	300.00	75000 operations
Natural Calamity	10.00	10.00	Unforeseen Circumstances cannot be determined	3 AWOs	10.00	Unforeseen Circumstances cannot be determined
CPCSEA	50.00	43.00	Cannot be fixed	47 new Registrations 55 Renewals 2 Large Animal House	50.00	Cannot be fixed
NIAW	210.00	142.00	26 Training Courses	23 Training Courses	210.00	26 Training Programmes
<b>Grand Total</b>	<b>2520.00</b>	<b>740.00</b>			<b>2320.00</b>	



**CHAPTER-3**  
**ENVIRONMENTAL IMPACT**  
**ASSESSMENT**

## Environment Impact Assessment Notification 2006

The Environmental Impact Assessment (EIA) 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 and Forests (MoEF) has used Environmental Impact Assessment 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 Environmental Impact Assessment (EIA) Notification of September 2006, requiring prior Environmental Clearance (EC) from MoEF 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

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 and nuclear power. 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) was accorded to three hundred and thirty six projects. (between April, 2013 to March, 2014). The sector-wise list of environmental clearances issued to the projects by the Ministry is given in the Table-38.

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

The Ministry has so far constituted twenty seven State/UT level Environmental Impact 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. Recently, SEIAA/SEAC have been reconstituted in Manipur (10<sup>th</sup> January, 2013), Uttarakhand on 8<sup>th</sup> March, 2013, Assam (30<sup>th</sup> April, 2013), Maharashtra (29<sup>th</sup> October, 2013), West Bengal, (9<sup>th</sup> December, 2013), Goa (9<sup>th</sup> December, 2013), Maharashtra (30<sup>th</sup> January, 2014), Tripura (30<sup>th</sup> January, 2014), Karnataka (2<sup>nd</sup> May, 2014), Gujarat (2<sup>nd</sup> May, 2014), Punjab (6<sup>th</sup> May, 2014).

### 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

**Table-38.** Environmental Clearances accorded during April, 2012 – January, 2013

Sl. No.	Category of Projects	Total
1	Industry	107
2	Thermal	15
3	River Valley & Hydro-Electric	07
4	Mining (Coal)	38
5	Mining (Non-Coal)	91
6	CRZ, Infrastructure, Construction, Industrial Estates	76
7	Nuclear, Defence & Strategic Projects	02
<b>Total</b>		<b>336</b>

clearance issued under EIA Notification 2006 and Coastal Regulation Zone Notification, 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 are undertaken as per

the provisions of the Environmental Impact Assessment 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. MoEF is in the process of amending the EIA Notification 2006 to provide this mechanism a legal cover.

#### **Policy Reform Measures in 2013-14**

- An amendment to the EIA notification, 2006 has been issued clarifying that no fresh environment clearance shall be required for a mining project or activity at the time of renewal of mining lease, which has already obtained environment clearance vide Gazette notification dated 13th March, 2013.
- The procedure to be followed for consideration of linear projects for environmental clearance, which involve forest land has been streamlined vide OM dated 19<sup>th</sup> March, 2013.

As per this O.M., pending grant of stage-I approval under the Forest (Conservation)



- Act, 1980 for non-forestry use of the forest land, environment clearance to linear projects may be issued subject to certain conditions mentioned in the O.M.
- An OM dated 19<sup>th</sup> June, 2013 streamlining the process for EC for buildings and real estate projects with a view to avoiding duplication of work between State Environment Impact Assessment Authorities and the Local Bodies / State Government Departments has been issued.
  - Guidelines dated 24<sup>th</sup> June, 2013 were issued categorizing brick earth and ordinary earth projects with area less than 5 ha as 'B2' category projects.
  - Ministry vide OM dated 1<sup>st</sup> July, 2013 lifted the moratorium for consideration of proposals for EC for iron ore mining operations in the districts of Bellary, Tumkur and Chitradurga in Karnataka since the Hon'ble Supreme Court vide order dated 18<sup>th</sup> April, 2013 in the W.P. (C) No. 562 of 2009 has allowed resumption of mining operations in aforesaid three districts.
  - To ensure that the Environmental Impact Assessment (EIA) / Environment Management Plan (EMP) reports are of good quality, a draft notification seeking comments was kept in public domain for amending the EIA Notification 2006 for providing accreditation of consultants with quality Council of India/National Accreditation Board for education and training. The draft notification was published on 19<sup>th</sup> July, 2013. After examining the comments or objections received from stakeholders, w.r.t. draft notification, the notification is being finalised.
  - A notification amending the EIA Notification, 2006 giving special dispensation under the EC process for highway expansion projects has been published in Gazette Notification, S.O. No. 1960 on 22<sup>nd</sup> August, 2013.
  - Based on the CPCB monitoring conducted in the Critically Polluted Areas (CPAs) during February-April, 2013, moratorium in respect of 10 industrial clusters/areas of Ahmedabad (Gujarat), Asansole (West Bengal), Bhiwadi (Rajasthan), Dhanbad (Jharkhand), Haldia (West Bengal), Howrah (West Bengal), Korba (Chhattisgarh), Kanpur (U.P.), Manali (Tamil Nadu) and Vishakhapatnam (Andhra Pradesh) is lifted vide Ministry's O.M. dated 17<sup>th</sup> September, 2013.
- In respect of 8 critically polluted areas namely Ghaziabad (UP), Indore (M.P.), Jharsuguda (Orissa), Ludhiana (Punjab), Panipat (Haryana), Patancheru - Bollaram (AP.), Singrauli (UP & MP) and Vapi (Gujarat) from where, the moratorium was lifted earlier vide OM of even no. dated 26.10.2010, 15.02.2011, 31.03.2011 and 05.07.2011, the moratorium has been re-imposed based on CPCB recommendation.
- MoEF had imposed a moratorium on consideration of projects in Ratnagiri and Sindhudurg Districts of Maharashtra vide OM dated 16<sup>th</sup> August, 2010. Now, the Ministry has lifted the moratorium vide OM dated 17<sup>th</sup> October, 2013 on consideration of projects from non-Western Ghats area of Ratnagiri and Sindhudurg Districts except in Talukas, Khed, Chiplum, Sangameshwar, Lanja and Rajapur in District Ratnagiri and Kankavli, Sawantwadi, Dodamarg, Deogad, Vaibhavwadi and Kadul in District



Sindhudurg which fall in Western Ghat Area.

- As per the EIA Notification, 2006, all the Category 'B' projects have been further categorized into Category B1 and B2 (except for township and area development projects). The projects categorized as B1 require EIA report for appraisal and have to undergo public consultation process (as applicable). Projects categorized as B2 will be appraised based on the application in Form-1 accompanied with the pre-feasibility report and any other document. As per the OM dated 24<sup>th</sup> December, 2013:
  - Mining projects of 'brick earth' and 'ordinary earth' having lease area less than 5 ha. have been categorized as B2 vide OM dated 24<sup>th</sup> June, 2013.
  - Mining projects of 'brick earth' and 'ordinary earth' having lease area  $\geq 5$  ha. but  $\leq 25$  ha. and all other minor mineral mining projects with mining lease area  $\leq 25$  ha., except for river sand mining projects will be appraised as Category B2 projects based on the Form-I, Pre-feasibility Report, Mining Plan approved by the authorized agency of the concerned State Government.
  - In case, these mining projects are in a cluster i.e. if the periphery of one lease area is less than 500 m from the periphery of another lease area and the total lease area equals or exceeds 25 ha, the activity will become Category B1 project and cluster will require EIA/EMP and public hearing as per EIA Notification, 2006.
  - In case of river sand mining project, with mine lease area less than 5 ha., concerned authority (SEIAA/SEAC) should not consider granting environment clearance.
- The river sand mining projects with mining lease area more than 5 ha. would be categorized as B2 and appraised based on the Form-1, Pre-feasibility Report, Mining Plan approved by the authorized agency of the concerned State Government. Besides, mining activity will be done manually; maximum permissible depth of mining will be 3 mtr. below the water level; mining in areas closed to embankments, bridges can be undertaken only after a safety zone is worked out; no in-stream mining will be permitted; developers have to provide replenishment plans and environment clearance for river sand mining will be valid for maximum period of five years.
- Similarly, the projects like small thermal power plants, mineral beneficiation plants, metallurgical industries, cement plants, chlor-alkali industry, leather/skin/hide processing industry, chemical fertilizers, manmade fiber manufacturing, aerial roadways etc. have also been re-categorized into B2 and B1 category. All the Thermal Power Plants based on coal/lignite/naphtha and gas of capacity  $\leq 5$  MW are categorized in Category B2 requiring no EIA and public hearing. Similarly, mineral beneficiation activity with throughput  $\leq 20,000$  Tonnes per annum (TPA), involving only physical beneficiation are categorized in Category B2. All the non-toxic secondary metallurgical processing industries involving operation of



furnaces only, such as induction and electric arc furnaces, submerged arc furnaces and cupola with capacity  $\geq$  30,000 TPA but  $\leq$  60,000 TPA located within the notified industrial estates are categorized in Category B2 requiring no EIA and public hearing.

- As per EIA Notification, 2006, public hearing can be exempted for expansion of projects under Clause 7 (ii) of EIA Notification, 2006 subject to certain conditions. Public hearing for capacity expansion proposals of existing coal mining projects, which have obtained environment clearance and which are for one time capacity expansion of up to 25%, within the existing mine lease area, has been exempted vide OM dated 19<sup>th</sup> December, 2012.

Further, as per the revised guidelines dated 7<sup>th</sup> January, 2014, expansion proposals of existing coal mining projects having production capacity up to 8 Million Tonnes Per Annum (MTPA) as per the environment clearance letter, the limit of one time capacity expansion may be considered as 50% or incremental production upto 1 MTPA, whichever is more, in the existing mining operation, within the existing mine lease area for exempting public hearing under Clause 7 (ii) of EIA Notification, 2006. If the production capacity of coal mining projects is more than 8 MTPA, OM dated 19<sup>th</sup> December, 2012 will continue to apply *in toto*.

- In exercise of the powers conferred by section 23 of the Environment (Protection) Act, 1986 (29 of 1986), the Ministry has delegated the powers vested in it under section 5 of the said Act to all the State and Union Territory Environment Impact Assessment Authorities constituted by the Central Government under sub-section (3)

of section 3 of Environment (Protection) Act, 1986, to issue show cause notice to project proponents in case of violation of the conditions of the environment clearances issued by the said Authorities to projects or activities within their jurisdiction and to issue directions to the said project proponents for keeping such environment clearances in abeyance or withdrawing them, subject to the condition that the Central Government may revoke such delegations of powers or may itself invoke the provisions of section 5 of the said Act, if in the opinion of the Central Government such a Course of action is necessary in the public interest.

- In exercise of the powers conferred by section 23 of the Environment (Protection) Act, 1986 (29 of 1986), the Ministry has delegated the powers vested in it under section 5 of the said Act to all the State and Union Territory Environment Impact Assessment Authorities (Hereinafter referred to as the said Authorities) constituted by the Central Government under sub-section (3) of section 3 of Environment (Protection) Act, 1986, to issue show cause notice to project proponents in case of violation of the conditions of the environment clearances issued by the said Authorities to projects or activities within their jurisdiction and to issue directions to the said project proponents for keeping such environment clearances in abeyance or withdrawing them, if required, for violations, subject to the condition that the Central Government may revoke such delegations of powers or may itself invoke the provisions of section 5 of the said Act, if in the opinion of the Central Government such a Course of action is necessary in the public interest.

The background of the page is a close-up photograph of numerous small, white, five-petaled flowers with green centers, arranged in dense clusters on dark green stems. A bright yellow, brushstroke-style graphic is overlaid on the upper right portion of the image, containing the chapter title.

**CHAPTER-4**

**ABATEMENT OF POLLUTION**

## Control of Pollution

### Introduction

The concern for environmental quality has become the topmost 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. Realising this trend of pollution in various environmental media like air, water, soil, etc., the Government earlier adopted Policy for Abatement of Pollution in 1992, which provides multi-pronged strategies in the form of regulations, legislations, agreements, fiscal incentives and other measures to prevent and abate pollution. To give effect to various measures and policies for pollution control, various steps have been initiated which include stringent regulations, development of environmental standards and periodical revision therein, control of vehicular pollution, control of air and water pollution, abatement and prevention of noise pollution, spatial environmental planning, revisit and revision in the list of critically polluted areas and improvement plans therein, etc. The Government also adopted National Conservation Strategy and Policy Statement on Environment and Development, 1992. Afterwards, the Government adopted the National Environment Policy (NEP- 2006) which seeks to extend the coverage, and fill in gaps that still exists, in light of present knowledge and accumulated experience. This policy does not displace, but builds on the earlier policies of the Government. It lays emphasis on a number of new issues.

Progress of Activities Undertaken under various programmes are as follows:

### 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.
- The scheme of Assistance for Abatement of Pollution was conceptualized in 1992 during the 7<sup>th</sup> Five-Year Plan with the objective inter alia to strengthen the CPCB and SPCBs for enforcing statutory provisions for pollution abatement. The scheme is now a part of a centrally sponsored umbrella scheme of 'Pollution Abatement'. The scheme of assistance for pollution abatement comprise of sub-components are Grants-in-aid-General; Grants for creation of Capital Assets; Environment Health Cell (EHC) & Trade and Environment (PL); North Eastern Region Grants-in-aid-General and North Eastern Region Grants for creation of Capital Assets
- The Scheme provides 100% grant to SPCBs/ PCCs, Governmental organizations.
- Under this scheme, grants are being provided to the State Pollution Control Boards/UT Pollution Control Committees, Environment Departments, Central/State Research Institutes, and other government agencies/organizations with the aim of strengthening their technical capabilities to achieve the objectives of the Policy Statement. Assistance is also provided to North Eastern Pollution Control Boards & Pollution Control Committees as salary



- support for the technical staff. In addition, support is also extended for undertaking projects for Abatement of Pollution.
- The scheme has been approved by the Standing Finance Committee in the Ministry. The salient features are as follows:
    - Grant for lab up-gradation/purchase of equipment would be provided to the weaker SPCBs/PCCs only as identified in SFC memo.
    - Salary support will be restricted to scientific and technical staff of the SPCBs of North-Eastern Region and all PCCs.
    - Grant for construction of office-cum -laboratory building would be restricted to SPCBs of North Eastern Region and the weaker PCCs as identified in SFC memo.
    - Capacity Building of SPCBs/PCCs including other environmental organisations by imparting training and education through State Department of Environment and Autonomous Institutions/Statutory Bodies under the Central and State Government.
    - Awareness and education generation, compliance assistance amongst SMEs should be done through CPCB/SPCBs and State Department of Environment and Autonomous Institutions/Statutory Bodies under the Central and State Government.
    - Technical Studies for R&D, survey and documentation for creation of environmental database and consultation in the area of pollution abatement will be expedited through State Department of Environment and Autonomous Institutions/Statutory Bodies under the Central and State Government.
    - Seminars/Workshops/Conference in the area of pollution abatement through State Department of Environment and Autonomous Institutions/Statutory Bodies under the Central and State Government.
    - No support will be extended to the NGOs under this scheme.
  - During this year (2013-14), an allocation of ₹ 2.76 crore in the RE was made for providing financial assistance to the on-going/new projects. The expenditure in the CFY is ₹ 1.23 crore. The assistance has been extended to five 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 Ministry of Petroleum and Natural Gas (MoP&NG), Government of India has enunciated an Auto Fuel Policy (2002) which aims to comprehensively and holistically address the issues of vehicular emissions, vehicular technologies and auto fuel quality in a cost-efficient manner while ensuring the security of fuel supply. The Government has also published Gazette Notification vide G.S.R 84(E) on 9<sup>th</sup> February, 2009 for introducing Bharat Stage IV and III norms, as applicable, for new vehicles in selected cities. The Policy objectives include ensuring sustainable, safe, affordable and uninterrupted supply of auto fuels; optimum utilization of infrastructure for import of crude and crude products,

processing and production, and the storage and transportation; assessing the future trends in emissions and air quality requirements from view point of public health; adopting such vehicular emission standards that will be able to make a decisive impact on air quality etc. The Policy provides for a road map for reduction in vehicular emission norms for new vehicles as well as for reduction of pollution from in-use vehicles. It also sets standards for quality of fuel and other kits. The report of the Source Apportionment studies that has been published and carried by MoEF/ CPCB along with MoPNG has also recommend supply of uniform fuel quality all over the country.

The Government of India, Ministry of Petroleum and Natural Gas (MoPNG) has constituted an Expert Committee for preparing a draft Auto Fuel Vision & Policy 2025.

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

- The successful implementation of environmental protection programmes essentially requires identifying and quantifying the pollution sources and pollutants, conducting baseline survey, laying down standards and build-up monitoring systems. To meet these requirements, an environmental laboratory requires to be provided with all the necessary instruments and equipments as also expertise and capability of its staff for monitoring all groups of parameters including water, air, noise, hazardous waste, soil, sludge etc.
- For effective implementation of environmental protection programmes there is an inescapable need for an efficient and reliable institutional arrangement and facilities for survey,

identification, quantification and systems for monitoring. In this context, the role of an environmental laboratory assumes paramount importance and significance, especially, for the assessment of the status of environment and its components and can facilitate effectively in prevention and control of pollution. The Ministry has been implementing a programme for recognition of environmental laboratories with the aim of increasing facilities for analysis of environmental samples.

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

- The extant guidelines (1994-95) for establishment and recognition of the laboratories have been revised and procedures streamlined. The revision had become necessary as the Environment (Protection) Act, 1986 has been strengthened over the years with the enactments of various rules and notifications there under. Further, Environmental standards have been formulated for various parameters in different industrial sectors. The guidelines for recognition of environmental laboratories under E(P) Act, 1986 have been revised by the Ministry with emphasis laid on quality assurance and quality control aspects. The revised guidelines have been placed on the website of Ministry ([www.envfor.nic.in](http://www.envfor.nic.in)) for wider circulation. The revised guidelines (June 2008) are a definite improvement in the content and the procedures for recognition of the environmental laboratories.
- These revised guidelines, have been made to bring in synergy in requirements



between Environmental Acts, viz. the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986. Under the provisions of Section 12 and 13 of the E (P) A, 1986, the private laboratories are considered by the Ministry for recognition.

- The revised guidelines have been operationalised. The Expert Committee on Labs is meeting once every month to discuss all the cases of Govt. and Private Sector Labs.
- As per the revised guidelines, periodic surveillance of recognized environmental laboratories under E(P) Act, 1986 was also desired to be undertaken to assess the proper functioning, systematic operation and reliability of data generated at the laboratory.
- Procurement of ISO 9001:2008 and OHSAS 18001:2007 have been made mandatory for all laboratories to be considered for recognition under E(P) Act, 1986
- From the beginning of the current year, the task of undertaking joint inspections for considering recognition of private laboratories under E(P)A, 1986 has been entrusted to the Regional Offices of MoEF, under the overall coordination of MoEF (HQ).
- Orientation Workshops on revised guidelines for recognition of environmental laboratories under E(P) Act, 1986, were organized. The first such Orientation Workshop was organized at CPCB-HQ and the second at CPCB-ZO, Bangalore.
- During the year, 30 private sector Labs were visited for considering recognition under E(P)A, 1986 and twenty laboratories

have been recommended for recognition under E(P) Act, 1986 during the year (till December, 2013).

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

- The concept of the Common Effluent Treatment Plants (CETPs) arose in order to make a co-operative movement for pollution control. The main objective of the CETPs is to reduce the treatment cost to be borne by an individual member unit to a minimum while protecting the environment to a maximum. Wastewater treatment and water conservation are the prime objectives of the CETP. The concept of CETPs was envisaged to treat the effluent emanating from the clusters of compatible small - scale industries. It was also envisaged that burden of various Government authorities working for controlling pollution and monitoring of water pollution could be reduced once the CETPs are implemented and commissioned.
- A Centrally Sponsored Scheme (CSS) has been undertaken by the Government for enabling small scale industries (SSI) to set up new and upgrade the existing Common Effluent Treatment Plants to cover all the States in the country. This CSS of CETPs has since been revised by the Ministry. The revised scheme has been approved by the Expenditure Finance Committee (EFC) and the Ministry of Finance.

The salient features of the revised scheme are as follows:

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

be covered for assistance. Progressive technologies like Zero Liquid Discharge will also be considered for assistance, subject to a ceiling.

- The management of the CETP is to be entrusted to a Special Purpose Vehicle registered under an appropriate statute.
- Performance guarantee at full design load is to be ensured upfront.
- During this year (2013-14), an allocation of ₹ 7.00 crore in the RE was made for providing financial assistance to the ongoing/new CETP projects. The expenditure in the CFY so far is ₹ 565 lakhs. Financial assistance was provided for the ongoing projects of CETPs at Pandesara, Palsana and new projects at New Palsana, Surat, Gujarat & Kondapally, Andhra Pradesh.
- 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. In the first phase during the IX Five Year Plan, 10 projects were approved by the Government and implemented by the State Government of Uttar Pradesh.
- The Ministry had sponsored a post-evaluation study for completed projects through the National Environmental Engineering Research Institute (NEERI),

Nagpur for ascertaining the improvement in environmental status of the area. The final report on the "Environmental Post Evaluation of the projects under the Taj Trapezium Zone" submitted by NEERI, Nagpur was accepted by the Ministry. The present environmental condition vis-à-vis Environmental Management Plan (EMP) for the area as suggested in the report was found useful for initiation of future activities in TTZ.

- At present, only a token of ₹ one lakh is available under the scheme.
- Subsequent to the acceptance by the Ministry of the Post Evaluation Report of the TTZ projects and in order to revive the scheme of TTZ, the U.P. Govt. has been intimated to formulate fresh proposals related to the strengthening of solid waste management, water management, electricity supply and distribution, road connectivity, greening and other activities which have a bearing on the environment in the TTZ area, in line with the EMP suggested by NEERI, Nagpur.
- The U.P Govt. was requested to submit fresh proposals to seek provision of more funds during the XII FYP from the Planning Commission. However, till date no comprehensive proposal has been received from the Government of U. P.



Fig-26. bird at Asan barrage



- 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.

## Central Pollution Control Board (CPCB)

### Introduction

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 has been playing a vital role in abatement and control of pollution in the country by generating environmental quality data, providing scientific information, rendering technical inputs for formulating national policies and programmes, training and development of manpower and organizing activities for promoting awareness at different levels of the Government and public at large.

The Central Pollution Control Board also co-ordinates enforcement and implementation of Rules framed under the Environmental (Protection) Act, 1986 with State Pollution Control Boards/Pollution Control Committees. It also provides support to various committees

and authorities constituted by the Government of India such as The Environmental Pollution (Prevention and Control) Authority for the National Capital Region.

### CPCB's Activities

- Coordinating activities of State Pollution Control Boards/Pollution Control Committees for prevention & control of pollution;
- Development of industry specific national minimal effluent and emission standards;
- Development of industry specific environmental guidelines and comprehensive documents;
- Implementation of CREP recommendations & Compliance of Standards for major polluting industrial sectors were undertaken compliance through Task Forces, the major highlights of sectors are as follows:
  - Action plans for improvement of environment in 43 critically polluted areas/clusters and monitoring their implementation;
  - Action plans for monitoring air quality in 16 polluted cities;
  - National water quality monitoring and publishing annual water quality reports;
  - National ambient air quality monitoring and publishing annual air quality reports;
  - Carrying out and sponsoring research activities relevant to environment protection;
  - Publishing material relevant to environment protection.



## Achievements during the year

### National Water Quality Monitoring Programme

In order to assess the nature and extent of pollution control needed in different water bodies or their part, water quality monitoring is an imperative prerequisite. Central Pollution Control Board in collaboration with State Pollution Control Boards has established a Water Quality Monitoring Network covering 2500 stations in 28 States and 6 Union Territories spread over the country. The monitoring network covers 445 Rivers, 154 Lakes, 12 Tanks, 78 Ponds, 41 Creeks/Seawater, 25 Canals, 45 Drains, 10 Water Treatment Plant (Raw Water) and 807 Wells. Among the 2500 stations, 1275 are on rivers, 190 on lakes, 45 on drains, 41 on canals, 12 on tanks, 41 on creeks/seawater, 79 on ponds, 10 Water Treatment Plant (Raw Water) and 807 are groundwater stations. Presently the inland water quality-monitoring network is operated under a three-tier programme i.e. Global Environmental Monitoring System (GEMS), Monitoring of Indian National Aquatic Resources System (MINARS) and Yamuna Action Plan (YAP). The water samples are analysed for 9 core parameters and 19 general parameters. The monitoring agencies have also analysed the trace metals at few locations. The monitoring results obtained during year 2011 indicate that organic pollution continues to be the predominant pollution of aquatic resources. The organic pollution measured in terms of bio-chemical oxygen demand (BOD) & Coliform bacterial count gives the indication of extent of water quality degradation in different parts of our country. It is observed that nearly 63% of the observations are having BOD less than 3 mg/l, 19% between 3-6 mg/l & 18% above 6 mg/l. Similarly Total & Faecal coliform which indicate presence of pathogens

in water are also a major concern. About 50% observations are having Total Coliforms and 69% observations are having Faecal Coliform less than 500 MPN /100 ml.

### Water quality-monitoring program at the river stretch of Interstate Boundaries

One of the function of the Central Pollution Control Board, under Section 16 2(b) of the Water (Prevention and Control of Pollution) Act, 1974 is to “co-ordinate the activities of the State Boards and resolve disputes among them”. In the light of above, CPCB is monitoring the water quality of rivers at the interstate boundaries since 2005. At present, monitoring is carried out four times a year at 82 locations spread over 40 rivers. It was observed that in 26 rivers at 40 locations the water was polluted due to high Bio-Chemical Oxygen Demand (BOD), one of the most important indicators of water quality.

Monitoring of river Satluj, Beas, Sone, Betwa, Ramganga, and Ganga was being carried out on quarterly basis at the Inter-State boundary of Himachal Pradesh, Punjab, U.P., M.P. and Bihar. Water Quality Monitoring was carried out for twelve Rivers at the Inter-state boundaries of Gujarat, Maharashtra, Rajasthan, Madhya Pradesh and UT of Daman etc. Water Quality Monitoring was carried out at interstate boundaries at 8 selected stations in five rivers viz. River Churni, Damodar, Subarnarekha, Indravati and Mahanadi.

### Water Quality of River Ganga

CPCB is regularly monitoring the water Quality of River Ganga from Allahabad to Tarighat (Gajipur) stretch to assess the performance of STPs and the impact on river water quality. With reference to designated best use classification (CPCB), the entire stretch of River Ganga from Haridwar to Tarighat has



been designated as conforming to category 'B', which implies that water quality should be fit for bathing, swimming, water contact sports etc.

### Monitoring During Mahakumbh 2013 At Allahabad

During the Mahakumbh Mela huge mass bathing activity took place. An estimated 130 million people visited the Mahakumbh Mela during the period spread over 55 days. Considering the importance of the occasion and to keep a constant vigil on status of water quality of rivers, CPCB conducted an intensive monitoring to assess the quality of river Ganga and Yamuna at 04 identified locations in Allahabad including Sangam during the Mela. (Fig-27).

The water quality in river Ganga, especially with respect to BOD and Color, registered improvement as compared to the status in the years 2009 & 2011. However, chloride concentration increased slightly. Observations with reference to water quality & quantity (flow) are summarized as under:

- Water quality of River Ganga observed at Sangam, Allahabad during the Mahakumbh improved with respect to color and BOD. It indicates the organic load on river Ganga has reduced, mainly due to measures taken by the local Government at different levels.
- Hon'ble High Court of Allahabad ordered for release of more than 2500 cusec water from Narora barrage to Ganga time to time during Mahakumbh. Hence, availability of

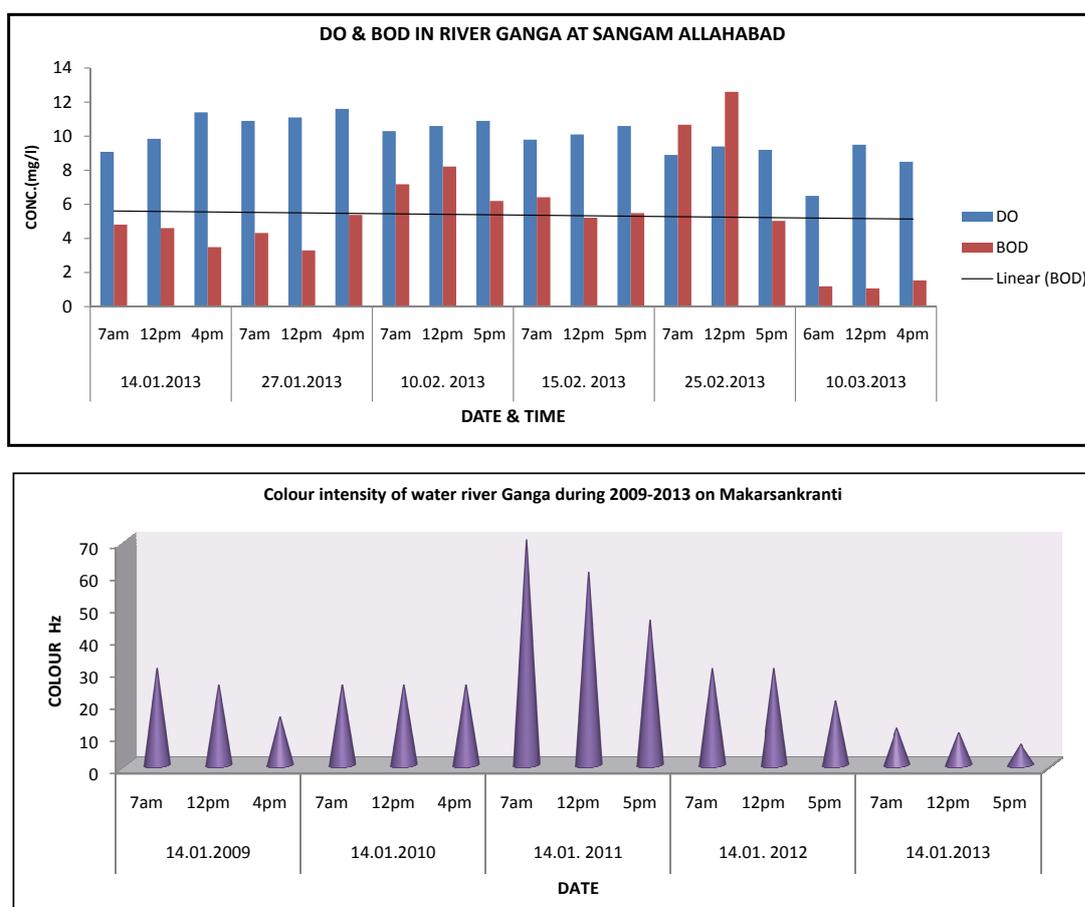


Fig-27. Water Quality Monitoring during Mahakumbh-2013, Allahabad

consistent additional flow in the river has also been the other important factor for improved water quality

- Pre-emptive approach for enforcement followed by the CPCB and SPCBs in state of U.P. and Uttarakhand to restrict industrial discharge in to River Ganga through strict vigil over the industrial activities had also helped in qualitative improvement of water quality of the river.
- Before the Mahakumbh period all the distilleries and tanneries in upper reaches of the river Ganga were directed to either achieve zero discharge or restrict their operations to eliminate any chance of adverse impact on the river. The concerted action resulted in phenomenal reduction in pollution load on river

### Statewise Groundwater Quality

The groundwater quality assessment in 23 States/UTs with respect to conductivity & nitrate and is summarised in Table-39.

### Inter-laboratory comparison for Proficiency Testing in Bio-monitoring of surface waters in India

Biological monitoring provides an effective, easy to understand, less time consuming and cost-effective method to determine cumulative impact of pollution in surface waters. Use of benthic macro-invertebrates for bio-monitoring is based upon community effects and the most frequent response of a community which is expressed in terms of Saprobic score and Diversity score for determination of biological water quality by using Biological Water Quality Criteria BWQC. Inter laboratory comparison for

**Table-39.** Statewise Groundwater Quality Ranges (Conductivity and Nitrate+Nitrite-N)

States/UTs	Conductivity ( $\mu\text{mhos/cm}$ )	Nitrate + Nitrite-N (mg/l)
Andhra Pradesh	211-6995	0.2-63.6
Assam, Meghalaya, Mizoram and Tripura	59-348	0.1-34.0
Chhattisgarh & Madhya Pradesh	340-2182	0.0-8.5
Himachal Pradesh, Chandigarh and Punjab	226-1409	0.0-6.6
Kerala	54-891	0.1-7.6
Odisha	120-1396	0.5-11.8
Puducherry and Tamil Nadu	143-3417	0.05-9.4
Daman & Dadra Nagar Haveli	515-2506	0.3-5.1
Maharashtra	50-5670	0.1-23.5
Gujarat	546-12018	0.26-50
Rajasthan	685-21500	0.08-9.8
Uttar Pradesh and Uttarakhand	225-3163	0.0-34.5
Bihar	356-1015	0.0-0.07
West Bengal	123-8600	0.0-25.5

proficiency testing in bio-monitoring of surface water bodies is a part of NABL Accreditation in association with State Pollution Control Board, Pollution Control Committees and CPCB. In view of assessment for performance of each laboratory, a representative sample of benthic macro-invertebrates was collected from any one location of river/water body. Bio-assessment of water quality was performed by the concerned analyst using standard field protocol. The same preserved sample along with duly filled field protocol was re-assessed in Bio-science laboratory of CPCB, Delhi. The level of training and infrastructure required in each

participating laboratory will be evaluated from the score calculated through this exercise.

## Air Quality Network

### National Ambient Air quality Standards

The National Ambient Air Quality Standards (NAAQS) were notified in the year 1982, duly revised in 1994 based on health criteria and land use based approach. The NAAQS have been revisited and revised in November 2009 in consultation with civil society and experts for 12 pollutants which include  $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ , Ozone, Lead, Arsenic, Nickel, CO,  $\text{NH}_3$ , Benzene, and B(a)P (particulate phase).

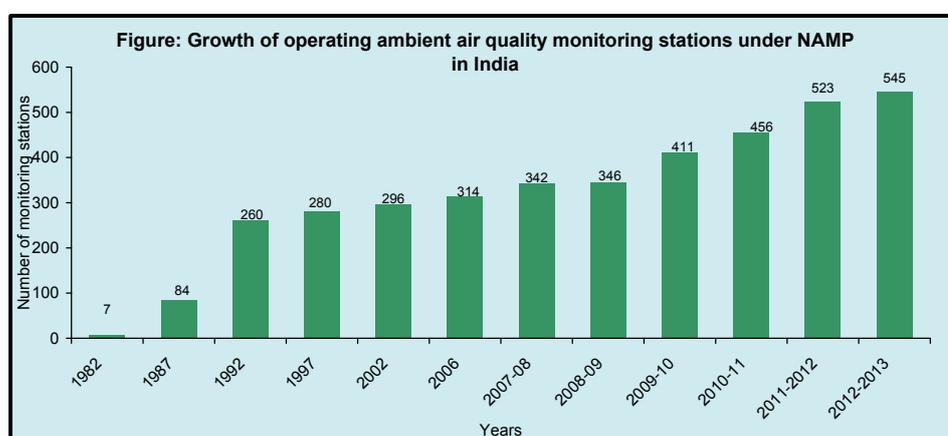


Fig-28. Growth of operating ambient air quality monitoring stations under NAMP in India

### National Ambient Air Quality Monitoring Programme

Central Pollution Control Board is executing a nation-wide National Air Quality Monitoring Programme (NAMP) covering 545 operating stations spread over covering 225 cities/towns in 26 States and 5 Union Territories. (Fig-28)

### Air Quality Monitoring Stations in Metropolitan Cities

In the 53 metropolitan cities (population  $\geq 10$  lacs; Census 2011), the air quality with respect to mainly three criteria air pollutants

such as  $\text{SO}_2$ ,  $\text{NO}_2$  and  $\text{PM}_{10}$  are analyzed. There are 205 air quality monitoring stations in 53 metropolitan cities.

The analysis of air quality in metropolitan cities reveals that with respect to  $\text{SO}_2$  all the cities are in the low category except Jamshedpur, Dhanbad, Pune and Ghaziabad (which falls in moderate category) and within the prescribed standard.

As for  $\text{NO}_2$ , 11 cities have been are in the low category, 31 cities in moderate category while 42 cities comply with the air quality standard. Cities falling under high category have been

Asansol, Jamshedpur, Raipur, Pune, Meerut, Kolkata and Jaipur (7 cities) and in critical categories Delhi thus air quality of 8 cities have been exceeding the National air quality standard with respect to PM<sup>10</sup> in ambient air no city falls under low category, 6 cities have been in moderate category, 6 cities (Chennai, Kollam, Kozhikode, Madurai, Mallappuram, Thiruvananthapuram). The air quality in 11 cities falls in high category, 33 in critical category while 44 cities exceed the standard.

With respect to PM<sub>10</sub>, 1 city and 6 cities are in the low and moderate category respectively. 6 cities fall in the high category and 36 in the critical category therefore 42 cities exceed the standard with respect to PM<sub>10</sub>.

### Measurement of Mixing Height (with sodar system)

Mixing height is the height of the top of the surface based layer, in which vertical mixing is relatively vigorous and it gives the height upto which pollutants disperse in the atmosphere. A SODAR system is in continuous operation at Parivesh Bhawan, CPCB to probe the lower atmosphere. The data obtained from the SODAR system have been analyzed for calculation of mixing height.

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

Central Pollution Control Board in association with State Pollution Control Boards established Real Time National Ambient Noise Monitoring Network by installing 35 Noise Monitoring Systems 05 at 07 metropolitan cities comprising Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad (five stations at each city). Noise data generated from February 2011 to January, 2013 at seven Metropolitan cities reveals following findings:

#### Delhi

- Noise monitoring station at CPCB - HQs depicted sound level within the prescribed standards.
- Sound level always exceeded the limit at ITO Station, however all remaining four stations except CPCB-HQs exceeded the prescribed noise standard.

#### Lucknow

- Sound level at Talkatora Industrial Area was found within the prescribed standards, whereas noise level at Indira Nagar Station exceeded the standard during night time.
- Gomti Nagar, Hajrat Ganj and SGPGI hospital stations exceeded the prescribed noise standard.

#### Kolkata

- Sound level at Kasba, Golpark, WBPCB HQ stations were within the prescribed standards, whereas noise level at New market, Patauli, SSKM hospital exceeded the prescribed noise standard.

#### Mumbai

- All five stations exceeded the prescribed noise standards.

#### Hyderabad

- Sound Level at Jeedimetla was within the prescribed noise standard limit whereas at remaining four stations exceeded the prescribed noise standard.

#### Chennai

- Noise Monitoring Stations at all five locations namely Eye Hospital, Perambur, T.Nagar and Triplicane, Guindy exceeded the prescribed noise standard.



## Bengaluru

- Exceedance of standards have been found for both day and night time at BTM and for day time at Nisarga Bhawan.
- Noise values at remaining four stations have been found within prescribed standard.

## Real-Time Pollution Monitoring Network at Central Pollution Control Board

A system for collecting online data on real time basis and publishing from 35 (Thirty five) continuous ambient air quality monitoring stations operated by various agencies such as CPCB, SPCB and industries is in operation. During the year, the concept of networking of different instruments in use for continuous air/water/noise quality monitoring throughout the country by different agencies was introduced. Central Pollution Control Board presently receiving data from more than 200 stations in different formats and efforts are being made to bring all the data on a single platform for easy understanding and analysis.

The concept was materialized with the installation of central software operated by the major suppliers of instruments through installation of their own hardware & software. Through these systems, data collection is possible without human intervention and data analysis is made possible on real time basis. These portals are web based and uninterruptedly operational in separate specific domains, through which online data can be analysed. The physical data submission proposed to be discontinued in future and time gaps in data submission will be significantly reduced.

## Environmental Data Bank

Web-enabled Environmental Data Bank has been set up to facilitate online entry and

quick retrieval of data on various environmental parameters. On-line data entry of air quality under NAMP and water quality under NWMP is being updated on regular basis by SPCBs/PCCs. These data are made available through CPCB's website (<http://cpcbodb.nic.in>)

## Measures taken for Controlling Air Pollution from Industries

The measures taken for controlling air pollution from industries are as follows:

- Emission standards have been notified under the Environment (Protection) Act, 1986 to check pollution.
- Industries have been directed to install necessary pollution control equipment in a time bound manner and legal action has been initiated against the defaulting units.
- 24 critically polluted areas have been identified. Action Plan have been formulated for restoration of environmental quality in these areas.
- Environmental guidelines have been evolved for siting of industries.
- Environmental clearance has been made compulsory for 29 categories of development projects involving public hearing/ NGO participation as an important component of Environmental Impact Assessment process.
- Environmental audit in the form of environmental statement has been made mandatory for all polluting industries.
- Preparation of Zoning Atlas for siting of industries based on environmental considerations in various districts of the country has been taken up.
- Power plants (coal based) located beyond 1000 kms from the pit-head are required

to use low ash content coal (not exceeding 34%) with effect from 1.6.2002. Power plants located in the sensitive areas are also required to use low ash coal irrespective of their distance from the pit head.

### **Action plan for Control of Air Pollution in sixteen cities identified by the Hon'ble Supreme Court of India**

With the objective of controlling rapidly burgeoning air pollution problems in our country, the Hon'ble Supreme Court of India, passed the orders on regarding formulation and implementation of action plans for control of pollution in selected cities. The Hon'ble Court directed that action plan for pollution control in the cities, which do not meet the ambient air quality standards, should be prepared. On August 14, 2003, the Hon'ble Supreme Court passed the following direction:

“CPCB's report shows that the Respirable Particulate Matter (in short “RSPM”) levels in Ahmedabad, Kanpur, Sholapur, Lucknow, Bangalore, Chennai, Hyderabad, Mumbai and Kolkata are alarming.”

Issue notices to the States of Maharashtra, Andhra Pradesh, Gujarat, Uttar Pradesh, Karnataka and Tamil Nadu. In the Meantime, we direct that the Union of India and the respective States shall draw a plan for lowering the rate of RSPM level in the aforesaid cities. After the plan is drawn, the same would be placed before EPCA. This may be done within a period of two months. We are excluding Mumbai and Kolkata, where the respective High Courts are stated to be monitoring the RSPM levels in those cities. EPCA after examining the matter shall submit a report to this Court within a period of four weeks thereafter.”

Further, CPCB has also identified various non-attainment cities all over the country on the

basis of national ambient air quality data under NAMP. Central Pollution has been coordinating with the concerned state governments of the sixteen critically polluted cities including cities identified by the Hon'ble Supreme Court of India as well as other non-attainment cities identified for preparation of action plan for control of air pollution. CPCB is also reviewing and monitoring the implementation of the action plans prepared for these critically polluted and non-attainment cities. State Governments of the all the sixteen critically polluted cities have submitted their action plan for controlling air Pollution from all the major sources including industrial, vehicular & domestic sources.

### **Charter for Corporate Responsibility for Environment Protection (CREP) - Status of Distilleries**

In 2003, the Charter on Corporate Responsibility for Environment Protection (CREP) was formulated in respect of major polluting industries, including distilleries, for compliance with the existing environmental standards in a time bound manner and for taking initiative to explore and adopt cleaner technologies and improve management practices to reduce pollution. CREP covers following options for spent wash effluent management at the distilleries:

- Compost making with press mud/ agricultural residue/Municipal Waste;
- Concentration and drying/ Incineration;
- Treatment of spent wash through biomethanation followed by two stage secondary treatment and dilution of the treated effluent with process water for irrigation as per norms prescribed by CPCB/MoEF;
- Treatment of spent wash through bio-methanation following by secondary



treatment (BOD<2500 mg/l) for controlled discharge into sea through a proper submerged marine outfall at a point permitted by SPCB/CPCB in consultation with National Institute of Oceanography (NIO), so that Dissolved Oxygen in the mixing zone does not deplete, less than 4.0 mg/l;

- One time controlled land application of treated effluent.

CPCB has been interacting with the State Pollution Control Boards/Pollution Control Committees for implementation of pollution control measures. As per information received from 26 State Pollution Control Boards/Pollution Control Committees, there are 339 distilleries. Of these, 250 distilleries have taken measures to achieve zero discharge of spent wash, 55 distilleries are yet to provide adequate measures to achieve zero discharge, 20 distilleries are closed and status of 14 distilleries are to be confirmed from the SPCBs/PCCs of Chhattisgarh, Jammu and Kashmir, Sikkim and Daman Diu Dadara Nagar Haveli. SPCBs/PCCs of Assam, Kerala, Nagaland, Tripura, Delhi and Pondicherry informed that there is no distillery within their jurisdiction.

### **Implementation of Charter for Water Recycling and Pollution Prevention in Pulp & Paper Industries in Five Identified Clusters in Ganga River Basin**

Central Pollution Control Board (CPCB) has carried out extensive consultations beginning in April, 2012 with various stake holders viz. Central Pulp & Paper Research Institute (CPPRI), Saharanpur, Department of Paper Technology, IIT, Roorkee, Uttarakhand Environment Protection and Pollution Control Board (UEPPCB), Uttar Pradesh Pollution Control Board, (UPPCB) and local Paper Industry Associations culminating in June, 2012 with a

detail implementation programme of about eight months duration for implementation of the Charter in five identified clusters of Pulp & Paper industries located in the catchments of Ramganga and Kali rivers.

Central Pollution Control Board issued directions on July 12, 2012 under section 18(1) (b) of the Water (Prevention and Control of Pollution) Act, 1974 to UEPPCB and UPPCB for implementation of the Charter. Accordingly, UEPPCB and UPPCB also issued directions under section 33(A) of the Water (Prevention and Control of Pollution) Act, 1974 to 84 identified Pulp & Paper industries located in the five clusters, viz. Kashipur and Roorkee in Uttarakhand and Muzaffarnagar, Meerut and Moradabad in Uttar Pradesh have consented to implement the Charter as per the detailed programme.

The 'Charter for Water Recycling and Pollution Prevention in Pulp and Paper Industries in Ganga River Basin' is under implementation by 84 Pulp & Paper industries located in five identified clusters namely Kashipur and Roorkee in Uttarakhand and Muzaffarnagar, Meerut and Moradabad in Uttar Pradesh since August, 2012.

Ramganga and East Kali, the major tributaries of river Ganga in the stretch Uttarakhand and upper reaches of Uttar Pradesh is largely affected by industrial effluent from Pulp & Paper mills located in Kashipur, Moradabad and Meerut (Village Saini, Meerut-Mawana Road) clusters. Similarly, West Kali, a tributary of river Hindon is largely affected by industrial effluent from Pulp & Paper mills located in Roorkee and Muzaffarnagar (Bhopa & Jansath Road) clusters. The major rivulets transporting industrial effluents from Pulp & paper mills to river Ramganga are Dhella, Bahella, Kosi, Pilakhar, Kalyani, Baigul and Gola. River East Kali meets river Ganga a few kilometres after the confluence of rivers Ganga and Ramganga at Kannauj, and further degrades water quality of the river Ganga.



The Charter focused on the following major areas:

- Formulation of Water Consumption & Discharge Norms
- Fresh Water Conservation
- Process Upgradation
- ETP Upgradation
- Documentation

### Benefits / Impact of Charter Implementation

Majority of the pulp and paper mills in Kashipur, Roorkee, Muzaffarnagar, Meerut & Moradabad have made significant progress in implementing the Charter as per the Detailed Implementation Programme. The benefits observed/ estimated due to Charter implementation in terms of water conservation, reduction in pollution load and overall improvement in environmental status.

### Status of Pollution Control in Cement Plants in Eastern Region

The air pollution is major concern in cement plants, which is caused due to emissions from the stacks, due to fugitive emissions and from material handling, crushing, feeding etc. Collection and recycling of dust particles at every step helps in improving the efficiency of plant, as well as minimizing the emission levels.

At present there are 62 cement plants in eastern region (Jharkhand -6, Orissa- 14 and West Bengal- 42). Information from these cement plants was collected through questionnaire. Field inspection was also carried out for seven units.

- In eastern region all cement plants are based on Dry Process and having Horizontal Rotary Kiln (clinker manufacturing) except for one plant which is having vertical kiln. However this plant is in the process of conversion from Vertical to Horizontal

kiln. Water is used for domestic purpose only.

- Due to less availability of lime stone in eastern region, most of the cement plants procure the raw material (clinker) from Madhya Pradesh, Rajasthan and Chhatisgarh state.
- The stack emission from the cement plants (for ball mill) were meeting the norms, but for kiln it was not meeting the norm.
- The fugitive emission control systems (dry fog system, cartridge filter, bag filter, telescopic chute) installed in cement plants are not very effective, may be due to under capacity pollution control equipment.
- Belt conveyors in some cement plants were not properly enclosed and causing fugitive emission.
- One plant is in process of installation of Reverse Air Bag Filter System for its kiln feeding (preheater) to limit the particulate emission of dust.
- One plant has installed the pneumatic conveying system of flyash from two boilers of its thermal power station, however, the thermal power station is not operating these boilers. Ash from other boilers is transported through capsule bulkers which increases the vehicular pollution as well as the transportation cost.
- The dust collection system from the hoppers of the bag filters and cyclones are still not mechanized at most of the plants. Dust is collected manually from the floor after being allowed to fall free from the hoppers/cyclones. In some of the plants the dust collection was mechanized, however, the pneumatic dust conveying system needs to be provided.



- The dust stored in bags/open area within the premises of the industry. This may flow with storm water during rains. It was informed by plant personnel that dust is reused in the process or used for low lying area filling.
- The packing machines are fully automatic. However, spillage of cement was found due to damaged bags, error in machine operation etc.

### **Monitoring of the Large Cement Plants at Lumshnong – Meghalaya**

Eleven (11) large cement plants in Jaintia Hills of Meghalaya, especially in Lumshnong and its surrounding areas were monitored. The capacities of these cement plants vary from 900 TPD to about 5500 TPD. All these cement units have captive lime stone mines with mining lease areas varying from 1.5 Ha to 70 Ha. A few of the units are also having coal based captive power plants.

The rapid growth of these large air polluting industries, together with captive mining and captive thermal power plants may result in adverse effect on the surrounding Environment. Therefore, emission monitoring was carried out to monitor the compliance by the industries and also to assess the pollution load from the cement plants. It is found that the almost all the cement plants have problems of uncontrolled fugitive emissions especially in fly ash handling areas. All the industries have installed various air pollution control devices (ESPs, Bag Filter. etc) to control source emissions at various units.

### **Assessment of Mercury in Clinker Cooler and Other Source Emissions in Cement Industries**

It is reported that Portland cement manufacturing industry (using coal) is the

third largest source of mercury emission in the world. Therefore the study was undertaken by Central Pollution Control Board to assess the emission of mercury from cement industries. In Central Zone 35 cement plants using various type of raw material as fuel i.e. coal, (imported & pet cock), RDF, Hazardous waste and plastics are operational.

The monitoring was performed in 23 cement industries (08 in Madhya Pradesh, 06 in Chhattisgarh and 09 in Rajasthan.) of Central Zone for assessment of mercury in source emissions. Water samples were also collected from nearby surface water bodies to assess the presence of Mercury in water if any. Samples of raw materials and product were also collected to establish the source of mercury in the process leading to environment. The method used for assessment of mercury was as per USEPA. During the study, mercury concentration in source emissions was found between BDL to 0.18 mg/Nm<sup>3</sup>.

### **Studies on Impact of Air Pollution On Corrosion Of Metallic And Non-Metallic Materials**

A study was initiated by Central Pollution Control Board, Delhi and CSIR-NML, Jamshedpur to study the deteriorating effect of air pollutants and various climatic parameters on materials. Nine locations viz. Jamshedpur, New Delhi, Lucknow, Kolkata, Mumbai, Chennai, Nagpur, Jorhat and Palampur (a virgin area) were selected depending upon the geographical locations and fluctuations in environmental and climatic conditions, nature and sources of pollutants for the exposure of the materials across the country. The materials were exposed for 1, 2 and 4 years in the set of triplicates to study the nature of corrosion of products and mechanism of degradation of the materials.

The data has been generated for impact of air pollutants on corrosion rate of different metals and materials. Phase analysis of components present in rust formed at different locations of exposure has been carried out by Raman Spectroscopy and XRD.

The preliminary observation of metallic corrosion in different climatic conditions indicated following findings:

- Increase in Air pollutants affected corrosion rate of zinc metals and its alloys;
- Nature of pollutants in air affect deterioration of metals / alloys;
- SO<sub>2</sub> in air has maximum impact on deterioration of ferrous materials;
- PM<sub>10</sub> indirectly accelerates the corrosion rate;
- Metallic contents in dust of an environment control the corrosion rate

### Disposal options of Marble Slurry in Rajasthan

The marble processing units & their slurry disposal practices were studied at Rajsamand, Kishangarh, Makrana, Udaipur & Chittorgarh districts of Rajasthan state. Around 5-6 Million Tons waste/slurry is generated from 1100 processing units located at 16 districts of Rajasthan. The dried fine particles (45-300µm size) may cause ill effects on environment and to the health of local residents.

A study has been conducted by Central Pollution Control Board to explore the possibility of reuse & recycle of Marble Dust Slurry in different areas. To manage this huge inorganic & non-hazardous waste in gainful/productive use, following options were reviewed for utilization of marble slurry:

- Utilization of marble slurry in cement manufacturing.

- Synthetic gypsum through chemical reaction with marble slurry.
- Utilization of Marble slurry dust in road construction.
- Utilization of Marble slurry as Low Cost Binder.
- Utilization of marble slurry in brick manufacturing.

Guideline for management of marble slurry is being developed in consultation with Rajasthan State Pollution Control Board (RSPCB).

### Impact of Industries on the Riparian land of River Haldi and Socio-economic Maladies

Haldia Township is bordered by Haldi River, which is an off-shoot of Ganga River. It is a tributary of Hugli River flowing through Purba Midnapur district. It is the last major river that flow into River Hugli before its confluence into the sea. The river Haldi joins Hugli at the industrial town of Haldia. A number of small natural streams drain into Haldi River form the main land water system. A host of related impacts to the water system such as degradation of land through soil erosion, water logging, pollution and reduction in organic matter content have several proximate and underlying causes. The pollution of the river affects lakhs of people, who live in close proximity of the river. This river receives an impact of Green Belt canal from the industrial complex of Haldia.

Central Pollution Control board undertook an investigation of surface water quality of Haldia River. Quantification of the samples analysed from Green Belt Canal, which drains into the river Haldi and Hugli indicates that pH varied from 6.8 to 8.7 while Conductivity from 5167 to 14350 µS/cm. The ionic composition of the River Haldi towards downstream was



found to be as  $\text{Ca} > \text{Mg} > \text{NH}_4^+$  (Cation) and  $\text{Cl} > \text{SO}_4 > \text{NO}_3^-$  (Anion). The high concentration of chloride ion may be from the industrial drains i.e. green belt canal and also, there is mixing of coastal water at the time of High Tide. Among the anion the dominance of Sulphate in the river Haldi may be due to the discharge of sewage, industrial drains, atmospheric deposition and surface run-off from agriculture fields.

Results of surface soils analysis of various industries indicate that pH varied from 5.8 to 9.3, Conductivity varied from 120 to 5340  $\mu\text{S}/\text{cm}$ , organic matter varied from 0.34 to 3.18% and nature of the soil was found sandy to silty clay. Surface soil of the industrial unit, through erosion, finds its way from riparian land to the river.

It has been observed that Haldi River receives industrial as well as the agriculture drainage into the river. It is also observed during the study, that extreme levels of ionic concentration (minimum and maximum) in water may not favour biological establishment in the form of benthic fauna.

### Impact of Mangrove Ecosystem on Emission of green house gases

Sunderbans, the world largest stretch of mangrove ecosystem, lies to the South–West of Bangladesh, part of which has been declared as world heritage site. Oceans play an important role in the climate system being the source and sink for green house gases. Mangrove litter produces huge amount of organic material for the whole ecosystem. Carbon is stored in the soil then it is released into the environment either in the form of green house gases or dissolved or particulate carbon into the water courses and in ambient air. Apart from this, the loss of nitrogen from the forest soil is a concern. Nitrous oxide is a green house gas

whose concentration is increasing at the rate of about 0.2-0.3% per annum. It is produced from a various biological sources in soil and water.

Central Pollution Control Board undertook a study to investigate the possible route of green house gases from the soil to the air. Root Zone soil was collected from different sites inside the Jharkhali mangrove forest. Microorganisms in the soil are critical in decomposing organic residues and recycling soil nutrients. Bacteria in the soil are efficient in recycling carbon as well as nitrogen. To monitor the response of green house gases in the air, with respect to soil characteristics can be corroborated by the analytical results of soil of all the unit of Jharkhali forest. pH of the soil varied from 7 to 8 and silt clay is the nature of the soil analyzed throughout the forest range. The soils are exposed to saline water intrusion and chances of erosion of top soil are normal and part of the organic matter is mineralized. Mineralization of organic matter and available nitrogen by the bacteria plays an important role. Collected soil from Jharkhali forest clearly indicates the decrease of available nitrogen in the soil, when incubated for 24 hrs. Available nitrogen in the soil varied from 89.6 to 159.6 mg/kg and after incubation for 24 hrs, nitrogen uptake by the soil bacteria indicates that level of the nitrogen reduces to 67.2 to 86.8 mg/kg. This mineralization may contribute to the air in different forms of nitrogen which helps in the formation of green house gases.

### Toxicity evaluation of Water and Wastewater at Critically Polluted Areas

A study was undertaken by Central Pollution Control Board to assess toxicity of water and wastewater at three critically polluted areas i.e. Najafgarh drain basin (Delhi), Panipat (Haryana) and Ludhiana (Punjab).

Thirty three locations were studied at three selected polluted areas, which belong to three categories i.e. sources of environmental pollution (11 locations), receiving water bodies both surface (10 locations) and ground water (12 locations). Samples were drawn twice from the studied locations and tested for Bioassay as per the requirement of CEPI. Two other parameters i.e. pH (for both type of receiving water bodies) and DO (for surface water bodies) were also included in the project study because these parameters are also important factors for toxicity.

The findings of study reflect that the toxicity level of source of environmental pollution at Najafgarh drain basin varied from 10% (low toxic) to severely toxic with 100% mortality with in half hours. At Panipat and Ludhiana this level was found varying from non toxic (0% mortality) to severely toxic (with 100% mortality with in 2 hours to instantly).

All the ground water bodies located at studied Critically polluted areas reflect 'A' Class of water (no death in 5 days) as per classification criteria adopted for CEPI except one body of Ludhiana where the toxicity of water was observed varying from 40% in 2 days) to 60% (in day 1).

The toxicity level of surface water bodies located in Najafgarh drain basin and Panipat were found ranging from no mortality in 5 days ('A' Class water) to 100% mortality of Zebra fish within half hour to 4 hours respectively (not meeting criteria of any Class of water). At Ludhiana the variation in the values of Bioassay data was 0% mortality ('A' Class water) with 5 days to 10 % mortality in 2 days ('C' Class water).

All the studied receiving water bodies located in selected critically polluted areas

confirmed water quality as Class 'A' (CEPI criteria) in terms of pH as its value ranged from 7.0 – 8.5. IN CEPI Dissolved Oxygen (DO) in terms of percent saturation is used to classify the water of surface water bodies. The saturation level of DO in the surface water bodies at Najafgarh drain basin was observed varying from 2.9% (no Class) to 94.5% ('B' Class of water) whereas, at Panipat it was in the range of 0.0% (no Class) - 102.0%. At Ludhiana this level was in the ranged of 5.3% (no Class) to 83.3% ('B' Class water).

### **Performance evaluation of ETPs and Hazardous Waste Management in Pharmaceutical Industries**

Pharmaceutical industries are one of the highly polluting industry and generate wastewater with high COD along with hazardous waste. There are 15 large and medium scale pharmaceutical industries in Central Zone out of that 11 are in Madhya Pradesh and 04 are in Rajasthan States.

It was observed that pharmaceutical industries have provided conventional ETPs based on activated sludge process consisting primary treatment (neutralization, flocculation & primary settling), secondary treatment (biological treatment comprising of surface aeration, secondary settling) and tertiary treatment (dual media filtration, pressure sand & activated carbon filter/ RO).

Central Pollution Control Board undertook a project on performance evaluation of ETPs & Hazardous waste management in pharmaceutical industries. The study has been conducted for performance evaluation of ETPs provided in major industries. Samples were collected from the inlet & outlets of ETP and analyzed for performance evaluation. The range of inlet COD was 3782 mg/l to 31040



mg/l and BOD was 964 mg/l to 5333 mg/l. The range of COD and BOD in treated effluent was 5327 mg/l to 43 mg/l and 1205 mg/l to 11 mg/l respectively.

Out of the 15 industries 2 industries have incinerator facilities within the premises for incineration/final disposal of hazardous waste while other remaining units are disposing their hazardous waste through TSDF.

### **Inventorisation of Industrial Clusters in the country and assessment of the need for CETPS**

Central Pollution Control Board (CPCB) on advice of Planning Commission and on behalf of Ministry of Environment & Forests, Government of India (MoEF) has undertaken network study 'Inventorisation of industrial clusters in the country and assessment of the unmet need for common effluent treatment plants' in association with IIT-Mumbai, IIT-Kanpur, EPTRI-Hyderabad, and TERI-New Delhi.

### **Study for documentation of Global Best Practices in Industrial Wastewater Treatment Technologies and Treated-Effluent Disposal/Reuse, with special reference to CETPS**

Central Pollution Control Board (CPCB) has undertaken the study for documentation of 'Global best practices' in industrial wastewater treatment technologies and treated-effluent disposal/reuse, with special reference to CETPS' in association with The Energy and Resources Institute (TERI), New Delhi.

### **Vehicular Pollution Control Measures**

Air Pollution generated by human activities adversely affects human population and causes great economic damage to ecosystems and society. Urban air pollution is a major problem across the country. Rural to urban migration,

growth in mobility demands, demands for power and industrial production are some of the reasons for increasing deterioration of air quality in urban areas. Vehicular sector is assumed to be one of the major sources of air pollution in urban areas and several measures have been undertaken to control pollution from vehicular sources.

### **Vehicle Registration details**

- Registered motor vehicles in India- **142 million vehicles**
- Registered motor vehicles in Delhi **7.5 million vehicles**

Automobile Pollution Control initiatives taken, include enforcement of series of control measures ranging from notification of advanced Euro-IV equivalent emission norms, commensurate with fuel quality norms for new vehicles to stricter exhaust emission limits for in-use vehicles, augmentation of infrastructures for alternative fuels and mass transits and other urban planning and management options. Salient measures undertaken for vehicular pollution control are as follows:

### **Mass Emission Standards**

The Ministry of Road Transport and Highways (MoRTH) acts as a nodal agency for the formulation and implementation of various provisions of the Motor Vehicle Act and CMVR.

- Mass Emission Standards (Bharat Stage IV) implemented for all categories of new four wheel vehicles in 13 mega cities namely Delhi (NCR), Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Ahmedabad, Pune, Surat, Kanpur, Agra, Lucknow and Sholapur from the year 2010.
- BS-IV Emission norms for new four wheel vehicles implemented in 7 more cities namely Puducherry, Vapi, Mathura,



- Jamnagar, Ankleshwar, Hissar, Bharatpur from March 2012. Further as per Ministry of Petroleum & Natural Gas, 50 cities will be made BS-IV compliant by the year 2015
- Mass Emission Standards (Bharat Stage III) have been implemented for all categories of new four wheelers all over the country, from 1<sup>st</sup> October 2010.
  - Mass Emission Standards (Bharat Stage III) implemented for two and three wheelers all over the country, from 1<sup>st</sup> October, 2010.
  - Mass Emission Standards (Bharat (Trem) Stage III) implemented for diesel driven agricultural tractors, from 1<sup>st</sup> April, 2010 for the category < 37KW and from 1st April, 2011 for the category >37 KW.
  - Bharat Stage III (CEV) emission norms implemented for construction equipment vehicles since April 1, 2011. These emission norms are based on the engine powered construction equipment i.e non-road vehicles.
  - Bharat Stage-III mass emission norms notified for gasoline driven power tillers manufactured on and from July 1, 2013.
  - Alternate Mass emission standards (BS-III) for two wheel gasoline vehicles with engine capacity exceeding 50 CC or a maximum design speed exceeding 50 km/hr based on Worldwide Harmonised Motorcycle Emission Certification (RWMT) implemented from May 9, 2011

### Fuel Quality Specifications

- Auto-Fuels commensurate to BS III specifications has been made available in the whole country and commensurate to BS IV specifications has been made available for 20 cities as per the road map of Auto Fuel Policy

- The Research Octane Number (RON) for premium gasoline available in 20 cities boosted to 95 with lead content reduced to 0.005 g/l and benzene content of maximum 1%. The content of sulphur in gasoline is reduced to 0.005% (50 mg/kg) from 0.015% (150 mg/kg) in BS-IV compliant 20 cities. However, all over the country, content of sulphur in gasoline is 0.015% (150 mg/kg) .
- For diesel, the Cetane Number has been enhanced to 51 with Sulphur content reduced further to 0.005 % (50 mg/kg) in BS-IV compliant 20 cities by. The amount of sulphur in diesel has been reduced to 0.035% (350 mg/kg) all over the country.

### In-Use Vehicles

- New PUC norms have been notified for both gasoline and diesel BS-IV vehicles, wherein besides idle emission limits for gasoline vehicles, high idle emission limits also included and implemented from February, 2013.
- MoRTH in collaboration with ARAI (Automotive Research Association of India) has proposed to develop model I&C (Inspection & Certification) centres in all the states and the said model will further be replicated by all state governments in respective states.
- The proposal for setting up model I&C centres for ten states viz. Andhra Pradesh, Karnataka, Haryana, Himachal Pradesh, NCT of Delhi, Maharashtra, Madhya Pradesh, Uttar Pradesh, Gujarat, Rajasthan has already been approved by MoRTH.

### Alternate Fuels - Initiatives

- There has been lot of developments in this front when various organizations including

**Table-40.** Gasolene Specifications for BS-IV Compliant Cities and for Entire Country

	20 cities(BS-IV Compliant )	Entire Country
Octane Number	91*	91*
Lead	0.005g/l	0.005g/l
Sulphur	50ppm	150 ppm
Bezene	1%	1%

the Planning Commission, Oil Companies, Auto Sectors, CPCB and other research agencies initiated various demonstration and feasibility studies with alternative fuels like LPG and bio-diesel (B20) in the country. Some of the developments are reported below:

- Presently CNG vehicles have been plying in 70 cities of the country. More than 11 lakh CNG vehicles have been plying all over the country.
- In Delhi more than 5.5 lakh CNG vehicles have been plying. Further Delhi has world's largest public transport system that runs on CNG
- Auto LPG Dispensing stations (ALDS) have been established in 232 cities/towns of the country.
- In December 2009, Government adapted National Bio-Fuel Policy, which requires blending of 20% bio-ethanol in gasoline and 20% bio-diesel in diesel by the year 2017.
- Bio-fuels mainly Ethanol and Biodiesel (in B20 form) are the prospective options for India. Pilot studies on ethanol and biodiesel are continuing.
- Efforts for developing and popularizing electric vehicles also gained momentum during this year. Already "Reva Motors" have commercialized a small electric/battery car. Many three-wheeler manufacturers are also contemplating electric driven OEM for Indian markets.
- Ministry of Petroleum & Natural Gas has set up a Hydrogen Corpus Fund with a corpus of ₹100 crore with contribution from five major Oil Companies and Oil Industry Development Board (OIDB) for supporting Research and Development in various aspects of hydrogen, which could substitute part of natural gas as transport fuel in future.
- For promoting Hydrogen as auto fuel with the help of Hydrogen Corpus Fund a Hydrogen-CNG dispensing station has

**Table-41.** Diesel Specifications for BS-IV Compliant Cities and for Entire Country

	20 cities(BS-IV Compliant )	Entire Country
Cetane Number	51*	51*
Sulphur	50 ppm	350 ppm
Poly Aromatic Hydrocarbons	11% mass	11% mass
Distillation 95% vol. Recovery at °C, max	360 °C	360 °C

\* for regular quality



been set up at IOC, R&D Centre, Faridabad to cater the re-fueling needs of test/demo vehicles operating on Hydrogen - CNG blends.

- IOC and Mahindra & Mahindra have agreed to jointly develop Fuel Cell Vehicles. In this regard a joint proposal on “Development of Fuel Cell Vehicles” has been submitted to Scientific Advisory Committee of MoPNG for funding from Hydrogen Corpus Fund.

### Other Measures

- In Delhi BRTS has been implemented at various corridors since year 2008.
- Road-infrastructure development, management and by-passing of inter-state vehicles, parking restrictions, etc. are other measures being adopted in various cities.
- The Delhi metro line has been extended to various stretches of Delhi for catering more people, thereby promoting use of mass public transport system. Other cities are also actively taking initiation to start metros and other mass transport systems.
- Phasing out of 15 year old commercial vehicles in Delhi
- Interstate trucks, which are not destined to Delhi are not allowed to ply within the city limits.
- Delhi Monorail system has been proposed and likely to be implemented in phased manner

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

The Central Pollution Control Board (CPCB) 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.

This treatment technology entitled “An Integrated Plant for Treatment of Raw Water Using Discarded Sludges to Produce Drinking Water” has been patented vide Indian Patent No. 215808 (Filed in April 2001 and Granted in March 2008).

Based on the above ground work the MoU was executed between CPCB and Delhi Jal Board (DJB) for Construction and Operation of 0.5 MLD Pilot Water Treatment Plant based on SRP technology at Bhagirathi Water Treatment Plant, Gokulpuri, Yamuna Vihar Delhi.

The construction and successful trial-operation of Pilot Plant was completed by M/s Hydrotech, Delhi (Contractor) with technical consultation of CPCB & DJB.

The drinking water quality of SRP-Technology based Pilot-Plant was tested by Delhi Jal Board and CPCB. The water quality of Pilot Plant is at par with the water quality from conventional treatment process.

The discarded sludge obtained from coagulant aided sedimentation 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 place of the fresh alum used in the water treatment.

### Advantages of SRP Technology

- Reduction in volume of sludge substantially.
- Reduction in alum consumption 70–90%.
- Near 100% water recovery in comparison to conventional process, where 15-20% water loss along with sludge.
- Reduction in cost of treatment i.e. 40-60%
- Zero wastewater discharge.
- Reduced pressure on the limited resources of raw material necessary for the production of alum.
- Save the Natural-Water-Bodies from alum contaminated sludge pollution.

### Market friendly Emissions Trading Scheme (ETS) for Particulate Matter in Stationary Sources

The Pilot Project for Emission Trading Scheme for Particulate Matter has been initiated by Ministry of Environment and Forests (Govt. of India) initially for three States i.e. Gujarat, Maharashtra and Tamil Nadu. Central Pollution Control Board, State Pollution Control Boards (SPCBs) of Gujarat, Maharashtra and Tamil Nadu are participants in this project.

The different phases of the entire activity are outlined in Table-42.

Attempts are on to create a national resource group with respective linkages for overall implementation of the entire activity in a technically sound manner. The capacity

**Table-42.** Emission Trading Scheme (ETS) for Particulate Matter in Stationery Sources – Various Phases

Project Phase & Number	Key Objectives
I. Design Phase	<ul style="list-style-type: none"> <li>● Dialogue and concurrence</li> <li>● Initial Concept Note and Evaluation Design</li> <li>● Draft Continuous Emissions Monitoring Systems, Data Acquisition and Handling Guidelines</li> <li>● Selection of pilot project areas and industry based on available data and objective selection criteria</li> <li>● Field Trials of Continuous Emissions Monitoring Systems (CEMS)</li> </ul>
II. Baseline Survey	<ul style="list-style-type: none"> <li>● Baseline survey of industries</li> <li>● Analysis of data to estimate abatement costs, project benefits, health impacts, status of industry etc</li> <li>● CARE Center infrastructure in SPCBs</li> <li>● CEMS installation and evaluation</li> <li>● (CARE Center used to receive continuous emissions data from regulated industries)</li> </ul>
III Implementation Phase	<ul style="list-style-type: none"> <li>● Training and capacity building, SPCBs</li> <li>● Regulatory notification enabling trading on pilot basis</li> <li>● Concurrent evaluation and documentation of pilot</li> </ul>

building programs for calibration, auditing / certification of PM-CEMS besides uniform data acquisition, handling and validation are in progress.

### **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 (WHO-TEF) 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 by National Reference Trace Organics Laboratory of Central Pollution Control Board:

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

The monitoring of Dioxin – Furan in stationary source emission at Incinerators of Treatment Storage and Disposal Facilities (TSDFs), Incinerators of organic chemical manufacturing units and Bio-medical waste incinerators have been undertaken on request of Hazardous Waste Management Division, State Pollution Control Boards, Pollution Control Committees etc.

#### **- National Ambient Air Dioxin Monitoring Programme**

Ambient air dioxin – furan monitoring program has been continued by National Reference Trace Organics Laboratory of Central Pollution Control Board at ten

identified Critically Polluting Areas (CPAs) in the country in association with CPCB Zonal Offices at Bangalore, Kolkata and Vadodara.

The vapour phase and particulate phase Dioxin & Furan ambient air sampling has been performed by Polyurethane Foam High Volume Sampler (PUF-HVS) at identified locations within the Critically Polluted Areas (CPAs) on quarterly intervals.

During the year, four quarterly Vapour phase and particulate phase samplings have been completed at remaining identified critically polluted areas. The collected vapour phase and particulate phase samples have been subjected to extraction of dioxin-furan from the sampling media and removal of interference organic compounds. The sample extracts after clean-up have been analysed by High Resolution Gas Chromatograph with High Resolution Mass Spectrometer (HRGC-HRMS) for Dioxin-Furan 17 congeners. The analytical data being compiled for Assessment of Status of Ambient Dioxin / Furan.

### **Computation of societal risk abatement cost and long run marginal financial cost with regard to Dioxin and Furan emission standards for common Hazardous Waste Incinerator**

Central Pollution Control Board undertook the aforesaid study as per the direction of MoEF. The primary purpose of this study was to determine the “break even” point for dioxin and furan emission standard, where emission control costs and societal costs are equal to each other, which could be considered “rational” as the societal costs justify the cost of control.



chlorine atoms attached to biphenyl molecule. Individual chlorinated biphenyl molecules are called congeners, which are identified by the number and position of the chlorine atoms around the biphenyl molecule. PCBs were mainly used as insulating liquid in electric equipments prior to ban on their manufacture during seventies. However, several other uses of PCBs such as sealants, carbonless printing and plasticizers may be the possible sources of their release into the environment.

The assessment of PCBs levels in water and bottom sediments of river Yamuna in Delhi have been undertaken on quarterly basis by National Reference Trace Organics Laboratory of Central Pollution Control Board during the year 2012-2013. River water samples and bottom sediment samples were collected from five locations from Delhi Stretch of River Yamuna i.e. Palla, Wazirabad, Rajghat, Nizamuddin and Okhla. 28 individual congeners of PCBs, selected based on their toxicological significance, prevalence in biological tissue, were analyzed with GC-ECD.

Concentrations of Total PCBs (28 congeners) in Yamuna River bottom sediment samples in Delhi varied from 0.051  $\mu\text{g}/\text{kg}$  to 3.060  $\mu\text{g}/\text{kg}$  with the mean of 0.631  $\mu\text{g}/\text{kg}$ . The Total PCBs analyzed in river water have been found Below Detection Limit most of the time except once (0.005  $\mu\text{g}/\text{l}$ ) at Rajghat monitoring location, while in river sediments also, the Total PCBs have been found very low and were well within the Total PCBs Guidelines value of 227  $\mu\text{g}/\text{kg}$  of United States. The contamination of PCB congeners in sediments samples may be due to confluence of untreated or partially treated domestic / industrial wastewater through several drains in the river.

### **Monitoring of pesticide residues at national level - sponsored project by Ministry of Agriculture, New Delhi**

Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, New Delhi and nodal department i.e. Project Coordinating Cell, All India Network Project (AINP) on Pesticide Residues, Indian Agricultural Research Institute New Delhi has been continuously sponsoring a project "Monitoring of Pesticide Residue at National Level" to Central Pollution Control Board, Delhi since October, 2006. The objective of the study is to evaluate pesticides levels in ground water, surface water and soil samples in National Capital Territory Delhi. About 112 locations of surface water and 100 locations for the Soil Samples have been selected and Monitored in National Capital Region i.e. Uttar Pradesh (Ghaziabad, Guatam Budh Nagar & Bagpat), Haryana (Sonapat, Faridabad & Ballabgarh) and Delhi (Alipur Block, Kanjhawala Block, Najafgarh & Nizamuddin Bridge). During the year, the Monitoring of Pesticide Residue has been undertaken on monthly basis in about 70 surface water samples. The groups of Pesticides being monitored on monthly basis are given in Table-43.

The study indicated that only 3% of Total surface water samples (750 Nos.) analyzed have been found with pesticides residues above limit (0.5 ppb), while in remaining surface water samples the pesticides contamination was either absent or below the limit (0.5  $\mu\text{g}/\text{l}$ ).

### **Methodology, Development and Standardization of trace organic parameters (Phenols and Phenolic compounds)**

Phenols and phenolic compounds are of widespread use in many industries and often found in wastewaters from coal gasification, coke-oven batteries, refinery and



exposure to human being through food, water, accidents and occupational environment is a common phenomena because of which these are of global concern.

Most of the organo-chlorine pesticides Persistent Organic Pollutants are persistent toxic contaminant having long half-life and tendency to be absorbed in human body through skin, inhalation, oral and placental route and tend to accumulate in fatty tissues. Women having higher body fat percentage are prone to bioaccumulation of pesticides due to exposure. The hormonal changes during pregnancy, lactation and menopause, mobilizes the bio-accumulated pollutants in the body. The organo-chlorine pesticides can interfere in normal endocrine system, resulting into reproductive disorders and breast cancers.

The study has been undertaken by Central Pollution Control Board since 2008-2009 onward in collaboration with University College of Medical Sciences (UCMS) as collaborative project to generate epidemiological data and establishment of relative risk / relationship between the incidence of adverse health outcomes including cancer due to exposure to pesticides with special reference to organo-chlorine Persistent Organic Pollutants residues and Polychlorinated Biphenyls. The salient objectives of the project are:

- Determination of blood POPs levels such as organo-chlorine pesticides in infants with special reference to pre-term and IUGR infants.
- Determination of blood POPs levels such as organo-chlorine pesticides, organo-chlorine residue levels in children and teenagers of various age groups.
- Determination of blood and tissue organo-chlorine and Polychlorinated biphenyls

(PCBs) residue levels in adult and senior citizen populations with special reference to breast cancer tissue and prostate cancer patients.

During the three years project duration, blood samples from different age group such as infants children, teenagers, adult, and senior citizens were collected, processed extracted and cleaned up at University College of Medical Sciences & GTB Hospital laboratories and the concentrated samples were analyzed with Perkin Elmer GC-ECD at National Reference Trace Organics Laboratory of Central Pollution Control Board. The blood samples analysis results indicated presence of Organo-chlorine pesticides, Total BHC, Endosulfan and Total DDT in the adults of age group 40-60 years and senior citizens of age more than 60 years. There has been increasing pattern in pesticide levels in various age groups from infants to senior citizens. The pesticide Heptachlor was recorded in only one blood sample of adult in the 20-40 age group. The blood samples drawn from infants, children and teenagers were comparatively free from pesticides residue.

### Co-Processing of wastes in Cement Kiln

Central Pollution Control Board (CPCB) initiated the concept of "Co-processing of waste in cement kiln" which has emerged as the best environment friendly option for disposal of waste as it reduces its carbon foot print besides enabling conservation of fossil fuel and raw material. Under provision of Rule 11 of the Hazardous Wastes (Management and Handling & Transboundary Movement) Rules, 2008 CPCB has been empowered to issue permissions for utilization of hazardous waste for resource recovery or energy recovery.

CPCB received various applications under Rule 11 of the Hazardous Wastes (Management and Handling & Transboundary Movement)



Rules, 2008 from cement plants for granting permission for co-processing of different kind of wastes in cement kiln. Various trial runs were conducted during the year 2012-2013 and based on satisfactory performance of trial runs, cement manufacturing units have been granted permission for co-processing of following categories of wastes.

- Organic plating sludge & dyeing sludge (Metal zippers Manufacturing Industry)
- Grinding waste, oil soaked cloth & ETP sludge (M/s Gillete India Ltd., Bhiwadi)
- Benzofuran (Kumar Organic Product Ltd)
- Chemical ETP sludge (M/s Syngenta India Limited, Goa)
- Liquid waste mix (M/s Bharuch Enviro Infrastructure Ltd., Ankleshwar, Gujarat)
- Spent carbon
- Solid waste mix (Shivalik Solid Waste Management Ltd., Nalagarh)
- PTA waste mix (M/s MCC PTA India Corporation Pvt. Ltd., West Bengal)
- CETP sludge of Jodhpur Pradushan Niwaran Trust
- Organic Residue
- Spent clay
- CETP sludge (Pali)
- ETP Sludge (Textile industry)

The successful trial runs indicate that all the above mentioned wastes are compatible for co-processing in cement kiln.

#### **R&D project on optimisation of Chrome Tanning**

Central Pollution Control Board Zonal Office-Lucknow initiated R&D Project on Optimisation of Chrome Tanning as a joint endeavor with M/s Super Tanneries, Jajmau, Kanpur. The Project Scope includes Process and

Chemical interventions to optimize absorption of chromium in the tanning process. In all the operations Process and Chemical optimization have to be undertaken by observing following steps:

**Step 01:** Execution of Conventional process with no chemical / process intervention

**Step 02:** Process wherein, conventional de-liming agents (ammonia salts) are substituted and other chemical interventions are incorporated but without improvisation in tanning drum and their configuration

**Step 03:** Same as Step 02 but accompanied with improvisation in tanning drum and their configuration

The Study includes testing of parameters - pH, COD, TDS, alkalinity, chloride and total Chromium in process-specific wastewater, and physico-chemical properties in tanned hide/side. Experimental set-up of the tannery has been utilized for the study. Analysis of wastewater samples has been undertaken at CPCB Zonal Office Lucknow laboratory, while characterization of processed hides has been undertaken at the tannery.

Three phases of experiments were completed during the year. Chromium uptake of 80 % has been achieved.

#### **Demonstration projects on MSW Management**

Central Pollution Control Board (CPCB) co-ordination with the State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) for implementation of the Municipal Solid Wastes (Management and Handling) Rules, 2000 in States/Union Territories and follows up for submission of Annual Reports on implementation of the MSW Rules. The Consolidated Annual Review Report was

prepared on the basis of the information received from 22 SPCBs/PCCs and submitted to MoEF.

To facilitate implementation of the MSW Rules, CPCB took initiatives for a few study projects as under;

- **Remote Sensing/GIS Study for identification of municipal landfill sites:** This Remote Sensing/GIS based study has been implemented in Karnataka through KSRASAC, Andhra Pradesh through APSRAC and in NCR-Delhi through BISAG, Gandhinagar. The study has been completed in all above areas and the final report received for NCR-Delhi and Karnataka. The final report for Andhra Pradesh is awaited.
- **Landfill Monitoring projects:** CPCB sponsored the landfill monitoring projects to Assam, Meghalaya, Andhra Pradesh and Himachal Pradesh for assessing Groundwater, ambient air, leachate and compost quality including the compliance verification. The study project has been completed by Assam State Pollution Control Board and submitted the report. The study is underway in the remaining 3 states.
- **Complete Utilization of MSW including inert:** CPCB sponsored the study to CBRI-Roorkee during year 2010. The study project has been completed by CBRI and submitted the report. It is observed in the study that Municipal solid wastes can be utilized almost completely by way of composting (organic matter), recycling (recyclable plastics, paper, wood, etc.) and utilizing inert for making bricks, tiles, pavement blocks, etc. In the process, only 10% of the MSW remains

for landfill disposal. Thus, municipal solid wastes reduces to 'Zero Garbage' and the requirement of landfill is minimized.

- **MSW Management in Hilly areas:** CPCB through NEERI-Nagpur has initiated the study for assessing management of MSW in Hilly areas of NE-States, Himachal Pradesh and Uttarakhand. The objective of the study is to suggest facilities for MSW management considering hilly areas as special case for implementing the MSW Rules; which are characterized by heavy rainfall, steep slopes, loose soil, narrow roads, low temperature, etc.

### Bio-Remediation Projects

Bioremediation technique is often used in curbing the problem of oil sleek, hazardous waste site reclamation, radioactive sludge removal, boosting of STP function, lake conservation, Groundwater reclamation, odor suppression, etc. In these processes, specific microbial consortia are used for application and treating the impurities. In view of quantum gap in between Sewage generation and treatment facilities, CPCB formulated the concept of In-situ treatment of sewage in open drains. The microbial consortia designed by various agencies were examined and conducted pilot studies in Ramnagar-Domora Drain of Bharatpur (Rajasthan) and AB Road Drain, Indore (Madhya Pradesh). The study revealed that in the In-situ Bioremediation stretch pollution load in terms of BOD, COD and TSS was reduced up to 50%. The technology is cheaper and doesn't involve any skilled manpower, heavy machineries, electricity and other recurring cost. Other such Bioremediation projects are on-going in Budha Nala, Ludhiana (Punjab) and Bakarganj Nala, Patna (Bihar) under NGRBA/NRCD programme of MoEF.



### Collaborative project on ground water remediation

Central Pollution Control Board Zonal Office Lucknow has been executing a collaborative Project "Geo-environmental Investigation and pilot scale remediation of soil and groundwater in Rania-Khanchandpur area, Distt. Kanpur Dehat (Rural). The project is being executed in collaboration with Central Ground Water Board (CGWB) Northern Region, Lucknow. In accordance to the Project, salient activities completed are detailed as under :

- Intensive groundwater monitoring in study area
- Drilling and development of strata-specific piezometers
- Development of groundwater quality profile for hexavalent chromium
- Ground survey and benchmarking of 30 locations reduced to mean sea level
- Digitization of study area map on 1:25000 scale
- Preparation of iso-concentration (isopleths) map for critical parameters

### Analysis of AOX from selected industrial effluents using AOX Analyzer

Adsorbable organic halides (AOX) are the organic compounds having bounded with halides viz. Chlorine, Bromine, Iodine. These are generated majorly from pulp and paper industry during the bleaching process. These compounds are formed as a result of reaction between residual lignin from wood fibres and chlorine/ chlorine compounds used for bleaching. Many of these compounds are recalcitrant and have long half-life periods. Some of these show a tendency to bioaccumulate, while some are proven carcinogens and mutagens. Hence, it is important to generate reliable data on chlorinated compounds (AOX)

discharged through the effluent of Pulp and paper units in India. The measurement of these compounds could be achieved by adsorption of the effluent on to activated carbon and combustion and titration of the adsorbed carbon using AOX Analyzer.

This ongoing study "Analysis of AOX from selected industrial effluents" 5 identified units of Pulp and Paper from U.P and Haryana involved in bleaching process for whitening of Pulp, were monitored and the samples collected were analyzed to assess AOX generation from these units

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

An important mandate of Central Pollution Control Board (CPCB) is to maintain vast water quality monitoring network, with an aim to evaluate the status of water quality of different sources. Comparability of data within the collaborative programme becomes the key challenge to the water testing laboratories. The quality of data must be of 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.

### Recommendations for AQC Scheme

The overall findings of the performance of AQC exercises reveal that Internal AQC system in all the laboratory is to be strengthened. The



analytical capability of SPCBs/PCCs laboratories could be improved by adopting the following major steps.

- Strengthening of the Internal AQC System
- Periodic calibration of instruments
- Using good quality chemicals and providing adequate quantity of glassware
- Providing good quality distilled water
- Improving the laboratory work atmosphere
- Providing analytical training to laboratory analysts.
- Adopting good quality assurance system
- Participation in Inter-laboratory AQC exercises by all laboratories of Pollution Control Boards and Committees.

#### **Inter-laboratory Proficiency Testing (PT) participation for analysis of physico-chemical and trace organics parameters including Dioxin & Furan**

Quality assurance is the definite programme for laboratory operation that specifies the measures required to produce reliable data of known precision and accuracy. Quality system which includes quality assurance policies and all quality control processes to ensure the quality of analytical data produced by the laboratory and to demonstrate the competence of the laboratory.

To maintain the quality assurance, Central Pollution Control Board HQs and five Zonal Office Laboratories (Lucknow, Vadodara, Bangalore, Kolkata and Bhopal) have participated in International Proficiency Testing (PT) programme conducted by M/s Environmental Resource Associates (ERA), USA (A Waters company) during October /

November, 2012 with coverage of various Physico-chemical, Microbiological, Chemical, Trace organics metallic parameters, and Air parameters. In addition, the National Reference Trace Organics Laboratory has also participated in International PT Programme for Dioxin & Furan conducted by Centre D'Expertise En Analyse Environmental Du Quebec, Canada and achieved good performance.

#### **Development of standards and guidelines**

- **Guidelines for the measurement of "notified ambient air quality parameters" (NAAQPs-2009)**

CPCB has notified fourth version of National Ambient Air Quality Standards (NAAQS) in 2009 under the provisions of the Air (Prevention & Control of Pollution) Act, 1981. This revised national standard aims to provide uniform air quality for all, irrespective of land use pattern, across the country. There are 12 identified health based parameters in the notification, which are to be measured at the national level. The methods, prescribed in the notification for respective parameters are the combination of wet-chemical method and continuous on-line methods. For the sake of uniformity in method and to meet the NAAQS, 2009 requirement across the country, the guidelines were prepared in two volumes based on active methods and automated (on-line) methods.

- **Guidelines on Methodologies for Source Emission Monitoring**

Guidelines on Methodologies for Source Emission Monitoring have been collated and compiled in the form of a document entitled "Guidelines on Methodologies for Source Emission Monitoring" under the CPCB publication series Laboratory Analytical Techniques (LATS). These guidelines will help



in harmonizing the sampling and analytical protocol being used by SPCBs and CPCB during source emission monitoring.

– **Development of standards and guidelines for water conservation and wastewater discharge in sugar mills**

Sugar cane consists of about 700 litre/ ton of cane water, out of which 100 – 200 litre/ ton of cane crushed is excess condensate. Theoretically, quantity of fresh water consumption in sugar mills can be brought down to “ZERO”, if the excess condensate is utilized and the effluent generation rate can be reduced to 0.10 m<sup>3</sup> per ton of cane. The possibilities of achieving zero fresh water consumption in sugar mills being explored in the project.

The standards for water consumption and wastewater generation in different categories of sugar industries are developed based on detailed study carried out at 11 sugar mills.

The outcome of the project shows that, it is techno-economically viable to implement Zero Fresh Water Consumption in sugar mills. Sugar mills will be economically benefited through implementation of zero fresh water consumption as it minimizes the amount paid towards the Water Cess. Approximately, 5 X 10<sup>7</sup> m<sup>3</sup> of fresh water could be saved per year nationally on implementation of the proposed standards. Guidelines for implementing process modification, 3R principles and good housekeeping in milling section, power turbine cooling, boiler house, clarification house, evaporation section, crystallisation and centrifugation section, spray pond/ cooling tower and Effluent Treatment Plant in implementing zero fresh water consumption and achieving

Zero Fresh Water consumption and standards for wastewater discharge being developed.

– **Revision of Environmental standards for Electroplating Industry**

The study for development of Environmental Standards for Electroplating Industry has been undertaken by Central Pollution Control Board (CPCB). Based on the study, the environmental standards for Electroplating Industry were finalized and notified under the Environment (Protection) Rules, 1986 in March, 2012.

– **Revision of Effluent Standards for Tanneries**

Central Pollution Control Board (CPCB) had undertaken the study for Revision of Comprehensive Industry Document on Tanneries in association with Central Leather Research Institute (CLRI), Chennai. The effluent standards suggested by CLRI were further reviewed in CPCB and the draft revised standards were circulated to stakeholders for consultation. The comments received were considered and the modified proposal of ‘Revised Effluent Standards for Leather Tanneries’ was prepared.

– **Revision of Effluent Standards for Common Effluent Treatment Plants**

Central Pollution Control Board (CPCB) had undertaken the revision of the existing Effluent Standards for Common Effluent Treatment Plants (CETPs). The draft revised standards for CETPs, were circulated to stakeholders for consultation. The comments received were considered and the modified proposal of ‘Revised Effluent Standards for Common Effluent Treatment



- Plants (for general and tanneries' CETPs) prepared
- **Revision of COINDS and Emission Standards for Brick Kilns**

Central Pollution Control Board (CPCB) has undertaken the study for Revision of COINDS and Emission Standards for Brick Kilns in association with Punjab State Council of Science and Technology (PSCS&T). In-depth studies of 50 brick kilns were completed and a report covering results of the monitoring studies as well as inventorisation data was prepared.
  - **Evaluation and Improvement in Design of Clamp Kilns**

Central Pollution Control Board (CPCB) has undertaken the study for Evaluation and Improvement in Design of Clamp Kilns in association with The Energy and Resources Institute (TERI). The study was awarded in January 2010. In-depth studies have been completed and the findings/ recommendations of the study and a suggested improved clamp kiln design were presented in consultation workshop held in March 2012 to finalize the improved clamp kiln design. After considering the views of experts and stakeholders, the improved clamp kiln design was finalised.
  - **Comprehensive Industrial Document for Maltery**

The study was undertaken to review the existing Minimum National Standards and to upgrade the existing COINDS document to include new and developing technologies adopted in maltery, so that maltery could achieve stringent emission and effluent norms with maximum recovery at minimum cost.
  - **Development / Revision of Emission Standards for Cement Sector**

Cement industry is one of the major air polluting industry falls under 17 categories of industries in the country. During various operations of cement manufacturing, substantial quantity of dust is generated and emit to the environment, if air pollution control device is not operating efficiently. Cement manufacturing also emits SO<sub>2</sub> and NO<sub>x</sub> emissions. The emission standards for particulate matter were notified in April, 1987 and thereafter amended in February, 2006. However, there is no emission standard for SO<sub>2</sub> and NO<sub>x</sub> emission. The Parliamentary Standing Committee has also made similar observation and requested CPCB to develop the emission standard for SO<sub>2</sub> and NO<sub>x</sub> at an earliest. Considering the above, a study on "Development / revision of emission standards for cement plants" was undertaken in association with National Council for Cement and Building Materials, Ballabgarh, Haryana. On the basis of the NO<sub>x</sub>, SO<sub>2</sub>, PM emission level and load based PM emission data vis-à-vis available control technology and prevailing emission standards in other countries, emission standards were finalised.
  - **Description of Clean Technology and Development of Environmental Standards for Limestone Mining**

A study has been undertaken on "Description of clean technology and development of environmental standards for limestone mining" in association with Central Institute of Mining & Fuel Research (CIMFR), Dhanbad. The main objective of this study, apart from giving an overall view of limestone mining operating in the country, is to develop



the National Environmental Standards, to provide cleaner technologies and to specify Guidelines / Code of Practice for Pollution Prevention & Control. The study was completed and report submitted. The findings and proposed standards were discussed in Peer & Core Committee meeting. Standards proposed for effluent and noise levels were agreed by the stake holders. The Members felt that further monitoring needs to be conducted at five more mines by to develop the environmental standards for air quality.

– **Preparation of Comprehensive Industry Document (COINDS) and the Status of Paint Industry**

Paints constitute a mixture of 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 / hazardous sludge (containing heavy metals & toxic organic chemicals). COINDS was prepared in the year 1990-1991 for development of effluent standards only. Since then the sector, has undergone fundamental changes in terms of raw materials consumption, technological up-gradation, and demand growth potential with an average rate of 13% over the last five years. There is a need to revise the existing effluent standards and to develop the emission standards (VOCs). This study was initiated in collaboration with NPC, New Delhi. In first phase, dry study was carried out in 10 units. Based on this, 6 units covering all type of paints, varying production capacities, location were selected for In-depth study. Final report

submitted indicate that main source of waste water is from mixer/ pug mills/ TSD/ cleaning operation & floor washing. solid/ hazardous wastes are generated from ETP, production process and from incinerator. The main source of VOC, is shop floor during filling operation. The emitted VOCs at the shop floor were extracted from one side through exhaust system and fresh air is allowed to flow from other end.

– **Implementation of new environmental standards for Petroleum Oil Refineries and Mass based standards for Oil Refineries and Corporate Responsibility for Environmental Protection (CREP) in Oil Refinery Sector**

The following tasks for refineries were recommended for implementation of CREP recommendations and implementation of standards:

- All refineries shall provide connectivity of stack to CPCB and SPCB and in case of any problem or hurdles, this will be informed to SPCB/CPCB with reasons.
- The refineries shall assess the technical feasibility with cost economics for implementation of bottom loading of all products in trucks & railways for emission reduction so that further action required can be taken.
- All refineries shall report to CPCB of any accident or pipe leakages occurring within 24 hours along with action taken or proposed.
- The refineries shall forward notes on success accomplished by them in environmental activities during the period 2005-2013.
- RIL to forward a note on the proposed modifications of effluent



- treatment facilities to comply with the notifications along with the time schedule i.e. covering of ETP and providing system for VOC adsorption.
- All refineries shall submit note on the storage arrangement made for oily sludge including details of stored oily sludge, proposal for bio-remediation with time bound programme and status of disposal of bio-remediated soil.
  - Refineries to compile data on particulate matter emitted, wherein the dual fuel (fuel gas and fuel oil) is used, to assess the factors effecting achievability of emission norms.
  - The comments on proposed guidelines for bio-remediation be forwarded for consideration before finalizing.
  - All refineries shall submit action plan to achieve zero-discharge and to cover their ETP with VOC adsorption system.
  - Refineries to submit time bound action plan to install state-of-the-art systems like SCADA (for monitoring the health of the pipeline) in all their crude and product pipelines and a time bound programme for replacing the old pipelines.
  - M/s Gurugobind Singh Refinery shall provide one more continuous air quality monitoring station to generate back ground data to assess the impact of air quality due to refinery operation.
- Effluent and Emission standards for Dyes and Dye Intermediate:** The Environmental Standards for Dyes and
- Dye Intermediate Industries were notified under the Environment (Protection) Act, 1986.
- **Environmental Standards for Fertiliser Industry:** The Environmental Standards for Fertilizer Industries were finalized.
  - **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 for irrigation. SSP Contributes to increase crop production, but also its production process is major polluting one with respect to process emissions and disposal of hydrofluorsilicic acid  
Matter for concern in SSP plants at present is that fluoride is emitted to environment through the process in the air through stacks, fugitive emissions and through effluents in the scrubbed liquid, silica sludge and as hydrofluorosilicic acid. Central Pollution Control Board has taken an in-house project to revise the standards for these industries.  
In-house project for Development of Emission and Effluent Standards for Single Super Phosphate Plants is initiated. Data collected through questionnaires and dry visits is under compilation.
  - **Review of Environmental Statements Submitted By Industries – Additional Sectors (Phase – II)**  
The Ministry of Environment and Forests, Government of India issued notification for submission of 'Environmental Statements'



(ES) by industries to respective State Pollution Control Boards (SPCBs) in April, 1992 and further amended in April, 1993. ES is a pro-active tool for self-examination of the industry itself to reduce / minimize pollution by adopting process modifications, recycling and reuse of the resources. The regular submission of ES will indicate the systematic improvement in conservation of resources and environmental pollution control being achieved by the industry. In other way, the parameters of ES may be used as environmental performance indicators for relative comparison, implementation and to promote better practices.

In order to assess the efficacy of ES, a project "Review of Environmental Statements submitted by the industries", was undertaken by MoEF and carried out by Central Pollution Control Board (CPCB). The Central Pollution Control Board engaged the Institutions having expertise in the concerned field to review the ES for Chlor-alkali, Dye & Dye intermediates, Aluminium smelter, Zinc smelter, Copper smelter, and Fertilizer in order to cover major priority industrial sectors under the programme in the second phase of work. The outcome of the exercise has been utilized for setting up the environmental benchmarks for attainment by all the industries in the sector.

– **Preparation of Comprehensive Industry Document (COINDS) and the Status of Pesticide Industry**

Comprehensive Industrial Document (COINDS) for Pesticide Industry was prepared in the year 1985-86 and revised during the year 1988-89. Further, the status of pesticide Industry was also prepared

in the year 1993-94. In these documents, aspects of air pollution and solid waste were not covered. Later, source emission standards for inorganic parameters like HCl,  $Cl_2$ ,  $H_2S$ ,  $P_2O_5$ ,  $NH_3$ , HBr & Particulate Matter and  $CH_3Cl$  (organic) were notified during year 2006 and also incinerator emission standards were notified in the year 2008 for pesticide industry. Since then the sector has undergone changes in terms of raw material consumption, technological up-gradation, demand growth potential, and diverse product range. Also there is a need to re-look into the additional pollutants generated from pesticide industries other than the notified parameters & development of VOC emission standards. 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.

The Central Pollution Control Board (CPCB) intends to take up a project on "Preparation of Comprehensive Industrial Document (COINDS) on Pesticide industry" for execution through engagement of outside expert agency on MoU/ Agreement basis.

– **Emission Standards of Petrochemical Industry**

Petrochemical industry is concerned with the manufacture of various products and comprises multiple processing units at one specific location adopting different technologies, equipment, unit processes and unit operations from the basic feed stock. It leads to generation of a wide spectrum of emission of air pollutants, mainly of volatile organic compounds. Some of these pollutants are toxic and even

carcinogenic, while others are responsible for damage to materials. Some pollutants also have potential for photochemical oxidant creation, global warming, ozone depletion or malodour creation. Besides, volatile organic compounds, there is generation of various types of inorganic hazardous air pollutants and conventional air pollutants. In order to reduce the air emission of these pollutants to an acceptable level, it is necessary to adopt a comprehensive approach considering possible “end of pipe” technologies, thermal destruction, and good engineering practices with due regard to techno-economic feasibility within the frame work of National Environment Policy (NEP), 2006.

With this backdrop, the Central Pollution Control Board in association with M/s Aditya Environmental Services, Mumbai and M/s Lurgi India Company Private Limited, New Delhi had taken up a study to develop national emission standard for petrochemical manufacturing units -basic and intermediate products. Considering the status of emission control by Indian industries and best practicable technology, and the document has been published and proposed emission standards has been notified by MoEF on November 09, 2012.

### ESS Inspection

Under ESS activities, highly polluting industrial units falling under 17 categories of industries are randomly selected through ESS Software, especially developed for surprise inspection/monitoring to check the compliance of consent conditions, standards, CREP, etc. ESS inspections are conducted through six Zonal Offices of Central Pollution

Control Board (CPCB) located at Bengaluru, Vadodara, Lucknow, Bhopal, Shillong and Kolkata. Overall 251 industries were inspected during the year.

Based on the inspection reports, Directions/Advices have been issued to the concerned SPCBs/ industries on severity of violations either under Section 18(1)(b) of the Water (Prevention and Control of Pollution) Act, 1974/ Air (Prevention and Control of Pollution) Act, 1981 or under Section 5 of the Environment (Protection) Act, 1986.

### 17 Categories of Highly Polluting Industries

17-Categories of Industries have been identified by Ministry of Environment & Forests, Govt. of India as highly polluting and covered under the Central Action Plan. A 15-point programme, for priority action, was formulated by the Ministry of Environment and Forests (MoEF). The programme is rigorously followed up by the Central Pollution Control Board. The status of these highly polluting industries is regularly obtained from respective State Pollution Control Boards and compiled. The sector-wise and the state-wise status of these industries are presented in Table-44 and Table-45.

### Inspection and Monitoring of Sewage Treatment Plants (STPs)

- **Sewage treatment plants in Delhi:**  
There are 17 Sewage treatment plants in Delhi with installed capacity of 2330 MLD whereas actual utilization is 1267 MLD due to inadequate conveyance system. The operation of these STPs is being maintained by Delhi Jal Board.
- **Sewage treatment plants at Agra:**  
Agra has generation of about 260 MLD sewage. Yamuna Pollution Control Unit,

**Table-44.** Status of moratorium in the critically polluted industrial clusters

S. No.	Industrial Cluster / Area	2009	2011	2013
<b>PART-A: 28 CPAs where moratorium has been lifted</b>				
<b>CPAs where CEPI score is decreasing as compared to 2011</b>				
1	Agra (Uttar Pradesh)	76.48	88.36	68.71
2	Ahmedabad (Gujarat)	75.28	78.09	69.54
3	Angul Talcher (Orissa)	82.09	89.74	72.86
4	Asansole (West Bengal)	70.20	70.96	56.01
5	Aurangabad (Maharashtra)	77.44	83.10	68.87
6	Bhadravathi (Karnataka)	72.33	62.64	45.27
7	Bhavnagar (Gujarat)	70.99	69.73	62.79
8	Bhiwadi (Rajasthan)	82.91	77.73	70.63
9	Coimbatore (Tamil Nadu)	72.38	54.16	53.14
10	Cuddalore (Tamil Nadu)	77.45	78.41	70.12
11	Dhanbad (Jharkhand)	78.63	80.17	71.78
12	Dombivalli (Maharashtra)	78.41	85.21	72.29
13	Faridabad (Haryana)	77.07	74.42	73.55
14	Greater Kochi (Kerala)	75.08	57.39	57.94
15	Haldia (West Bengal)	83.48	79.71	61.58
16	Howrah (West Bengal)	74.84	76.88	61.11
17	Ib Valley (Orissa)	74.00	65.68	59.73
18	Junagarh (Gujarat)	70.82	67.85	52.75
19	Kanpur (Uttar Pradesh)	78.09	88.82	72.31
20	Korba (Chhattisgarh)	83.00	82.84	69.11
21	Manali (Tamil Nadu)	85.04	88.88	77.26
22	Mandi Gobindgarh (Punjab)	75.08	79.06	77.98
23	Mangalore (Karnataka)	73.68	73.86	67.62
24	Navi Mumbai (Maharashtra)	73.77	78.51	72.87
25	Noida (Uttar Pradesh)	78.90	80.72	78.69
26	Tarapur (Maharashtra)	72.01	85.24	73.30
27	Varanasi-Mirzapur (Uttar Pradesh)	73.79	73.66	56.91
28	Vishakhapatnam (Andhra Pradesh)	70.82	57.39	52.31



<b>PART-B: 15 CPAs where moratorium is currently in place</b>				
<b>CPAs where CEPI score is above 80 due to which moratorium was continued</b>				
1	Ankaleshwar (Gujarat)	88.50	85.75	80.93
2	Chandrapur (Maharashtra)	83.88	83.82	81.90
3	Pali (Rajasthan)	73.73	85.26	82.71
4	Vatva (Gujarat)	74.77	87.46	83.44
5	Vellore (North Arcot) (Tamil Nadu)	81.79	84.73	79.67
<b>CPAs where CEPI score is above 80 due to which moratorium was re-imposed</b>				
6	Ghaziabad (Uttar Pradesh)	87.37	79.71	84.13
7	Panipat (Haryana)	71.91	85.07	81.27
8	Singrauli (Uttar Pradesh & Madya Pradesh)	81.73	83.35	83.24
9	Vapi (Gujarat)	88.09	90.75	85.31
<b>CPAs where CEPI score is increasing as compared to 2011 due to which moratorium was re-imposed</b>				
10	Indore (Madhya Pradesh)	71.26	78.67	78.75
11	Jharsuguda (Orissa)	73.34	67.48	73.31
12	Jodhpur (Rajasthan)	75.19	78.20	78.00
13	Ludhiana (Punjab)	81.66	73.23	75.72
14	Nazafgarh Drain Basin (Delhi)	73.09	67.07	73.42
15	Patancheru Bollaram (Andhra Pradesh)	70.07	74.58	76.05

UP Jal Nigam, Agra has installed five sewage treatment plants of total capacity of 116.25 MLD ((i) Devri Road- 12 MLD, (ii) Dhandupura-78 MLD, (iii) Pilakhar-10 MLD, (iv) Buri ka nagla-2.25 MLD and (v) Jaganpur 14 MLD) in different phases by tapping various drains falling directly into river Yamuna. Presently three more STPs viz. Dhandhupura Part-II (24 MLD), Bichpuri 40 (MLD) and Bichpuri –II 36 (MLD) are under construction. The completion of these STP will raise total sewage treatment capacity to 226.25 MLD.

- **Sewage treatment plants at Mathura:** The total sewage generation of Mathura city is approx. 60 MLD out of which, 27 MLD of sewage is treated in two STPs located at

Masani Nalla (12.5 MLD) and Laxmi Nagar (14.5 MLD) and the remaining is discharged into Yamuna River through various drains. Another sewage treatment plant (16 MLD) capacity is under construction in Mathura.

- **Sewage treatment plants at Vrindavan:** Vrindavan city has two Sewage Treatment Plants, one Kalideh STP with a capacity 0.5 MLD and another Pagla Baba STP with capacity of 4.0 MLD. Out of 12 MLD sewage generated in the city, only 4.5 MLD of sewage is treated at STPs and remaining untreated sewage is discharged into Yamuna River through various drains. Another 8 MLD sewage treatment plant is under construction at Vrindavan.

**Table-45.** Sector-wise summary status of industries in 17 categories

S. No.	Sector	Complying	Non Complying	Closed	Total
1	Aluminium	6	2	2	10
2	Cement	238	44	22	304
3	Chlor Alkali	25	4	2	31
4	Copper	4	1	1	6
5	Distillery	221	52	41	314
6	Dye & DI	125	5	9	139
7	Fertilizers	76	4	17	97
8	Iron & Steel	152	81	17	250
9	Oil Refinery	21	3	0	24
10	Pesticide	76	3	13	92
11	Petrochemical	33	5	3	41
12	Pharmaceutical	534	38	61	633
13	Power Plant	210	88	10	308
14	Pulp & Paper	172	37	35	244
15	Sugar	302	202	92	596
16	Tannery	101	18	35	154
17	Zinc	6	1	0	7
	<b>Total</b>	<b>2302</b>	<b>588</b>	<b>360</b>	<b>3250</b>

4

### Inspection and monitoring of Common Effluent Treatment Plants (CETPs)

- **Common Effluent Treatment Plants (CETPs) at Jodhpur** - Jodhpur Pradushan Niwaran Trust established a CETP of 20 MLD (i.e. 5 MLD Acidic and 15 MLD Alkaline Effluent) capacity at Sangaria Industrial Area, Jodhpur to treat the wastewater of textile units and steel re-rolling mills. Acidic wastes of steel industries are being collected through underground pipeline whereas alkaline wastes of textile units through RIICO open drain. Approximately 15MLD alkaline waste water generated from textile mills and 1.5 MLD acidic waste water generated from steel mills. 109 rolling mills, 215 textile

units and 10 dye & dyes intermediate units are the members of CETP. The final treated effluent, after mixing with untreated effluent joins River Jodri near Salawas at about five Km. distance from CETP. The CETP was monitored by Central Pollution Control Board, samples from CETP inlet and final outlet were collected for analysed. On the basis of the monitoring report, direction under section 18(1)(b) of the Water Act 1974 has been issued to RSPCB for necessary improvement at CETP, Jodhpur.

- **Common Effluent Treatment Plants (CETPs) at Kanpur, Unnao and Banthar Unnao** - Monitoring of CETPs operational at Kanpur, Unnao and Banthar (Unnao)

**Table-46.** State-wise summary status of industries in 17 categories

S. No.	State	Complying	Non Complying	Closed	Total
1	Andhra Pradesh	359	74	39	472
2	Arunachal Pradesh	2	0	0	2
3	Assam	36	12	1	49
4	Bihar	16	4	0	20
5	Chhattisgarh	71	6	1	78
6	Chandigarh	0	0	0	0
7	Daman & Diu	2	0	1	3
8	Delhi	2	0	0	2
9	Goa	14	0	1	15
10	Gujarat	302	7	8	317
11	Haryana	114	4	14	132
12	Himachal Pradesh	14	0	3	17
13	Jharkhand	104	47	22	173
14	Jammu & Kashmir	7	0	3	10
15	Karnataka	102	49	32	183
16	Kerala	22	14	15	51
17	Lakshadweep	0	0	0	0
18	Madhya Pradesh	65	16	2	83
19	Maharashtra	317	145	58	520
20	Meghalaya	13	1	0	14
21	Mizoram	1	0	0	1
22	Nagaland	0	0	0	0
23	Orissa	37	17	11	65
24	Puducherry	5	2	0	7
25	Punjab	52	16	19	87
26	Rajasthan	69	31	18	118
27	Sikkim	3	1	0	4
28	Tamil Nadu	210	10	11	231
29	Tripura	11	1	5	17
30	Uttar Pradesh	278	45	78	401
31	Uttarakhand	25	19	5	49
32	West Bengal	49	67	13	129
	<b>Total</b>	2302	588	360	3250





- High concentration of Chromium (30.8 mg/l) in raw effluent indicate ineffective chrome recovery through primary treatment by member units of CETP.
- High TDS (10911 mg/l) in treated effluent indicate improper waste management practices by individual member units.
- **Common Effluent Treatment Plants (CETPs) at Karnataka** - Performance evaluations of three CETPs were carried out at Kadugondanahalli, Bengaluru, KIADB Industrial Area, Doddaballapur and Kunigal Industrial Area, Kunigal, Karnataka. The salient observations and monitoring results of these CETP's are as follows:
  - Out of three CETP's, two CETP's are working in the range of 70-80% of its designed capacity and one CETP was working at 20 % of its designed capacity.
  - All CETP's are having chemical treatment followed by biological treatment system.
  - At two CETPs the treated effluent being utilised for gardening and plantation in their own land and selling to neighbours for gardening purpose. In other CETP the treated effluent being discharges into sewer line for further treatment at STP.
  - The sludge generated from the CETP's is being sent to TSDF.
  - No CETP's are having laboratory nor maintaining records of effluent quality received from member units.
- **Common Effluent Treatment Plants (CETPs) at Tamilnadu** - In-depth study/ monitoring of CETP at Walajapet, and CETP at Thuthipet, Ambur was carried out during the period as a follow up of direction under Section 5 of E(P)Act, 1986. Salient observations are presented below:
  - In compliance to the direction from Central Pollution Control Board, the two CETPs have stopped discharging treated effluent into the drain.
  - CETP at Walajapet has Tertiary treatment system comprising of the softener to reduce hardness, Ultra Filtration (UF) system followed by RO, MEE and ATFD to achieve zero liquid discharge. About 15-18 TPD salt is generated from the process.. The RO permeate and MEE condensate being sent back to member units through closed conduits.
  - CETP at Thuthipet is operating at about 50% capacity. The unit has installed RO followed by MEE and ATFD to achieve zero discharge and generating salt about 1.0 tons/day. The unit has taken steps to modify the existing MBR into SBR and installation of softener and Ultra filtration are under progress.
  - Both CETP's have developed Secured Landfills to dispose Hazardous waste generated from their member units as well as to dispose sludge generated from CETP's.
- **Common Effluent Treatment Plants (CETPs) at Gujarat & Maharashtra** - There are 26 Nos. of CETPs operational in Gujarat while 28 Nos. of CETPs operational at Maharashtra. The CETPs are located in various industrial estates for the treatment of the liquid effluent generated from different industrial sectors. In order to assess the quality of treatment, the Central Pollution Control Board, Zonal Office Vadodara has taken up the study on the



performance evaluation of selected CETPs located at Gujarat and Maharashtra. The monitoring was carried out for CETPs located at Vapi, Surat, Panoli, Ankleshwar, Ahmedabad in Gujarat and CETPs located at Tarapur, Ambarnath, Dombivilli, Lote-Parshuram in Maharashtra. The CETPs located in GIDC Ankleshwar, GIDC Panoli, GIDC Vapi and Final Effluent Treatment Plant (FETP) at Ankleshwar are regularly monitored on quarterly basis.

## Bio-Medical Waste Management

### Status on Bio-medical Waste Management

As per the annual report information received from the State Pollution Control Boards / Pollution Control Committees (SPCBs/PCCs) except Sikkim SPCB and Director General of Armed Forces Medical Services (DGAFMS), the bio-medical waste management status in the Country is given as follow:

No. of healthcare facilities	:	151535
No. of beds	:	1491147
No. of Common Bio-medical Waste Treatment Facilities (CBWTFs)	:	179 + 22* (*under installation)
No. of healthcare facilities (HCFs) using CBWTFs	:	112199
No. of HCFs having treatment & disposal facilities	:	23,668
No. of healthcare facilities applied for authorization	:	84396
No. of healthcare facilities granted authorization	:	79901

### Total no. of on-site/captive treatment equipment installed (excluding CBWTFs) by the HCFs

No. of incinerators		
(i) With Air Pollution Control Device	:	450
(ii) Without Air Pollution Control Device	:	234
No. of Autoclaves	:	3282
No. of Microwaves	:	139
No. of Hydroclave	:	3
No. of Shredders	:	4974

### Total no. of treatment equipment installed at CBWTFs:

No. of Incinerators	:	171
No. of Autoclaves	:	166
No. of Microwaves	:	10
No. of Hydroclave	:	5
No. of Shredders	:	172
Quantity of bio-medical waste generated in Tons/day	:	415
Quantity of bio-medical waste treated in Tons /day	:	378
No. of HCFs violated Bio Medical Waste Rules	:	5472
No. of Show-cause notices/Directions issued to defaulter HCFs	:	3585



### **Initiative taken for cytotoxic drugs waste generated from Cancer Hospitals & Research Centres**

Central Pollution Control Board has prepared a format seeking information with reference to type of cytotoxic drugs used, quantum of cytotoxic drugs generated, present waste management practices from about 120 HCFs (Cancer Hospitals) in the Country and the information received so far from the HCFs is being compiled for preparation of draft guidelines for management & handling of cytotoxic drugs waste generated from Cancer Hospitals.

### **Bilateral project with Government of Finland**

A Memorandum of Understanding (MoU) was signed between Central Pollution Control Board in India and VTT Technical Research Centre of Finland on the 'Project for "Capacity Building for Emission Measurements in India" for the following areas pertaining to industrial sectors:

- Improved capacities in odour measurement technologies;
- Improved capacities in the measurement of fugitive emissions, especially VOCs, from organic chemical industry; and
- Improved capacities in emission measurements.

### **Clean Technology in SMEs**

The project 'Creation of database and evolving a mechanism for capacity building in the financial sector and application of fiscal instruments for clean technology projects for Small & Medium Enterprises (SMEs)' was initiated and report has been finalized on following sectors :

- Used oil & waste oil

- Textile wet processing
- Tanneries
- Dye & dye intermediates

### **Fly Ash Utilization**

A Notification No. S.O.763 (E) dated 14<sup>th</sup> September 1999 on fly ash utilization has been issued by the Ministry of Environment & Forests (MoEF) with the objectives 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 activities. The notification has been amended vide notification No. S.O. 979 (E) dated the 27<sup>th</sup> August, 2003 and Notification No. S.O.2804 (E) dated 03.11.2009. The notification applies to every coal or lignite based thermal power plants and inter-alia, provides for targets for fly ash utilization by the coal or lignite based thermal power plants.

As per the notification, every construction agency engaged in the construction of buildings within a radius of 100 kilometres from a coal or lignite based thermal power plant shall use only fly ash based products for construction. All agencies undertaking construction of roads or fly over bridges and reclamation and compaction of low lying areas, including Department of Road Transport and Highways (DORTH), National Highways Authority of India (NHAI), Central Public Works Department (CPWD), State Public Works Departments and other State Government Agencies, are required to take certain steps for promotion of utilization of the fly ash in construction activities undertaken by them.

Stock taking was done for status of implementation of the notification, namely; generation of fly ash, gainful utilization of fly ash



and environmentally sound disposal of fly ash. As per the information, the generation of fly ash during the year 2012-13 from 138 coal or lignite based thermal power plants in the country is reported to be 163.56 million tons. The fly ash utilization is reported to be 100.37 million tons, which about 61.37 % of the total generation of fly ash from these 138 power generation plants. The major modes, in which the fly ash was used included, Cement, Reclamation of low lying area, Ash Dyke Raising, Mine filling, Bricks & Tiles, Roads & Embankments, etc. The maximum utilization of fly ash to the extent of 41.18% of total fly ash utilized was in the Cement sector, followed by 11.78% in reclamation of low lying area, 10.89% in ash dyke raising, 10.30% in mine filling, 9.94% in making bricks & tiles, 6.00 % in roads and embankments.

## Development and Promotion of Clean Technology

### Introduction and Objectives

The policy statement of 1992 of the Ministry of Environment and Forests for abatement of pollution lays emphasis on preventive aspects of pollution abatement and promotion of technical inputs to reduce industrial pollution. One of the simplest preventive strategies is to minimize the waste in production of products and goods. The main objective of waste minimization is to optimize the consumption of raw materials and also reduce waste generation by adopting production techniques which are cleaner in nature and which can be adopted by the existing units without necessarily changing the production processes or unit operations. The approach to the problem is towards utilizing the existing production facilities in an optimal manner.

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 so far

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.

### Progress made during the year

Under the scheme on Development & Promotion of Clean Technology and Waste Minimisation Strategies the progress made during the financial year 2013-14 are as follows:

- Three cleaner technologies has been developed by the Ministry in collaboration with the research institutions of the



country during the current financial year.

- Seven meetings of the Progress Review Committee were organized on the site to monitor the progress of the projects.
- Three national workshops were organized to disseminate the technology for implementation.
- SFC & Guidelines of the merged scheme "Development & Promotion of Clean Technology and Waste Minimisation Strategies" has been approved.
- The Scheme was widely publicized through leading national newspapers as well as website of the Ministry to obtain good project proposals on transparent manner.

**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.
- Clean Technology for the recovery of Gold, Silver and other allied materials from E-waste by Yenepoya University, Mysore.
- 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 TiO<sub>2</sub>- 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.
- Eco Friendly Road Technology – RBI Grade 81 Natural Soil Stabilizer by M/s Alchemist Touchnology Limited, New Delhi.
- Waste Minimization in small scale Industries by National Productivity Council (NPC), New Delhi.
- Clean Technology for waste Minimization from Nutraceutical Industry, Mysore University, Mysore.
- Biological Liquefaction of Waste Fleshing and Treatment with Tannery Effluent for Biogas Generation in Single Reactor by Central Leather Research Institute (CLRI), Chennai.
- Waste Minimisation Studies in Electroplating Operation by M/s APITCO, Hyderabad.
- Production of bioelectricity from sludge and domestic wastewater using microbial fuel cell University of Calcutta, Kolkata.
- Waste Minimisation through co-composting by Annamalai University.



- Waste Minimisation in Moradabad Brassware Cluster by The Energy Research Institute (TERI), New Delhi
- Synthesis of Polymer Hydrogel and Development of Hybrid Waste Water Treatment System using Cavitation Technique and Hydrogel by NIT, Warangal.
- 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.

**Life Cycle Assessment:** Life Cycle Assessment Studies in Thermal Power Plants, Steel, Pulp and Paper, Cement and Construction Studies has been completed while wood and Bamboo Composite Products are likely to be completed soon.

**Carrying Capacity Studies:** Carrying capacity studies of Greater Kochi Region, Doon Valley, Damodar River Basin, Tapi Estuary and National Capital Region (NCR), Natural Resource Accounting Studies for Upper Yamuna Basin; has been completed. New studies are in the pipeline.

**Creation of data base for Clean Technologies:** The project on "Data Base on the available cleaner technologies in the country as well as in abroad, Evolving a Networking Mechanism of the Research Institutions of the country, Capacity Building in the financial sector and application of fiscal instruments for adoption of clean technologies by the Small Scale Industries are in progress". Ministry has awarded the project to CPCB with 18 months duration. The progress is very slow.

**Organisation of Workshop:** Three National level workshop was organised by the Ministry

to disseminate the outcome of the project on i) Derivation of engine fuel from waste plastics and its performance evaluation by Annamalai University ii) Development of Fly Ash Based Geo polymer Concrete Pre-cast elements by Annamalai University, iii) Effective removal of arsenic from groundwater by Central Salt and Marine Research Institute. One awareness workshop was organised by the National Productivity Council on Waste Minimisation Strategies.

**Details of the Completed Projects:** Three cleaner technologies have been developed by the research institutions of the country during the current financial year. These are:

- Derivation of engine fuel from waste plastics and its performance evaluation by Annamalai University.
- Development of Fly Ash Based Geo polymer Concrete Pre-cast elements by Annamalai University.
- Effective removal of arsenic from groundwater by Central Salt and Marine Research Institute.

### Brief summary of the completed projects

#### Derivation of engine fuel from waste plastics and its performance evaluation by Annamalai University.

The project was sanctioned to Annamalai University. Main objective of the project is to find a solution to the mounting problem of plastic disposal, by converting it into useable fuel and to access the suitability and limitation of utilization of Waste Plastics Derived Oil (WPDO) in an engine, without making any modifications to the engine. Pyrolysis of waste plastic in inert atmosphere has got dual advantage of generating an alternate fuel and eco-friendly way of disposing waste

plastics as against the conventional methods like incineration and landfill. The present study has developed on derivation of oil from waste plastic and the utilization of the waste plastic derived oil (WPDO) will be an alternate fuel for automobile.

In the project, an oil extraction plant has been designed and fabricated for cracking waste plastics and convert to oil. The features of the plant makes it suitable for controlling the process parameters like temperature, flow rate, resident time and condensation of the liquid product. In this process, fly ash has been used as a catalyst to crack the waste plastics. This reaction leads to generation of liquid and gaseous hydrocarbons as a desired product. The catalyst gives better yield under optimum conditions of temperature and flow rate and a yield of 90% of waste plastic derived oil on volume basis has been obtained. Distillation unit is used for the separation of petrol, diesel and kerosene, at different temperatures, when 60% of diesel, 30% of petrol and 10% of kerosene and other hydrocarbons are obtained. Properties of the waste plastic derived oil (density, specific gravity, flash point, fire point, calorific value and cetane number) are closer to those of the conventional fossil fuels. As the waste plastic derived oil has low sulphur content when compared to that of the conventional fuels, it would help reduce the environmental pollution (eg. acid rain) and improve the life of the exhaust systems. Waste plastic derived oil is cheaper cost-wise as compared to the price of petrol and diesel. The cost of waste plastic derived petrol per liter is ₹40 and that of diesel is ₹30 only.

#### **Development of Fly Ash Based Geo polymer Concrete Pre-cast elements by Annamalai University**

The project was sanctioned to Annamalai University. The objective of the project is to

use large quantities of fly ash to develop of an alternative concrete (geo-polymer concrete) to normal cement. Development of an alternative to cement will reduce the production of cement which in turn reduce the emission of CO<sub>2</sub> to the atmosphere. Also, it will save the natural resources and vast area of land for ash pond to store it. The geo-polymer concrete developed can be used for Pre-cast Concrete elements like Railways sleepers, Electric power poles, Concrete bridges etc. Proposed product would have better strength than the cement one. In preparing the geopolymers concrete, the Ordinary Portland Cement is replaced 100 percent by fly ash and hence geopolymers concrete is termed as cementless concrete. The price of fly ash based geopolymers concrete is estimated about 10 to 30 percent cheaper than portland cement concrete. Heat-cured low-calcium fly ash-based geopolymers concrete offers several economic benefits over portland cement concrete. One ton low-calcium fly ash can be utilized to manufacture approximately three cubic meters of high quality fly ash-based geopolymers concrete, and hence earn monetary benefits through carbon-credit trade. The heat-cured low-calcium fly ash based geopolymers concrete may yield additional economic benefits when it is utilized in infrastructure applications.

#### **Effective removal of arsenic from groundwater by Central Salt and Marine Research Institute**

The project was sanctioned to Central Salt and Marine Research Institute. The objectives of the project were to fabricate, install and monitor fifty domestic units for dearsenification in individual households of Maslandapur-Ghoshpur blocks of 24 Parganas (N), to explore the possibilities of installing at least ten community scale units in a cluster of houses for dearsenificating 1000 liters of



water per day in an eight hour shift, and to develop easy and affordable field testing kit for arsenic. Out of the 22 blocks of North 24-Parganas, in 20 blocks arsenic has been reported above the maximum permissible limit and so far in 16 blocks people have been identified as suffering from arsenical skin lesions. It is estimated that about 2.0 million and 1.0 million people are drinking arsenic contaminated water above 10 µg/L and 50 µg/L level, respectively in North 24-Parganas alone. Extrapolation of the available data indicates about 0.1 million people may be suffering from arsenical skin lesions from North 24-Parganas alone. Due to the use of arsenic contaminated groundwater for agricultural irrigation, rice and vegetable are getting contaminated with arsenic. The project team detected 40 ppb arsenic in coconut water during their investigation. Hence there is an additional arsenic burden from food chain. People from arsenic affected villages are also suffering from arsenical neuropathy. The follow-up studies indicate that many of the victims suffering from severe arsenical skin lesions for several years are now suffering from cancer or have already died of cancer.

A total of 55 units have been installed in North 24-Parganas district. 10 community scale units were installed at mosques and temples so that maximum people may be benefitted. ₹ 17.55 shall be the cost of production of 1000 litre of arsenic-free water per day. A semi-quantitative arsenic detection kit has also been developed under the project to test the actual amount of arsenic in the ground water. This kit has been supplied free to all beneficiaries in the affected area as it is essential for a confidence building measure.

## Hazardous Substances Management (HSM)

### Introduction

The activities under the scheme relate to planning and overseeing implementation of policies and programmes on management of chemical accidents and solid wastes so as to promote safe handling of hazardous chemicals and solid wastes viz-a-viz Hazardous Waste, Bio-Medical Waste, E-waste, Municipal Solid Waste and Plastic Waste. The Scheme has following objectives:

- Creation of Hazardous Substances Management Structures in the States.
- Chemical Safety – Management of Chemical Accidents.
- Proper handling and disposal of Solid Wastes

### Activities undertaken so far

#### National Inventory of Hazardous Wastes

As per the information of Central Pollution Control Board (CPCB), there are about 41,523 industries in the country generating about 7.90 million tonnes of hazardous waste every year, of which landfillable waste is 3.32 million tonnes (42.02%), incinerable waste is 0.60 million tonnes (7.60%) and recyclable hazardous waste is 3.98 million tonnes (50.38%).

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. During the year 2013-14, the database for about 5,000 industries was processed. As on date, the system has state wise information



for about 33,000 hazardous waste generating Industries.

### **Treatment, Storage and Disposal Facilities (TSDFs) for Hazardous Wastes**

At present, 38 TSDFs include 17 Integrated TSDF, 13 Exclusive Common Secure Landfills and 8 Exclusive Common Incinerators are available in 10, 9 and 4 States/UT respectively. These States /UT contribute about 97.8% of total landfillable and 88.19% of total incinerable hazardous wastes generation in the country respectively. During 2013-14, financial assistance has been provided for setting up of one TSDF for hazardous wastes in the country.

### **E-Waste Management**

The Ministry has notified E-waste (Management and Handling) Rules, 2011. These rules have come into force from 1<sup>st</sup> May, 2012. These rules apply to e-waste generated from IT and telecommunication equipment and consumer electrical and electronics namely Television Sets (including LCD & LED), Refrigerators, Washing Machines and Air-conditioners. These rules empower the concerned state agencies to control, supervise and regulate relevant activities connected with e-waste management such as collection, segregation, dismantling and recycling.

The concept of Extended Producer Responsibility (EPR) has been enshrined in these Rules. Accordingly, producers are required to set up collection systems and meet the cost involved in the environmentally sound management of e-waste generated from the 'end of life' of their own products. Besides, threshold limits, which are accepted globally, have been prescribed for six hazardous substances used in manufacture of electrical and electronics components. Producers are expected to achieve reduction in use of the

hazardous substances (RoHS) to the prescribed limit within a period of two years from the date of commencement of these rules.

These rules are the main instrument to ensure environmentally sound management of e-waste. Financial assistance was release for creating awareness among stakeholders on various aspects of these Rules.

### **Basel Convention**

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22<sup>nd</sup> March 1989 by the Conference of Plenipotentiaries in Basel, Switzerland. The Convention entered into force on 5<sup>th</sup> 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.

### **Chemical safety**

The Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) (CAEPPR) Rules, 1996 are 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 the 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 1905 MAH units in the country located in 304 districts across the country.

A sub-scheme titled "Industrial Pocket wise Hazard Analysis" is in operation since the Eighth Five Year Plan. Under the sub-scheme the Ministry provides financial assistance for preparation of off-site emergency plans, hazardous analysis and rapid safety audit reports. About 41 such reports had been received and are under consideration.

### Stockholm Convention

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 22 chemicals. The Convention was adopted in May, 2001 and came into force on 17th May, 2004. The Convention was ratified on 13th January, 2006 by Government of India which came in to force on 12th April, 2006. The Ministry of Environment and Forests serves as the focal point for GEF and Stockholm Convention in the country. Designated national authorities (DNAs) in Ministry of Agriculture and Cooperation and Ministry of Chemicals and Fertilizers have been notified. India has ratified 12 initially listed chemicals.

In accordance with Article 7 of the Stockholm Convention on POPs, India developed a National Implementation Plan (NIP) through Global Environment Facility (GEF)

funding to demonstrate how its obligations to the Convention would be implemented. The Ministry of Environment and Forests serves as the focal point for GEF and Stockholm Convention in the country. Environmentally sound management and disposal of Polychlorinated Biphenyls (PCBs) in India has been selected as one of the first priorities of post-NIP programme. The objectives are to provide information and technical indication, in accordance with the Indian regulation and the international conventions. Four volumes of guidance documents were prepared by UNIDO through an international consultant. These guidelines are currently under review by the Ministry and Central Pollution Control Board (CPCB).

During the preparation of the National Implementation Plan (NIP) under the Stockholm Convention, an inventory on PCBs was prepared. As per said inventory, 9837 tonnes of PCBs are available in the country. Under the provision of the Convention, Parties are required to identify, label and remove PCB-containing equipments from use by 2025, and manage PCBs, PCB-containing equipment and PCB wastes in environmentally sound manner not later than 2028. The Government of India has signed a US \$ 14.5 million project, i.e. "Environmentally Sound Management and Final Disposal of PCBs in India" funded by the Global Environment Facility (GEF) with the United Nations Industrial Development Organization (UNIDO) for the phase-out and disposal of 7700 tonnes of PCBs in the country during next five years and further inventorisation of PCBs would also be undertaken. The above mentioned project was endorsed on February 13<sup>th</sup>, 2009 and the project was initiated in March, 2010. The Ministry of Environment and Forests is the nodal Ministry. However, the actual implementation started in May, 2012 after the recommendations of a Sub-

committee of the National Steering Committee on the Stockholm Convention on Persistent Organic Pollutants (POPs). The major activities undertaken during 2013 under this project were:

- A Technical Committee under Director General, Central Power Research Institute (CPRI) was constituted to assess the environmentally sound technologies for final disposal of PCBs in India.
- Technical Working Group (TWG) met at CPRI, Bangalore and approved the TOR for setting up of a facility needed for the disposal of pure PCBs. An approval of MoEF was communicated to UNIDO on June 11th, 2013, and a global tendering to procure the facility was undertaken.
- No objection certificate has been accorded under EIA Notification, 2006 to Bhilai Steel Plant (BSP), Bhilai, Chhattisgarh for setting up of non-combustion decontamination facility and non-combustion destruction facility for PCBs in transformer oils, etc. at Bhilai Steel Plant, Bhilai.

### Rotterdam Convention

The Rotterdam Convention on the prior informed consent procedure for certain Hazardous Chemicals and Pesticides in International Trade entered into force on 24<sup>th</sup> February 2004. The convention was acceded to by Government of India on 24<sup>th</sup> May 2005 and it became operative on 23<sup>rd</sup> 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 have been notified. The Official Contact Point (OCP) is designated in Ministry of Environment and Forests.

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 by two or more Parties and which the Conference of the Parties (COPs) has decided to subject to the Prior Informed consent (PIC) procedure. The inclusion of Pentabromodiphenyl Ether (CAS No. 32534-81-9) and Penta-bromo-diphenyl Ether Commercial Mixtures, Octabromodiphenyl ether (OctaBDE) commercial mixture, Perfluoro-octane-Sulphonic Acid, Perfluoro-octane-sulfonates, Perfluoro-octane-sulfonamides and Perfluoro-octane-sulfonyls in Annex III of the Convention has been agreed.

### Strategic Approach to International Chemicals Management (SAICM)

In February 2006, over 190 countries including India acceded to the Strategic Approach to International Chemicals Management (SAICM), which is 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.

### Minamata Convention on Mercury

At its twenty-fifth session, by the decision 25/5, the Governing Council of the United Nations Environment Programme (UNEP) agreed to the elaboration of a legally binding instrument on mercury. The first meeting of the INC was held in June, 2010 in Stockholm, second INC was held in Chiba, Japan, (January



2011), the third in Nairobi in October-November 2011 and the fourth in Punta del Este, Uruguay in July 2012. The 5th Meeting of INC to decide the text of a global legally binding instrument on Mercury was held in Geneva, Switzerland in January 2013. India has participated in all the INC meetings.

Due to our insistence, the phase out date for mercury was extended to 2020. There is a provision in the instrument as per which the member states could seek exemptions from compliance with respect to one or more such products for further period of 5 years and there- after another 5 years with the approval of COP. This means that phase out of certain mercury products could be extended till 2030 which could be a comfortable situation for India to find and put to use alternatives.

The agreed text of the proposed Minamata Convention has been signed by 94 parties in a Diplomatic Conference held in Japan during 7-13 October, 2013. So far, the Convention has been signed by 97 parties and ratified by one party (USA). The Minamata convention has not yet been signed by the India. It is open for signing till 09.10.2014 at UN Head Quarter in New York.

### **Municipal Solid Waste Management including Plastic Waste Management**

As per the information, about 130822.31 tons of municipal waste is generated per day in the country. The Ministry has notified the Municipal Solid Wastes (Management and Handling) Rules, 2000 for management of the municipal solid waste. These Rules, inter-alia, provide for mechanisms to be set up by the Municipal Authority for management of the waste within their jurisdiction. However, the Municipal Authorities are facing difficulties in implementation of these Rules. The matter

was discussed with stakeholders and it has been decided to amend the existing rules on the Municipal Solid Waste. The Ministry has published the draft (Municipal Solid Waste (Management and Handling) Rules, 2013 inviting comments/ suggestion from the public. The Comments/ suggestions received so are being analyzed for the finalization of the new rules on the municipal solid waste. The emphasis is on management of the waste through a sustainable business model which may include segregation of municipal solid waste at source, door to door collection by involving waste collectors, processing of segregated waste in to useful products such as methane, compost, etc.

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

The Ministry regularly provides financial assistance to create awareness on the various provisions of these Rules.

### **Bio-Medical Waste Management**

As per the information received from SPCBs and PCCs of Union Territories, about 4.16tons of biomedical waste is generated per day. There are 192 Common Bio-Medical Waste Treatment and Disposal Facilities (CBMWTFs) in operation and 29 CBMWTFs are under construction. The waste is required to be managed as per the Biomedical Waste



(Management and Handling) Rules, 1998, as amended by the Ministry.

The Ministry notified the draft Bio-Medical Waste (Management & Handling) Rules, 2011 inviting comments/suggestions from the public. The comments/ suggestions received in the Ministry were compiled and analyzed in consultation with various stakeholders such as Union Ministry of Health and Family Welfare, SPCBs/PCCs of Union Territories, representatives of health care establishments, operators of common biomedical waste treatment and storage facilities and civil societies. The activities related to finalization of these rules were undertaken during the year 2013-14. The Rules are being finalized and may be notified in supersession of the existing Rules on Bio-Medical Waste Management.

To create awareness among the persons, who are involved in handling of biomedical waste, the Ministry provides support to some SPCBs for conducting training programmes on various aspect of Bio-medical waste management.

### Progress/Achievements made during the year

- Financial assistance for setting up of one treatment, storage and disposal facilities for hazardous wastes was released.
- Financial Assistance for project on Web-based GIS Emergency Planning and Response System was released to NICSI, New Delhi through NIC.
- The notification of 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. A public notice was issued in this regarding leading News papers across the country.
- **Minimata Convention:-** The 5th Meeting of INC to decide the text of a global legally binding instrument on Mercury was held in Geneva, Switzerland in January 2013. India has participated in all the INC meetings. Due to our insistence, the phase out date was extended to 2020. There is a provision in the instrument as per which the member states could seek exemptions from compliance with respect to one or more such products for further period of 5 years and there- after another 5 years with the approval of COP. This means that phase out of certain mercury products could be extended till 2030 which could be a comfortable situation for India to find and put to use alternatives.
- **Stockholm Convention:-** Under the ongoing project on “Environmentally Sound Management and Final Disposal of PCBs in India”, the Technical Working Group (TWG) met at CPRI, Bangalore and approved the TOR for setting up of a facility needed for the disposal of pure PCBs. An approval of MoEF was communicated to UNIDO on June 11th, 2013, and a global tendering to procure the facility was undertaken. No objection certificate has been accorded under EIA Notification, 2006 to Bhilai Steel Plant (BSP), Bhilai, Chhattisgarh for setting up of non-combustion decontamination facility and non-combustion destruction facility for PCBs in transformer oils, etc. at Bhilai Steel Plant, Bhilai.



Fig-29. Butterflies at Dudhwa National Park

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

- **The draft Hazardous Wastes (Management, Handling and Transboundary Movement) Fifth Amendment Rules, 2008** - The draft Hazardous Wastes (Management, Handling and Transboundary Movement) Fifth Amendment Rules, 2008 were notified to seek public comments. The comments are being complied.
- **The draft Municipal Solid Waste Management and Handling Rules, 2012** - The draft Municipal Solid Waste (Management and Handling) Rules, 2013 were notified to seek public comments. The comments are being examined for finalization of the Rules.
- **Review of regulatory frame work on Chemical Safety** - India has a significant

presence in the production of basic organic and inorganic chemicals, pesticides, paints, dyestuffs and intermediates, petrochemicals, fine and specialty chemicals, cosmetic and toiletry product segments. The chemical industries in the Country have entered in to an era of growth and change. A need was felt to review the existing regulatory framework on chemical safety and therefore, the Ministry has initiated a review of the existing regulatory framework through consultation with stakeholders. The following other legislations/subordinate legislations are considered for their review:-

- The Manufacture, Storage, and Import of Hazardous Chemical Rules 1989 and as amended.
- The Chemical Accidents (Emergency, Preparedness, Planning and Response Rules 1996.



- Notification (S.O. No. 227 dated 24.3.1992) delineating the scope of Public Liability Assurance Act, 1991.

### Budget allocation and progress of expenditure during 2013-14

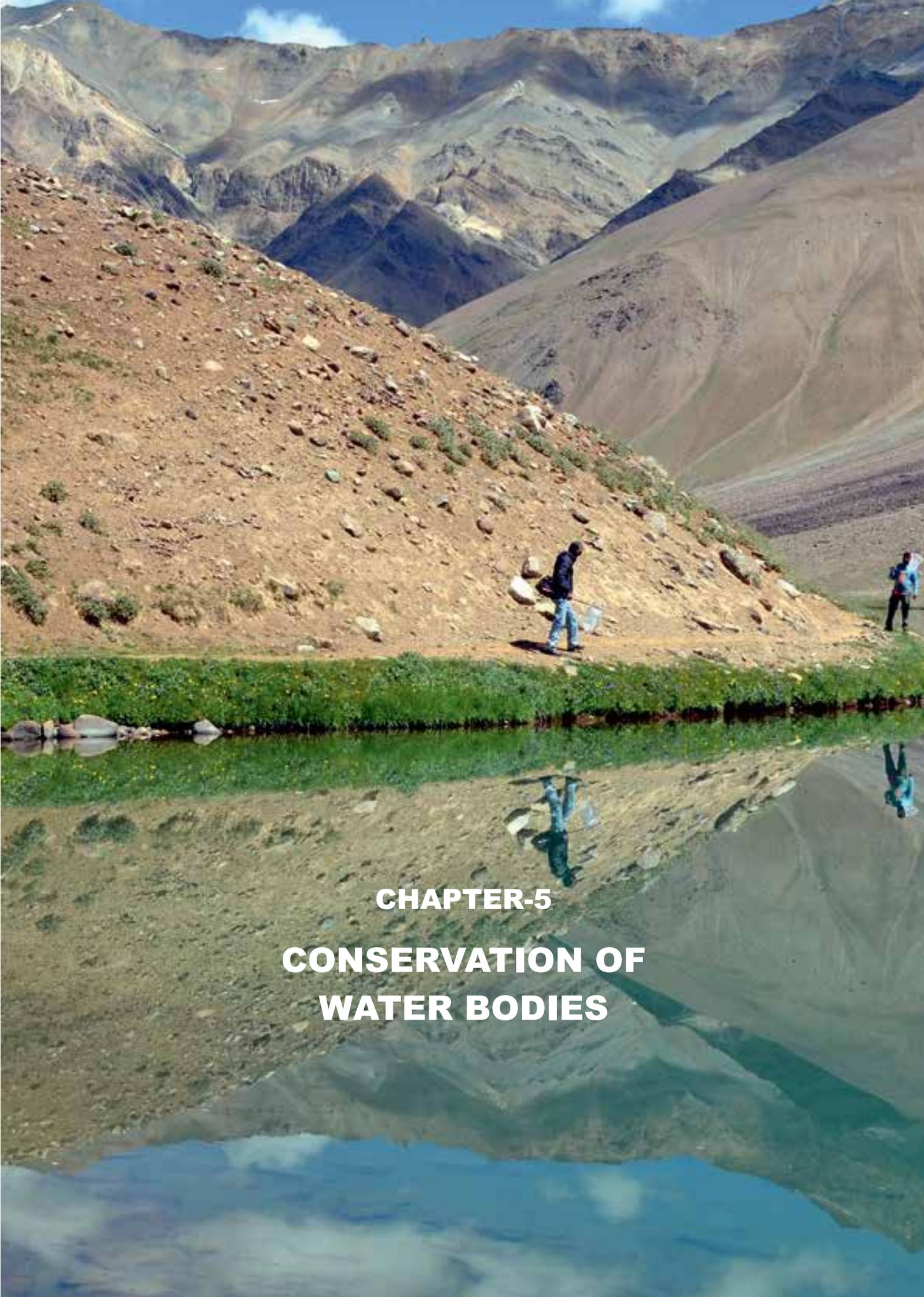
**XII Plan Outlay : 39.25 crore**

₹ in crore

Year	BE	RE	Expenditure
2013-14	7.85	2.87	2.87

### Implementing organizations along with details of responsibilities:

The Central Pollution Control Board, State Pollution Control Boards, Pollution Control Committees and various other Central/ State departments as prescribed under the regulatory framework notified on Chemical Safety and Solid Waste Management under the Environment (Protection) Act, 1986.



**CHAPTER-5**  
**CONSERVATION OF**  
**WATER BODIES**



## National River Conservation Directorate

The National River Conservation Directorate, functioning under the Ministry of Environment and Forests is engaged in implementing the River, Lake and Wetland Action Plans under the National River Conservation Plan (NRCP) as well as National Ganga River Basin Authority (NGRBA) Programme, National Plan for Conservation of Aquatic Eco-systems (NPCA) by providing financial assistance to the State Governments.

### National River Conservation Plan

#### Introduction

The objective of National River Conservation Plan (NRCP) is to improve the water quality of the rivers, which are the major water sources in the country, through the implementation of pollution abatement works, to the level of designated best use. So far a total of 42 rivers have been covered under the programme. (Table-47).

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.

**Table-47.** 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	Tamrarbarani
17	Krishna	39	Vaigai
18	Kshipra	40	Vennar
19	Mahanadi	41	Wainganga
20	Mandovi	42	Yamuna
21	Mandakini		
22	Mahananda		

- Afforestation on the river banks.
- Public Participation & Awareness building etc.

### Major Initiatives – Constitution of National Ganga River Basin Authority (NGRBA)

National Ganga River Basin Authority (NGRBA) was constituted on 20.02.2009, under the chairmanship of the Prime Minister as an empowered planning, financing, monitoring and coordinating authority for the Ganga River, in exercise of the powers conferred under the Environment (Protection) Act, 1986.



So far three meetings of NGRBA have taken place. In its first meeting on 5th October, 2009, the Authority decided that under Mission Clean Ganga it will be ensured that by 2020 no untreated municipal sewage and industrial effluents flow into Ganga and the investments required to create the necessary treatment and sewerage infrastructure will be shared suitably between the Centre and the State Governments.

An Action Plan was approved by the NGRBA in its first meeting, to achieve the aforesaid Mission objective. Implementation of this Action Plan was reviewed in the 2<sup>nd</sup> Meeting of the NGRBA on 01.11.2010. The 3<sup>rd</sup> meeting of NGRBA was held on 17<sup>th</sup> April, 2012.

The following steps have been taken by the Ministry to implement the Action Plan:

- **Preparation of Basin Management Plan:** A comprehensive River Basin Management Plan for Ganga is being prepared. This work has been entrusted to a consortium of seven Indian Institute of Technology (IITs) (Kanpur, Delhi, Madras, Bombay, Kharagpur, Guwahati and Roorkee). In this regard, a Memorandum of Agreement (MoA) has been signed on 06.07.2010 by the MoEF & the IITs.

The Plan is being prepared with the objective of taking comprehensive measures for restoration of the wholesomeness of the Ganga system and improvement of its ecological health. The Plan will be the basis for specific projects to be undertaken, policy interventions required and non-project investments under NGRBA. So far, the consortium has submitted 23 (twenty three) reports in two phases. These reports are being examined in consultation with state Government and stakeholders.

- **Revision of Guidelines for preparation of DPRs and introduction of NGRBA programme framework:** The guidelines prepared in the year 2002 for Detailed Project Report (DPR) preparation have been revised in December, 2010 with the help of IIT Roorkee. The NGRBA programme framework has subsequently been prepared in May, 2011, which includes implementation arrangements, investment frameworks financial management manual, Environmental and Social Management Framework, Communication and Public Outreach Framework, Governance and Accountability Action Plan, Programme and Investment Level Model Memorandum of Agreements (MoAs) and the Procurement Manual ( for World Bank Assisted Project). As per new guidelines and the programme framework, whole river basin will be considered for river conservation schemes and preparation of City Sanitation Plan is required for selecting the Schemes for abatement of pollution. Feasibility study will also be carried out before preparing DPR. O&M plan for first 5 years will be inbuilt in the DPR, whereas for next 10 years Operation and Maintenance (O&M) plan based on recovery will be included. Stake holder consultation at project formulation stage, holistic approach and provision of integrated sewer network up to the house property line, in place of drain interception and diversion to ensure 100% sewage collection, signing of tripartite MoAs among Government of India, State Government (including the executing agency) and Urban Local Bodies to bind them for release of funds, timely completion of projects, ensure house connection and O&M of assets, appraisal of projects proposals by independent



intuitions/experts to enhance quality of DPR and cost optimization are some of the new additions in the guidelines the programme.

- **Funding of NGRBA projects:** The existing NRCP funding pattern i.e. 70:30 between the Centre and States is being followed for NGRBA projects. Planning Commission has agreed to the proposal that the O&M costs of the assets created under NGRBA will be shared by the Central and State Governments on 70:30 basis for three years. It was decided in the second meeting of NGRBA that O&M costs of assets created under NGRBA will be shared between Centre and the States for 5 years, with a review at the end of two/three years. During this time, the States are expected to build the technical and financial capacity of ULBs to ensure O&M on a sustained.
- **Measures for improving implementation:** The following are among the measures taken to improve implementation of projects under NGRBA;
  - **Standing Committee and Empowered Steering Committee:** A Standing Committee of NGRBA has been constituted with Union Finance Minister as Chairman to review and assess the implementation of Authority's work and measures to achieve its objectives. An Empowered Steering Committee (ESC) has been constituted for appraisal and sanction of project proposals on a Fast Track Mode.
  - **State River Conservation Authorities:** To coordinate and implement the conservation activities at the State level, Empowered State River Conservation Authorities (SRCAs) have been notified under the Environment (Protection) Act, 1986 for all five Ganga States.
- **National Mission for Clean Ganga:** National Mission for Clean Ganga (NMCG), a registered society has been setup at the central level to plan and implement the NGRBA programme in coordination with the concerned State Agencies. The NMCG is headed by a Mission Director.
- **Dedicated implementation institutions in States:** Since the constitution of the NGRBA, State River Conservation Authorities (SCRAs) have been constituted in all five basin states (Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal) to lead the program in the respective states. Each of the NGRBA states have also set up the State (SGRCA) Program Management Group (SPMG) as a registered society, to ensure effective implementation at state level with the exception of Jharkhand, provided with one dedicated NGRBA cell within the UD Department, as a very small stretch of the Ganga main stem passing through the state.
- **Memorandum of Agreements (MoA):** Tripartite MoAs are being signed with the State Governments/ Urban Local Bodies in respect of sanctioned projects. The MoAs provide for commitments by the Centre and States for funding of the projects, regular monitoring and review of implementation, coordination by the State Governments with the ULBs and other agencies to ensure synergy with programs like Jawaharlal Nehru



National Urban Renewal Mission (JNNURM)/ Urban Infrastructure Development Scheme for Small and Medium Towne (UIDSSMT) etc. 35 (thirty five) MoAs have been signed so far.

- **Independent appraisal of Detailed Project Reports:** Reputed professional institutions have been appointed for appraisal of DPRs for projects to be taken up under NGRBA.
- **Third Party Inspection:** Third Party Inspection (TPI) of projects under NGRBA has been introduced, covering four stages of the life cycle of a project, namely Pre-construction, Construction, Commissioning & Trial Run and Post-construction. The inputs of third party inspection are being taken into consideration before release of funds.
- **Industrial Pollution:** In order to effectively tackle the problem of industrial pollution, a dedicated NGRBA cell is being set up in Central Pollution Control Board (CPCB) for inspection and monitoring of industrial units discharging effluents into the river Ganga. The CPCB and the State Pollution control Boards (SPCBs) of the five main stem basin states shall ensure water quality monitoring of the river Ganga main stem. In the first instance, the cell will focus on the critical stretch of about 500 kms from Kannauj to Varanasi.
- **Strengthening of CPCB/SPCBs:** Support will be provided for improvements in: (i) infrastructure, including the up-gradation of buildings, laboratories, transportation facilities

for sample collection, R&D facilities, etc; (ii) information, including IT infrastructure, MIS and GIS systems, legacy data computerization, website development, laboratory information management systems etc; and (iii) institutions, including training, staffing for new skills and accreditation of labs etc. Capacity building packages for individual SPCBs have been customized according to need and demand, and phased across the duration of the project to ensure a pragmatic approach and realistic results. The activities will be executed by the CPCB and SPCBs.

- **Setting up of Ganga Knowledge Centre (GKC) and Collaborative Research:** Ganga Knowledge Centre has been established under NMCG with the aim to evolve as a repository for data and any information related to Ganga. The task of developing the Knowledge Centre is underway incorporating the recommendations by the IIT consortium. Efforts are also being made to develop the data base and to initiate research studies. This includes identifying potential areas of research, scope for collaboration with other research institutions and organisations as well as doing independent in-house research studies. The process of acquiring data related and relevant with regard to managing the river basin has been initiated. The aim is to enable GKC to act as a central repository for any data on Ganga be it statistical or spatial, data management being an integral part. Conservation of Bio-diversity of river Ganga including Dolphins, declared as a national aquatic animal is also an integral part



of activities under NGRBA programme. The Centre for Environment Education (CEE), Ahmedabad has carried out a Dolphin Awareness program and submitted final report. Under this program a network of 11 NGOs, 379 schools and 328 school teachers in the Ganga basin has been established. GKC is presently working in close collaboration with World Bank in the research areas. Initiatives have been taken for possible long and short term research collaborations with various renowned national and international institutions and agencies.

– **Projects/ Schemes undertaken so far:**

In order to bridge the critical deficit in sewage infrastructure and treatment capacity, and other related activities for river conservation in towns along the river Ganga the first phase of 53 Projects (1 institutional project and 52 investment projects) in 43 towns from the Government's own resources i.e. under Non-EAP component and 1 JICA assisted Ganga Action Plan (GAP) project in Ganga States have been sanctioned under NGRBA, costing ₹ 2600 crores. The works program has been divided into two broad components: **Externally Aided Projects (EAP) and Non-Externally Aided Projects (Non-EAP)**. The EAP component is presently comprised of **World Bank** aided projects and **JICA** assisted program in Varanasi. In total, 4 institutional development projects costing ₹ 223.32 Crores and 61 investment Projects in 47 towns in Ganga States costing ₹ 3546.61 Crores have so far been sanctioned under NGRBA. These include projects in Uttarakhand (₹ 251.21 Crore), Uttar Pradesh (₹ 1590.55 Crore), Bihar (₹

946.08 Crore), Jharkhand (₹ 99.36 Crore) and West Bengal (₹ 659.41 Crore) for laying of sewerage networks, treatment plants, pumping stations, electric crematoria, community toilets, development of river fronts, etc. These projects are currently under implementation by the states. Against these, ₹ 1080.27 crore has been released by the Centre including the matching share of the States and a total expenditure of ₹ 804.49 crore has been incurred till 31<sup>st</sup> December, 2013 for implementation of the projects. 15 investment projects have been completed while, 39 investment projects are under different stages of implementation, and 12 projects are yet to be started as on 31<sup>st</sup> December 2013.

- The revised Guidelines for preparation of DPRs Signing of Tripartite Memorandum of Agreements (MoAs) with the State Governments/Urban Local Bodies, Independent Appraisal of Detailed Project Reports by reputed professional/ academic institutions, Third Party Inspection for projects, are applicable to NRCP schemes also.

**National River Conservation Plan (NRCP) – (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 presently covers polluted stretches of 42 rivers in 195 towns spread over 20 States at a sanctioned cost of ₹ 9852 crore (including NGRBA programme). The pollution abatement works are implemented on a cost sharing basis between the Centre and State Governments. The works include; collection,



transportation and treatment of municipal sewage, River Front Development (RFD), Low Cost Sanitation (LCS), Electric Crematoria, Improved Wood Based Crematoria etc. So far, sewage treatment capacity of 4842 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)

#### Pollution Abatement of River Ghaggar

River Ghaggar between Mubarakpur to Sardulgarh in Punjab 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, Moonal 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. Thirty six storm water outlets carrying sewage and sullage of the city, drain into Sabarmati River. A sewage treatment capacity of 232 mld has been created under Sabarmati Conservation Plan Phase-I at a cost of ₹ 115 crore apart from 585 mld created

under JNNURM. Major problems reasons for pollution of Sabarmati River at Ahmedabad are domestic wastewater discharge through the overflowing drains, mal-functioning of existing sewage pumping stations due to the age, collapse of sewers due to corrosion, silting of sewer lines etc. At present, about 804 mld sewage is generated in the city.

The total sewer network in Ahmedabad is 1523 kms. in length. Sewage is conveyed to the STPs through the trunk lines laid on eastern and western periphery of Ahmedabad. Presently, not all of the sewage generated is reaching the STPs. Only 80% of the area is covered by the sewerage system. This area consists of densely populated localities as well as newly developed area, which have been recently merged into the municipal boundary. Major factors causing large scale pollution to Sabarmati River in the Ahmedabad city are as follows:

- 36 Storm Water Drains of both banks carrying domestic waste water to river from city.
- Malfunctioning of existing sewage pumping stations due to ageing.
- Frequent break-down of sewers and pipes due to corrosion.
- Silting of sewer lines.
- Partially treated / untreated sewage discharging into river.
- Non-point source locations on the river bank such as open defecation, discharge of sullage etc.

Thus, about 570 mld sewage is reaching the STPs and about 234 mld sewage is finding its way into the river.

The State Govt. has prepared the project for Sabarmati River Conservation Project Phase-II at a cost of ₹ 599.23 crore. Various



components of the project considered are construction and commissioning of new sewerage network and sewage pumping stations, rehabilitation of old sewer network, relief sewers, construction and commissioning of new sewage pumping stations and associated networks, creation of additional sewage treatment capacity etc. within a period of 48 months.

### **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. A treatment capacity of 427.50 has been created so far. 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, the State Govt. has submitted the project proposal costing ₹ 387.58 crore making

provisions for sewerage networks, sewage pumping stations in three drainage districts along with creation of sewage treatment capacity of 53 mld for the conservation of river Mindhola along Surat within a period of 30 months.

The project has been sanctioned at an estimated cost of ₹ 262.13 crore on 24.08.2012. Funds of ₹ 41.71 crore have been released to Surat Municipal Corporation, implementing agency for implementation of the project so far. The next installment of funds is likely to be released in the financial year 2014-15.

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

#### **Yamuna Action Plan (YAP)–(Phase-I)**

Yamuna Action Plan (YAP) Phase I & II was launched by the Ministry to take up the pollution abatement works in Yamuna river in the States Uttar Pradesh, Delhi & Haryana in April 1993, with a loan assistance from Japan Bank for International Cooperation (JBIC). Works under the Plan have been implemented at a total cost of ₹1456.10 crore and sewage treatment capacity of 942.25 mld has been created.

#### **Yamuna Action Plan (Phase-II)**

The Central Government has approved Yamuna Action Plan (YAP) Phase - III project for Delhi in December, 2011 with the assistance from Japan International Cooperation Agency (JICA) at a total cost of ₹ 1656 crore. The project cost will be shared between the Government of India (GoI) and the Government of NCT of Delhi on 85:15 basis. The share of Government of India will be ₹ 1407.6 crore and that of Government of NCT of Delhi will be ₹ 248.4 crore. JICA has agreed to provide a loan assistance of ₹ 32571 Million to GoI for the proposed project, which will constitute the central share of the project

equivalent to 85% of the total project cost as per pattern adopted for the earlier JICA assisted YAP-II project.

Under YAP-III, it is proposed to rehabilitate the damaged trunk sewers to maximize the utilization of available treatment capacity, rehabilitate and modernize the STPs in three catchment areas of Delhi namely Okhla, Kondli and Rithala and to equip them with tertiary level treatment facilities to achieve treated effluent quality of 10 mg/l for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) so as to improve the water quality of river Yamuna. The proposed works are (a) Rehabilitation/modernization of STPs, totalling 814 MLD capacity at Okhla, Kondli and Rithala in Delhi. (b) Setting up of Tertiary Treatment Facilities at the above STPs (c) Construction of a new state of art STP in place of old STP of 136 MLD capacity at Okhla. (d) Rehabilitation of sewer lines/Rising mains in the two

catchments of Delhi viz Kondli and Rithala. (d) Public Outreach Activities. These works will be integral to the Sewerage Master Plan being prepared by Delhi Jal Board (DJB).

The project is being implemented by DJB under the supervision of the Department of Urban Development, Government of NCT of Delhi. The Ministry of Environment and Forests will monitor the progress of work. The implementation of the project will be over a period of 7 years. Project Management Consultant (PMC) has been appointed by DJB to assist in project implementation. The operation and maintenance (O&M) of the assets created under the project will be the responsibility of the State Government/DJB who have provided commitment to bear the complete O&M cost. Part of the O&M cost is proposed to be recovered by selling the treated effluent for industrial purposes. The requirement of funds for the project during the 12<sup>th</sup> Plan as well as



**Fig-30.** Black-necked stork with Spot-Billed Duck at Surajpur Bird Sanctuary



in the Annual Plan 2014-15 has been projected under NRCP (EAP).

Six DPRs costing ₹ 1025.88 crore have been prepared by Delhi Jal Board. These DPRs are being appraised by third party agencies like IIT-Roorkee, IIT-Delhi and AHEC IIT-Roorkee. The six DPRs of Rehabilitation of Trunk Sewer No.4 in Kondli Zone, Rehabilitation of Trunk Sewer No.5 in Kondli Zone, Rehabilitation of Trunk Sewers in Rithala zone, Construction of New 136 mld Okhla Phase-I STP, Rehabilitation and up-gradation of 182 MLD Rithala Phase-I STP and Rehabilitation and up-gradation of 204 mld Kondli Phase-I, Phase-II & Phase-III STP will be approved during 2014-15 for which ₹ 100 crore would be required in 2014-15, including central share for ongoing PMC services.

#### **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 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 of Pune is finding its way to river Mula-Mutha, thereby polluting it.

A proposal has been received from Maharashtra Government for pollution abatement of river Mula-Mutha under NRCP. In this proposal it is proposed to provide 9 numbers of STPs having additional total treatment capacity of 364 mld to cater the sewage generation upto year 2026. It is also proposed to provide 43 Km. Sewer line, 5 number of intermediate sewage pumping stations and 71.5 km. Rising mains & trunk sewer to feed these STPs. The estimated cost

of the proposed works in Pune is ₹ 638.66 crore. The proposal has been posed to Japan International Corporation Agency (JICA) for external assistance and is under their consideration.

#### **National Ganga River Basin Authority (NGRBA)**

Japan International Cooperation Agency (JICA) assisted Ganga Action Plan (GAP), Phase-II Project to abate pollution from Varanasi City into River Ganga has been approved for 11.184 billion Yen. The project consists of the following.

- Sewerage component (comprising of trunk sewers, pumping stations and related rising mains, rehabilitation of old trunk sewers and five ghats pumping stations, renovation of existing STPs, construction of 140 mld new STP at Sathwa and land acquisition)
- Non-sewerage component (comprising of community toilet complexes in slum areas, construction of dhobi ghats and improvement of bathing ghats)
- Public awareness and participation programme
- Institutional Development programme for the local body (Varanasi Nagar Nigam and Varanasi Jal Sansthan) to enable proper O&M of the assets created.

UP Jal Nigam is the project implementing agency (PIA) for the sewerage component while the non-sewerage component would be implemented by Varanasi Nagar Nigam.

Pollution abatement schemes for creation of 140 mld sewage treatment capacity have been sanctioned so far under the assistance at a cost of ₹496.90 crore. Expenditure has been incurred for ₹ 74.55 crore till December, 2013.



## World Bank Assisted project for pollution abatement of river Ganga under NGRBA

A project with World Bank assistance for abatement of pollution of river Ganga' at an estimated cost of ₹7000 crore has been approved by the Cabinet Committee on Economic Affairs (CCEA). The Bank will support the Government of India by providing technical assistance and financing of US \$ 1 billion (approx. ₹4600 crore). The World Bank Board has also accorded approval to this project on 31.05.2011. The Loan agreement with World Bank has been signed on 14.06.2011. The share of Government of India will be ₹5100 crore (including the Bank's assistance for ₹ 4600 crore) and that of the State Governments of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal will be ₹1900 crore.

To facilitate project implementation project and monitoring, National Mission for Clean Ganga, a registered society has been formed at the Central level. States have set up dedicated State Project Management Group (SPMG) under the State nodal Departments for planning, coordination, monitoring implementation and reporting of the projects taken up under the Programme. Implementation of the Project will be spread over a period of 8 years. The principal objective of the project is to set up institutional structure at Centre and States and fund priority infrastructure investments for conservation and restoration of the water quality of the river Ganga. The project will render benefits of significant order to the local populations. It would contribute to lessening the pollution loads due to untreated sewage from cities and towns located along Ganga. Tackling of industrial effluents and municipal solid wastes impacting the river water quality would also help move towards

the objective of Mission Clean Ganga.

To achieve the objective of 'Mission Clean Ganga' as resolved by NGRBA and to ensure that by the year 2020, no untreated municipal or industrial effluent will be allowed to be discharged into the river Ganga, an investment of ₹26000 crore has been estimated based on the State Perspective for 8 years.

Till December, 2013, 11 projects, of which 8 investment projects and 3 institutional development project have been approved based on the recommendations of the Empowered Steering Committee of NGRBA at total cost of ₹ 1136.68 crore. These include projects in Uttarakhand (₹ 95.60 Crore), Uttar Pradesh (₹ 248.95 Crore), Bihar (₹ 504.22 Crore) and Jharkhand (₹ 99.36 Crore) for i) Municipal WasteWater system through laying of sewerage networks, treatment plants, pumping stations, ii) River Front Management for construction of electric crematoria, community toilets, development of river fronts, etc., iii) 2 on a) real time water quality monitoring system for River Ganga & b) capacity building of the CPCB and iv) 1 institutional development project for developing Ganga Knowledge Centre under the National Mission for Clean Ganga (NMCG).

### 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.



## Water Quality Management Plan for River Ganga

The water quality of river Ganga is being monitored since 1986 from Rishikesh in Uttaranchal to Uluberia in West Bengal by institutions such as Pollution Control Research Institute (Hardwar), CPCB Zonal Office Lucknow, Indian Institute of Technology, Kanpur, Patna University and Bidhan Chandra Krishi Vishwavidyalaya, Kalyani. As a result of the projects completed under Ganga Action Plan, the water quality of river Ganga has shown a general improvement despite tremendous population growth along the river banks as compared to pre-GAP period. Water quality monitoring carried out by reputed institutions such as, IIT, Kanpur, BHEL, Patna University, etc. indicates that, water quality of the river Ganga conforms to the prescribed standards in terms of key indicators, namely, Bio-chemical Oxygen Demand (BOD) and Dissolved Oxygen (DO) at most of the locations, except in the stretch between Kannauj and Varanasi in Uttar Pradesh. The level of bacterial contamination in terms of fecal coliform however, exceeds the maximum permissible limit at most monitoring stations along the river.

The summer average values of two important river water quality parameters viz. Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD) recorded in one of the important monitoring stations on river Ganga.

A very significant factor is increasing demand due to large scale water extraction for various purposes including irrigation, drinking water supply, and power projects. Besides this, inadequate operation and maintenance (O&M) by the States, under-utilisation of the STPs in some instances, delay in acquisition of land, contractual issues, court cases, erratic power supply and inadequate capacities of local

bodies/agencies and lack of involvement of civil society were some of the constraints faced in the implementation of the Ganga Action Plan. The pollution load on rivers has increased over the years due to rapid urbanisation and industrialization. Domestic sewage is the major source of pollution of rivers besides industrial and other non-point sources of pollution.

The water quality monitoring has also been undertaken for rivers namely, Yamuna, Western Yamuna Canal, Gomti, Hindon, Satluj (Punjab), Cauvery (Tamil Nadu), Tunga, Bhadra, Tungbhadra in Karnataka and Waterways of Chennai. The number of monitoring stations presently are 158 in 10 rivers which include 27 stations set up in the upper reaches of Ganga and 32 stations of Chennai Waterways.

## National Plan for Conservation of Aquatic Eco-systems (NPCA) (Lakes and Wetlands Conservation Programme)

- For conservation of lakes and wetlands, Ministry of Environment and Forests has been implementing two separate Centrally Sponsored Schemes (CSS), namely the National Wetlands Conservation Programme (NWCP) and the National Lake Conservation Plan (NLCP).
- Under NLCP, the Ministry has sanctioned projects for conservation of 61 lakes in 14 States, at a total cost of ₹1031.18 crore.
- Under NWCP, for conservation of identified wetlands, funds have been provided to the State Governments for various conservation activities like survey & demarcation, catchment area treatment, bio-diversity conservation, fisheries development, pollution abatement, education & awareness, R&D etc. So far, an amount of ₹133 crore has been released to State Governments under the scheme.



- To avoid overlap, promote better synergies and to ensure that conservation/management works, an integrated scheme NPCA was proposed with the objective of conserving aquatic ecosystems (lakes and wetlands) through implementation of sustainable Conservation Plans and governed with application of uniform policy and guidelines.
- The approval of the Government has been obtained in February, 2013 for merger of National Lake Conservation Plan and National Wetlands Conservation Programme into a new scheme called 'National Plan for Conservation of Aquatic Eco-systems' (NPCA). The merged scheme is to be operational during XII Plan Period with approved outlay of ₹525 crore, NPCA shall have a funding pattern of 70:30 cost sharing between Central Government and respective State Governments (90:10 for NE States).

### Lake Conservation Programme

So far under NLCP, a total of 41 projects for conservation of 61 lakes have been sanctioned in 14 States at a sanctioned cost of ₹1031.18 crore for undertaking works like providing sewerage system and installing sewage treatment plants, interception and diversion for sewage, desilting, catchment area treatment, storm water management etc.. Conservation works for 27 lakes have been completed.

An allocation of ₹ 59.20 crore (BE) was made under NPCA for the year 2013-14 for conservation of polluted and degraded lakes in the country. An expenditure of ₹ 48.26 crore has been incurred in the current financial year till 31<sup>st</sup> December, 2013 under the scheme for

conservation and management of Dal Lake in Srinagar, Twin Lakes in Mokokchung in Nagaland, Ramgarh Tal in Gorakhpur, UP and Rankala Lake in Kolhapur, Maharashtra.

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 Nishat 4.5 mld and Nalla Amir Khan 5.4 mld) have been commissioned. STP at Brari Numbal (16.1 mld capacity) is in advanced stages. Other conservation works like dewatering of the lake and dredging of feeder channels.

### Wetland Conservation Programme

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 invasive 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 restoration of selected Wet lands. So far, approximately ₹ 133 Crore has been provided to 22 States. During the year 2013-14, Management Action Plans of 26 wetlands were approved and financial assistance of ₹6.49 crores has been released to the concerned State Governments (till 31.12.2013). 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 and Wetlands (Conservation and Management) Rules**

As a commitment for conserving wetlands, India became signatory to the Ramsar Convention in 1982. As per this convention, India is committed for International Cooperation and to take National Action for conservation and wise use of Wetlands 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. 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 Convention and 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.

### **Central Wetlands Regulatory Authority (CWRA)**

As per the provision under Rule 5 of the wetlands rules, Central Wetlands Regulatory Authority (CWRA) has been constituted under the chairmanship of Secretary (E&F). The main functions of CWRA are:

- Appraise proposals for identification of new wetlands.
- To enforce the provisions contained under these rules along with other laws in force;
- Grant clearances or identify the areas for the grant of clearance for regulated activities in the wetlands under jurisdictions;
- Issue whatever directions, from time to time necessary for the conservation, preservation and wise use of wetlands to the State Governments.
- Review the list of wetlands and the details of prohibited and regulated activities under the rules and the mode and methodology for execution.

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.

### World Wetland Day

Each year, World Wetland Day (WWD) is celebrated on 2<sup>nd</sup> 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 Sultanpur wetland, Gurgaon, Haryana during 2013 by Ministry of Environment & Forests in collaboration with the Department of Forests, Government of Haryana. 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 'Wetland and Agriculture'. The programme was scheduled at Harike Wetland in Punjab.

### International issues and Ramsar Convention

India represented Wetlands International on the Board of Directors and was elected as member of Supervisory Council of Wetlands International twice which is a partner organization of the Ramsar Convention.

### Implementation organizations along with details of responsibilities

Department of Environment and Forests, Department of Fisheries, Council for Science and Technology, State Wetland 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



**Fig-31.** Manual deweeding of Dal lake, Srinagar, J&K

responsibilities of these organisations 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 utilisation certificates for submission to MoEF.

### 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 given 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.

### Budget Allocation

Budget Allocation for 2013-14 under National River Conservation Plan and



National Lake Conservation Plan is given in Table-48.

The names and addresses of State Implementing Agencies under NRCP is at Annexure-V.

### Names and addresses of implementing agencies

**Table-48.** Budget Allocation for 2013-14 under National River Conservation Plan and National Lake Conservation Plan (upto November 2012)

(₹ in Crore)

Sl. No.	Name of the Plan	Budget Estimate	Revised Estimate	Expenditure by GOI
1	National River Conservation Directorate (NRCD)	7.05	6.72	5.22
2	National River Conservation Plan (NRCP)	187.25	154.49	150.99
3	National Ganga River Basin Authority (NGRBA)	355.00	309.00	294.03
3	National Plan for Conservation of Aquatic Eco-systems (NPCA)	70.50	55.85	54.85
	<b>Total</b>	<b>619.80</b>	<b>526.06</b>	<b>505.09</b>

**CHAPTER-6**  
**REGENERATION AND**  
**ECO-DEVELOPMENT**



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

### Introduction

In order to promote afforestation, tree planting, ecological restoration and eco-development activities in the country, the National Afforestation and Eco-Development Board (NAEB) was set up in August 1992. Special attention is also given by NAEB to the regeneration of degraded forest areas and lands adjoining forest areas, national parks, sanctuaries and other protected areas as well as the ecologically fragile areas like the Western Himalayas, Aravallis and Western Ghats etc.

### Objectives

The detailed objectives of the NAEB are to:

- Evolve mechanisms for ecological restoration of degraded forest areas and adjoining lands through systematic planning and implementation;
- Restore, through natural regeneration or appropriate intervention, the forest cover in the country for ecological security and to meet the fuelwood, fodder and other needs of the rural communities;
- Augment availability of fuelwood, fodder, timber and other forest produce on the degraded forest and adjoining lands in order to meet the demands for these items;
- Sponsor research and extension of findings to disseminate new and proper technologies for the regeneration and development of degraded forest areas and adjoining lands;

- Create general awareness and help foster a people's movement for promoting afforestation and eco-development with the assistance of voluntary agencies, Non-Governmental Organizations, Panchayati Raj institutions and others and promote participatory and sustainable management of degraded forest areas and adjoining lands;
- Coordinate and monitor the Action Plans for tree planting, ecological restoration and eco-development; and
- Undertake all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco-development activities in the country

### Name of the Schemes

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

- (a) National Afforestation Programme (NAP) Scheme
- (b) NAEB Scheme: The major components of the Scheme are:
  - i. Support to Regional Centres (RCs)
  - ii. Monitoring and Evaluation (M&E)
  - iii. Communication
- (c) Eco Development Forces (EDF) Scheme
- (d) Green India Mission

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

#### Introduction and Objectives

It continues to be the flagship scheme of NAEB, in so much as it provides support, both in physical and capacity building terms, to the Forest Development Agencies (FDAs) which in turn are the main organs to



move forward institutionalization of Joint Forest Management. The FDA has been conceived and established as a federation of Joint Forest Management Committees (JFMCs) at the Forest Division level to undertake holistic development in the forestry sector with people's participation. From the year 2010-11, State Forest Development Agency (SFDA) has been constituted at the State level to smoothen the fund flow to the FDAs. This decentralized three-tier institutional structure (SFDA, FDA and JFMC) allows greater participation of the community, both in planning and implementation, to improve forests and livelihoods of the people living in and around forest areas. The village is reckoned as a unit of planning and implementation and all activities under the programme are conceptualized at the village level. The three-tier approach, apart from building capacities at the grassroots level, significantly empowers the local people to participate in the decision making process. Under Entry Point Activities, community assets are created with a 'care and share' concept. The objectives of the scheme are as follows:

- Protection and conservation of natural resources through active involvement of the people.
- Checking land degradation, deforestation and loss of biodiversity
- Ecological restoration and environmental conservation and eco-development
- Evolving village level people's organization which can manage the natural resources in and around villages in a sustainable manner

- Fulfillment of the broader objectives of productivity, equity, and sustainability for the general good of the people
- Improve quality of life and self-sustenance aspect of people living in and around forest areas
- Capability endowment and skill enhancement for improving employability of the rural people

### Progress and Achievements during the year

- Eight hundred (800) FDA projects have been operationalised so far, since the launch of the FDA mechanism in 2000-01, at an expenditure of ₹ 3300.86 crore to treat a total area of 20.25 lakh ha. (As on 31.12.2013). Rehabilitation of shifting cultivation lands has been given specific focus under the programme, and so far, thirty three Jhum projects have been sanctioned in North-Eastern (NE) States and in Orissa.
- As on 31.12.2013, ₹257.62 crore was released to State Forest Development Agencies (SFDAs) during the year 2013-14 for implementation of National Afforestation Programme (NAP)

The NAP Scheme is implemented through three-tier decentralized mechanism of State Forest Development Agency (SFDA) at State level, Forest Development Agency at Forest Division Level and Joint Forest Management Committees (JFMCs) at the village level.

Year-wise and State-wise progress of National Afforestation Programme in the Tenth Five Year Plan and during the current year is given in Table-49 and Table-50 respectively.



**Table-49.** Year-wise progress of National Afforestation Programme (As on 31.12.2013)

Year	No. of New FDA projects approved	No. of New JFMCs involved	Project Area approved (ha.)*	Release (Rs. in crores)**
2000-02	47	1843	71068	47.53
2002-03	237	8197	404799	151.26
2003-04	231	7902	282536	207.98
2004-05	105	3404	106743	233.00
2005-06	94	2362	54432	248.12
2006-07	15	494	0	292.75
2007-08	53	3979	493061	392.95
2008-09	13	6598	173435	345.62
2009-10	5	7756	103556	318.17
2010-11	26 SFDA Projects	--	57126	309.99
2011-12	26 SFDA Projects	--	141448	303.00
2012-13	27 SFDA Projects	--	55529	193.37
2013-14 (As on 31.12.2013)	26 SFDA Projects	--	82000	257.62

\* 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-50.** State-wise status of FDA projects since inception of the scheme (2000-02) till 31.3.2010.

Sl. No.	Name of State/Union Territory	No. of FDA Projects/ Proposals sanctioned	Total project cost (in Rs. crores)	Total JFMCs	Area (in ha.)	Total Releases (in Rs. Crores)
1	Andhra Pradesh	47	130.74	2555	72823	84.67
2	Chhattisgarh	32	225.56	2611	106660	158.51
3	Gujarat	25	212.02	2157	82530	127.38
4	Haryana	19	128.35	2265	44189	102.22
5	Himachal Pradesh	30	81.82	1556	44883	58.73
6	Jammu & Kashmir	31	109.69	1836	65494	55.28
7	Karnataka	45	212.36	1560	96155	157.84
8	Madhya Pradesh	55	208.30	3270	124782	142.98
9	Maharashtra	48	205.03	3092	119227	134.69
10	Orissa	46	157.69	3547	123307	105.99
11	Punjab	15	38.07	1192	18109	21.91



Sl. No.	Name of State/Union Territory	No. of FDA Projects/ Proposals sanctioned	Total project cost (in Rs. crores)	Total JFMCs	Area (in ha.)	Total Releases (in Rs. Crores)
12	Rajasthan	33	67.52	996	45490	49.46
13	Tamil Nadu	32	130.83	1580	68192	101.73
14	Uttar Pradesh	69	241.21	2752	130127	193.23
15	Uttarakhand	38	98.33	1900	65576	72.34
16	Goa	3	2.39	26	1250	0.64
17	Jharkhand	34	160.50	2495	96500	118.09
18	Bihar	10	45.12	978	28481	34.12
19	Kerala	27	87.31	615	31981	45.58
20	West Bengal	20	67.48	1960	38248	46.16
	<b>Total (Other States)</b>	<b>659</b>	<b>2610.34</b>	<b>38943</b>	<b>1404004</b>	<b>1811.57</b>
21	Arunachal Pradesh	23	40.93	481	30321	25.69
22	Assam	30	84.36	810	52605	65.51
23	Manipur	16	67.91	578	35144	54.80
24	Nagaland	19	71.12	456	43718	62.78
25	Sikkim	8	65.95	244	26003	54.60
26	Tripura	13	41.00	271	29470	29.79
27	Mizoram	24	124.57	528	50120	106.70
28	Meghalaya	8	32.06	224	18245	25.91
	<b>Total (NE States)</b>	<b>141</b>	<b>527.90</b>	<b>3592</b>	<b>285626</b>	<b>425.79</b>
	<b>TOTAL</b>	<b>800</b>	<b>3138.24</b>	<b>42535</b>	<b>1689630</b>	<b>2237.36</b>

Table-51. State-wise status of SFDA projects (from 1.4.2011 to 31.12.2013)

S. No.	State	Total Cost	Amt. Released	Approved Advance Work
		(Rs. in crore)		(in Hectares)
1	Andhra Pradesh	51.89	32.09	9399
2	Bihar	35.13	28.64	11947
3	Chhattisgarh	98.85	92.70	18387
4	Goa	0.00	0.00	0
5	Gujarat	110.63	82.41	17645
6	Haryana	67.87	60.83	8799
7	Himachal Pradesh	23.52	13.18	6570



S. No.	State	Total Cost	Amt. Released	Approved Advance Work
		(Rs. in crore)		(in Hectares)
8	Jammu & Kashmir	42.11	22.35	11603
9	Jharkhand	66.88	32.86	8790
10	Karnataka	61.11	37.10	14473
11	Kerala	46.34	27.84	6233
12	Madhya Pradesh	118.61	83.07	33454
13	Maharashtra	132.37	105.48	19604
14	Orissa	47.33	27.23	14295
15	Punjab	7.16	3.22	1972
16	Rajasthan	29.40	18.12	7275
17	Tamil Nadu	24.91	16.21	6878
18	Uttar Pradesh	95.60	82.97	26762
19	Uttarakhand	40.32	23.34	11989
20	West Bengal	19.59	15.94	6855
	<b>Sub Total</b>	<b>1119.63</b>	<b>805.60</b>	<b>242930</b>
21	Arunachal Pradesh	10.33	7.18	3125
22	Assam	31.83	18.49	3675
23	Manipur	44.69	44.68	14349
24	Meghalaya	38.13	26.69	14730
25	Mizoram	45.84	46.37	10470
26	Nagaland	42.50	42.50	16910
27	Sikkim	37.84	32.36	7024
28	Tripura	51.88	39.61	21473
	<b>Total (NE States)</b>	<b>303.03</b>	<b>257.88</b>	<b>91756</b>
	<b>G. Total</b>	<b>1422.66</b>	<b>1063.48</b>	<b>334686</b>

### Comparison of achievements/progress made in 2013-2014 vis-à-vis that in 2012-2013

The financial assistance provided to States under National Afforestation Programme during financial year 2012-13 and 2013-14 (CFY upto 31.12.2013) is given in Table-52.

### 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:

- Stepping-up monitoring and evaluation of the FDA projects by activation of State-level Coordination Committees for NAP, increased field visit by officers, and expeditious commissioning by the States of first independent concurrent evaluation of FDA projects

**Table-52.** Comparison of achievements/progress made in 2013-2014 vis-à-vis that in 2012-2013

S. No.	State	2012-13		2013-14	
		Amt. Released	Approved Advance Work	Amt. Released	Approved Advance Work
		(Rs. in crore)	(in Hectares)	(Rs. in crore)	(in Hectares)
1	Andhra Pradesh	2.71	0	3.75	1605
2	Bihar	3.40	2415	12.84	3885
3	Chhattisgarh	13.33	2934	21.38	5906
4	Goa	0.00		0.00	0
5	Gujarat	14.30	2000	11.68	2735
6	Haryana	6.41	1519	17.94	3035
7	Himachal Pradesh	3.62	1450	2.61	908
8	Jammu & Kashmir	3.37	4486	8.11	2260
9	Jharkhand	4.69	0	9.02	3975
10	Karnataka	6.81	1880	9.26	3070
11	Kerala	11.30	1000	6.96	1620
12	Madhya Pradesh	9.15	5125	22.10	5110
13	Maharashtra	28.87	2900	32.42	6850
14	Orissa	3.38	1975	5.36	4910
15	Punjab	0.76	0	2.00	1347
16	Rajasthan	4.14	1250	2.81	2325
17	Tamil Nadu	2.78	1800	3.14	2094
18	Uttar Pradesh	15.27	4270	20.15	4890
19	Uttarakhand	6.25	2350	6.01	1241
20	West Bengal	2.57	710	2.96	970
	<b>Total (Other States)</b>	<b>143.11</b>	<b>38064</b>	<b>200.49</b>	<b>58736</b>
21	Arunachal Pradesh	1.66	0	0.00	0
22	Assam	1.47	0	2.99	3675
23	Manipur	9.46	3970	12.12	2530
24	Meghalaya	9.10	3000	4.50	3000
25	Mizoram	8.78	2500	11.94	3000
26	Nagaland	10.88	2910	9.82	4000
27	Sikkim	5.42	650	3.77	1095
28	Tripura	3.50	4435	11.99	4547
	<b>Total (NE States)</b>	<b>50.26</b>	<b>17465</b>	<b>57.13</b>	<b>21847</b>
	<b>G. Total</b>	<b>193.37</b>	<b>55529</b>	<b>257.62</b>	<b>80583</b>



- Increased number of training programmes for the frontline staff and JFM committee members
- Organising district-level interdepartmental linkage workshops for promoting linkage of NAP with other developmental programmes for enhancing the sustainability of JFM
- Initiating pilot projects for establishing forest-based microenterprises which will provide experiential learning for scaling-up such activity with a view to consolidate the JFM during the Twelfth Plan.
- Comprehensive amendment in Guidelines of NAP scheme has been made to promote further decentralization by delegating more responsibilities to State Forest Departments with respect to processing of the FDA project proposals, greater organic linkage of JFMCs with Gram Panchayats, increased security of the elected members of JFMCs through longer tenure of JFMC presidency, capacity building in particular of frontline staff of Forest Department and JFMC members especially with regard to local management and administrative responsibilities

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

The major component of the scheme are:-

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

### **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 Centres 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 Centres carry out problem-specific studies as well as evaluation of NAEB's programmes in the field and organize training programmes and workshops focusing on priorities set out by the Board.

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 interdepartmental 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 (current financial year upto 31/12/2013) is given in Table-53.

**Table-53.** Financial assistance provided to Regional Centres during financial year 2012-13 and 2013-14

Sl. No.	Name & Address of Regional Centre	State/UTs covered as per MOU	Financial Assistance (Rs. In lakh)	
			2012-13	2013-14 (up to 31.12.2013)
1.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. B-1/9, Community Centre, Janakpuri, New Delhi-110058	Haryana, Rajasthan, Uttar Pradesh, Uttarakhand and UT of Delhi	76.00	68.00
2.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. Dhanraj Mahal, 1st Floor, CSM Marg, Bombay-400001	Maharashtra, Gujarat, Goa and UTs of Daman & Diu, Dadar & Nagar Haveli	72.00	64.00
3.	Regional Centre for NAEB North Eastern Hill University, Shillong – 793 014	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura	93.88	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	70.00	56.00
5.	Regional Centre for NAEB Indian Institute of Forest Management, Nehru Nagar, Post Box no. 357, Bhopal-462003	Chhattisgarh, Madhya Pradesh and Odisha	64.00	52.00
6.	Regional Centre for NAEB Dr. Y. S. Parmar University of Horticulture and Forestry, Nauli, Solan-173230	Himachal Pradesh, Jammu & Kashmir, Punjab and UT of Chandigarh	70.00	0.00
7.	Regional Centre for NAEB Jadhavpur University, Kolkata-700032	Bihar, Jharkhand, Sikkim, West Bengal and UT of Andaman & Nicobar Island	74.00	70.00

### 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.

It is also proposed to continue with:

- First concurrent evaluation of SFDA projects under NAP Scheme;
- Study of tree planting under 20-Point Programme in selected districts of India;

A sum of ₹17.00 lakh is the budgetary outlay of 2013-14, out of which ₹9.00 lakh has



been released till 31.12.2013. It is expected to fully utilize the allocated budget.

### Communication

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-visuals and TV commercials in regional and local language.

During 2013-14 an amount of ₹25.00 lakhs (RE) has been provided as the outlay for various items under Communication out of which ₹21.00 lakhs has been released upto 31-12-2013. It is proposed to significantly scale-up this activity during 2013-2014 through preparation and implementation of a structured Media Plan 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.

### Grants in Aid for Greening India Scheme

Increasing forest and tree cover (FTC) of the country to one- third of its geographical area, as envisaged in the National Forest Policy 1988, is essential for economic and ecological security of the country. Achieving the target of one- third of FTC, however, requires substantial increase in the annual tree planting rate in the country, and that too, mostly on lands outside recorded forest area (RFA) wherein non-forest

organizations and the custodian institutions can play a significant role. The Scheme 'Grants-in-Aid Scheme providing assistance to Voluntary Agencies for tree planting' was started for encouraging participation of the interested Non-Governmental Organisations as well as Government Institutions. It has been observed that for raising tree plantations on lands outside forest cover, economic return is the major driving force. These could be encouraged if returns to the growers were made attractive. The wanting economic returns are largely attributed to the low volume and poor quality yield of tree products. The main reason for this is that the tree growers do not have easy access to quality planting material (QPM) due to both paucity of QPM production facilities in the rural areas and low awareness about gains of using QPM. Recognizing these constraints, the then Grants-in-Aid Scheme was restructured by incorporating additional components of QPM production facilities and creation of mass awareness about QPM. This was renamed as "Grants in aid for Greening India" Scheme and three aspects expressly stated:-

- a) Raising mass awareness about QPM and tree planting
- b) Enhancing the capacity for QPM production
- c) Tree planting with people's participation

"Grants in Aid for Greening India" Scheme has been discontinued w.e.f. 2008-09. The Budget Estimate for ongoing projects under the Scheme for 2013-14 is ₹0.50 crore.

The number of projects for tree planting supported under the previous 'Grants-Aid to Voluntary Agencies' scheme (until 2004-05) and the present 'Grants-in-Aid for Greening India' Scheme till the current financial year 2010-11 are reflected in Table-54.



**Table-54.** Progress under the previous 'Grants-in-Aid to Voluntary Agencies' and present Grants-in-Aid for Greening India Scheme

Year	No. of tree planting projects supported *	Expenditure (Rs. in Cr.) **
2002-03	141	4.00
2003-04	251	8.49
2004-05	266	8.97
2005-06	211	11.76
2006-07	109	5.86
2007-08	129	8.48
2008-09 ***	85	3.95
2009-10***	29	1.05
2010-11***	7	0.38
2011-12	Nil	Nil
2012-13	Nil	Nil
2013-14	Nil	Nil

\* Includes ongoing projects, sanctioned in previous years also.

\*\* Includes grants given for Awareness Generation, High-Tech Nursery and Tree Planting components of the Grants in Aid for Greening India Scheme.

\*\*\* Includes only on-going projects as no new project was sanctioned.

The scheme is being implemented by Government Departments, Urban Local Bodies, Panchayati Raj Institutions, Public Sector Undertakings, Autonomous Bodies, Registered Societies, Non-Profit Organizations, Cooperatives, Charitable Trusts, Voluntary Agencies, Registered Schools, Colleges, Universities and State Forest Departments. Voluntary Agencies were implementing majority of Tree Planting projects.

### 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 2012-13 is given in Table-55.

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 2013-14 is ₹ 20.60 crores and the same has been reimbursed to the Ministry of Defence.

All ETF Battalions have undertaken works like raising nursery and plantation and protection measures to protect the plantation area. They have also constructed stone dams and also other soil and moisture conservation works.



**Fig-32.** Hightech Nursery in a North-Eastern State

**Table-55.** The progress of ETF Battalions during the year 2012-13

Batallion	Location	No. of plants planted (in lakh)	Plants survived (in lakh)	Survival % age	Area Covered (in ha.)
1	2	3	5	6	4
127 Inf. Bn(TA) Eco	Jaunpur District Tehri Garhwal (Uttarakhand)	5.09	4.79	94%	400
128 Inf. Bn(TA) Eco	Shri Mohangarh District Jaisalmer (Rajasthan)	2.40	2.40	100%	300
129 Inf. Bn(TA) Eco	Bahu Jindra Project (J&K)	1.00	0.90	90%	145
130 Inf. Bn(TA) Eco	Pithoragarh (Uttarakhand)	5.00	4.75	95%	500
134 Inf. Bn(TA) Eco	Sonitpur District (Assam)	5.69	4.72	83%	600
135 Inf. Bn(TA) Eco	Chirang Res. Forest (Assam)	4.22	3.38	80%	422
<b>Total</b>		<b>23.4</b>	<b>20.94</b>		<b>2367</b>



## Implementing Organization

Directorate General of Territorial Army,  
Ministry of Defence, New Delhi.

## Green India Mission

The National Mission for Green India is one of the eight missions under the National Action Plan on Climate Change (NAPCC). The Mission acknowledges the influences that the forestry sector has on environmental amelioration through climate mitigation, food security, water security, biodiversity conservation and livelihood security of forest dependent communities. The Mission is launched to enhance ecosystem services such as carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; as well as other provisioning services such as fuel, fodder, small timber and non-timber forest products (NTFPs).

## Objectives of the Mission

- a) Increased forest/tree cover on 5 m ha of forest/non-forest lands and improved quality of forest cover on another 5 m ha ( a total of 10m ha).
- b) Improved ecosystem services including biodiversity, hydrological services and carbon sequestration as a result of treatment of 10m ha.
- c) Increased forest-based livelihood income of about 3 million households living in and around the forests.
- d) Enhanced annual CO<sub>2</sub> sequestration by 50 to 60 million tonnes in the years 2022.

## Key Core features of the Mission

The Mission addresses the qualitative improvement of the forests along with increased forest cover and focuses on ecosystem services with the emphasis on biodiversity, water, improved biomass and

carbon sequestration as a co-benefit. It addresses ecosystem approach and habitat diversity like grasslands, wetlands, pastures, forests in urban and periurban areas and other critical ecosystems. An important feature of this Mission is the thrust on landscape based approach in which the interventions at a scale of 4000 to 6000 hectares is done at a time which is prioritized based on criteria including climate vulnerability. The forest and non-forest areas are simultaneously treated and the drivers of degradation are effectively addressed.

The local communities will play a key role in project governance and implementation with a bottom up participatory approach. The Mission will bring primacy to Gram Sabha as an overarching institution to oversee Mission implementation at the village level. The committees set up by the Gram Sabha, including revamped JFMCs, CFM groups, Van Panchayats, Committees set up under Forest Rights Act; Biodiversity Management Committees etc., will be strengthened as the primary institutions on the ground for nested decentralized forest governance in rural areas.

The Mission will invest in the development of a cadre of community-based change agents from amongst educated community youth. These community foresters will facilitate planning, implementation and monitoring of the Mission activities at the local level. This will provide skilled employment opportunity to about one lakh educated community youths.

## Cross Cutting Interventions

Several cross activities have been incorporated in the Green India Mission. To effectively address the livelihood enhancement, a provision of ₹ 15-20 lac for each village has been envisaged. The wildlife corridors will be identified and the mission aims at working with an array of state holder to maintain the



**Fig-33.** Frangipani (*Plumeria*) - fragrant at night in order to lure sphinx moths for pollination

cover and also seeks rapid agency response in case of crop raiding. The mission also strives to support the community conserved area and also envisages indentifying and protecting areas/catchments of hydrological importance.

#### **Mission Outputs:**

As stated above the mission output would be increased forest/tree cover on 5 m ha of the mission outputs is given forest/non-forest lands and improved quality of forest cover on another 5 m ha ( a total of 10m ha). The details below:

#### **Qualitative improvement of forest cover/ ecosystems in:**

- **Submission 1** - 1.5 m ha dense forests
  - 3.0 m ha of degraded forests
  - 0.4 m ha of grasslands
- **Submissions 5** - 0.1 m ha of wet lands

#### **Creating new forest cover through eco-restoration/afforestation**

- **Submission 2** - 1.8 m ha of scrub, mangroves, ravines, cold desert, shifting cultivation areas, abandoned mining area
- **Submission 3** - 0.2 m ha of urban peri urban
- **Submission 4** - 3.0 m ha of agro/social forestry; no cultivable land.

The mission will also provide increased forest-based livelihood income of about 3 million households living in and around the forests. One of thrust area will be for the adoption of fuelwood efficiency and promoting alternative fuel energy by the households in the project area.

#### **Monitoring Mechanism**

The Mission will focus beyond input level/activity to outcome level over time

by a combination of impact assessment at the field-unit level and application of modern technology like Remote Sensing and GIS. Monitoring under the Mission will help in timely information of planning and feedback to multiple agencies/stakeholders. In addition to on-ground self-monitoring by multiple agencies and communities, audit by Government bodies the Mission would support use of Geomatics (remote sensing with GPS mapping of boundaries) for monitoring at the out put/outcome level. In addition, a few pilot areas will be intensively monitored to assess the impact and efficacy of different old and new practices, in tandem by the implementing agency, the Forest Department and a support organization. The Mission will similarly require that the Gram Sabha carries out a social audit of all expenses incurred by the committees constituted by the Gram Sabha and these reports would be shared in the public domain.

### The Mission Cost

Green India Mission will rely heavily on the convergence with schemes/Funds like MG NREGS, National Afforestation Program (NAP), Integrated Forest Management Scheme; XIII Finance commission award and schemes of other Ministries in the identified landscapes under the Mission. Under GIM ₹ 13,000 crores will be incurred during 12<sup>th</sup> Plan and one year spill over into the 13<sup>th</sup> Plan, consisting of funding of ₹ 2,400 crore and convergence of ₹ 10,600 crores.

### Timeframe

The actual implementation period of the Mission will spread over 10 years, coinciding with the 12<sup>th</sup> and 13<sup>th</sup> five year plan periods. The preparatory phase of the Mission will be devoted to carrying out institutional reforms,

**Table-56.** Statement of funds released for preparatory activities during 2011-12 under Green India Mission

S. No.	State	Funds released (Rs. in Lakhs)
1	Maharashtra	405.77
2	Jharkhand	147.00
3	Kerala	194.60
4	Tamil Nadu	72.15
5	Gujarat	133.80
6	Rajasthan	275.25
7	Himachal Pradesh	126.50
8	Jammu & Kashmir	64.00
9	Odisha	107.50
10	Punjab	125.50
11	Haryana	357.00
12	Chhattisgarh	972.00
13	Assam	130.00
14	Andhra Pradesh	89.53
15	Manipur	40.50
16	Nagaland	141.50
17	Tripura	350.50
18	Karnataka	267.45
19	Madhya Pradesh	823.50
20	Uttar Pradesh	119.50
21	Uttarakhand	51.00
	<b>Total</b>	<b>4994.55</b>

setting up of the Mission organisation, identification of sub-landscapes/areas for the Mission interventions, identification of partners, and awareness and capacity building etc.



### Approach to meet the objectives

As stated earlier decentralized Forest Governance and Polycentric approach has been envisaged with the Supremacy of Gram Sabha and its Committees and the revamped Joint Forest Management Committees (JFMC) to be the committees of Gram Sabha. The State Forest Development Agency (SFDA) and Forest Development Agency (FDA) will be revamped to facilitate implementation by Gram Sabha, strengthened capacity of forest department to assume new roles. Other stakeholders like the NGOs and Schools/Colleges will be involved in the implementation of the mission. Private sector partnership is short especially in agro forestry, institutional lands, abandoned mines. Convergence with existing

programs and other Missions and research in field of carbon capture potential by forest types, adaption options etc. will also facilitate effective implementation of the mission.

An allocation of ₹ 50 crore was set aside from the National Clean Energy Fund for the preparatory year 2011-12 which has been released to 21 states for 71 landscapes involving 708 Villages. The state wise release details are given in the Annexure. The interventions in the preparatory year include micro planning, entry point activities, nursery development, landscape identification awareness and outreach, etc., The funding for the major interventions would be based on the perspective plans of these landscapes.

# **CHAPTER-7**

# **RESEARCH**



## Research

### Environmental Research

### Research and Development (R&D)

#### Introduction

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.

#### Programme-wise 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 seven meetings of the Programme Advisory Committee (PAC) were held to consider the new/



revised/comments of peer reviewers received proposals and to review/ monitor the progress of ongoing/completed projects. Total one hundred and twelve proposals were considered by the Programme Advisory Committee (PAC) of which six are recommended. Progress of fifty three ongoing projects were reviewed and monitored, comments received for thirty proposals considered during the year. Two new projects have been sanctioned during the period (Annexure-III). Programme Advisory Committee also reviewed the Final Technical Report (FTR) of 25 completed projects during the period (up to 31.12.2013) (Annexure-IV).

### **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. Ecosystem studies become even more important as the Earth's environmental ecosystems are increasingly being affected at all levels. Ecological understanding and research in this area offer tangible hope for addressing extremely complex and potentially devastating assaults on local, regional and global ecosystems. Under the scheme, emphasis is laid on multi-disciplinary aspects of environmental conservation with emphasis on eco-system approach consistent with the identified thrust areas and orientation.

During the current financial year till 31<sup>st</sup> December, 2013, three (3) meetings were held where progress of 30 ongoing projects were reviewed and mid-term corrections were suggested case to case basis and also review 07 Final Technical Reports of completed projects. The Committee also appraised 50 Final Research Proposals after receiving the comments of Expert peer reviewers under Ecosystem Research Programme (EcRP), out of this, 10 new projects were sanctioned.

During the year 2013-2014, 07 projects were completed which are at Annexure-IV. During the year under Ecosystem Research Programme 10 new projects were initiated (Annexure-III).

### **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. The 3<sup>rd</sup> meeting of the Programme Advisory Committee (PAC) was

held during October 2013 and 34 proposals were appraised and one Final Technical Report (FTR) was accepted.

Concept paper on All India Coordinated Programme on RPSE was submitted by Gujarat Institute of Development Research (Ahmedabad), Indian Institute of Forest Management (Bhopal) National Law School of India University (Bengaluru).

Summary of the completed project under RPSE :

- ***Project titled “Development of Mine Closure Strategy for Sustainable Surface Coal Mining in West Bengal” by Dr.Suranjan Sinha.***

Mining is extraction of finite resources involving an intermittent use of land and other natural resources. Several sustainability issues will have to be addressed during the lifecycle of a surface mine. The major issues being how to maintaining term economic, social and environmental sustainability both during operational and post mining periods. By adopting case study approach an attempt has been made to resolve some of these issues. Prerequisite to any study on long term sustainability issues in mining areas is building of extensive baseline database on environmental quality parameters. Village level database on demographic, socioeconomic profile of the area and stakeholder analysis, Consultative approach of database building, with different stakeholders, is adopted to develop knowledge on villager’s perception on socio economic and environmental risks of mine closure.

Different maps, under PRA techniques, were drawn to find out whether any

positive legacy is being left by mining in the region. Separate meetings were also conducted in rehabilitation villages together information on the implementation of rehabilitation packages framed by the mining companies. Along with village level survey, environmental quality parameters are measured at different strategic locations surrounding the active mine working zone. Impact zones are identified to find the ecological footprints, which are used to develop biophysical indicators. Developments of biophysical and socioeconomic indicators are essential tools for government regulatory bodies to monitor the sustainability of mining operations. In international scenario this is done by using both top down and bottom up approaches. Using the village level database as set of socioeconomic indicators is developed Unique.

On the basis of social impact assessment indicators can be selected from a list of indicators developed by top down approach (involving expert knowledge). It is worthwhile to point out here that the social security of the impoverished vulnerable section of villagers is lost after mine opening. There is loss of earning from their traditional means of earning.

Best practices in India and across the world are kept in the background while examining the present policy regime with respect to mine closure. Feasibility of approval of mine closure is suggested by making some modifications in the existing guidelines. CSR and rehabilitation policies of mining companies are also similarly examined. An analytical framework is suggested for indicator development to monitor sustainability of



mining. The existing financial assurance for mine closure is reviewed and definite suggestions are made to allocate funds for investment in social capital. The final project output is a broad policy outline to resolve certain relevant issues of mine closure.

### **Dr. B.P. Pal and Pitambar Pant Fellowship Award**

Guidelines for Dr.B.P.Pal National Environment Fellowship Award for Biodiversity (2013) and Pitambar Pant National Environment Fellowship Award(2013) published.

### **Summary of the Completed Projects**

Following is the executive summary of completed projects under Environment Research Programme (EnvRP)

#### **Optimization and Application of Microbial Formulation for Removal of Toxic Metals from Effluents of Small-Scale Industries by Dr. Anushree Malik**

The objective of the project was to obtain a robust microbial strain and optimize the conditions for removal of metals from synthetic solutions & effluents from small scale industries. Development of an appropriate bioreactor, microbial consortium and novel storable formulations were also aimed to ease the actual application of the process.

As outcome of the project, a versatile and robust fungal strain *Aspergillus lentulus* was obtained which is capable of removing metals (Cr, Cu & Ni) from synthetic solutions as well as industrial effluents (electroplating, textile, CETP etc.) under varying conditions. Further, a Consortium of strains with better metal removal efficiency was also developed and nutritional conditions were optimized using RSM. To facilitate the application, a Low

Cost Plant Based Alternative Medium (at 1/10<sup>th</sup> cost) was developed that offered Complete Substitution of commercial media. An appropriate Bioreactor (CSTR) was developed and optimized, whereby 99% Cr(VI) removal was obtained within 10 days HRT. Comparison with the chemical methods revealed that the cost as well as the amount of sludge generated is much less in case of biological process.

In view of the existing gap on the multiple metal removals from actual effluents/waste streams, these results constitute a significant contribution towards development of a field worthy bioremediation technology. The products delivered through the project can be easily utilized by the industries.

#### **Effects of elevated CO<sub>2</sub> on some important plant diseases of India by Dr. (Mrs.) Rupam Kapoor**

The objective of the project was to study effect of elevated CO<sub>2</sub> on disease development in two important crops of India – Rice and Mustard. Plants grown under FACE showed increased incidence and severity of white rust caused by *Albugo candida* whereas the decrease in incidence and severity of Alternaria blight caused by *Alternaria brassicae* and downy mildew caused by *Hyaloperonospora brassicae* was observed.

The variation in disease expression was correlated to changes in biochemical and epidermal characteristics of leaf that determine plant's resistance to foliar pathogens.

The results reinforce the need to take into account impact of elevated CO<sub>2</sub> on disease development in the crop models that predict the performance of a crop species in future projected scenario of elevated CO<sub>2</sub> regime.

The study highlights the fact that different pathogens of a crop may respond differently

to elevated CO<sub>2</sub> depending on how the host itself is affected by the changed conditions. Studies on one crop cannot be extrapolated to another.

Specifically, the study recommends to focus on research efforts in disease management and development of mustard plants resistant to white rust; and rice plants resistant to rice blast.

### **A process development for ameliorating alarming environmental and health hazards posed by phthalates in plastics via chemical, biochemical and bioremediation approaches by Prof. Sailas Benjamin**

The main objectives of the project were of Screening, identification and characterisation of novel DEHP degraders, Chemical studies. Migration studies. Migration of DEHP from DEHP containing Plastics (Blood Bag).

Six fungi were discovered and characterized [*Aspergillus parasiticus* strain bp10 (JN968368), *Aspergillus japonicus* strain bp9 (HQ876768), *Penicillium brocae* strain bp6 (HQ876765), *Penicillium funiculosum* strain bp7 (HQ876766), *Fusarium subglutinans* strain bp8 (HQ876767), *Purpureocillium lilacinum* strain bp13 (JQ353487)] and seven bacterial cultures which efficiently degrade DEHP *in situ* (bound to plastics) and *ex situ* (extracted from the plastics) were identified. Esterase, the crucial enzyme which breaks the ester bond in phthalate produced by *A. denitrificans* strain SP1 was characterized. Using mycelial fungi, batch process was developed for the complete remediation of DEHP (other phthalates too) in plastics *in situ*.

The process developed can be utilized by municipal waste treatment centres for the remediation of hazardous phthalates in various plastic wastes, thus obtained PVC sheet can be

re-pelleted and used afresh. The industrial production of the 25-C prodigiosin can be done by pharmaceutical companies.

Following is the executive summary of completed projects under Ecosystem Research Programme (EcRP)

### **Icthyofaunal diversity and studies on the biology of certain indigenous ornamental fishes of Meghalaya by Sh. S.N. Ramanujam**

The study was conducted in 36 sites in Meghalaya. A total of 102 species belonging to 65 genera of fishes were identified and deposited in the Fish Biology Laboratory Museum. West Garo Hills recorded the highest number of species (71 spp.) followed by Jaintio Hill (46 spp.), East Khasi Hills (39 spp.), West Khasi Hills (3 spp.) and Ribhoi Distt. (12 spp.) Ecological including physico-chemical properties of water of rivers/streams and relationship with fish spp., distribution and biology of fishes were studied. Rearing and breeding of some of the fishes were carried out. Two research papers have been published so far.

### **Algal Flora from different habitats of Central Assam and Conservation of Collected Strains by Dr. Farishta Yasmin**

The algal flora was studied at seven study sites in Central Assam under different seasons, the study sites included aquatic terrestrial and aerial habitats. A total of 268 spp. were recorded belonging to different groups. Good taxonomic description has been provided for each species. Species diversity Index for the species was calculated. In-vitro culture of collected algal species has also been attempted. A total of 38 new species were recorded from Assam. Objectives of the research have been achieved. Three publications have been published. The Investigator established a good phycology laboratory in the College.



### **Aquatic biodiversity and function of hyporheic biotope in a regulated river of Doon Valley by Dr. Ramesh C. Sharma**

Aquatic biodiversity and physico-chemical characteristics of regulated river of Doon Valley was studied. A total of 19 genera of hyporheic macrofauna and 15 genera of meiofauna were recorded from hyporheic biotope. Alpha diversity and diversity index were worked out which showed that it decreased with hyporheic depth. Also, the study recorded 17 genera of microphytobenthos. Environmental parameters were found to be highly significant influencing the macrofauna, meiofauna and microphytobenthos. Most abundant species were recorded. The report also deals with the conservation of different components of biodiversity. The study achieved all the objectives. Three research papers were published in good journals with high Impact factor. Overall, the Report brought out significant new information on hyporheic biodiversity which will help in the management of hyporheic biotypes of regulated rivers.

### **Ecologically Sensitive Areas**

#### **Introduction**

Environmentally Sensitive Zones may be defined as areas with identified environmental resources having "Incomparable Values" which require special attention for their conservation. The Ministry has already notified Ecologically-sensitive areas in respect of Matheran, Mahableshwar-Panchgani, Mount Abu, Sultanpur, Bandipur, Girnar, Narayan Sarovar, Purna, Vansda and River Bhagirathi from Gaumukh to Uttarkashi under the Environment (Protection) Act, 1986. The Zonal Master Plan / Area Development Plan for all notified / to be notified environmentally sensitive areas would be prepared by the

concerned State Governments as per the provisions of the said respective notifications involving local communities / experts and shall be approved by the Ministry for regulating development activities and protection and conservation of Entities of Incomparable Values. Monitoring Committees with representatives of Government, Experts and local representatives as per the notifications would be constituted to ensure compliance of approved Zonal Master Plans / Area Development Plan.

### **Progress / achievements made during the year**

The following final and draft notifications notifications were published during the year:

- Final notification on Marine National Park and Marine Sanctuary Eco-sensitive Zone Gujarat, S.O. 2561(E) Dated 22<sup>nd</sup> August 2013.
- Draft notification on Thol Wildlife Sanctuary, Eco-sensitive Zone, Gujarat, S.O. 3202(E) Dated 18<sup>th</sup> October 2013.
- Draft notification on Pulicat Bird Sanctuary, Eco-sensitive Zone, Andhra Pradesh, S.O. 22(E) Dated 3<sup>rd</sup> January, 2014.
- Six draft Eco-sensitive Zone notifications around the protected areas in the State of Goa are under final stage of publication.
- Eight draft Eco-sensitive Zone notifications around the protected areas in the State of Sikkim are under final stage of publication

An Expert Committee on Eco-sensitive Zone has been constituted to examine and assist the Ministry in preparing the final notifications on Eco Sensitive Zones to be issued under the Environment (Protection) Act, 1986 for a period of five years. The Committee will also examine the zonal master plans of the



Fig-34. Flamingoes (*Phoenicopterus*) during courtship

Eco Sensitive Zones submitted by the State Governments/UTs as per the provisions of the Eco Sensitive Zone Notifications.

### Dahanu Taluka Environment Protection Authority (DTEPA)

#### Introduction

Pursuant to the direction of Hon'ble Supreme Court, and in exercise of the powers conferred by Sub-Section (3) of Section 3 of the Environment (Protection) Act 1986 (29 of 1986), the Ministry of Environment & Forests, New Delhi vide its Notification No. S.O. 884 (E), Dated 19th December, 1996, has constituted an Authority known as "**Dahanu Taluka Environment Protection Authority**" in the District of Thane, State of Maharashtra, for protection of eco-fragile character of Dahanu Region under the Chairmanship of Justice Chandrashekhar Shankar Dharmadhikari (Retired Judge of High Court, Mumbai). It is an independent and autonomous Authority. The Hon. Supreme Court vide its order dated 9th September, 2002 in I.A. No. 2 & 3 in Writ Petition (Civil) No. 231 of 1994 directed that "the Authority shall continue to function till further orders of this Court." In compliance to the order of Hon'ble Supreme Court, the

Ministry of Environment and Forests amended the notification vide S.O.No.1211 (E), dated 18th Nov. 2002.

#### Functions :

As per the Ministry of Environment & Forests, New Delhi Notification No. S.O.884 (E), Dated 19<sup>th</sup> December, 1996, the Authority is to exercise the following powers and perform the following functions:-

- Exercise of powers under section 5 of the Environment (Protection) Act, 1986 for issuing directions and for taking measures with respect to matters referred to in clauses (v), (vi), (vii), (viii), (ix), (x) and (xii) of sub-section (2) of Section 3 of the said Act to protect the ecologically fragile areas of Dahanu Taluka and to control pollution in the said area.
- To consider and implement the 'Precautionary Principle and the "Polluter Pays Principle".
- To consider and implement the recommendations given by the National Environmental Engineering Research Institute, Nagpur, in respect of Dahanu Taluka.



- To ensure the implementation of the notifications issued by the Government of India in the Ministry of Environment and Forests No.S.O.114 (E), Dated the 19<sup>th</sup> February, 1991 and No.S.O.416 (E), dated the 20<sup>th</sup> June, 1991.
- To comply with the relevant orders issued by the Bombay High Court and the Supreme Court from time to time.
- To deal with any other relevant environment issues pertaining to Dahanu Taluka including those which may be referred to it by the Central Government in the Ministry of Environment and Forests.
- Before exercising these powers, the Authority has to follow the Principles of Natural Justice and give an opportunity of being heard to persons likely to be adversely affected.
- Monitoring of the F.G.D. Plant at Dahanu Thermal Power Station by M/s. Reliance Infrastructure Ltd.
- Proposal for Establishing Ash Brick Manufacturing Plant at Dahanu Thermal Power Station by M/s. Reliance Infrastructure Ltd
- Monitoring of the Coarse Ash Grinding and Ash Dry Collecting System at Dahanu Thermal Power Station By M/s Reliance Infrastructure Ltd
- Monitoring of the Closed Pipe Conveyor System for improving in house Coal transportation installed at Dahanu Thermal Power Station.
- 42<sup>nd</sup> meeting of Dahanu Taluka Environment Protection Authority (DTEPA) was held on 16.01.2014 and considered 16 Environment Clearance project in the Dahanu Eco-sensitive Area.
- Monitoring the Pre-afforestation Schemes being implemented by the Deputy Conservation of Forests, Dahanu Division in the Dahanu Eco-sensitive Area. The implemented projects are given in Table-57.

#### Financial Progress (As on 31.12.2013)

During the current Financial Year 2013-14 the financial outlay under DTEPA is ₹25.00 Lakhs (₹36.00 Revised Estimate) and the entire amount has been utilized for performing the mandate of the Dahanu Taluka Environment Protection Authority (DTEPA).

#### Progress / Achievements made during the year (up to 31.12.2013)

- As per directives of the Hon'ble Supreme Court continuous monitoring work is being carried out for the protection of Dahanu Region. During the year 2013-14, six projects were monitored by the Dahanu Taluka Environment Protection Authority (DTEPA). The list of monitored projects are as under:
  - Monitoring of the Utilization of Fly Ash at Dahanu Thermal Power Station by M/s. Reliance Infrastructure Ltd

#### 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 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.



**Table-57.** List of implemented projects in Dahanu Eco-sensitive Area

Sl. No.	Name of the Project Agency	Village	Name of plantation Site	Area under Site (In ha.)	No. of trees planted
1.	National Highway Authority of India	Chikhala	Achyutrao Patwardhan KrantiVan	10.00	11,110
2.	National Highway Authority of India	Khambale	Antarbharati Upavan	28.00	31,108
3.	National Highway Authority of India	Khanivade	Shramashakti Upavan	22.00	24,490
4.	National Highway Authority of India	Nandgaon	Mahatma Gandhi Upavan	20.00	22,220
5.	National Highway Authority of India	Jalsar	Megharaj Deorai	15.00	16,665
6.	National Highway Authority of India	Kodad	Strishakti Upavan	6.00	6,666
7.	National Highway Authority of India (Six Laning)	Nikane C.No.237	Matrubhoomi Upavan	10.00	11,110
8.	Power Grid Corporation	Nava Sakhara	Tarabai Modak Bal Shakti Upavan	19.00	21,109
9.	Power Grid Corporation	Nava Sakhara	Ahimsa Upavan	12.00	13,332
10.	Power Grid Corporation	Chikhala	Matsyavatar Upavan	10.00	11,110
11.	Power Grid Corporation	Man Jambugaon	Vishwakarma Upavan	15.00	16,665
12.	Power Grid Corporation	Sonule	Sarva Dharma Sambhav Upavan	10.00	11,110
13.	GAIL.	Chikhala	Sevamayi Acharya Bhise Upavan	1.90	2,110
14.	GAIL.	Dahanu Sea Beach	Bharat Sevak Gopal Krishna Gokhale Upavan	2.00	21,209
15.	Reliance Gas Transportation Infrastructure Ltd.	Nava Sakhara	Sane Guruji Upavan	9.00	9,999
16.	Reliance Gas Transportation Infrastructure Ltd.	Aasave	Bhoomiputra Upavan	14.00	21,109
17.	Reliance Gas Transportation Infrastructure Ltd.	Sonale	Annadata Upavan	5.00	5,555
18.	Maharashtra State Road Development Corporation.	Osarvira	Jeevan Darshan Upavan	4.00	4,444
<b>Total</b>				<b>218.89</b>	<b>2,61,121</b>



To fulfill the above objective, the PC-NNRMS has constituted a number of different Standing Committees for different themes in various Ministries. The Standing Committee on Bio-resources and Environment (SC-B) is one of the Standing Committees constituted by PC-NNRMS under the Chairmanship of Secretary (E&F) with Members from concerned line Ministries / Departments. So far It has met 27 times. About 120 projects addressing key environmental and ecological issues covering eco-system inventorization and monitoring of eco-systems, desertification, Forest Type Mapping, coastal land use and landforms, snow and glaciers, wetland inventory and assessment etc. have been sponsored. Out of these 98 projects have been completed. Some of the mega projects undertaken and completed under this programme include the following:

- Forest Type Mapping on 1:50,000 scale of Entire Country Coordinated by FSI.
- Mapping of Wildlife Sanctuaries and National Parks on 1:25,000 scale Coordinated by Wildlife Institute of India
- Coastal Studies (Land use, Mangroves, Coral Reefs, etc.) for entire Indian Coast (1:25,000 scale)
- Snow & Glaciers mapping of entire Himalayas (1:250,000/50,000 scale) Coordinated by SAC (ISRO)
- National Wetland Inventory and Assessment (1:50,000 scale) Coordinated by SAC (ISRO)

National Wetland Information System and National Coastal Zone Information System in GIS Platform has been developed and is being extensively used in the implementation of wetland and CRZ notification.

In order to streamline the process, Technical & Financial Sub-Committee has been constituted to scrutinize/review all the proposals submitted for funding under NNRMS SC-B from the technical and financial angle. Only those proposals recommended by the Sub-Committee are taken up by NNRMS SC-B for financial assistance. The Committee also oversees and monitors the progress of 29 on-going sanctioned projects funded under NNRMS programme of the Ministry.

The potential user agencies for utilizing the outcome / information generated in the projects sanctioned by the Ministry under NNRMS programme are the Central Government Departments/Agencies, and the Ministry of Environment and Forests itself including the various organizations under its administrative control like FSI, ZSI, BSI etc.

#### **Financial Progress (As on 31.12.2013)**

The financial outlay of the NNRMS Scheme During the financial year 2013-14 is ₹5.00 Crores and the entire amount would be utilized for on-going and new projects based on the recommendations of the Technical & Financial Sub-Committee of NNRMS SC-B and final approval of the Standing Committee on Bio-resources and Environment of NNRMS (SC-B).

#### **Progress/Achievements made during the year (up to 31.12.2013)**

- Organised two 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 2013-14 and considered 58 new / revised projects and accepted Eleven Final Technical Report (FTR) of the completed projects.
- Organised One Meeting of National



Natural Resources Management System Standing Committee on Bio-resources and Environment (NNRMS SC-B) and approved Five (5) projects for funding during the year 2013-14.

- During the year 2013-14 under NNRMS programme 04 new research projects have been initiated, 11 research projects have been completed and their outcomes of some of them have been published & disseminated among scientific community as well as displayed on the Ministry's web-site.
- The then Hon'ble Minister of State I/C (Environment and Forests). Smt. Jayanthi Natarajan had released a book on "Coastal Zones of India" and two Atlases viz. i) "National Wetlands Atlas: High Altitude Lakes of India" and ii) National Wetlands Atlas: Wetlands of International Importance under Ramsar Convention on the occasion of the World Environment Day, which have been brought out by the Space Application Centre, ISRO, Ahmadabad under the MoEF sponsored project under the NNRMS Programme of the Ministry.

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

#### **Introduction**

G.B. Pant Institute of Himalayan Environment and Development (GBPIHED) was established in August 1988 by the Ministry of Environment and Forests, Government of India, as an autonomous Institute, with a mandate of achieving sustainable development and environmental conservation in the Indian Himalayan Region (IHR). The Institute attempts to execute its mandate through the Headquarters located at Kosi-Katarmal, Almora (Uttarakhand), and 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 elements of all project activities geared towards development of environment-friendly technology packages. In addition GBPIHED also provides guidelines to the ministry with policy implications.

#### **Objectives**

The Institute has three broad objectives:

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

#### **Progress/Achievements made during the year**

- Implementation of transboundary project 'Kailash Sacred Landscape



Conservation and Development Initiative: Developing a Transboundary Framework for Conservation and Sustainable Development in the Greater Mt. Kailash Region of China, India, and Nepal'

- The participatory action research and training centers (RTCs) at Triyuginarayan and Kosi got wide popularity and played a catalytic role in capacity building of the user groups on various rural technologies either introduced or developed by the Institute. The capacity building programme at Triyuginarayan has made significant contribution in the field of off-season vegetable cultivation and bioprospecting of wild bioresources.
- Draft of Arunachal Ecotourism Policy developed jointly with Department of Tourism, Government of Arunachal Pradesh by the NE unit of the Institute.
- On occasion of Silver Jubilee year, 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.
- To strengthen collaboration between different group of stakeholders, Institute has taken responsibility to develop plan for greening Indo-Tibetan Border Police (ITBP) campus at Kosi. In this context, plantation of some multipurpose trees has been done (19 August, 2013).
- Towards developing policies and plan for Himalayan environment and development National workshop cum brain storming has been organized in the prelude of Institute Annual day at Almora (September

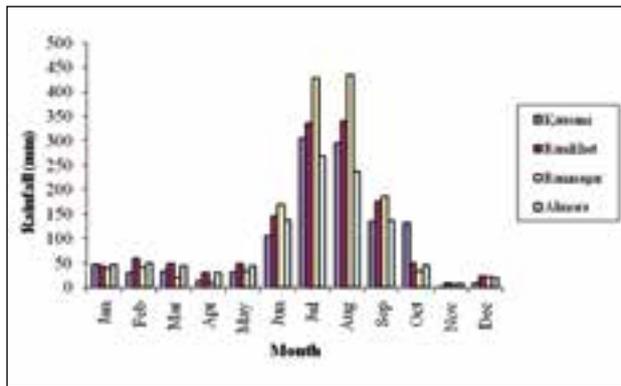
8-9, 2013) and at Indian National Science Academy (INSA), New Delhi on December 19-20, 2013.

## Research and Development Achievements

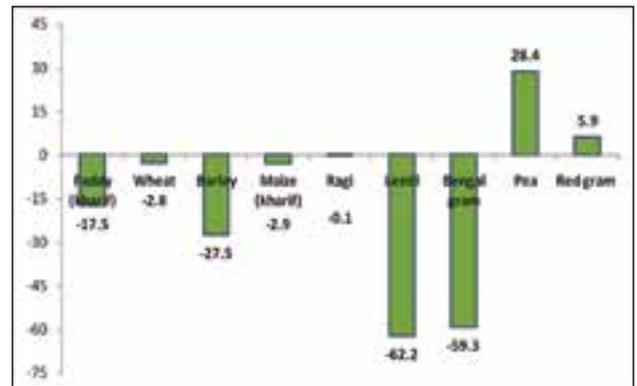
### Group 1: Watershed Processes and Management (WPM) & Knowledge Products and Capacity Building (KCB)

Watershed Process and Management (WPM) and Knowledge Products and Capacity Building (KCB) are two major thematic thrusts of this group. Through its WPM theme, group focuses on studies of ecosystem processes operational at the watershed level with the involvement of user groups to address upstream-downstream linkages. The overall aim is strengthening of mountain specific resource management practices using a systems approach. The KCB theme conducts activities that lead to enhancement of Institutional outreach, based on its research products such as state-of-the-art methodologies/ approaches, models, policy briefs, etc. Achievements of this group include the following:

- A long term project has been initiated to address the ecological, social and policy implications of changing water resource scenario in the Indian Himalayan region. Data on mean monthly rainfall of four stations i.e. Almora (1901-1968), Ranikhet (1901-1968), Kausani (1951-1977) and Ramnagar (1901-1941) watershed were analyzed, which revealed that 77% of the total annual rainfall was recorded in monsoon season. Maximum mean monthly rainfall was recorded in Ramnagar and minimum in Almora in the Kosi watershed (Fig-35).
- Towards strengthening food and nutritional security in the Indian Himalayan region, detail documentation of food crops and cropping patterns was done. Preliminary



**Fig-35.** Mean monthly rainfall in Kosi watershed



**Fig-36.** Changes in cropping area of food crops in block years from 1991-2001 to block years 2001-2010.

analyses revealed that average cropping area of various food crops in 2001-2010 has shown 62.2% reduction in cropping area of lentil (*Lens culinaris*), 27.5% reduction in barley (*Hordeum vulgare*) and 17.5% reduction in paddy (*Oryza sativa*) as compared to 1991-2000 (Fig-36). Out migration of families and subsequently abandoning land without cultivation are the main causes of reduction in cropping area. An increase of 28.4% in cropping area was noted for pea (*Pisum sativum*). From 1990 to 2010 per hectare productivity of paddy, wheat, pea, lentil, soya bean and potato is showing declining trend. Mustard showed no change and ragi (*Eleusine coracana*) and black gram (*Vigna mungo*) showed slightly increasing trends.

- To delineate the deformation field in the Himalayan terrains operation of permanent and campaign mode GPS stations has been initiated. The field campaign is carried out for data collection from 7 stations in Kali valley (Dharchula to Lipu Lekh) for monitoring the strain-rate accumulation in Kumaun Himalayan region. The data were recorded and rinexed. Processing of data for baseline is done using GAMIT/GLOBK.
- Monitoring of snow and glaciers of Himalayan region is continued. Field

verification of glaciers and glacial lakes in Dhauliganga and Goriganga valleys using RS data and handheld GPS showed position of snout and glacial lake. Assessment of data revealed that most of the glaciers of Goriganga basin are oriented towards west (34.27%) and south-east (22.75%), whereas in Dhauliganga basin they fall in east (37.49%) and north-east (22.97%) orientation. Maximum area loss in Dhauliganga basin is found in east facing glaciers as 42.59% while in the Goriganga basin area loss is maximum in north-east facing glaciers.



**Fig-37.** Snout position and glacial lake of Mapang Glacier

- Runoff and sediment load of Gangotri Glacier systems is being estimated. Results reveals that maximum daily discharge is in the month of August (107.31cum/s) followed by July (103.6 cum/s) and September (85.0 cum/s) whereas minimum daily discharge is in the month of September (47.83cum/s) followed by July (64.78cum/s) and August (69.57cum/s). Relatively high runoff in July and August is due to the high melting rates caused by rise in temperature during these months. Increase in discharge was observed during mid September and showed delay in end of ablation season. Similarly, average daily suspended sediment load showed large variations (CV= 0.67) during the season. During the ablation season, maximum and minimum concentration of suspended sediment load was estimated as 4.08 g/l and 0.27 g/l, respectively, whereas average load of suspended sediment was estimated as 9671.51tones/day. Maximum concentration of suspended sediment was observed in the month of July, followed by August and September.
- To mitigate climate change impact on village ecosystem of north-west Himalaya, detail documentation on (a) farmer's perception and response to climate variability; (b) impact on various food production systems (agriculture, animal husbandry, etc.), village ecosystem (forests, wild bioresources and water resources); and (c) local evidences of climate variability/ change as well as factors responsible for change and major future climate change risk as perceived by villagers have been carried out. Community based adaptation

particularly in agriculture and livestock sectors with regard to climate change were documented and analysed. The cost-benefit analysis of adaptation is being worked out.

### 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, migration, etc; and (ii) Environmental Assessment and Management (EAM) targeting on activities such as hill specific Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), valuation of ecosystem services, climate change impacts, disaster mitigation and management, and environmental management of urban areas, etc. The highlights of the R&D work include:

- Towards developing eco-tourism as a potential tool for biodiversity conservation and sustainable livelihood in Indian Himalayan Region detail analysis of tourist inflow has been carried out. Results reveal

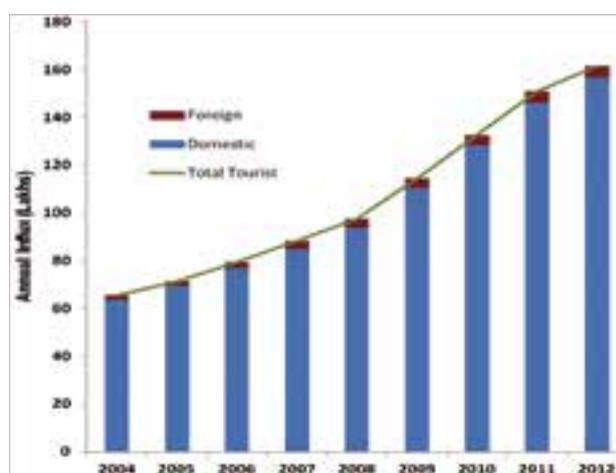


Fig-38. Profile of Annual Tourist Influx to Himachal Pradesh

**Table-58.** Minimum, maximum and average concentration of heavy metal in vegetables collected from market areas of Kullu, Himachal Pradesh during January-February 2013.

Vegetables		Heavy metals (mg/kg dw)			
		Cu	Zn	Cd	Pb
Tomato (n=8)	Minimum	7.55	7.55	0.15	0.79
	Maximum	28.35	64.50	2.58	2.04
	Average	15.99	32.95	1.44	1.26
Cabbage (n=8)	Minimum	1.85	6.00	0.16	0.23
	Maximum	22.30	70.50	1.88	4.45
	Average	10.13	34.90	0.81	1.83
Radish (n=8)	Minimum	3.84	28.04	0.36	0.01
	Maximum	46.90	87.68	5.69	7.60
	Average	20.16	51.45	2.71	2.69
Cauliflower (n=8)	Minimum	7.34	15.25	0.11	0.01
	Maximum	38.88	79.50	1.32	7.60
	Average	28.44	45.44	0.64	2.69
Indian Safe Limit		30	50	1.5	2.5
WHO/FAO Safe Limit		40	60	0.3	-
EU Safe Limit		-	-	0.2	0.3

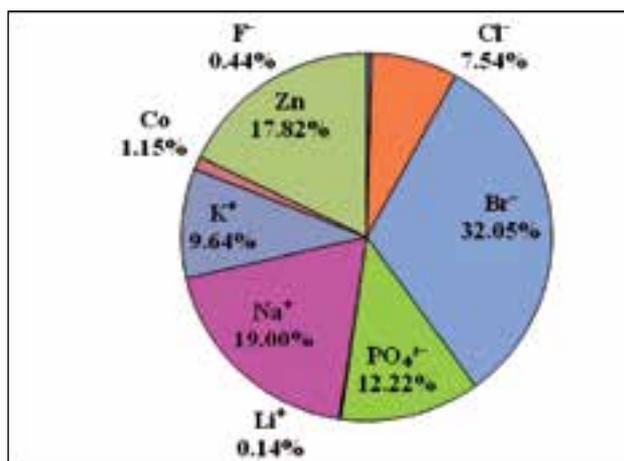
n = Numbers of samples collected and analyzed in triplicates

that the North east states receive only 1% of the total tourist arrivals in India. In Himachal Pradesh tourist inflow volume has nearly doubled from 6.55 million in 2004 to 16.15 million in 2012, suggesting a total growth of 146.54% (Fig-38). The foreign tourists comprises around 3.44% of the total arrivals.

- Heavy metal contamination of vegetables and their risk to Human Health in Himachal Pradesh revealed that Cadmium (Cd) and Lead (Pb) concentration in different vegetables (Tomato, Cabbage, Reddish, Cauliflower) at market sites exceeded European Union (2002) and FAO/WHO

(2007) safe limits (Table-58). Whereas, Cu and Zn were found below their safe limits. Cd concentrations (mg/kg dw) in vegetables in marketsamples varied from 0.17 (Manali) to 2.37 (Patlikul), 0.13 (Nagger) to 1.29 (Nagwain), 0.17 (Bajaura) to 1.73 (Patlikul), and 0.37 (Kullu) to 5.54 (Bajaura) in tomato, cauliflower, cabbage and radish, respectively. The average Cd contamination level was found maximum in radish followed by tomato, cabbage and minimum in cauliflower.

- Strategic Environmental Assessment (SEA) of hydropower projects in the Indian Himalayan Region focuses on Sutlej basin catchments. Baseline data on several



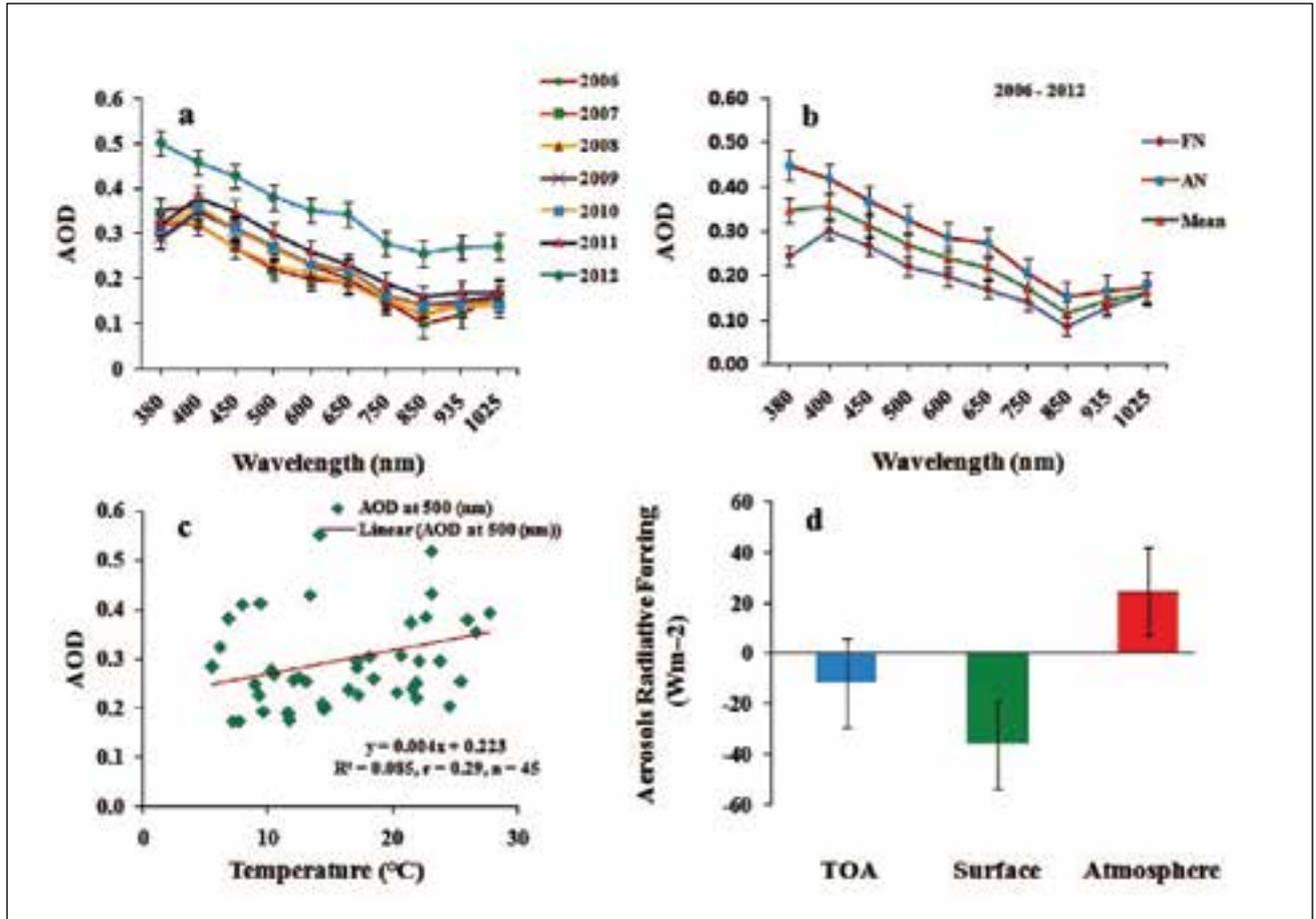
**Fig-39.** Ionic components of water samples in the adjacent areas of the Satlaj basin

physico-chemical parameters of soil and water in and around HEPs of Satlaj basin were generated. Ionic components and transition metals chemically analysed through Ion Chromatography (IC-3000 Dionex, U.S.A.) in water samples from the surrounding of HEPs. In river water samples, Br<sup>-</sup> > Zn > Cl<sup>-</sup> > Na<sup>+</sup> > K<sup>+</sup> emerged as the major ions, whereas PO<sub>4</sub><sup>3-</sup> > F<sup>-</sup> > Co > Li<sup>+</sup> were the other minor ones (Fig-39).

- To understand the impacts of climate change on forest ecosystem of the Indian Himalayan Region (IHR) and to cope up with the changing situation, four representative forest communities (viz., *Shorea robusta*, *Pinus roxburghii*, *Quercus leucotrichophora* and *Quercus floribunda*) along an altitudinal gradient of 500 – 2000 m asl have been selected in the Kumaun Himalaya to carry out studies on different structural and functional parameters, particularly phenological observations are being made. Also, community perception on climate change impacts and adaptation measures has been recorded and being analysed.
- Aerosols and Radiative Forcing analysis at Mohal, Himachal Pradesh was analysed to

look into the impact of vehicular pollution. Results reveal that aerosol optical depth at 500nm was found to be increasing and anthropogenic activities may be responsible for higher AOD in shorter wavelengths than the longer (Fig-40a). The solar flux due to the atmospheric aerosols is attenuated by 47.1% at 500 nm and 46.69% at all other wavelengths from forenoon to afternoon (Fig-40b). While analyzing the data among different season, alpha decreased at the rate of 20% from winter to summer, 2% from summer to monsoon and 47% from monsoon to autumn. Similarly, the turbidity coefficient ( $\beta$ ) from winter to summer increased by 23% and from summer to monsoon by 19%, but decreased by 46% from monsoon to autumn. Positive correlation coefficient  $r = 0.29$  was found between AOD and temperature. This showed positive indications in temperature rise with the increase in AOD (Fig-40c). The instantaneous aerosol Radiative Forcing at top of the atmosphere, surface and atmosphere was  $-11.45 \pm 5.80 \text{ Wm}^{-2}$ ,  $-35.83 \pm 14.34 \text{ Wm}^{-2}$  and  $+24.39 \pm 10.94 \text{ Wm}^{-2}$  respectively (Fig-40d).

- Analysis of gaseous air pollution in the background site of sprawling urban environment of Himachal Pradesh showed the amplitude and duration of the O<sub>3</sub> and NO<sub>x</sub> peaks vary with seasons. Daytime ozone and nighttime NO<sub>x</sub> peaks are noticed during summer and autumn months. During diurnal variation, ozone showed daytime high and nighttime low concentration, whereas NO<sub>x</sub> concentration showed bimodal peaks in a day, first in morning and second in evening. Also, NO<sub>x</sub> concentration shows an inverse relationship with O<sub>3</sub>. The daytime O<sub>3</sub> peak

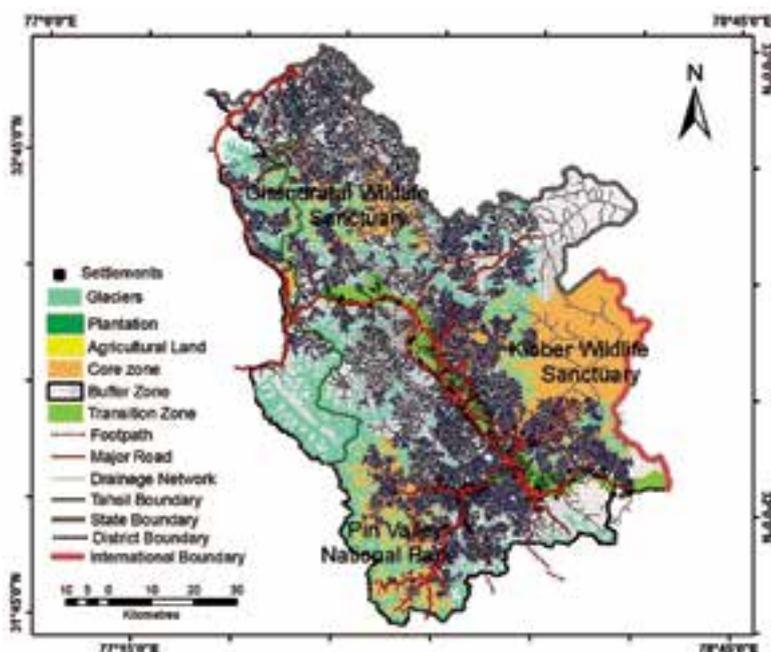


**Fig-40.** Aerosols and Radiative Forcing at Mohal during 2006 to 2012: (a) AOD at ten wavelengths, (b) FN, AN and mean AOD at ten wavelengths, (c) correlation between AOD and temperature (2008 to 2012), and (d) Aerosol Radiative forcing.

is broader and its values are higher from April to June with a seasonal mean value ( $61.2 \pm 8.5$  ppbv) in the summer months. The rainy season was characterized by low  $O_3$  concentration ( $23.9 \pm 2.4$  ppbv) and showed relatively short duration of the peak. Autumn months also show high diurnal value ( $51.9 \pm 9.5$  ppbv) but less broader peak than summer. While higher  $NO_x$  values appear in the autumn ( $21.2 \pm 5.2$  ppbv) followed by winter ( $14.3 \pm 9.5$  ppbv) and lower value appear in the rainy season ( $5.2 \pm 5.0$  ppbv).

- Remote Sensing and GIS technology were used for inventorization and monitoring of Cold Desert Biosphere Reserve (approximately 7,770 km<sup>2</sup>),

Himachal Pradesh of which core zone (36.02%), buffer zone (49.46%) and transition zone (14.52%) is categorised. Total area of glaciers in CDBR is about 886.08 km<sup>2</sup>, which stands to be 11.4% of the total area of BR (Fig-41). The Bada Shigri glacier, located in the CDBR, is the largest glacier in Himachal Pradesh covering an area of about 173.75 km<sup>2</sup>. These massive glaciers lead to the formation of dense drainage network in CDBR. The total length of drainage in CDBR is about 14,939.87 km, it has an eighth order river basin and the streams of lower order mostly dominate the basin with 79% of the first order and 0.005% of the eighth order streams. CDBR comprises three main river systems, i.e.,



**Fig-41.** Land use and land cover characteristics in CDBR. (Based on 1:50,000 Survey of India topographical maps)

River Spiti, River Chandra and River Pin with their respective lengths of 133 km, 67.61 km and 50.39 km, respectively. Total number of human settlements identified in CDBR is 719, while total number of monasteries and *chortens* (small deity points) were 163. Total length of road network in CDBR is 1199.02 km. The total area of agricultural land in all the villages of CDBR is 17.4 km<sup>2</sup>.

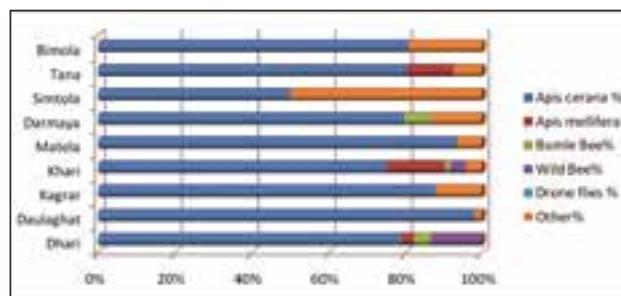
### Group 3: Biodiversity Conservation and Management (BCM) & Biotechnological Applications (BTA)

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 ensure 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 the biodiversity patterns and processes under changing resource use and climate scenario in the Indian Himalayan region various studies such as (i) participatory identification and selection of traditional crops for long term studies in Uttarakhand Himalaya, (ii) qualitative assessment and economic valuation of floristic diversity in Kanawar wildlife sanctuary, (iii) socio-economic/resource survey in south-west Kanchendzonga Biosphere Reserve, Sikkim, and (iv) dependency of household on biodiversity at West Kameng, Arunachal Pradesh were conducted. Preliminary results revealed that among ten most preferred fuel wood species, *Alnus nepalensis* and *Schima wallichii* secured top position for either village; however, *Castanopsis tribuloides* and *Quercus lamellosa* were other preferred species in Sikkim Himalaya.
- Towards documenting sacred groves and their role in ecosystem services detailed assessment of 17 sites was made between 1956 – 2212 m asl, of which five were identified for detail study i.e. Hidimba Mata, Kalinag, Jamadagni Rishi, Bhirghu Rishi, and Sangchul Rishi Sacred Groves. The floral diversity in each sacred grove was varied. For example, in Hadimba Mata Sacred Grove 73 species representing 66 genera and 29 families, in Kalinag Sacred Grove 44 species representing 41 genera and 21 families and in Jamdagni Rishi Sacred Grove total 33 species representing 30 genera and 16 families were recorded. These sacred groves are providing some provisioning services to local in the form of medicine, wild edible, fuel, fodder and religious.

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- Recognizing the dimensions of a “pollination crisis” and its linkages to biodiversity and human livelihoods a detail study on pollination conservation and management were conducted through UNEP/GEF/FAO project in three sites of Indian Himalayan Region i.e. Uttarakhand; Himachal Pradesh (HP) and Sikkim. In HP site, pollination Deficit Protocol experiments were applied in 20 apple orchards and a total 33 species of apple pollinators were reported from different orchards. Out of 33 species, 23 were solitary bees, followed by flies (06 species), Honey & Bumble bees (02 spp. Each), Butterflies (02 spp.) and Carpenter bee (01 sp.). In Kosi, Uttarkhand site, density of pollinators on different mustard sites have been evaluated and highest insect density was recorded at site Dhari (39.50) and lowest at Simnola (0.50) with highest average density of *Apis cerana* (6.00). The indigenous honey bee *Apis cerana* emerged as the most efficient pollinator across all the sites, contributing >more 80% of the insect visitation (80.53 %) followed by other bees and insects (Fig-42). In Sikkim STEP Site, the status and trends of pollinators were monitored. A significant positive correlation exists between flower phenology of large cardamom and density of *A. cerana* ( $r = 0.50$ ;  $p < 0.01$ ), *Bombus* sp. ( $r = 0.37$ ;  $p < 0.05$ ) and total numbers of bees ( $r = 0.46$ ;  $p < 0.01$ ). A linear regression model estimated that the increased density of pollinators per 100 flowers resulted increase in yield of large cardamom.
- Application of biotechnological and physiological approaches for biodiversity conservation and its sustainable utilization has been initiated. At the beginning of project stakeholder consultation cum



**Fig-42.** Relative contribution (%) of various pollinator groups across the mustard sites: 2011-12

brain storming meeting was organized at Uttarakhand, Sikkim and Himachal Pradesh with a major aim to optimize the benefits from selected high value plants to the people in the region. Besides, *In vitro* propagation protocol is being developed for *Valeriana jatamansi* (a source of Valerian); aseptic cultures have been established and multiple shoots have been obtained on MS media; these shoots are being rooted and subsequently the rooted plants will be assessed for genetic fidelity and field transferred. Seed germination protocols of different high value medicinal plants have been developed.

- Micropropagation method was developed for *R. nevieum* (State tree of Sikkim) from the cotyledonary nodal segments of 7-week-old seedlings. Maximum multiplication of shoots was observed in Anderson medium containing 25  $\mu\text{M}$  2iP with phytigel (0.3%) (Fig-43). More than 200 tissue culture raised plants have been transferred to pots containing peat moss and garden soil for hardening.
- Physiological studies on the imposition of drought stress in potted *Panicum miliaceum* plants at anthesis and 10 days after anthesis stage clearly showed sharp reduction in biomass production, grain number and grain weight as compared



**Fig-43.** In vitro propagation of *R. griffithianum*:  
(a) established shoots derived from nodal segment grown on AM medium supplemented with 2 iP, and (b) root induction from *in vitro* regenerated shoots on liquid AM medium with IBA

metal contaminated sites (Kullu unit) and rhizosphere microorganisms (Sikkim). In preliminary study, showed thirty five thermotolerant bacterial isolates have been subjected to morphological, physiological and biochemical characterization. Plants regenerated through multiple shoot induction from shoot tips of *Rhododendron niveum* and nodal explants of *R. griffithianum* have been selected for bacterial inoculation experiments. Heavy metal contaminated sites have been selected in Kullu region and methodology for isolation of heavy metal resistant microbes is being standardized. Leaf and rhizome extracts from a medicinal herb, *Berginia ligulata*, are being analyzed for biochemical constituents, antimicrobials in particular.

#### Application of R & D Outputs in Demonstration and Dissemination:

- Towards investigating the ecological resilience of the extremophiles from Himalaya initiatives were undertaken on phenotypic and genotypic characterization of extremophiles, inhabiting the extreme climatic regions in IHR (HQs), heavy
- Under the Integrated Eco-development Research Programme (IERP), funds for 32 ongoing/completed projects were released to different organizations after careful examination of the reports, Utilization Certificates (UCs) and Statement of Expenditures (SEs), etc. Annual Progress Reports (APRs) of 32 on-going projects were processed and referred to the subject experts for evaluation. Subsequently, the comments of the subject experts on the APRs were sent to the concerned PIs for

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**Table-59.** Impact of drought stress at anthesis and 10-days after anthesis on biomass production, grain number and grain weight in *Panicum miliaceum*. Values are in percentage of control plants.

Treatment	Biomass (%)	Grain number (%)	Grain weight (%)
Control	100.00	100.00	100.00
Anthesis	33.65	0.00	0.00
10 days after anthesis	89.90	26.67	19.44

- follow-up action. Final Technical Reports (FTRs) of 11 completed projects were sent to various govt./user agencies for follow-up action on the recommendations of the project and also to the subject experts for their comments/suggestions. Coordinated programme entitled "*Sacred values, eco-restoration and conservation initiatives in the Indian Himalayan region*" was continued and strengthened in the two States (Uttarakhand and Meghalaya) of the IHR.
- Environmental Information System (ENVIS) Centre on Himalayan Ecology regularly collected and updated information on various aspects of Himalayan ecology from various district information centres, universities, research centers, government institutions, NGOs and experts/individuals working in the Indian Himalayan region (IHR). The abstracts and news-clippings (bi-lingual) were published in the 'Selected Abstracts' and 'News and Views' section of the ENVIS Bulletin. About 62 research abstracts, related to the various aspects of Himalayan Ecology were added on the Abstract Database of the ENVIS Centre. At present, this database contains 2057 abstracts. State-wise and district-wise resource profile (related to demography as per Census 1991, 2001, 2011, educational infrastructure, health, etc.) of all the Indian Himalayan states. Besides, available information on various aspects of Himalayan Ecology collected and compiled during the year, were disseminated to 341 stakeholders through electronic and print media. Website of the ENVIS Centre on Himalayan Ecology <<http://gbpihedenvi.nic.in>> was re-designed, maintained and upgraded at the headquarters of the Institute (GBPIHED);
  - efforts for the conversion of ENVIS website from its STATIC mode to DYNAMIC mode were also carried out.
  - The Central Library of the Institute at its headquarters is being strengthening regularly. The library is subscribing a total of 90 periodicals (51 Foreign and 39 Indian). For management of Library and Information Centre, a network version of the software PALMS developed by the Scientist of this Institute is being used. As a result, the Library is providing a number of services such as Article Alert, Current Awareness, Selective Dissemination of Information, Reprography, Reference, Indexing, Bibliography, Web Services (Online Journals) etc., for the development of the human resources. The Library of the Institute is accessible through the Institute's web site (<http://gbpihed.gov.in>).
  - Institute has strengthened the facilities of physico-chemical, biological, heavy metal analysis of drinking, raw, waste water and quantification of volatile compounds of soil and plant samples. The heavy metals in the water and soil samples are detected through Atomic Absorption Spectrophotometer (Make-Varian AA280Z, equipped with graphite tube atomizer). For the quantification of aromatic and volatile compounds institute have Gas Chromatography (make- Chemito, Ceres 800+). Institute is also having the facility of detection of C, H, N & S through CHNS-O analyzer (make- Elementar, Vario EL-III) and UV-Vis spectrophotometer (make-UV 5704, Electronics corporation of India Ltd.) for soil, water & plant analysis. The Institute has extended these services for other organizations (NGO's and other Government Organization) on payment basis.



- Assessment of resource availability of potential wild edibles along with its value addition and cost benefit analysis of product developed for income generation

were undertaken. Exhibition of wild edible products, regional and village level business workshops were organized bi-annually and annually. Awareness

### R&D progress of GBPIHED

Categorization of R&D activities			
R&D areas	Research	Demonstration	Dissemination
<i>Environmental Status Assessment and Monitoring</i>	<ul style="list-style-type: none"> <li>● Land and water resources assessment, monitoring of climate sensitive areas</li> <li>● Dynamics studies of sensitive biodiversity elements (species/habitats)</li> <li>● Impact of development initiatives on natural systems</li> <li>● Resource-use surveys for rural planning</li> <li>● Documentation of IKS and database development</li> </ul>	<ul style="list-style-type: none"> <li>● Eco-Restoration and conservation</li> </ul>	<ul style="list-style-type: none"> <li>● Capacity building/skill development</li> </ul>
Environmental Conservation and Management	<ul style="list-style-type: none"> <li>● Strengthening conservation of priority areas/species</li> <li>● Eco-restoration of degraded sites/areas</li> <li>● Factors and processes for mountain hazard management</li> <li>● Microbial diversity, potential application &amp; culture collections</li> </ul>	<ul style="list-style-type: none"> <li>● Arboretum, herbal gardens, multipleuse garden and <i>Vriksh Vatika</i></li> </ul>	<ul style="list-style-type: none"> <li>● Networking</li> </ul>
Developmental options/ strategies/ plans	<ul style="list-style-type: none"> <li>● Resource management interventions</li> <li>● Propagation of economically important plants</li> <li>● IERP for IHR</li> </ul>	<ul style="list-style-type: none"> <li>● Livelihood options</li> </ul>	<ul style="list-style-type: none"> <li>● Publications / documentation</li> </ul>

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**Table-60.** The core competence / services available with the Institute

Competence	Services
<ul style="list-style-type: none"> <li>● <i>Village Environment Action Plan (VEAP)</i></li> <li>● <i>Natural Resource Assessment &amp; Management</i></li> <li>● <i>Water Resource Conservation</i></li> <li>● <i>Biodiversity Characterization and Monitoring</i></li> <li>● <i>Documentation of IKS</i></li> <li>● <i>Environmental Physiology and Plant Adaptation</i></li> <li>● <i>Biotechnological and Microbiological Applications</i></li> <li>● <i>Environmental Impact Assessment &amp; Environmental Management Plans</i></li> <li>● <i>Wasteland Development/ Restoration</i></li> <li>● <i>Resource Mapping for Rural Planning and Management</i></li> <li>● <i>Institutional Networking</i></li> </ul>	<ul style="list-style-type: none"> <li>● Laboratory Analysis</li> <li>● Plant, soil, water and air quality</li> <li>● Meteorological data analysis</li> <li>● Biochemical investigations on medicinal/edible plants</li> <li>● Microbiological and biotechnological experimentation</li> </ul> <p><i>Capacity Building</i></p> <ul style="list-style-type: none"> <li>● Natural Resource Management</li> <li>● Nature protection and conservation education</li> <li>● RS/GIS training</li> <li>● Training on low-cost rural technologies</li> <li>● Disaster management</li> <li>● Glacier Studies</li> <li>● Doctoral/Masters and Graduate level dissertations</li> </ul> <p><i>Consultancies</i></p> <ul style="list-style-type: none"> <li>● Water Resource Management –Catchment Area Protection</li> <li>● Hydropower - EIA/EMP</li> <li>● Project formulation on bioresources</li> <li>● Watershed Management Strategies</li> <li>● Environmental guidelines and monitoring plans for watershed management</li> <li>● Landscape planning for mountain risk engineering</li> <li>● Biodiversity assessment and Monitoring</li> <li>● Impact of agricultural diversification</li> </ul> <p><i>Other Services</i></p> <ul style="list-style-type: none"> <li>● Gene bank and identification of plants</li> <li>● Supply of elite planting material of selected herbs &amp; multi-purpose trees (MPTs)</li> <li>● Library &amp; Information, and dissemination through books, journals, periodicals, etc.</li> </ul>



generation through print as well as electronic media was also popularized. About 290 households of 45 villages in upper Kedar valley and Niti valley have adopted the local value addition of variety of wild edible plants as small household activity for income generation. The various local value added products i.e. squash, juice and sauce etc prepared by the people for their household consumption and also for marketing.

- About 23 ha of village common degraded land were developed under 7 prototypes (2 MPTs and 5 Horticulture models) in three village clusters of Tehri Garhwal districts. In addition, fodder bank model has been developed on the 5 ha degraded wasteland in Maikhanda village in Rudraprayag district.
- Popularized lesser-known tourism spots in upper Kedar valley with the support of village institutions and highlighted their uniqueness for promoting tourism in these areas, which will reduce pressure on well-known tourist places and provide opportunities to local people to participate in managing tourism and deriving benefits from it.
- Agrotechniques developed/compiled for 26 commercially viable medicinal plants were disseminated to different stakeholders. Agrotechniques of *Aconitum heterophyllum*, *Picrorhiza kurrooa*, *Angelica glauca*, *Withania somnifera*, *Valeriana jatamansi*, etc. were demonstrated in the farmers' fields. Over 300 seedlings of *Withania somnifera* and *Grevillea robusta* were distributed to the Schools of Kullu valley.
- To strengthen alternate livelihood options, particularly Community Based Tourism

(CBT) as a potential mechanism for livelihood and biodiversity conservation. CBT was promoted in Tawang and West Kameng Biosphere Reserve (proposed BR - TWKBR) and a model for culture based tourism was developed in Apatani plateau.

Throughout the year, the R&D findings of the Institute were disseminated through publication of research papers in scientific journals and magazines, popular articles and books and through Institute publications: Pt. G.B. Pant Memorial Lectures by eminent thinkers and scholars, Hima-Paryavaran (Biannual-Newsletter), ENVIS Bulletin, ENVIS Newsletter, Himalayan Biosphere Reserve Bulletin (Biannual) by Lead centre, and Annual Report.

Based on its competence gained over the years on different aspects of mountain-specific environment and development issues the Institute is fully equipped to extend services in diverse sectors; some of the areas are given in Table-60.

#### 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	12.36	7.124
Capital	2.11	0.901
Total	14.47	8.025

#### Forestry Research

##### Introduction

Research & Training Division (RT) is a nodal division for two major central sector plan schemes namely "Grants-in-Aid to Forestry & Wildlife Sector" & "Capacity Building in

Forestry Sector". This division looks after the administrative, financial and other matters of four research & training institutions viz. Indira Gandhi National Forest Academy (IGNFA), Dehradun, Indian Plywood Research and Training Institute (IPIRTI)- Bangalore, Indian Institute of Forest Management (IIFM)-Bhopal, Indian Council of Forestry Research & Education (ICFRE)- Dehradun. The scheme of Capacity Building includes training of members of Indian Forest Service, State Forest Service, Range officers, Forest Guard etc. Awareness program through short term training/workshops/study tours for personnel of various departments such as police, revenue, custom, agriculture, etc. are also one of the component of the capacity building scheme. Training of Other stake holders like Panchayat Members, elected representatives, teachers, social activist, NGOs, and Media personnel is also arranged by the various institutions under the capacity building schemes. The RT- Division is also implementing externally aided project on "Capacity Development for Forest Management & Training of Personnel (IDP.199)".

Following two umbrella schemes are being implemented by RT division through various institutions/ organisations.

### **Grants in aid to Forestry & Wildlife Institutions**

This new scheme is a merged scheme of four ongoing central sector "Grants-in-Aid Schemes" of Ministry of Environment and Forests. The individual schemes of 10<sup>th</sup> Five Year Plan which have been merged include:

- Grants-in-aid to Indian Council of Forestry Research & Education (ICFRE), Dehradun.
- Grants-in-aid to Indian Institute of Forest Management (IIFM), Bhopal
- Grants-in-aid to Indian Plywood Industries

Research and Training Institute (IPIRTI), Bengaluru.

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

Indian Council of Forestry Research and Education (ICFRE), an apex body in the national forestry research system, has been undertaking the holistic development of forestry research through need based planning, promoting, conducting and coordinating research, education and extension 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 the ability of forest managers and researchers to successfully handle challenges related to natural resources management. The council also imparts forestry education through FRI Deemed University, supports forestry education in Agricultural Universities and organize training programmes for the personnel of the State Forest Departments and other stakeholders in the field of forestry and allied sectors.

**Evaluation of the Scheme:** ICFRE has eight Regional Research Institutes and four Research Centers located in different bio-geographical regions of the country to cater to the forestry research needs of the nation.

### **Research Institutes under the Council are:**

- Forest Research Institute (FRI), Dehradun
- Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore
- Institute of Wood Science and Technology (IWST), Bengaluru
- Tropical Forest Research Institute (TFRI), Jabalpur



- Rain Forest Research Institute (RFRI), Jorhat
- Arid Forest Research Institute (AFRI), Jodhpur
- Himalayan Forest Research Institute (HFRI), Shimla
- Institute of Forest Productivity (IFP), Ranchi
- Institute of Biodiversity, Hyderabad

#### **Advanced Research Centres under the Council are:**

- Centre for Social Forestry and Eco-Rehabilitation (CSFER), Allahabad
- Centre for Forestry Research and Human Resource Development (CFRHRD), Chhindwara
- Advanced Research Centre for Bamboo and Rattans (ARCBR), Aizawl

#### **Indian Institute of Forest Management (IIFM), Bhopal**

Established in 1982 as an Autonomous Institution under the Ministry of Environment & Forests, Govt. Of India, the IIFM was conceptualised in response to recommendations of National Commission on Agriculture (1972). Further in 1974, Govt. of India accepted the recommendations of Food and Agriculture Organization of the United Nations and Swedish International Development Agency. Besides, emphasis on renewable national resource system under Business Management was also suggested by Ford Foundation. All this necessitated the creation of Autonomous Institute to provide a formal identity in the field of Management Education in Forest & Allied Sectors.

Recognizing the need Govt. of India entered into agreement with Indian Institute of Management, Ahmadabad, to

share the responsibility of establishing an independent and Autonomous Institute. The impetus generated by the recommendations culminated in an alliance with the Indian Institute of Management, Ahmadabad (IIMA) with the establishment of programme office at IIM Ahmadabad in 1978 – 1981. The first, Ten Years Perspective Plan (1981 to 1991) of IIFM was prepared by IIM Ahmadabad. In August 1981 the programme office was shifted at Bhopal and IIFM Society was registered on 15<sup>th</sup> January 1982. The current/second perspective plan (2006-2016) of IIFM is under implementation and gives tremendous thrust on increased research, expansion of educational programmes, increased national and international linkages along with supporting infrastructure and resource base for effective implementation.

Since its establishment, in 1982 as an autonomous institution of the Ministry of Environment & Forests the Institute has developed as an educational, research, training and consultancy organisation at national as well as international level. The IIFM aims to provide leadership in professional forestry management aimed at environmental conservation and sustainable development of Ecosystems.

To be among the leading international institutions in the area of forest and related environment development management and be respected, both nationally as well as internationally, for its outstanding contributions in the field of education, training, research, consultancy, and thought leadership.

The Institute, as a sectoral management institute, imparts education in forest management, which is a judicious combination of management, social, and forestry sciences. The Institute constantly endeavours to keep in

touch with the problems of people, especially the forest dwellers and undertakes need-based research. The Institute tries to serve as a reservoir of knowledge in forest management and ensures proper integration of external and indigenous knowledge suitable to Indian context. The specific objectives of the Institute are:

In consideration of the major objectives, the vision of the Institute has been translated into the following mission statement:-

- To serve different stakeholders of forestry, environment, and Development sectors and the society, in general, through development and dissemination of knowledge, human resource development through its education and training activities, and providing assistance in formulation and advocacy of relevant policies and strategies,
- To be a national institution with international perspective and outreach, and
- To build culture of excellence, achievement, cooperation and service within a framework of strong ethical patterns of behavior informed by universal values.

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

IPIRTI was established for undertaking research and development of technologies for plywood and panel products made from wood and other lignocellulosic materials including plantation timber, bamboo and other natural fibres. The technologies developed have been made available to the forest based industries (mostly plywood manufacturing units) and other stakeholders. Institute is also responsible for providing training to meet human resource development needs for plywood and other

allied industries. IPIRTI is also a recognized Institute from BIS for undertaking testing and formulating standards related to wood based panel products.

### **Capacity Building in Forestry Sector**

It is a Central Sector Scheme formulated by merger of different existing, Central Sector Forestry Training Schemes into a single Scheme with additional components. The Planning Commission has approved the merger proposal in principle at an outlay of ₹ 110.00 crores for the Eleventh Five Year Plan and CCEA has approved the scheme along with additional EAP component of ₹225.00 Crore from Japanese International Cooperation Agency.

### **Training of IFS Officers**

The scheme provides capacity building of Indian Forest Service officers through sponsoring of short-term refresher courses of one/two week(s) duration in the premier institutions in the country for keeping them up to date on latest technologies, new ideas and change of the attitude for managing the natural resources of the country. The institutes organize specialized tailor-made courses on various topics/themes as decided by the MoEF. The courses cover a wide range of topics relating to management and administration of forests, wildlife and environment and general administration in the government. The topics include human resource development, financial management including micro-financing, environmental impact assessment & auditing, joint forest management, intellectual property rights issues in forestry, policy and legal issues, good governance, managing of non-timber forest products for addressing livelihood concerns of local communities, effective leadership and conflict resolution, impact of global warming and climate change on forests



and biodiversity, geographical information system – a decision tool for forestry planning and management, captive management of wild animals, eco-tourism assessment and development, economics of conservation areas, enhancing the effectiveness for implementation of government policies and programmes, wildlife management – issues, concerns and practices, eco-tourism – strategies for success, learning lessons from externally aided projects, conservation and development of medicinal plants, natural resources accounting, bamboo resource development for livelihood generation for tribal and rural communities, role of forestry in conservation, development and management of water resources, role of agro-forestry in increasing tree cover etc. Besides this, IFS officers will also be sponsored to pursue long-term training courses in the areas of interest offered by premier institutions of the country.

In addition to sponsoring short-term refresher courses for the IFS officers, it is proposed to continue sponsoring sponsor 1-3 day training workshops and seminars for the IFS officers on emerging topics of regional, natural and international importance like professionalizing the forestry service, water conservation, training curricula and effectiveness review, forest invasive species, bio-prospecting, interventions required for scientific management of NTFPs and livelihood concerns of local communities, changing needs of forestry administration and management etc. The training workshops/seminars will be sponsored in the premier institutions/organization in the country depending upon their expertise in a particular field/discipline.

### **Indira Gandhi National Forest Academy (IGNFA), Dehradun**

IGNFA was constituted in the year 1987 by renaming the erstwhile Indian Forest College

vide Ministry of Environment and Forest order No. 1-6/87-RT dated 25.05.1987. This Academy is engaged in imparting Induction training to IFS (Probationers) and in service training of one week/two week/three weeks to the in-service officers. Academy has also started Professional skills upgradation training for the officers promoted to Indian Forest Service from SFS and officers of other services including judiciary. Brief objective/activities of the Academy are as under:

- Conducting initial training of IFS probationers extended over a period of three years (changed to two years from 2005).
- Organizing Professional skill upgradation training programme for officers of SFS promoted into IFS.
- Conducting compulsory course for in service IFS officers at middle/senior level.
- Organizing thematic seminar/workshop on relevant sectoral issues.
- Conducting Advanced Forest Management Courses for in service officers with 10, 17 and 21 years of service in IFS upto 2001 YOA.
- Organizing Senior Foresters Workshop for senior IFS Officers of 50 years (retired foresters) and 30 years of service.
- Conducting Mid Career Training Programme for IFS officers of 7-9 (Phase-III), 16-18 (Phase-IV) and 26-28 years (Phase-V) of service.

### **State Forest Service and Ranger's College**

The Directorate of Forest Education, a subordinate office directly under the Ministry of Environment and Forests has been involved in capacity building of forestry personnel of the states and union territories in the country

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other than IFS since 1991. The forestry training institutes under the direct administrative control of the Directorate of Forest Education are:

- Central Academy for State Forest Service, Dehradun (Uttarakhand)
- Central Academy for State Forest Service, Coimbatore (Tamil Nadu)
- Central Academy for State Forest Service, Burnihat (Assam)
- Eastern Forest Rangers College, Kurseong (West Bengal)

The mandate of the Directorate of Forests Education is :

- To ensure 'Standard and quality' of training being imparted to the forestry personnel of all levels other than Indian Forest Service personnel.
- To help develop 'Capacity and Infrastructure' of desired standard for training of various levels of personnel in forestry sector other than IFS.
- To assist develop appropriate and relevant training modules/ content/evaluation formats for forestry training at various levels of personnel.
- To sensitize the stakeholders about forestry and forest conservation through conducting custom made training modules.
- To assist Government of India and State Governments to develop training policy for efficient human resource management and development.
- To assess the 'Changing Training Needs' of forestry personnel for quality and standard training.
- To ensure a pool of professionally competent and qualified Forestry Personnel.

### Training of Personnel of Other Services

Personnel of Police, Revenue, Customs, Agriculture, Horticulture, Soil Conservation, Animal Husbandry, Tribal/Rural Development, Judiciary, Public Health Engineering etc., have an interface with forestry sector. Sensitization of these departments through in-service training of their personnel will be covered under this component. It is proposed to organize awareness programmes in the form of short-term trainings, study tours, seminars and workshops in the institutions under the government as well as in the private sector. The trainings can be organized at two levels one for the senior officers (Group A/class I) at IGNSA/LBSNAA/WII/Customs Academy or any other reputed training institute and the other one for the class II/class III state level officers at the State ATIs/Forest Training Institutes (Regional) and institutions under ICFRE etc. For participation in these courses, a provision has been kept for meeting expenses on TA/DA in the budget proposals.

### Foreign Training of Forestry Personnel

Present-day foresters have to deal with non-technical issues e.g. inter-sectoral policy and programme linkages. Also, the forestry personnel need to keep themselves abreast of the technological advances in the fast changing world to address the changing requirements of the developing societies as well as the various global, regional national and local environmental concerns. Presently there is no scheme for providing opportunities to forest officers, working in the States and under the CSS and non CSS posts of MoEF and the autonomous institutions of the MoEF, for undergoing courses/participating in study tours/workshops in foreign institutions organizations. This component for foreign training of IFS and SFS Officers and also for



providing opportunities to them (including the FROs) for participating in international seminars, workshops and study tours abroad on emerging issues and challenges in forestry sector is therefore, proposed.

### Training of other Stakeholders

Forest Management in India is in a transitory stage moving from traditionally centralized forest management to participatory forest management. In traditional system of control, regulations and policing the forests have alienated the people from developing a sense of belonging to the forests. There is a need to sensitize other stakeholders for conservation of these natural resources. As such, under this component, it is proposed

to organize/sponsor a number of specially designed short-term courses, study tours, workshops and seminars on various aspects of forest and environmental conservation for different stakeholders which may include NGOs, students in educational institutions, nature clubs/eco-clubs, panchayats, elected public representatives, personnel from banking institutions, social activists, press and media persons etc.

### Capacity Development for Forest Management and Training of Personnel

It is a Central Scheme (in a project mode) to be implemented with the assistance of a loan component to be provided by the JICA as reimbursement. The scheme is being

**Table-61.** The estimated physical targets

Items	Activities	Physical targets
(i) Infrastructural upgradation/creation of new infrastructure (Rehabilitation of Training Institutes/Schools)	<ul style="list-style-type: none"> <li>Rehabilitation of Training Institutes/Schools of target states.</li> <li>Improvement of Infrastructure of SFSC (Central Academy for State Forest Services - CASFOS) Dehradun.</li> </ul>	<ul style="list-style-type: none"> <li>No of State Forest Training Institutes (SFTIs) to be rehabilitated: 27</li> <li>No of STIS to be newly constructed: 3.</li> <li>One</li> </ul>
(ii) Activities for Strengthening of Training System.		
Qualitative inputs	<ul style="list-style-type: none"> <li>Creation of Steering Committee and Project Monitoring Unit (PMU).</li> <li>Revision of Training Guidelines.</li> <li>Preparation of sample course materials and teaching notes.</li> </ul>	<ul style="list-style-type: none"> <li>One each.</li> <li>National-1</li> <li>State- 10.</li> <li>State-20.</li> </ul>
Qualitative yield (improved).	<ol style="list-style-type: none"> <li>Master Trainers (MT) Training.</li> <li>Training of Trainer (TOT).</li> <li>Training for Field Staffs (TOF).</li> </ol>	<ul style="list-style-type: none"> <li>40 (MTs).</li> <li>100 trainers.</li> <li>1500 trainees/year.</li> </ul>



## Overall Status of the Project

Item of Work		As on March, 2013	As on 31 <sup>st</sup> . Dec., 2013
<b>1.</b>	<b>Construction/ Rehabilitation of SFTI/ CASFOS &amp; EFRC (Target 30 No.)</b>		
1.1	Projects sanctioned	22 SFTIs & CASFOS, Dehradun	25 SFTIs & CASFOS, Dehradun, Coimbatore, Burnihat Nagaland SFTI Under process
1.2	DPR under preparation	3	Nil
1.3	No. of SFTI where construction started	9	22
1.4	Number of SFTI where construction not started	13	Himachal Pradesh-2 Uttarakhand-1
1.5	Funds sanctioned	₹121.97 Crore	135.58 Crore
1.6	Funds Released	₹ 86.53 Crore	₹90.96 Crore
<b>2.</b>	<b>Development of Master Trainer/MRP (50) &amp; Trainers (100)</b>		
2.1	PMT created	41	41
2.2	PMT conducted ToT	0	14
2.3	Trainers trained under ToT	Nil	86 (4)
2.4	Funds sanctioned (ToT)	Nil	₹30 Lac
2.5	Funds (ToT) released	Nil	₹22 Lac
2.6	Request for ToT received from State	Nil	2
2.7	ToT Plan till March,'14		West Bengal-1 Maharashtra-1 Chattisgarh/Jharkhand -1
2.8	Lesson Plan finalised	41	41
<b>3.</b>	<b>State Consultants (13 No.)</b>		
3.1	No. of States consultants engaged	4	9
3.2	Status of engagement /under processing/ proposal to be received	Fund released to MP, Maharashtra & Kerala Under Process-1	Funds transferred: 5 Under Process in the State-4 Not received from the State-4
3.3	Funds sanctioned	₹ 130.704 Lac	₹ 209 Lac
3.4	Funds Released	₹ 65.352 Lac	₹104 Lac
<b>4.</b>	<b>Reimbursement claimed</b>	₹7.95 Crore	₹25.48 Crore
<b>5. Other items</b>			
5.1	Website status	Under development	Launched temporarily. Security Audit undertaken by NIC
5.2	Operational & financial guidelines	Issued	Issued
5.3	Monitoring format	Issued	Issued
5.4	Audit certificate	Received up to 2010-11	Received up to FY 2011-12
5.5	Auditor approval for three years	EOI opened, RFP issued	Done



implemented in the following Thirteen States:-

- Assam
- Bihar
- Chhattisgarh
- Jharkhand
- Kerala
- Madhya Pradesh
- Maharashtra
- Uttarakhand
- West Bengal
- Mizoram
- Arunachal Pradesh
- Nagaland
- Himachal Pradesh

The project is for the human resource development of field forestry personnel in the level of Foresters/Forest Guard and the infrastructure development to meet these human resource development needs. As such the output of the project is going to be in the form of (i) infrastructural up-gradation/creation of new infrastructure for the forestry training schools/institutes of the country and (ii) enhanced output of the training schools/institutes, quantitatively by the number of trainees trained and qualitatively, by the quality of training inputs. The estimated physical targets for (i) & (ii) are given in Table-61.

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

### Introduction

Indian Council of Forestry Research and Education (ICFRE), an apex body in the national forestry research system, has been undertaking the holistic development of forestry research through need based planning, promoting, conducting and coordinating

research, education and extension covering all aspects of forestry. The Council deals with the solution based forestry research in tune with the emerging issues in the sector, including global concerns such as climate change, conservation of biological diversity, combating desertification and sustainable management and development of resources. Topical research by the Council enhances public confidence in the ability of forest managers and researchers to successfully handle challenges related to natural resource management.

### Objectives

- To undertake, aid, promote and coordinate forestry education, research and their applications
- To develop and maintain a national library and information centre for forestry and allied sciences
- To act as a clearing-house for research and general information related to forests and wildlife
- To develop forestry extension programmes and propagate the same through mass media, audio-visual aids and extension machinery
- To provide consultancy services in the field of forestry research, education and allied sciences
- To undertake other jobs considered necessary to attain these objectives

### Activities undertaken so far (ending March 2013):

- ICFRE revisited its thrust areas to make research people-centric, primarily focusing on the livelihoods of the rural tribal population, along with a focus on food and water security. **Six thrust areas and 43 themes** were identified.
- A new innovative scheme, "**Direct to Consumer**", for quick transfer of



- technologies to consumers/stakeholders on completion of research projects has been launched by the ICFRE so that the end users can get immediate benefits from the research findings. Seventeen projects from various institutes of the ICFRE have been identified for extension under the Direct to Consumer scheme.
- The composition of **Forest Types of India** in the field has changed a lot since last revision in 1969. Their revision was long overdue. ICFRE constituted a task force to prepare a change matrix of forest vegetation in the country.
  - ICFRE has prepared the HRD Plan for Capacity Building of Scientific Personnel for the XII Five Year Plan. The document is available at the website of ICFRE at [www.icfre.org.in](http://www.icfre.org.in).
  - On the directions of Hon'ble Supreme Court of India, preparation of Reclamation and Rehabilitation Plans of the mine areas in Bellary, Tumkur and Chitradurga districts of Karnataka being carried out for which ICFRE has been awarded with a consultancy worth ₹ 14 crores by the Government of Karnataka.
  - ICFRE organized 24<sup>th</sup> Session of International Poplar Commission (IPC) and 46 meeting of its executive committee in October 2012 at Dehradun. It is for the first time that such a prestigious event of the IPC was held in India. 227 Delegates from 23 countries participated in the Session.
  - Taking a further step in the directions of benefiting the farmers from the technologies/processes evolved by the Council and with a specific aim of extension of agroforestry the **networking of Van Vigyan Kendras (VVKs) with Krishi Vigyan Kendras (KVKs)** is in process.
  - Published a coffee table book "**Forest Biodiversity in India**" which covers various parameters of biodiversity including the hotspots, diverse forest types and drivers of change. The book has been beautifully presented with a large collection of photographs from all over India and has been praised by one and all. In addition, "**Forest Sector Report India 2010**" was published by ICFRE with the funds provided by the Ministry of Environment and Forest, Government of India. Both the books were released by Smt. Jayanthi Natarajan, Hon'ble Minister of Environment and Forests, Government of India during COP-11, Hyderabad on 17<sup>th</sup> October 2012.
  - ICFRE released a compendium "Changing Frontiers of Research Programs in ICFRE based on XIII Research Policy Committee (RPC) 2012 Meeting".
  - The Forest Research Centre, Hyderabad has been upgraded to Institute level and renamed as **Institute of Forest Biodiversity**. The Institute will give focus on the biodiversity of Andhra Pradesh, Maharashtra and Eastern Ghats.
  - To encourage young Forestry Researchers from **SAARC countries, 10 Fellowships** announced by Hon'ble Prime Minister. SAARC center proposed creation of SAARC research net work to be hosted by ICFRE.
  - ICFRE successfully carried out **Mid Career Training** on behalf of IGNFA, Dehradun **for IFS officers** for Phase III (Third Course), by providing best institutional arrangement and partnership with Institutions like WII, Dehradun, FSI, Dehradun, IIM-Ahmedabad, Colorado State University (US) and Swedish



- University of Agricultural Sciences (SLU) Sweden.
- Forest Research Institute (FRI), Dehradun obtained thirteen isolates of *Alternaria* species from diseased eucalyptus samples, amplified and sequenced for ITS region of nrDNA.
  - Forest Research Institute (FRI), Dehradun observed that three clones of *Dalbergia sissoo* are showing resistance against *Fusarium solani* wilt disease.
  - Under 'Direct to Consumer' programme of ICFRE, technology developed by FRI, Dehradun for 'Reshaping of exudates gums' was transferred to M/s Anand Gond Udyog, Nagpur on a license fee of ₹ 1.4 Lakhs.
  - Root rot disease on *Melia dubia* caused by *Fusarium* sp. was recorded for the first time in 6-months old plantation in Chennimalai, Tamil Nadu.
  - Six bacterial isolates were isolated and identified from textile dye effluents. Assessed the efficacy of all these bacterial isolates for heavy metal degradation and it was observed that most of the isolates were able to degrade the textile dye effluents and maximum degradation was observed by *Bacillus* sp. under *in vitro*.
  - Leaf blight disease on *Gmelina arborea* caused by species of *Alternaria*, *Cuvularia* and *Colletotrichum* were recorded for the first time in SFD Research Nurseries at Villupuram and Dindugal, Tamil Nadu.
  - 55 PGPR isolates were isolated from 12 contaminated soil samples and it was pure cultured and maintained in nutrient agar slants for further studies under *in vitro*.
  - Three full length CDS sequences from *E. tereticornis* were submitted to NCBI.
  - IFGTB, Coimbatore organized an "Awareness Training Workshop on The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)"
  - IFGTB, Coimbatore organized a stakeholders meeting on Validation of Descriptors of Casuarinas and Eucalyptus with the funding support of the PPVFR Authority to complete the validation process of the draft DUS guidelines.
  - IFGTB, Coimbatore through a national consultative process has brought out the country report on the state of Forest Genetic Resources (FGR). This report was released by Smt. Jayanthi Natarajan, Hon'ble Minister of State (Independent Charge), Environment and Forests, at Chennai on 22<sup>nd</sup> December 2012.
  - Institute of Wood Science and Technology (IWST), Bangalore started nursery activities for raising of sandal QPM at Nagroor Nursery. Total 33 kgs of sandal seeds were sown in 4 sand beds (1 mx10m) after treatment. Seeds are germinating. Root trainers are being filled with potting mixture for producing 60,000 seedlings.
  - Institute of Wood Science and Technology (IWST), Bangalore organized workshop on Wood & Engineered Wood Working Units under "Design Clinic Scheme" with the sponsorship of National Institute of Design (NID-MSME).
  - Trap culture of elite strains of entophytes collected from 3 samples i.e. AMS/RM-19, AMS/PH- 20 & AMS/PH-21 has been initiated and sub culturing of some useful rhizospheric bacteria and fungi is under progress.
  - During the field survey at Mokochung, Nagaland 62 species of mushroom were collected. Out of these following 16 species were identified.



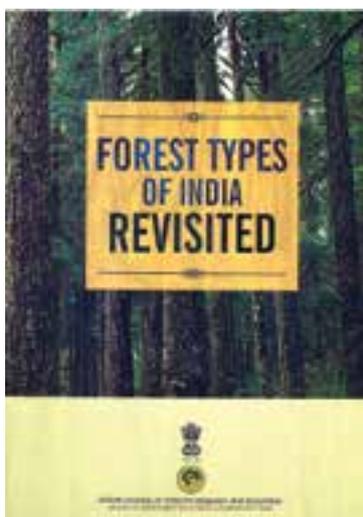
- A species of pathogenic bacteria *Bacillus* sp. was detected from the naturally infected cadavers of *Pyrausta coclesalis* Wlk. a major defoliator of *Bambusa tulda* and *B.balcooa*. The record of this native pathogenic bacteria on the host *P.coclesalis* was found to be a new record.
- Studies on carbon sequestration in different forest types of Rajasthan was conducted. Jhalawar, Bundi, Karauli, Sawaimadhapur, Jodhpur and Kota Forest Division were surveyed where dominant forest types are *Anogeissus pendula*, *Acacia catechu* and *Boswellia serrata*. In the forests of these divisions, soil organic carbon stock in 0-90 cm soil layer ranged from 41.5 tone ha<sup>-1</sup> in Kota to 18.3 tone ha<sup>-1</sup> in Jhalawar. Soil inorganic carbon ranged from 57.72 tones ha<sup>-1</sup> in Karauli to 2.9 tonnes ha<sup>-1</sup> in Bundi forests.
- Identification of soil-vegetation relations and indicator species for assessment and rehabilitation in lower Aravalli of Rajasthan were carried out.
- DNA extraction and purification protocol for mapping genetic diversity of *Prosopis cineraria* was optimized.
- *In vitro* rooting was achieved in microshoots of *Hardwickia binata*.
- Improved rooting without application of growth regulators in *Commiphora weightii*.
- HFRI, Shimla has been awarded a consultancy titled, "Redrafting of Catchment Area Treatment Plan for Shongtong-Karchham Hydroelectric Project" by Himachal Pradesh Power Corporation Limited, Shimla.
- IFP, Ranchi participated in 17th Year Rural Exhibition-cum-Fair Sunderban Kristi Mela O Loko Sanskriti Utsab organized by Kultali Milon Tirtha Society, Vill. Kultali, P.O. – Narayantala, P.S.- Basanti, Dist – 24 Pgs (S). West Bengal – 743329. Among 23 Central Government stalls, the stall of IFP, Ranchi received big appreciation and got 4th prize in terms of their livelihood generation.

### Progress/achievements made during 2012-13

#### New initiatives

- XIV Research Policy Committee Meeting (RPC) was held on 30 and 31 May 2013 in the ICFRE under the Chairmanship of Director General, ICFRE. Eighty six new proposals with the budget outlay of ₹ 1663.88 lakhs were submitted by the institutes for discussion and approval by the RPC. 76 new projects with current year (2013-14) budget of ₹ 631.23 lakhs were approved in four Research Thrust Areas.
- The 4<sup>th</sup> meeting of National Steering Committee (NSC) of Sustainable Land and Ecosystem Management (SLEM) Project was held at Hyderabad on 4 and 5 April 2013 under the Chairpersonship of Mrs. Mira Mehrishi, Special Secretary, MoEF. The Meeting was attended by officials from MoEF, Members of NSC, representatives from World Bank, UNDP and FAO, SLEM-TFO members, officials from Project partners SPACC and CARE, Soil and Land Use Survey, Ministry of Agriculture, Institute of Forest Biodiversity, Desertification Cell MoEF and NGOs.
- ICFRE, Dehradun organized a seminar on 17 June 2013 to commemorate World Day to Combat Desertification. The World Day to Combat Desertification has been observed since 1995 to promote public awareness relating to international cooperation to combat desertification and the effects of drought, and the implementation of the

- United Nations Convention to Combat Desertification (UNCCD). On the occasion two flyers titled 'Rain water Harvesting and Augmentation of Water Resources for Sustainable Land and Ecosystem Management' and 'Rejuvenation of Gharats (Water mills) for Sustainable Land and Ecosystem Management in Uttarakhand' were also released. The seminar was attended by scientists and officers of ICFRE and FRI, Dehradun.
- The Government of Karnataka awarded consultancy for preparing 'Reclamation and Rehabilitation (R&R) Plan' for 166 mines in Bellary, Chitradurga and Tumkur districts of Karnataka to ICFRE. R & R Plans for 71 Mines of category A and B (category defined based on illegalities) have been prepared and submitted to the Hon'ble Supreme Court of India through the Government of Karnataka. Out of these, 67 R & R plans have been approved by the Central Empowered Committee (CEC) of Hon'ble Supreme Court.



- The composition of **Forest Types of India** have drastically changed since 1969 (around 30 mil. hect. of plantations). ICFRE has recently published a book on "Forest Types of India Revisited". This will act as a

baseline for monitoring climatic changes in the forests of the country.

- **ICFRE: Vision 2040** was prepared by ICFRE. The Document addresses Food Security and Livelihood support, Biodiversity Conservation and ecological security, Forest Genetic Resource Management for Improving Productivity and Climate Change, its impact and mitigation strategies
- ICFRE has brought out a booklet titled "**Forestry Research ICFRE Supporting Rural & Tribal Livelihoods**". This booklet contains significant ICFRE research highlights viz. recent technologies, products, procedures and extension strategies, which would be of great use to the people especially, those living in the rural, forest fringe as well as forest areas, besides other stakeholders such as forest departments and industries.

## Forest Research Institute (FRI), Dehradun

### Research

- Two Field Germplasm Banks of important indigenous fodder tree species i.e. of *Grewia optiva* at Dudhli, Lachhiwala, Dehra Dun and of *Quercus leucotrichophora* at Magra Forest Division, Mussoorie were established.
- Natural Dyes were extracted from *Pinus roxburghii* and *Mallotus philippensis* under different medium. Dyes were also extracted from the culture of *Fusarium monaliform* obtained from NTCC, FRI by using distilled water as solvent and *Pycnoporous sanguinius* collected from field. Dyes thus extracted were applied on silk, wool and cotton fabrics and tested for colour fastness properties towards light and washing.

- **Biological control of Eucalyptus gall wasp in Punjab:** Work on the Biological control of Eucalyptus gall wasp *Leptocybe invasa* (Hymenoptera: Eulophidae) using parasitoid *Megastigmus viggianii* (Hymenoptera: Torymidae) was started and the parasitoid which was reared on the eucalyptus galls was released in Hoshiarpur district of Punjab.
- **Hispine bamboo borer-*Estigmene chinensis*:** Attack of *Estigmene chinensis* (Coleoptera: Chrysomelidae) and its intensity on different bamboo species were observed in the field. Eight green standing bamboo species- *Dendrocalamus longispathus*, *D. giganteus*, *D. asper*, *D. calostachyus*, *Bambusa wamin*, *B. tulda*, *B. multiplex*, *B. striata* were recorded to be damaged by it for the first time.

Screening of salt tolerant forest species especially for northern India was done. Effect of using brackish water for seed germination and survival of tree species was studied and brackish water tolerant species were screened based on their performance in the field.
- **Taxonomic studies of insects :** National Forest Insect Collection (NFIC) housed in the Forest Entomology Division, FRI, Dehra Dun holds more than 18,000 identified species of forest insects and this collection is being enriched by identifying the unidentified collection of parasitic Hymenoptera belonging to the families Encyrtidae and Eulophidae (Chalcidoidea) and new collection of Thysanoptera. Two new species one belonging to the family Encyrtidae *Lakshaphagus dehradunensis* Singh and Dobhal and second species, a thrips, *Streothrips anshumani* Chauhan were described from Dehradun. Leaf galls on *Murrya koenigii* were observed having the severe infestation of *Taeniothrips major*.
- **Interaction between *Pseudomonas fluorescens* and AM Fungi on *Dendrocalamus strictus*:** *In vitro* interactions between pathogens of poplar namely, *Alternaria alternata*, *Bipolaris* sp., *Curvularia ovoidea*, *Fusarium solani*, *Rhizoctonia* sp. and *Sclerotium rofsii* and fluorescent pseudomonads isolated from the rhizospheres of poplar (G-48 clone of *P. deltoides*) and bamboo (*Dendrocalamus strictus*) was conducted using Dual Culture method. The positive value of mean percent change in growth inhibition of fungal isolates was observed only in two fungi, *Curvularia ovoidea* and *Rhizoctonia* sp. signifying that bamboo strains of pseudomonads were superior over poplar. The absolute per cent inhibition of poplar pathogens revealed an interesting fact that isolates exhibited differential suppression of growth. Most of the pathogens were more suppressed by the siderophore barring *Rhizoctonia* sp. and *Sclerotium rofsii* underlining the fact that HCN producing antagonist, in some cases, may prove better than the siderophore producing antagonist.
- **Development of molecular diagnostic kits for identification and early detection of nursery and plantation pathogens of Eucalyptus:** From diseased eucalyptus samples, isolation of associated fungal species were made. Pure cultures of four isolates from the above samples were prepared in liquid cultures for DNA extraction. Using phenol-chloroform isoamyl alcohol procedure, the DNA



- extractions were made and later quantified. The ITS regions of nrDNA of different isolates were amplified.
- Field trials of superior 30 clones of *Populus deltoides* (poplar) at 8 sites are being monitored and maintained.. Nursery of 30 clones is being maintained. Germplasm bank of 350 clones of this species in form of stool bed is also being maintained. The germplasm maintained has been augmented to establish national germplasm bank of this species under the Forest Genetic Resources Management Network programme of ICFRE Dehradun.
  - Developed low cost technology for preparing handmade paper with good strength from Pine needle pulp and Jute fibres from recycled waste gunny bags. Gunny bags pulp was utilized in different proportions (20% and 30%) with pine needle for making handmade paper.
  - Organized five days' specialized training on Bamboo/ ringal handicrafts under National Bamboo Mission / BTSG- ICFRE for farmers/ artisans of the state of Uttarakhand from 24<sup>th</sup> to 28<sup>th</sup> June 2013.
  - Organized "Asia pacific workshop on forests hydrology water and forests-beyond traditional forest hydrology" from 23<sup>rd</sup> to 25<sup>th</sup> September 2013.
  - Consultancy Services in relation to conservation of heritage sites were provided to the following:
    - APSARA Authority, Cambodia and ASI for conservation of trees at Ta Prohm temple, Cambodia
    - Bodhgaya Temple Management Committee for maintenance and conservation of Bodhivriksha at Bodhgaya
    - Kurukshetra Development Board for the conservation of Vatvriksha at Jyotisar, Kurukshetra.

### Extension

- A five days *Training cum Workshop* on "Essential Oils, Perfumery & Aromatherapy" is organized in collaboration with Fragrance and Flavour Development Centre (FFDC), Kannauj. All together 32 participants from diverse fields and different corners of India participated in the programme. The Training cum Workshop provided a detailed exposure towards fundamental and applied aspects of processing, quality assessment and therapeutic benefits of essential oils and their applications in perfumery and aromatherapy for advancements of scientific knowledge, skills and entrepreneurship of the participants through lectures and practical demonstrations by experts from aroma industry, scientists and practicing aroma therapists.

### Patent

- FRI, Dehradun has filed a patent on 'A process for obtaining phytoecdysteroids from weeds of amaranthace for the synchronized maturation of mulberry silkworm' vide Indian Patent application No. 1401/DEL/2013

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

#### Research

- The products developed by the institute namely Hy-Act, Treepal (H) and Tree rich biobooster pellets have been evaluated and found their efficacy against pest and diseases of *Tectona grandis*, *Casuarina equisetifolia*, *Eucalyptus tereticornis*, *Ailanthus excelsa*, *Gmelina arborea*, *Syzygium cumini*, *Shorea robusta*, *Pterocarpus*, *Polyalthia*



*longifolia, Melia dubia, Delonix regia, Betulia, Swetinia mahagony, Pongamia pinnata, and Jacaranda.*

- Hy-Act and Tree PAL(H) was sprayed at the interval of 15days at early stage on the commercial crop plants like *Lycopersicon esculentum, Trigonella foenum, Sichuan pepper, Centella asiatica, Coriandrum sativum, Murraya koeingii, Allium sativum* and spinach which were affected by the sucking pests like aphids, white flies, leaf minor etc. In a single foliar spray over these crops controlled the aphids in six hours and no further attack was noticed by the farmer till harvesting. According to the farmer's report it was found that the Tree rich biobooster efficiently enhanced the growth of plant species like *Pterocarpus santalinus, Casuarina equisetifolia* and *Citrus medica var. limonum.*
- Germination percentage and growth performance were increased significantly in coir pith base media with FYM of bio-inoculants compost. The compost media is made into 20x60mm size using hydraulic pressure mechanism as an alternative to potting media for forestry nurseries. The effect of coir pith based organic biocomposts with bio-inoculants (Azospirillum and Phosphobacteria) on growth performance of *Casuarina equisetifolia* seedlings in nursery was observed.
- The Institute has established a Mother Bed Chamber Facility in an area of 180 sq. mt for vegetative multiplication of *Eucalyptus, Casuarina Ailanthus, Melia, Bamboos, Thespesia* and *Acacia.* This multiplication facility with ten propagation trenches has provision for misting, drip irrigation and fertigation. Each trench is filled with sand as the multiplication medium with

suitable drainage facilities. The trenches can accommodate a maximum of 9000 mother stools, which can be maintained to produce multiple shoots for large scale propagation. The nutrient management for the mother stools is essential to induce multiple shoot production, size of cuttings, rooting percentage and the survival percentage of plantlets produced. The sanitary quality of the medium and the conditions of humidity and drainage in the chamber are critical to ensure quality planting stock production. The facility is useful for mass multiplication of superior clones developed by the institute. Through this facility superior clones and planting stocks will be multiplied and made available to clients under direct to consumer program and also the extension of technology mission of IFGTB.

#### Extension

- A National workshop on "Eucalyptus Gall Wasp - Present Status and Future Strategies" was arranged on the 10<sup>th</sup> June 2013 at IFGTB, Coimbatore bringing together stake holders involved in large scale eucalyptus planting like Paper industries, State Forest Departments, Forest Development Corporations, farmers besides researchers who are actively working on the gall wasp and its management.
- A five day refresher training programme for the Indian Forest Service officers on "Forest Genetic Resource Management" is organized at IFGTB, Coimbatore from 16 to 20 September 2013, sponsored by the Ministry of Environment and Forests, Govt. of India. A total of 29 IFS officers at the level of Addl. Principal Chief Conservator of Forests, Chief Conservator of Forests, Conservator of Forests and District Forest Officers from Arunachal Pradesh, Assam,



Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Odhisa, Madhya Pradesh, Maharashtra, Jharkhand, Chhattisgarh, Uttarakhand, Gujarat, West Bengal, Sikkim, Bihar, Haryana, Punjab, Uttar Pradesh, and Jammu and Kashmir attended the said training programme.

- Dr. N. Krishnakumar, Director, IFGTB, delivering the presidential address, informed that the State of World's forest genetic resource is to be released by the FAO in 2014. The draft report reveals that out of the 80,000 tree species in the world, 8000 are endangered and only about 450 are being used in tree improvement programmes.

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

### Research

- *Eucalyptus tereticornis*, *E. eurograndis* and *Acacia hybrid* clones were studied for various anatomical, physical and mechanical properties. Studies on wood working qualities have also been carried out to evaluate their suitability as alternate material to the wooden handicrafts. Few prototypes were made with the help of artisans
- A microprocessor controlled vacuum oven for thermal modification of wood under different inert environments was designed and got fabricated. One computer and LVDT-based swellometer equipment was also designed and installed for measuring the swelling profile of wood samples in real-time to evaluate their dimensional stability. Heat treatments of wood of *Acacia auriculaeformis*, rubberwood and *Eucalyptus* spp. were carried out using different temperature profiles under

vacuum, nitrogen and atmospheric pressure in air. Various physical and mechanical properties and durability against termite and fungi were studied. Heat treated wooden planks have shown improved dimensional stability, water resistivity, darker pleasant colour and enhanced durability and were demonstrated for usage as flooring tiles.

- A survey has been carried out in sandal bearing areas of Karnataka, Tamil Nadu and Kerala states. Identified sandal trees of above 40 cm girth to validate the colour reaction based on enzyme activity in living bark tissue. of the 12 substrates identified for colour reaction, only 2 substrates – Benzidine and Guaiacol were found to be effective for distinguishing sandal plants in to low and high oil yielders. Of these two reagents Guaiacol is found to be cost effective, environment and user friendly and sharp colour to distinguish high and low yielders of oil in the standing tree. Core samples were taken using increment borer from the experimental plants and oil content in each plant was estimated using UV- spectroscopic method. These results are then compared with developed colour reaction in each plant for verification. Further refinement has been made to estimate oil content in standing tree by measuring colour intensity using portable colorimeter. Growth and climatic factors (of the location) were recorded to correlate with quality and yield of heartwood and oil content.
- *Acacia auriculaeformis* logs of two different age groups of known year plantation were converted into planks for air seasoning. Assembly of joint and curing of adhesives work done. Evaluation of joints performance through testing of finger

joints for MoE & MoR were carried out. While analysing strength of finger joints by using different adhesives, the preliminary investigation shows that Phenol resorcinol formaldehyde (PRF) gives more strength comparing other adhesives.

- Test panels of different materials immersed at test sites at Kakinada and Narsapur ports for making observations on settling behavior of different fouling organisms. Major fouling organisms at Narsapur were bryozoans, balanids and serpulids and at Kakinada, bryozoans, balanids, serpulids and oysters. Major groups of foulers were bryozoans, balanids, serpulids and ascidians at Tuticorin and serpulids, balanids, and oysters at Chennai.

#### Extension

- Participated in Vendor Development and Technology Show organized by Peenya Industries Association along with Government of Karnataka from 6<sup>th</sup> – 8<sup>th</sup> June 2013. The Institute exhibited the technologies viz Prototypes of alternate timbers, WPC technology, Bamboo treatment technology and Sandal QPM production technology. The exhibition was organized at Bangalore International Exhibition Centre, 10<sup>th</sup> Mile, Tumkur Road, Madavara Post Dasanapura Hobli, Bangalore.
- A workshop on “Recent Advances In Biofuels” was conducted in collaboration with Karnataka State Biofuel Development Board (KSBDB) and Karnataka State Council for Science and Technology (KSCST) on 22<sup>nd</sup> and 23<sup>rd</sup> November 2013. The workshop included special lectures on Biofuel development and presentation by the Principal Coordinators of 32 different District Biofuel Information and

Demonstration centers from 30 districts of Karnataka followed by a panel discussion. The workshop was inaugurated by Shri. A K Monnappa IAS, Managing Director, KSBDB. Prof Udipi Shrinivasa, Member, KSBDB delivered the keynote address.

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

##### Research

- A study on carbon sequestration conducted in 139 forest blocks in Jodhpur indicates large variation in soil organic carbon stock and highest carbon stock was recorded of 229.6 tons/ ha. in Luni and Osian ranges.
- *Bruchidius bilineatopygus* was identified as major pest on *Prosopis cineraria* seeds.
- Three litter decomposing fungi, *Trichoderma viride*, *Aspergillus niger* and *Streptomyces* were selected for rapid composting process. Aerobic composting (heap method) by using indigenous strain of *Trichoderma viride* (500gm in 20 kg FYM) + PSB (250ml in 20 lit. of water) + dried leaves has taken 90 days, whereas in traditional process, it takes about 120 days.
- Germplasm of *Commiphora wightii*, a threatened medicinal plant collected for ex situ conservation from identified 117 CPPs. Progenies of 10 CPPs were evaluated for apomixis behavior of these CPPs. DNA and Isozyme marker studies revealed that many of these CPPs produces genetically different progenies of guggal. Guidelines for seed germination in nursery bed and vegetative propagation have been developed of *C. wightii*.
- With the objective to develop methodology for enhanced/non-destructive gum



production, Ethephon (a plant growth regulator) injection based method is worked upon in arid conditions and method gave very encouraging results and Guggul plants are surviving even after three time gum exudations. The optimum concentration of ethephon to induce average production of gum with minimum injury to the tapped plants is between 150 to 300 mg under arid conditions as no casualty took place despite being tapped for three times in four years. The yield ranging from 50.0 to 80.0 g per plant.

- Demonstration trial of male and female plants of *A. excelsa* revealed that female plants are taking lead in growth and difference is also increasing gradually.
- For cloning of CPT of *P. cineraria*, shoot multiplication has been achieved from mature stem nodal segments from axillary buds and *in vitro* rooting was achieved on MS medium supplemented with 3mg/l IBA.
- The eco-biology of khejri root borer *Acanthophorus serraticornis* has been completed. The complete life cycle ranged from 850-900 days with an average  $835.97 \pm 69.70$  days. A gravid female beetle can lay an average of  $110.50 \pm 15.81$  eggs in  $11.25 \pm 1.19$  days during its oviposition period. An average incubation period of  $40.87 \pm 3.87$  days has been recorded with 5 larval instars. Total larval period ranged between 650-700 days with an average of  $675.50 \pm 45.00$  days. An artificial diet for rearing of larvae in the laboratory condition has been standardized

### Tropical Forest Research Institute (TFRI), Jabalpur

- Organized one week specialized training programme on 'Bamboo Handicrafts for

Farmers & Artisans of Madhya Pradesh and Chhattisgarh' from 24<sup>th</sup> to 28<sup>th</sup> June 2013 under BTSG-ICFRE (NBM) programme.

- Organized a three days training programme on "Cultivation of Medicinal Plant for other stakeholders", from 8<sup>th</sup> to 10<sup>th</sup> July 2013, sponsored by the Ministry of Environment & Forests (GoI), New Delhi. 36 participants attended the the training programme.

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

#### Research

- Carried out a survey covering Kohima district of Nagaland to collect wild edible mushrooms under the project "Studies on ecological and ethno mycological aspects of wild mushrooms of Nagaland". A total of 34 mushrooms belonging to the species of *Strobilomyces strobilaceus*, *Boletus zellere*, *Termetomyces heimii*, *Xylaria hypoxylon*, *Leccinum scabrum*, *Russula alnetorum*, *Russula aeruginea*, *Hygrocybe miniata*, *Clitocybe fragrans*, *Clitocybe odora*, *Lactarius delivieri*, *Aminita rubrovalvata*, *Chlorophyllum olivieri* and *Mycena flavoalba* were collected. Of which, five spp. were edible and 29 spp. were non edible.
- Studies on the "Effect of the endomycorrhiza along with other bio-agents on biomass production, conservation and accumulation of some phytochemicals in *Abroma augusta* L. were carried out. Seedlings of *Abroma augusta* L. were inoculated with bio-agents for biomass production. Analyzed 3 samples through rapid clearing technique and wet sieving and decanting technique for % Root colonization, quantification and Wakesman's method for screening of beneficial microbes (bio-agents). Fungal staining and Photography for identification

of fungal strains was done for 5 samples. Isolation of 4 beneficial bacterial strains and multiplication in Nutrient broth for further experiment to conduct was made. Sub-culturing of *Trichoderma* culture was done. Mycorrhizal spore count for 3 rhizospheric soil samples and Identification of bacterial strains with the help of Gram's stain was carried out.

- Completed socio-economic survey of 14 villages of Chandel district of Manipur, 9 villages of Cachar district of Assam and 15 villages of Lower Dibang valley of Arunachal Pradesh; socio-economic survey of 16 villages and vegetation sampling of 6 fringe forests in Tamnlong district of Manipur; socioeconomic survey of 11 villages with 3 vegetation sampling in Ri-Bhoi district of Meghalaya, 13 villages with 4 vegetation sampling in Ukhrul district of Manipur and socioeconomic survey of 11 villages with 3 vegetation sampling in Karmganj of Assam under the project "Identification forest lands in forest fringe village under NRAA".

#### Extension

- RFRI, Jorhat and SAARC Forestry Centre, Bhutan organized expert group meeting on Adaptation to climate change impacts and risks to different forest types of South Asia at RFRI, Jorhat from 22<sup>nd</sup> to 24<sup>th</sup> October 2013. Delegates from India, Bangladesh, Bhutan, Maldives, Nepal & Srilanka participated in the deliberation.

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

##### Research

- With the recording of new species under the genus *Nesticella* in India at HFRI, Shimla, one more Spider family "Nesticidae"

has been added to the already existing literature on the classifications of spiders in the country.

- Effect of field trial of Baculovirus on IGM, was evaluated in the field by counting per cent of egg-mass produced in the oak forest at Charwag, Sarahan.

#### Extension

- Organized three days training and demonstration programme on Cultivation of Important Temperate Medicinal Plants sponsored by Ministry of Environment and Forest, Government of India, New Delhi for other Stakeholders at Atal Bihari Vajpayee Mountaineering and Allied Sports Institute, Manali (HP) from 22<sup>nd</sup> to 24<sup>th</sup> May 2013. This training programme was attended by 50 participants from other stakeholders comprising of Pradhans Gram Panchayats, Non Governmental Organizations, Representatives from herbal industry etc.
- Organized a one day meeting on "Networking of Van Vigyan Kendras with Krishi Vigyan Kendras" on 30<sup>th</sup> August 2013. The meeting was attended by about 30 participants including Programme Coordinators of KVK's of Jammu, Kathua, Mandi, Bilaspur, Shimla, Solan, Kullu.

#### Institute of Forest Productivity (IFP), Ranchi

- Conducted one week training programme on "Rural livelihood promotion through scientific lac cultivation and management" sponsored by the Ministry of Environment & Forest, Govt. of India from 24<sup>th</sup> to 28<sup>th</sup> June 2013. The said training programme was attended by Panchyat Mukhia, NGOs and farmers.



### Comparison of progress via-a-vis that achieved in previous years:

A study to assess the present status of composition of Forest Types of India was conducted by ICFRE throughout the country. As a result of the study a book titled "Forest Types of India Revisited" published.

Highlighting the people centric approach of the ICFRE, an important publication during the year was a booklet titled "Forestry Research ICFRE Supporting Rural & Tribal Livelihoods". ICFRE also come up with a document- "ICFRE: Vision 2040" depicting the course of activities of ICFRE in the years to come.

Activities including publication of literature, training and exposition etc. have been undertaken in Van Vigyan Kendras. Besides, the regular activities, training and other activities have also been undertaken in collaboration with KVKs of ICAR

### Budget allocation and Progress of expenditure during 2012-13

Budget Component	Budget allocation by MoEF for 2012-13 (Rs. in crore)	Progress of Expenditure upto November, 2013 (Rs. in crore)
Plan	143.66	77.88
Non-Plan	24.10	16.99

### Implementing organization along with details of responsibilities:

Indian Council of Forestry Research and Education, Dehradun

- To develop holistic forestry research through planning, promoting, conducting and coordinating research, education and extension on all aspects of forestry.

### Empowerment of women/ weaker sections matters

- FRI, Dehradun conducted training on Diseases of Agro-forestry trees and their Management to the farmers at KVK Yamuna Nagar on 1<sup>st</sup> October 2013.
- Dr. Baba sahib ambedhkar Birth anniversary celebrated at IFGTB. Chief Guest, Prof. D.J. Jayaharan, Centre for Social Analysis, Madurai delivered a lecture on 'Democratization of Indian Society'.
- TFRI, Jabalpur under BTSG-ICFRE (NBM) programme organized one week specialized training programme on Bamboo Handicrafts for Farmers & Artisans of Madhya Pradesh and Chhattisgarh from 23<sup>rd</sup> to 27<sup>th</sup> September 2013.
- RFRI, Jorhat organized five days training on 'Bamboo Handicrafts' from 22<sup>nd</sup> to 26<sup>th</sup> July 2013. Sixteen participants including women from three villages viz. Madhupur, Gobindpur and Bhogpur participated in the training. The participants made several bamboo artisans like bed, trays, flower pots, belts, fans, bangles, pens, resting chairs, wall hangings etc.
- RFRI, Jorhat organized training-cum-workshop on Bamboos Handicraft (*Direct to Consumer Programme of ICFRE*) from 26<sup>th</sup> September - 5<sup>th</sup> October, 2013 for trainees of Dibrugarh, Tinsukia, Sibsagar and Jorhat district of Assam under the Project "Capacity building, skill up-gradation of artisans and promotion of traditional Bamboo handicraft and art with improved technology, suitable design and value addition".
- RFRI, Jorhat organized training-cum-workshop on *Agarbatti* sticks making on 5<sup>th</sup> September, 2013 to the SHG members of Nemuguri, Sibsagar area and provided



hands on training. Different product of bamboos were also presented during the seminar.

- RFRI, Jorhat organized a hand on Training on 7<sup>th</sup> October 2013 to the Women SHG on Agarbati stick making at Meleng Balichapori, Jorhat. A lecture was delivered on product diversity of bamboo and marketing prospect of the product

**Important Committees/ Commissions – separately for those continuing and new ones constituted – their composition, terms of reference, progress made.**

**Committee to examine and propose the structuring of ICFRE, Dehradun (Gautam Committee)**

**Composition**

- i. Dr. P.L. Gautam, Chairperson, Protection of Plant Varieties and Farmer’s Right Authority (PPVFRA), New Delhi- Chairman
- ii. Dr. Ram Prasad, IFS- Member
- iii. Dr. J.K. Rawat, IFS- Member

**Terms of Reference (ToR)**

- i. To review the current functioning of ICFRE w.r.t. processes and systems for achievement of the mandate.
- ii. To assess the strengths and weaknesses of ICFRE
- iii. To suggest measures for strengthening and revamping ICFRE

**Committee to examine and suggest ways for making ICFRE self reliant and less dependent on Ministry (Vandana Agarwal Committee)**

**Composition**

- i. Smt. Vandana Agarwal, EA- Chairperson
- ii. ADG (Admin), ICFRE- Member
- iii. Director (FF)- Member
- iv. DIG(RT)- Member Secretary

**Terms of Reference (ToR)**

- i. To examine the expenditure pattern both Non- Plan and Plan of ICFRE during 11th Five Year Plan
- ii. To suggest measures to strengthen the ICFRE by suggesting ways to reduce dependence of ICFRE on the Ministry’s budgetary support.

**Committee to examine the consultancy rules of ICFRE (ASFA Committee)**

**Composition**

- i. Additional Secretary and Financial Advisor, Ministry of Environment and Forests, New Delhi – Chairman
- ii. Shri Surjit Singh, Joint Secretary to the Govt. of India, Ministry of Environment and Forests, New Delhi – Member
- iii. Dr. Sudhanshu Gupta, Secretary, ICFRE- Member

**Work Sphere**

The Committee has to examine the consultancy rules of ICFRE and come up with the recommendations, in line with the extant rules of DOPT on the subject of consultancy/ honorarium.

**Conferences, including nature of participation, subjects discussed, outcomes, and implementation/ action taken on its outcomes**

- ICFRE and FRI, Dehradun organised a one day workshop on “Innovations for Forest Carbon Finance in India” in collaboration with M/s. Welspun Energy Limited on 28<sup>th</sup> May 2013 at FRI, Dehradun. Thirty eight participants from different organizations attended the workshop.
- ICFRE conducted a one- week refresher course on Forest Research Methodology for IFS officers from 2<sup>nd</sup> to 6<sup>th</sup> September



2013. The main objective of the course was to orient the participants in latest techniques and research being carried out in the various disciplines of the forestry sector and also to expose them to the statistical methodology being followed. A wide spectrum of topics was covered under the programme from basic research in Silviculture, designs for nursery and fields, solutions to insect pest problems, evaluation of eco-system goods and services to applications of nano- technology, Geographical Information System, Remote Sensing etc. A panel discussion on Improvement in the working of Forest Departments-need for career development through training and improvement of skills was also conducted.
- ICFRE, Dehradun organized two days training workshop for the district level officers of line department of Uttarakhand State on 12<sup>th</sup> and 13<sup>th</sup> September 2013 on "Conservation of Biodiversity and sustainable livelihood in Watershed Management". Twenty district officers from different parts of Uttarakhand are participating in the training workshop. The training workshop is sponsored by Watershed Management Directorate, Dehradun.
  - ICFRE organized a one week DST sponsored training programme on "Climate Change and Carbon Mitigation" for scientists and technologists working in Government Sector from 21 to 25 October 2013. Twenty seven participants from different research institutions, departments and universities participated in the training programme.
  - ICFRE organized one week DST training programme on "Forest Ecosystems and Biodiversity, Climate Change: Vulnerabilities and Adaptation Strategies" from 9<sup>th</sup> to 13<sup>th</sup> December 2013 ICFRE, Dehradun and sponsored by Department of Science and Technology, New Delhi, Government of India under the National Programme for training of Scientists and Technologists working in Government Sector. Twenty Five participants representing 14 States of India and belongs to various scientific organizations of the country participated in the training programme.
  - IFGTB, Coimbatore organized a two days training workshop on "Bio prospecting – role of state forest departments" for Indian Forest Service (IFS) Officers was held during 1<sup>st</sup> and 2<sup>nd</sup> August 2013 sponsored by Ministry of Environment and Forests, Govt. of India, New Delhi. Twenty five (25) officers from thirteen states attended the workshop. Since forests have tremendous potential for bio prospecting values and it is the right time to conserve our biological wealth for social and livelihood security. Hence, MoEF is planning to establish National Bureau of Forest Genetic Resources and IFGTB has been identified as a nodal agency to develop FGR management network. Conservation and sustainable utilization of our biological diversity is the step-in process for Bioprospecting. A book on "Bioprospecting in Forestry: Scope, Challenges and Prospects" was also released during the two days workshop.

### **Indian Institute of Forest Management (IIFM), Bhopal**

The Institute, as a sectoral management institute, imparts education in forest management, which is a judicious mixture of



**Fig-44.** Convocation programme at IIFM, Bhopal

forestry, social, and management science. The Institute constantly endeavours to keep in touch with the problems of people, especially the forest dwellers and undertakes need-based research. The Institute tries to serve as a reservoir of knowledge in the area of forest management and ensures proper integration of external and indigenous knowledge suitable to Indian context.

The specific objectives of the Institute are:

#### **Education and Training**

- To meet the demand for the trained human resource with managerial and analytical skills in the areas of forestry, environment and development management through regular educational courses.

- To update the knowledge and managerial skills of the serving professionals in the above areas through short-term training Programs.

#### **Research and Consultancy**

- To generate information on field realities and derive meaningful interpretation through systematic research.
- To offer consultancy services to the client organizations based on the available expertise.

#### **Dissemination**

- To disseminate the research-based information/knowledge and meet the information needs of the forestry, environment and allied sectors through training, seminars and publications.



## Databases and Information Systems

- To generate and maintain relevant databases that are essential for policy formulation, project planning and strategy development in forestry, environment and allied sectors
- To develop an Information Management System, which is compatible with and easily accessible for all users, i.e. from local (community) to global level.

## Policy Formulation, Analysis and Advocacy

- To function as a national 'think tank' on forestry and environment aimed at developing appropriate policies and strategies.
- To play an advocacy role in the sectors of concern to promote adoption of appropriate policies and implementation strategies and safeguard the genuine interests of the disadvantaged stakeholders whenever necessary without compromising national interests.

## Research

- Research constitutes one of the core activities of the Institute and during the year IIFM completed 07 research projects, out of which 06 were sponsored by IIFM and one was externally sponsored project. Currently, there are 08 ongoing research projects at the Institute, out of which 07 projects are externally sponsored.

## Centres of Excellence

### International Centre for Community Forestry (ICCF)

The International Centre for Community Forestry (ICCF), functioning as a "Centre of Excellence" was established at the Institute's Campus on January 14, 2000 to cater to the growing need and interest in Community

Forestry initiatives. The centre emphasizes upon strengthening the country's community forestry policy, rural livelihoods support system and development of small scale enterprises to support millions of people who depend and care for forests and its management.

The Centre has entered into an agreement with Indo-European Chamber of Commerce & Industry (IECCI), Bhopal for the purpose of technical collaboration in various fields of Research & Development at regional, national and international level on case-to-case basis. This technical collaboration has the following scope of work:

- Identification and exploration of viable areas of work and projects as mutually decided and in consonance with the Articles and aims and objectives/mandate of both the parties;
- Preparation of feasibility report and collaboration in project implementation;
- Maintaining close rapport and strong PR with the Government departments, public sector, corporate through private sector, Industries, Organizations, Institutions for tapping funds from regional, national and international agencies;
- Joint participation in tenders, EOI, RFP, RFQ and Bidding for projects from government, semi government institutions and organizations, execution of the projects and final clearance certificates/ completion certificates and to do all related activities with regard to procurement and execution of the projects.

### Center for Ecological Services Management (CESM)

The Centre for Ecological Services Management (CESM) has been set up as an interdisciplinary centre to address crucial

policy issues associated with the complex relationship between ecological, social, economic, legal and institutional aspects of ecosystem management. Several initiatives have been taken by organisations on the issues of environment and development in south and south East Asia, but the number of professional organisation working on the related issues on valuation and developing markets and incentive based mechanism ecosystem services is very small. CESM specifically addressed this crucial gap and would undertake research, consultancy, teaching, training activities as well as prepare data base on the values of ecosystem services, develop and standardise techniques of valuation of ecosystem service and impact studies of degradation. It also networks with national and international organisations in the NRM Sector for promoting professional exchange.

The centre has focus on ecological services like water production and watershed conservation, carbon sequestration, biodiversity conservation and bio-prospecting, ecotourism and landscape conservation are being addressed for the forest, mangroves, water resources, wetlands, agroforestry and landscapes including grassland ecosystems mainly in Trans Himalayan and Himalayan region, Western ghats, Eastern mangroves and Islands. The Areas of work of the Centre include Ecosystem services physical estimation, data generation, ecosystem modelling, estimation and valuation of carbon sequestration, biodiversity conservation, watershed protection, landscape beauty etc., environment and conservation finance, impact assessment, developing market for ecological services, issues relating to instruments for ecosystem service conservation like tradable permits, CDM, taxation and subsidies, ecological services and livelihood management, institutions

and environmental governance process for sustainable management of economic services.

### **Center for Sustainable Forest Management & Forest Certification (SFM & FC)**

Forest Certification has emerged as an important market driven tool and a mechanism for assessment and monitoring of forest and forest products. It is a process that leads to the issuing of a certificate by an independent party, which verifies that an area of forest is managed to a defined standard. The centre for SFM & FC represents IIFM as member in both the National Working Group as well as the National Forest Certification Committee, constituted by Govt. of India. The centre is expected to generate the pool of knowledge and understanding on the emerging field of Sustainable Forest Management & Forest Certification for the benefit of forestry sector in the country.

### **Center for Livelihood Management**

Centre for Livelihood Management's mission is "Sustainable Livelihood Enhancement of Communities including Poor, Marginalized and Women". The centre acts as a Resource Centre for Stakeholders in the area of training, research, documentation, consultancy, network and advocacy activities. It provides a forum for influencing the programmes and policies related to livelihood. It also strives for dissemination of technology and approaches which can sustain livelihood. The stakeholders would include government officials implementing various development projects for livelihood enhancement, personnel from NGO and Civil Society organisations, representatives of Panchyati Raj Institutions and Communities.



### Centre for Climate Change Studies

The vision statement of the Centre for Climate Change Studies is “to generate scientific evidence and strengthen advocacy for climate change deliberations and actions”. As prescribed in its annual plan, the Centre will generate data base on climate change negotiations, outcomes, mitigation, adaptation and low carbon technologies consistent with the objectives of NAPCC, International obligations & National policies; networking with other National institutes; and undertakes capacity building programs for relevant stakeholders.

### Centre for Policy

The functions and activities of the Centre for Policy are to: (i) Develop data base; (ii) Organize expert consultations and draft policy analysis; (iii) Pre-Policy impact assessment studies; (iv) Provide inputs to the MOEF and actively participate in International negotiations related to Forestry & Environment; (v) Engage in continuing education through Institute’s educational Programmes of PGDFM, M.Phil & FPM.

### Centre for Application of Management Techniques in Government

The Centre has been established to build awareness among policy makers and resource managers about the Management Tools and Techniques. The Centre’s objectives are: (i) To identify and document the relevant management tools and techniques regularly; (ii) To evolve methods and processes for transfer of such tools and techniques to the policy makers and Resource managers; (iii) Measure and monitor the adoption and application of such tools and techniques in the Government sector.

### Regional Center for National Afforestation and Eco-development Board (RCNAEB)

The Regional Centre for National Afforestation and Eco-development Board, (RCNAEB), came into existence in year 1989 at the Institute. Since then the Centre has been working in the areas related to afforestation and eco-development in the States of Madhya Pradesh, Chhattisgarh and Odisha as per the mandate contained in the Memorandum of Understanding (MoU) signed between the National Afforestation and Eco-development Board (NAEB), MoEF, Gol and IIFM.

The main focus area of this Regional Centre is National Afforestation Programme (NAP) of MoEF, GOI which aims at supporting and accelerating the ongoing process of devolving forest protection, management and development functions to institutions of Joint Forest Management i.e. Joint Forest Management Committees (JFMCs) at the village level, and Forest Development Agencies (FDAs) at the forest division level. RCNAEB, Bhopal is supporting the JFMCs, which are the main organs of Joint Forest Management in capacity building at the grassroots level. This decentralised two-tier institutional structure (FDAs and JFMCs) allows greater participation of the community, both in planning and implementation, to improve forests and livelihoods of the people living in and around forest areas in addition to significantly empowering the local people in participating in the decision making process.

During the year 2013-14, the Centre is carrying out 02 research studies; 03 monitoring & evaluation studies; 03 documentations; 03 workshops; 01 training programme and 05 awareness raising programmes.



## Publications

The Institute continues to disseminate its research findings to the larger audience through its own publications and also by publication of research papers in reputed journals, books and also by presentation of papers in national and international conferences. The faculty also participated and presented research papers in national and international conferences.

## Other Activities

The year 2013-14 was marked by significant progress in different areas of academic activities necessary for the holistic development of the students. Student and Alumni Affairs Council (SAAC) is the student body headed by SAAC Chairperson at the Institute. SAAC constitutes 11 different clubs and cells.

## Budget Allocation & Progress of Expenditure

₹ 75 crores has been approved for the Institute for the XXII Five Year Plan period.

During the financial year 2013-14, the total grant sanctioned to the Institute was ₹13.52 crores, out of which ₹11.18 crores was towards Plan Expenditure and ₹2.34 crores towards non-plan expenditure. The Corpus fund of the Institute is expected to be ₹57 crores by 31.03.2014.

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

### Introduction

At the Initiative of Indian Plywood Industry and with participation of Council of Scientific and Industrial Research (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 vision and objectives reflect the changing need of the Plywood and wood Panel Industry of India. IPIRTI's headquarters is at Bangalore and field stations are at Kolkata and Mohali.

With the need for conservation of natural forests, Government of India imposed ban on the felling of natural forests. This drove the forest based industry to seek alternate resources and need for engineered wood. 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 work done in the Year 2013-2014

### - Bioefficacy Study of Colemanite against Wood Destroying Organisms

Wood and wood-based panel products are susceptible to damage from various wood destroying organisms like fungus, borers and termites. Recently, great interest has been focused on wood preservatives that are relatively cost-effective chemicals and



have minimal toxicity to mammals and the environment. In the present invention an ecofriendly and economical wood preservative chemical i.e. colemanite was tested against various wood destroying organism Colemanite, also called as hydrated calcium borate hydroxide, is a borate mineral found in evaporate deposits of alkaline lacustrine environments.

It is a secondary mineral that forms by alternation of borax and ulexite. As this chemical is not toxic to human beings and other mammals, it has been chosen for the present work on assessing the efficacy against various wood destroying organisms. Colemanite at 1% concentration is the lethal dose found in the present investigation to make plywood free from wood destroying organisms. In India this is the first report where colemanite is used in the preservation of plywood.

– **Development of Soya Based Resin for Manufacturing Plywood**

Phenolic and amino resins have been the preferred adhesives for the production of weather and moisture resistant wood-based panel products. Environmental concerns and the higher cost of petroleum based resins have resulted in the development of technologies to replace phenol by bio-materials for panel production. Natural bio-materials such as Cardanol (CNSL), tannin for phenol in the development of PF for panel products, lignin etc. have been tried as substitutes.

Hence a study was initiated to develop phenol-soya formaldehyde adhesive for the manufacture of exterior grade plywood. About 25-30% substitution of phenol by soya was optimized for

making exterior grade plywood having strength properties conforming to relevant specifications (IS: 848-2006 and IS: 303-1989). The adhesive developed meets the requirement of IS 848: 2006 for boiling water proof grade plywood. The panels were evaluated for mechanical properties as per IS: 303:1989 and the results conform to the requirement of relevant specifications

– **Development of Medium density Fibre board (MDF) from Plantation grown timber Species Grevillea robusta (Silver Oak)**

There is an increase in production of industrial wood from Agro/Farm forest due to withdrawal of forest areas from industrial production in order to provide for environmental, recreational, and other social needs. Use of plantation grown species for different panel production poses different challenges in processing due to inherent defects present in the plantation species. This study was conducted to determine the suitability of plantation grown timber Species Grevillea robusta (Silver Oak) as a raw material for the manufacture medium density fiberboard (MDF). Refining parameters for the manufacture of fibres were optimised. It has been found that 0.3mm disc gap, 6 bar pressure is sufficient for the manufacture of fibres suitable for the manufacture of Panel from Silver oak species. MDF panels of size 0.3 m x 0.3 m x 12 mm were made using urea formaldehyde resin and tested as per IS 12406-2003 "Specification for MDF for general Purpose". The results showed that all physical & mechanical properties of the panels were above minimum requirements for MDF as specified in IS-12406-2003

standards. These results indicate that MDF can be made from fiber derived from Silver oak. Additional work is needed to ascertain the performance of MDF panels from this species through pilot- and production scale trials.

– **Energy Efficiency in Bamboo Based Housing – Sponsored by NMBA, New Delhi.**

In this project, Studies were conducted on four types of bamboo based houses namely IPIRTI-TRADA Bamboo House, Timber Prefabricated Bamboo House, Steel Prefabricated Bamboo House and Mud Bamboo House and compared with conventional RCC house of the same size. The total embodied energy of the buildings constructed using bamboo and its composites is 3 times less when compared to R.C.C. Buildings.

The houses built using bamboo and its composites are almost half the cost of the buildings constructed with conventional building materials and operational costs are also less. When we look into occupant health and safety in case of fire hazards, the bamboo composites used as walling and roofing material showed better performance in less smoke production, fire growth & CO, CO<sub>2</sub> release when compared with other conventional materials such as FRP sheet or poly carbonate sheet. The roof temperature of bamboo composite sheet is 4-6°C less when compared with the R.C.C. Roofing sheet. Based on the detailed study carried out, thermal comfort inside the bamboo based houses showed better performance when compared to RCC houses. The earthquake resistant feature of the buildings constructed using bamboo and composites is much superior

to the other conventional buildings. Hence Bamboo based housing technology is very much suitable for making cost effective eco-friendly houses.

### Completed Research Projects

- Development OF uv& Weather Resistant Coating for Wood based Panel products and Bamboo Composites.
- Development of alternative preservative treatment procedure for marine/shuttering grade plywood.
- Development of Soya Based Resin for Manufacturing Plywood.
- Evaluation of New Boron Fixation System for Wood Preservation.
- Effect of cassava flour as an extender in UF and PF resin on the bond quality of Plywood.
- Life Cycle assessment of Plywood and Bamboo Composite Products – Sponsored by CT division of MoEF, Govt. of India
- Study on Substitution of conventional Extender/Filler with XTRA BOND of different grades.
- Exploratory studies on the Utilization of Industrial waste for the development of wood-plastic composites

### New Infrastructure for Research Established at Institute

- **LCR meter** was procured to study and analysis of dielectric and electrical (conductivity & Impedance) properties of wood and Bamboo based materials. **LCR meter** is used to measure the inductance (L), capacitance (C), and resistance (R) of a component or panel. LCR meter have selectable test frequencies. Studies were carried out on panel products for specialized application such as insulation.



Fig-45. Spot-billed duck (*Anas poecilorhyncha*) beautiful migratory bird

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

#### Research Projects Wildlife research

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, 6 research projects were completed and 43 projects were ongoing. The Institute worked on the following important research activities during the reporting period:

- **Planetary Micro Ball Mill** was installed. Study and analysis of nano coating on wood panel products as low flammability properties. A **ball mill** is a type of grinder used to grind materials into extremely fine powder for use in mineral dressing processes, paints, pyrotechnics, ceramics etc. The nano sized particles of different chemicals thus obtained will be used to study the surface properties, resistance to external agencies etc.

### Budget Allocation

A sum of ₹7.52 Crores towards PLAN Expenditure and ₹2.3 Crores towards NON-PLAN Expenditure is allocated for 2013-14.

### IPIRTI Industry Meet

Two IPIRTI-Industry meet organized at Mohali and Kolkata.

### Wildlife Research

#### Wildlife Institute of India (WII), Dehradun

##### Introduction

Wildlife Institute of India (WII) was established in 1986 as an autonomous institute



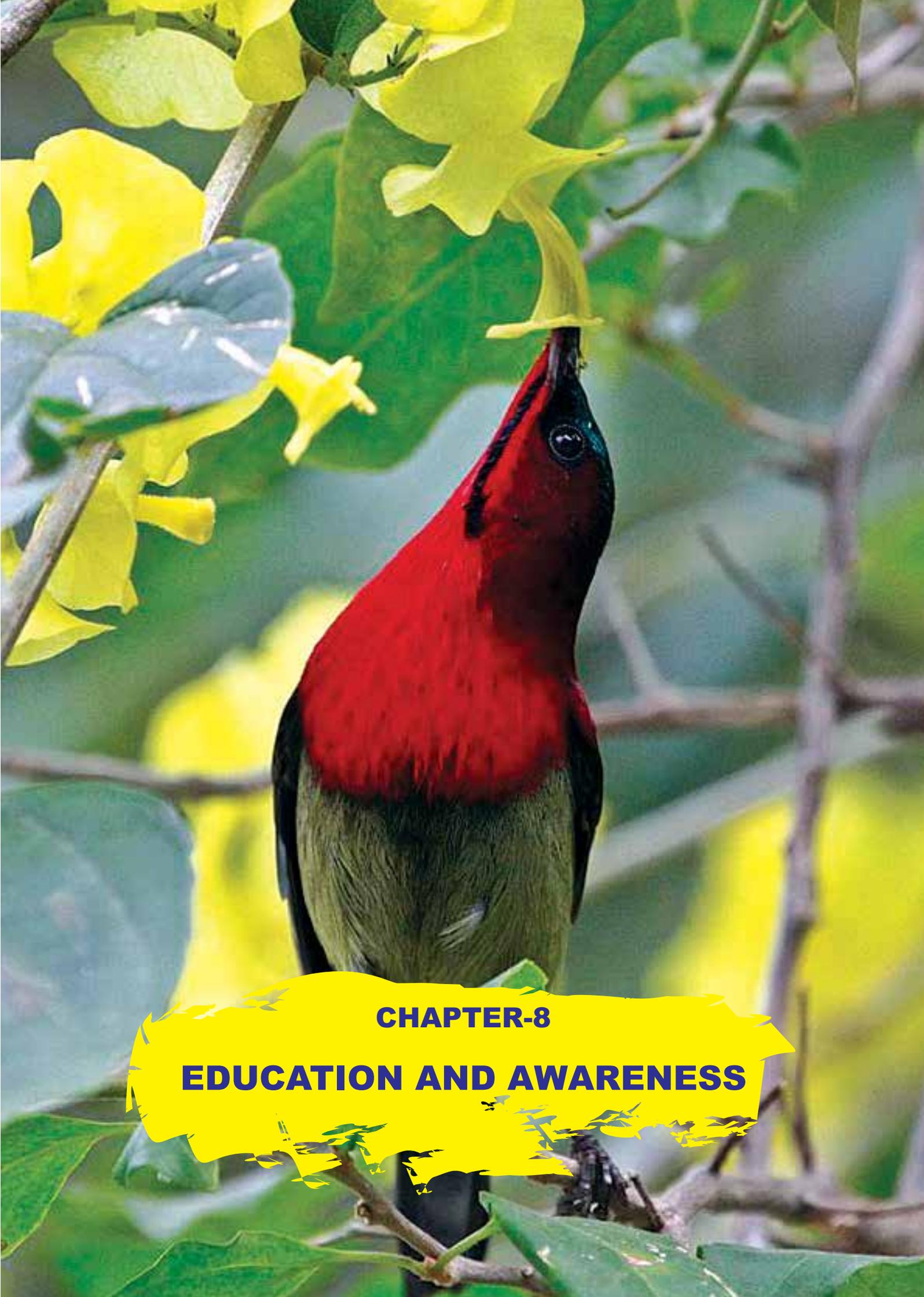
### **Country-wide Tiger Status Estimation**

The National Tiger Conservation Authority (NTCA) has mandated Wildlife Institute of India to assess country-wide status of tiger, co-predators, prey and their habitat for the year 2013-14. The project commenced in 2013 wherein 5 regional training workshops were conducted. Field guide was printed in 9 regional languages and distributed in 18 tiger range States. Currently, a team of 56 biologists is working in different tiger landscapes to estimate tiger and carnivore status by remote camera trapping and prey population status by Distance Sampling.

### **GOI-GEF-UNDP Marine Programme - "Mainstreaming coastal and marine biodiversity conservation into production sectors in East Godavari River Estuarine Ecosystem (EGREE), Andhra Pradesh"**

The Ministry of Environment and Forests, Government of India constituted a

National Project Steering Committee (NPSC) to execute and monitor the activities related to GOI-GEF-UNDP Marine Programme "Mainstreaming coastal and marine biodiversity conservation into production sectors in EGREE, Andhra Pradesh". The NPSC delegated the task of preparing proposal for conducting research studies on 'Climate Change impact on Coastal and Marine Ecosystem' and 'Payment of Ecosystem Services of EGREE' to the Wildlife Institute of India, Dehradun and also for establishing Knowledge Management System (KMS) for GEF Coastal and Marine Programme (IGCMP). Wildlife Institute of India prepared a report on 'Identification and prioritization of research gaps in conservation of coastal and marine biodiversity conservation in EGREE' and research studies are ongoing in this landscape.



**CHAPTER-8**

**EDUCATION AND AWARENESS**

## Environmental Education, Awareness and Training

### Introduction

The emergence of environmental issues at the top of the global agenda in the context of climate change concerns underline the need for collective endeavour for protection of environment. This warrants informed and voluntary participation of all sections of the people in the movement for conservation and participation of environment. Awareness of people about emerging environmental issues and the interconnections between the life styles and environment is an essential prerequisite for such participation.

Population increase, rapid urbanisation and industrialisation, increasing needs of energy etc., have impacted the availability of natural resources besides denting the quality of environment. The environmental damage already inflicted cannot be reversed unless there is collective thinking, will and effort. These call for public awareness and participation for bringing about an attitudinal change and finally restricting further damage to the environment. Effective implementation of environmental management and conservation programmes depends on education, awareness raising and training in the relevant areas. Without an adequate awareness of the impending challenges and their implications, few people would be motivated to participate actively in programmes on environmental conservation. Environment education and awareness thus assumes critical importance.

The 'Environmental Education, Awareness and Training' is a flagship scheme of the Ministry for enhancing the understanding of people at all levels about the relationship between human beings and the environment and to develop capabilities/skills to improve

and protect the environment. This scheme was launched in 1983-84 with the following basic objectives:

- To promote environmental awareness among all sections of the society;
- To spread environment education, especially in the non-formal system among different sections of the society;
- To facilitate development of education/training materials and aids in the formal education sector;
- To promote environment education through existing educational/scientific/research institutions;
- To ensure training and manpower development for environment education, awareness and training;
- To encourage non-governmental organizations, mass media and other concerned organizations for promoting awareness about environmental issues among the people at all levels;
- To use different media including films, audio, visual and print, theatre, drama, advertisements, hoarding, posters, seminars, workshops, competitions, meetings etc. for spreading messages concerning environment and awareness; and
- To mobilize people's participation for preservation and conservation of environment.

### Activities undertaken during the year

The major programmes undertaken to achieve the overall objectives of the scheme are as follows:

#### National Green Corps (NGC) Programme

It is a well established and recognised fact that the children can be catalysts in promoting



a mass movement about the ensemble of the environmental issues. Being future citizens, inculcation of environment friendly attitudes and behavioural patterns amongst them can make a significant difference to the long term efforts for protection of environment. Children are triggers for a chain reaction, making a difference at the local and community level which in due course lead to awareness at village, city, State, country and global level.

MoEF has hence, embarked upon a major initiative for creating environmental awareness among children by formulating National Green Corps (NGC) in 2001-02. The phenomenal response that NGC has received has made the network more than 1,00,000 Eco clubs across the country in 13 years, making it one of the largest conservation networks. The unique partnership between the MoEF, the states Government agencies alongwith the dedicated NGOs, working in the field of Environmental Education has contributed to the success of the programme. During financial year 2013-14 (as on 18.2.2014), 86387 Eco-clubs were supported by the Ministry across the country.

Also in order to strengthen monitoring mechanism of NGC programme, MoEF 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 need for a mass movement for protection of environment needs no emphasis. The concerns of the people for environment need to be harnessed into voluntary action. This requires a network of nodal agencies and grass-root level organisations.

The NEAC was hence launched in mid 1986 with the objective of creating environmental awareness at the national level. In this campaign, nominal financial assistance is provided to NGOs, schools, colleges, universities, research institutes, women and youth organisations, army units, government departments etc. from all over the country for conducting awareness raising and action oriented activities. The awareness activities could be seminars, workshops, training programmes, camps, padyatras, rallies, public meetings, exhibitions, essay/debate/painting/poster competitions, folk dances and songs, street theatre, puppet shows, preparation and distribution of environmental education resource materials etc. Action components could be plantation of trees, management of household waste, cleaning of water bodies, taking up water harvesting structures, use of energy saving devices etc. Diverse target groups encompassing students, youths, teachers, tribals, farmers, other rural population, professionals and the general public are covered under NEAC. The programme is implemented through designated Regional Resource Agencies (RRAs) appointed for specific States/Regions of the country. This programme was continued during this year with the main theme as 'Biodiversity & Conservation'. The following sub-themes were considered for financial assistance:

- Livestock-Indigenous breed conservation.
- Biodiversity conservation in urban & peri urban areas
- Conservation of agro-biodiversity.
- Biodiversity & traditional knowledge and Culture
- Biodiversity and Sustainable practices.
- Biodiversity conservation for food security



Thirty three Regional Resource Agencies (RRAs) appointed by the Ministry are involved in conducting, supervising and monitoring the NEAC activities during the year. A total of 13911, organisations have been involved in the campaign across the country during the year 2013-14 and the Ministry has released an amount of ₹ 13.44 Cr to the RRAs for further disbursement among the approved participating organisations.

### National Nature Camping Programme

National Nature Camping Programme is an initiative of the Ministry of Environment and Forests in environment education which is aimed at creating greater awareness, understanding and empathy of children with and for the environment. Through this initiative it is hoped that every child who goes through middle school (classes VI to VIII) will get at least one opportunity for a 2-3 day camping experience during these years.

This is a pilot phase wherein a limited number of nature camps are being organised by identified agencies /organisations to demonstrate good practices in Nature Camping. A system for feedback has been developed so that this may be used for improvement so as to up-scale the programme in 2014-15.

### 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. Media Cell is guided by an Advisory Committee of Experts on Media Matters under the Chairmanship of Secretary (E&F).

### Science Express: Biodiversity Special (SEBS)

The Ministry of Environment & Forests, 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.

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 Communications remained on-board in another coach throughout the journey and explained the content and purpose of the exhibition to curious visitors.

The 1st Phase of SEBS was launched on World Environment Day (5<sup>th</sup> June, 2012) from New Delhi's Safdarjung Railway Station. During its first phase which ended on 22<sup>nd</sup>



December, 2012 at Ahmedabad, it had 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 II<sup>nd</sup> 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 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 group 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 MoEF 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 (BNHS), Mumbai, Centre for Ecological Science, Indian Institute of Science (IISc), Bengaluru, G.B.Pant Institute of Himalayan Environment and Development (GBPIHED), Almora, Indian Council of Forestry Research and Education (ICFRE), Dehradun, National Centre for Sustainable Coastal Management, National Museum of Natural History, Delhi, Wildlife Institute of India (WII) and Wildlife Trust of India, and several other 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, MoEF was able to reach out to even those who could not physically visit the train but were made aware of its contents by the extensive coverage in media including social media like Facebook, etc. The III Phase is being planned now to reach the remaining stations on the Indian Railway network.

### Green Haat-2012

Green Haat is an initiative of Ministry of Environment and Forests (MoEF) Government of India to showcase different products made by various NGO's, Artisans and various State Forest Development Corporation/ Federations. Forest based products constitute a significant segment of the decentralized/ unorganized Sector of our economy.

Its objective is to raise awareness on the rich forest and bio diverse heritage of the country among the growing urban population often living far off from the forests. The initiative is to showcase various value added forest based products developed by Rural Artisans, Community Self Help Groups, NGOs, and State Federations and thus provide support to biodiversity conservation and sustainable livelihoods.

- The first Green Haat was organised on the eve of World Environment Day 2011 where India played as a Global Host. Encouraged by the response received, a decision was taken to make it an annual event.
- The second Green Haat in March 2012 provided a platform for exhibition of forest based handicraft, and Bio diverse and Organic Food & Herbal remedies under different categories of value added forest products.
- Through the Green Haat, the MoEF intends to build and capitalize upon the rich traditional knowledge to the local communities to augment their forest based livelihood and generate awareness about the economic significance of forests among all sections of the society.

Green Haat 2013 was organised at Dilli Haat opposite INA Market, New Delhi for fifteen days with effect from 16<sup>th</sup> to 31<sup>st</sup> January 2013. About 61000 people visited Green Haat 2013. The Forest based products put up in the fifty stalls in Green Haat 2013 can broadly be classified in following mentioned three categories:

- Helping urban population to rediscover the "Connect" with nature.
- Showcasing of various value added forest based products developed by Rural

Artisans, Community Self Help Groups, NGOs, and State Federations.

Augment local community's forest based livelihood and generation of awareness about the economic significance of forests among all sections of the society.

- Help in providing support and market linkages to bio-diverse product, crucial to livelihood of communities in far-flung areas.

### Library

The Library is the documented repository of the Ministry for dissemination of information in the field of environment and its associated areas. It has a collection of over 25,000 books and Technical reports etc. Besides, the library also receives more than 29 national/ international journals covering diverse areas of environment. Being the scientific Ministry, Library is one of the richest documentary bases for scientific journals in the field of environment and its associated areas.

The library performs an important role in the planning, promotion, implementation and coordination of the Ministry's objectives by providing timely access to relevant and comprehensive information to its users- officials of the Ministry, external organizations (both governmental and non-governmental), research students, decision makers etc.

Research scholars from various organisations, institutions and other professional bodies visited the library for a variety of information required by them from time to time.

### Seminars/Symposia/Workshops

This programme provides a platform to scientists/environmentalists/ University professionals/ technocrats, etc, to share

their knowledge on various subjects related to environment. The Ministry provides financial assistance to the Universities/other institutions/NGOs to organise events (seminars/Symposia/Workshops/Conferences) and to publish the proceedings. The scheme facilitates the transfer of technical know-how to different people including local population.

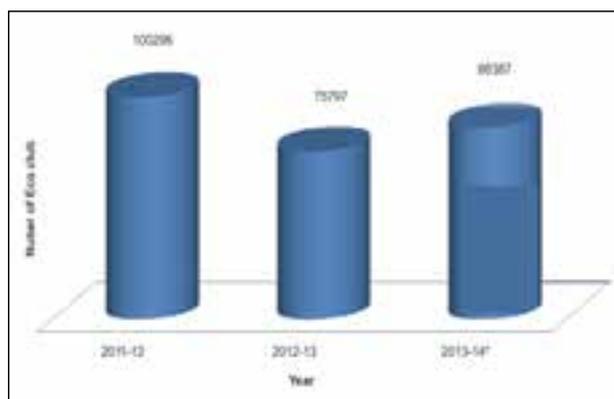
Universities/professional bodies/technical institutions and other R&D organisations are very responsive to the programme as is evidenced by the increase in the number of proposals being received by the Ministry. Thrust areas as identified under the programme are under constant review and being expanded to include more new areas. Proposal to enhance the monetary ceilings for events at District, State, National and International levels is under consideration to expand the outreach of the programme both geographically and demographically. During the financial year 2013-14, 24 organisations were approved for financial assistance for conducting Seminars/Symposia /Workshop/Conferences etc.

### Performance/ Achievements/ Progress made in year 2013-14

- 86387 Eco-clubs under NGC programme were supported with the financial assistance of ₹ 23.24\_Crore during 2013-14 (as on 18<sup>th</sup> February, 2014).
- The financial assistance of ₹ 13.44. crore was released under NEAC & number of participating organisations in NEAC was 13911.

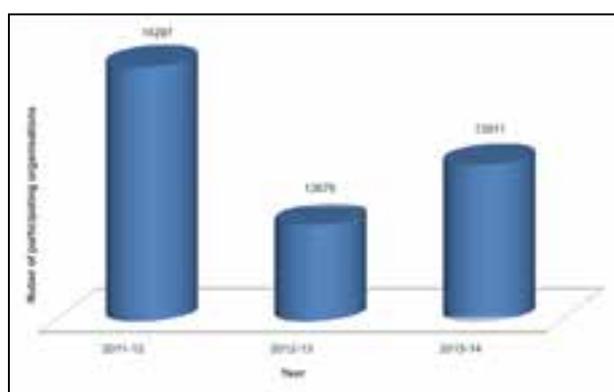
### Comparison of Achievements with previous years/progress made in 2013-14

Number of ecoclubs supported under NGC since 2011-12 to 2013-14 is shown in Fig-46.



\*As on 18th Feb 2014

**Fig-46.** Number of ecoclubs supported under NGC programme



**Fig-47.** Year wise support and number of participating organisations under NEAC

The number of participating organisations in NEAC from 2011-12 to 2013-14 (Fig-47).

### State-wise status

- Number of eco-clubs established in States / UTs is given in Table-62.
- A detail of financial assistance released under the NGC programme is given in Table-63.
- Amount sanctioned and number of participating agencies in NEAC programme are given in Table-64 and Table-65 respectively.



**Table-62.** Number of eco-clubs established in States/ UTs (\*as on 18<sup>th</sup> Feb., 2014)

S. No.	State/UT	No. of Eco-clubs			
		2013-14*	2012-13	2011-12	2010-11
1.	Andhra Pradesh	5750	5750	5750	5750
2.	Arunachal Pradesh (NE)				
3.	Assam (NE)		5407	5207	5207
4.	Bihar	8871		8871	8971
5.	Chandigarh (UT)				
6.	Chhattisgarh	6750		4000	3932
7.	Dadra & Nagar Haveli (UT)				
8.	Daman & Diu (UT)				
9.	Delhi (NCT)	1883	1796	1796	1796
10.	Goa				
11.	Gujarat	6500	6500		6750
12.	Haryana			5250	
13.	Himachal Pradesh	3000		3000	
14.	Jammu & Kashmir				
15.	Jharkhand			2842	2842
16.	Karnataka	8500			8500
17.	Kerala	3500	3500	3500	3500
18.	Lakshadweep (UT)				
19.	Maharashtra	8818	8819	8905	8905
20.	Manipur (NE)			1750	
21.	Meghalaya (NE)				
22.	Mizoram (NE)			1235	1235
23.	Madhya Pradesh		12500	12500	12500
24.	Nagaland (NE)	2275	2275	2280	2275
25.	Orissa	7500	7500	7500	7500
26.	Puducherry (UT)	390			
27.	Punjab	5500	5500	5000	5000
28.	Rajasthan	8250	8250	8250	8000
29.	Sikkim (NE)				
30.	Tamil Nadu	8000	8000	8000	7500
31.	Tripura (NE)	900		750	600
32.	Uttar Pradesh				
33.	Uttaranchal				
34.	West Bengal			3912	
	<b>Total</b>	<b>86387</b>	<b>75797</b>	<b>100298</b>	<b>100763</b>

**Table-63.** Financial assistance released under the NGC programme (as on 18th Feb., 2014)

(in ₹)

S. No.	State/UT	2013-2014*	2012-13	2011-12	2010-11
1	Andhra Pradesh	15697500	15697500	15697500	15697500
2	Andaman & Nicobar Islands (UT)				
3	Arunachal Pradesh (NE)				
4	Assam (NE)		14877125	14102125	14377125
5	Bihar	23041115		24283875	24283875
6	Chhattisgarh	18061500		10911500	10741500
7	Chandigarh (UT)				
8	Dadra & Nagar (UT)				
9	Daman & Diu (UT)				
10	Delhi (NCT)	5243250	5025750	4950750	4791182
11	Goa				
12	Gujarat	16428485	15651250		18372375
13	Haryana			14300000	
14	Himachal Pradesh	8056218		8107976	
15	Jammu & Kashmir				
16	Jharkhand			3507481	4100985
17	Karnataka	22697307			12562262
18	Kerala	9555000	9555000	9555000	9450000
19	Lakshadweep (UT)				
20	Madhya Pradesh		34125000	34125000	34125000
21	Maharashtra	23490716	23460122	23714781	23718362
22	Manipur (NE)			4780000	
23	Meghalaya (NE)				
24	Mizoram (NE)				3451875
25	Nagaland (NE)	7074375	7036250	6273125	12097125
26	Orissa	20216589	20372260	20193734	20474511
27	Puducherry (UT)	1093142			
28	Punjab	15015000	14950000	13650000	13650000
29	Rajasthan	22449387	22306369	22522154	22490000
30	Tamil Nadu	21748643	21651248	21744654	20470818
31	Tripura (NE)	2566250		2055000	1680000
32	Sikkim (NE)				
33	Uttarakhand				
34	Uttar Pradesh				
35	West Bengal			10767750	
	<b>Total</b>	<b>232434477</b>	<b>204707874</b>	<b>265242405</b>	<b>266534495</b>

**Table-64.** Amount sanctioned under NEAC programme

(in ₹)

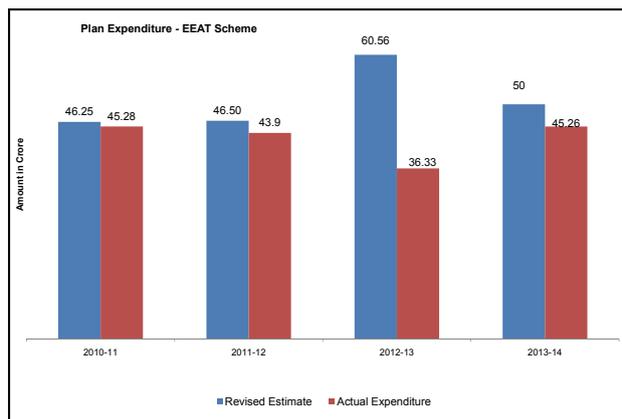
S. No.	State/UT	Amount Sanctioned (2013-14)	Amount Sanctioned (2012-13)	Amount Sanctioned (2011-12)	Amount Sanctioned (2010-11)
1	Andhra Pradesh	7623250	7553000	6917500	6687600
2	Andaman & Nicobar Island	373100	287000	232000	162000
3	Arunachal Pradesh	20000	40000	57000	164000
4	Assam	3934000	3694000	3364400	3708000
5	Bihar	8000000	6592000	6500000	6000000
6	Chhattisgarh	1840000	1162000	1247000	844000
7	Dadar & Nagar Haveli	-	-	14000	-
8	Daman & Diu	70000	81000	68000	85000
9	Delhi	1319000	1214000	1151000	1560000
10	Goa	-	110000	8000	7000
11	Gujarat	7571000	6488000	5222000	4485000
12	Haryana	5770350	4077000	12500000	10035500
13	Himachal Pradesh	5713500	3665000	3011000	1735500
14	Jammu & Kashmir	9109700	9757300	9170000	8376500
15	Jharkhand	2062000		4807000	4456000
16	Karnataka	2696900	2275000	3273000	2784600
17	Kerala	2996050	2811000	2606000	2230000
18	Lakshadweep	-	-	-	-
19	Madhya Pradesh	7315000	8609000	6313000	6551000
20	Maharashtra	8543100	6305000	5743000	5307500
21	Manipur	2775000	2600000	2445000	2383000
22	Meghalaya	82000	30000	97000	88000
23	Mizoram	2700000	2540000	2278000	2065000
24	Nagaland	1705000	1605000	1601000	1339000
25	Orissa	10438000	9076000	8416000	8112000
26	Puducherry	698000	515000	543000	571000
27	Punjab & Chandigarh	5641800	5622500	3472300	3536000
28	Rajasthan	2739000	2512100	2168000	3044000
29	Sikkim	1000000	886000	852000	507000
30	Tamil Nadu	5882500	6863000	5760000	6230300
31	Tripura	3182000	2533000	2400000	2148000
32	Uttar Pradesh	12674000	11487000	11556000	10772000
33	Uttarakhand	1215000	1087500	664000	624000
34	West Bengal	8706000	7151000	6787000	5881000
	<b>Total</b>	<b>134395250</b>	<b>119228400</b>	<b>121243200</b>	<b>112479500</b>

**Table-65.** Number of participating agencies in NEAC

S. No.	RRA	No. of Organization Participation
1	Indian Environmental Society, Delhi and Western UP, Delhi.	668
2	Shohratgarh Environmental Society (SES), Uttar Pradesh	712
3	CUTS, Rajasthan	250
4	Rural Youth Coordination Centre, Patna (RYCC) Bihar	1126
5	Animal Welfare Society of Orissa, Bhubaneswar Orissa(North)	446
6	Centre for Env. Studies & Env. Deptt, Bhubaneswar Orissa (South)	528
7	Federation of Societies for Env. Protection (FOSEP), Darjeeling, All Areas of Darjeeling including Siliguri, WB	390
8	School of Fundamental Research, Kolkata , West Bengal excluding Darjeeling and Silliguri	714
9	C.P. Ramaswamy Aiyar Foundation, Chennai Tamilnadu (North) Andaman Nicobar	270
10	Karnataka Rajya Vijnana Parishad Bangalore	198
11	BAIF Development Research Foundation, Pune, Maharashtra	956
12	CPREEC, Puducherry	57
13	EPCO, MP	828
14	Sri Swarupa Nishta Ashrama Philosophical Welfare Society (SNAPS), Andhrapradesh South	414
15	Baif Institute for Rural Vocations and Advancement (BIRVA) Jharkhand	219
16	Deccan Development Society (DDS)	302
17	Jan Kalyan Parishad, Chhattisgarh	219
18	VIKSAT, Gujarat and Daman-Diu	741
19	Tripura State Pollution Control Board, Tripura	444
20	Assam Science Society, Assam	671
21	Dept. Of Forests and Environment, Meghalaya	07
22	Directorate of Environment , Govt. Of Manipur, Imphal	358
23	Nagaland Pollution control Board, Dimapur Nagaland	190
24	Centre for Env. Protection, Aizawl, Mizoram	540
25	Forest , Environment and Wildlife Management Deptt. Gangtok, Sikkim	122
26	Arunanchal Pradesh State pollution Control Board	01
27	Centre for Environment and Development, Kerala	247
28	PEACE Trust, Dindigul, Tamil Nadu	225
29	State Council for Science, Technology & Environment, Himachal Pradesh	405
30	WWF, Jammu	467
31	Punjab State Council for science and technology , Punjab ( This include Participating agencies of Uttrakhand, as PSCST is also the RRA for Uttrakhand)	534
32	The NGOs Coordination and Federation (J&K)	234
33	Haryana Nav Yuvak Kala Sangam, Haryana	428
<b>Total</b>		<b>13911</b>

## Budget Allocation and progress of expenditure during 2012-13; XII Plan Outlay

The budget allocation of the scheme and progress of expenditure from 2010-11 to 2013-14 (as on 18.02.2014) is given in Fig-48 (The expenditure shown for FY 2013-14 includes cases of pending utilisation certificate also.)



**Fig-48.** Budget allocation and progress of expenditure

The XII plan outlay for the EEAT scheme is ₹ 428.20 cr. and for the CoE is ₹ 110.00 cr.

## National Museum of Natural History

### Introduction

The National Museum of Natural History (NMNH) is a sub-ordinate office of the Ministry of Environment & Forests. It is headed by Director who is the Head of Department. In Ministry, the NMNH works under the NMNH Cell headed by an Advisor. The NMNH has its Head Quarter in New Delhi. In order to expand the geographical coverage of its activities, the NMNH has established a few Regional Museums of Natural History (RMNH) in South India at Mysore in 1995, in Central India at Bhopal in 1997 and in Eastern India at Bhubaneswar in 2004. New RMNH are being established in Western India at Sawai Madhopur, Rajasthan and North-East India at Gangtok, Sikkim.

The NMNH comes under the scheme Environment Information, Education & Awareness in the MoEF. The NMNH itself involves two schemes: The NMNH (HQ) and Establishment of Regional Museums of Natural History.

### Functions

- Implement of policies of the Ministry under the scheme Environmental education (EE), training and awareness as well as other schemes/programmes (Biodiversity).
- Work towards natural history curatorship by way of collection, conservation, documentation, research, and exhibition of representative samples of flora and fauna for the purpose of education.
- Supplement formal education in schools through museum-oriented resources and extension programmes.
- Undertake awareness among general public about environment through non-formal and informal methods.
- Organise programmes on social inclusion for the benefit of those who are not regular museum visitors.
- Extend professional help to other organizations for establishment of new natural history museums and re-structuring of existing collections/ museums of natural history.
- Organise professional capacity building training programmes for Museologists in the country on all aspects of Natural History Museology.
- Undertake professional collaborative programmes with Museums and institutions including those from outside India.



## Objectives

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 EE 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).

The objectives of NMNH are:

- 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.

The NMNH has been undertaking various Environmental educational programmes through the 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).

## Performance/ achievements/ progress made in 2013-2014

- **Educational Activities:** NMNH along with its Regional Museums of Natural History organises a number of in-house and outreach programmes for the benefit of school children, college students, teachers, challenged children and general public. Various National and International days of scientific relevance like World Wetland Day, World Day for Water, World Forestry Day, International Ozone Day, Conservation Day, Earth Day, Environment Day, World Heritage Day, International Bio-diversity day, Wildlife Week, were observed and different programmes for school children and challenged children were also organised. The Museum organises different educational activities and competitions like Quiz, Declamation, On-the-spot Painting, Poster Making, Slogan Writing, Essay Writing, Model Making, Bird Watching and

Tree-spotting for the participating students on these occasions.

- **Publications:** NMNH and its Regional Centres published a number of publications in English, Hindi, Kannada and Oriya on the topics related to animals, plants, biodiversity and other environment related issues. A special desk calendar has been printed on the state animals in India as a symbol of representation of their faunal biodiversity. The NMNH and its Regional Museums also published posters and booklets including the 'Tryst with Nature' A Green Magazine on Explore Nature & Environment on Museums Programme, 2012.

### Exhibitions

- **RMNH, Bhopal:** Regional Museum of Natural History, Bhopal has inaugurated an exhibition on Urban Wildlife on September 29, 2013 observing the Wildlife Week and seventeenth anniversary of museum. This exhibition was arranged to create the awareness towards the urban wildlife. The conservation of urban wildlife like insects, fishes and small mammals found in the city's park, office, school and residential area is the message of the exhibit photographs ranging from ants to elephants displayed.
- **RMNH Mysore:** The showcase of temporary exhibition titled "NAMMA MYSOORU" was extended based on the demand of the public till the end of Oct. 2013 for the utility of visitors who visits Mysore during world famous DASARA festival. An exhibition based on the origami workshop done by the museum to the students of De-paul international school, Mysore were exhibited for public view.

### Workshops:

- **NMNH New Delhi:** Orientation Workshop was conducted for the trainee teachers from 16th to 18th August, 2013 for the students of Lady Irwin College (University of Delhi), pursuing B.Ed. Home Science. 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". Through worksheets and various activities like making low cost teaching aids, teachers' observations are narrowed down to a museum object so that they can develop similar worksheets/models for their students, an attempt at highlighting the role of students in conservation of natural and cultural heritage.
- **RMNH Mysore:** A three day Teacher Training Workshop was held from 2<sup>nd</sup> to 4<sup>th</sup> September, 2013. The selected place to conduct the TEACHER TRAINING WORKSHOP -2013 was DAROJI NATURE CAMP, KAMALAPURA-a place studded with copious Neolithic, Chalcolithic sites, patches of scrub jungle and grass land. The terrain is such attractive and safe shelter for the SLOTH BEARS dominating the pasture. Thirty active School teachers [High school] working in the rural schools in and around the BEAR SANCTUARY were selected with the help and assistance of state administration and local NGO groups. The objective of the workshop is to develop environmental awareness among the teacher, to equip the teachers in imparting Environmental Education in the classroom, to emphasize the importance of Eco clubs



in schools & to conduct various activities related to Environmental Conservation.

### Collaborative Programmes

- **NMNH New Delhi:** NMNH in collaboration with Hindustan Times organized annual Inter-school essay writing competition on 12th November 2013. 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. Students from across the Delhi/NCR wrote essays on the topics: "If our environment has life, only then we can survive" for Junior category students from classes IV & V and "Stop your contribution to pollution, before it's too late to find a solution" for Senior category from classes VI, VII & VIII. First, Second, Third and Five Encouragement Prize winners in each category was awarded in a Prize Distribution Function held on 20th December 2013. The First Prize winners in each category was awarded with the glittering NMNH- HT PACE Rolling Trophy for their schools. In addition all 16 winners was taken for an exciting Nature Study Tour to Aravalli Biodiversity Park, Vasant Vihar, Delhi on 28th November 2013.
- **NMNH-Khushi Centre for Rehabilitation and Research** - To mark World Environment Day (5<sup>th</sup> June 2013) with the theme given by UNEP i.e., "THINK, EAT, SAVE REDUCE YOUR FOOTPRINT", as well as the 35<sup>th</sup> Anniversary of the National Museum of Natural History, a programme was organised in collaboration with Khushi Centre for Rehabilitation and Research from 6<sup>th</sup> to 11<sup>th</sup> June 2013 at NMNH, New Delhi. The programme included panel discussions by Experts on the themes like Role of Health Care Providers, Role of Indian Sports Fraternity, Food Security & its Impact.
- **NMNH-A.L.P.A.N.A.** - A special workshop for specially challenged children was organized from 24<sup>th</sup> to 26<sup>th</sup> July 2013 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 were invited through their schools/institutions. They participated in various activities during the programme. The activities included Drawing, Painting, Sketching, Origami, working with Clay, Vase decoration, Making of Wall hangings, etc.
- **Teachers' Training Programme on Paryavaran Mitra** - The NMNH collaborated with CEE New Delhi in the organisation of a one day Teachers Training Programme on "Paryavaran Mitra" initiative of the MoEF, in the Museum on 23<sup>rd</sup> September 2013. About 50 teachers participated.
- **RMNH, Mysore:** One day workshop on integrated Watershed Management was organized on 05/09/2013 by the Dept. of District Watershed Development, Mysore as Collaborative programme for field veterinary doctors, taluk assistant directors, animal husbandry extension officers taluk watershed development officers, assistant agricultural officers and NGOs in the field of animal husbandry activities in watershed development department. The main objective of their workshop was to educate and train the said officers in promoting the self-help group, users group who are actually rearing animals and depending on



- animal husbandry on their lively hood.
- **RMNH, Bhopal:** RMNH Bhopal conducted high profile and informative collaborative programme with Prayatna an NGO and National Law Institute University on electoral reform focussing on green agenda on October 26<sup>th</sup> 2013.
- **Science Fiesta-** RMNH, Bhopal participated Science Fiesta during November 11<sup>th</sup> – 12<sup>th</sup>, 2013 and created awareness about “King Cobra” which enthused the students of Bhopal very much.
- Similarly the NGO Birds of Bhopal conducted collaborative programme at RMNH Bhopal about migratory birds during wildlife week.
- **EPCO, Institute of Environmental Management** conducted a few environmental interactive sessions with the students for environmental management during November and December.
- Tree plantation was conducted with the heritage tree Bal during July to reinforce the roll of heritage as the way of conservation. Similarly World Ozone Day lecture was organized with EPCO at Millenium Institute of Technology, Bhopal on Nov. 2013
- **RMNH, Bhubaneswar:** Museum celebrated World Day to Combat Desertification & Drought on 17<sup>th</sup> June 2013 in collaboration with Forest Deptt., Govt. of Odisha on the theme “Drought and Water Scarcity”.
- Museum conducted a meeting on 06.11.2013 in collaboration with State Wildlife Organization Forest Deptt., Govt. of Odisha Protection and Conservation of Olive Ridley sea turtles.
- A Preparatory meeting for Odisha Environmental Congress-2013 was

organized by HDF School of Management, Bhubaneswar in collaboration with CED and RMNH in the museum on 6<sup>th</sup> November 2013.

- In collaboration with Department of Geology, Utkal University, museum organized the INSPIRE internship Programme on Basic science for class XI on 6<sup>th</sup> October, 2013.

### Outreach Programmes

- **RGRNMNH Sawai Madhopur:** This museum organized educational programmes/Activities for special children (MR, PH, HI, and VI) at Adarsh Manovikas Seva Sansthan, Near Helipad Sherpur and Yash Viklang Mand buddhi seva sansthan Bazaria, SWM respectively 20<sup>th</sup> and 21<sup>st</sup> Nov. 2013 at Vinayak Mook Badhir Vidyalaya SWM and Chetna Viklang Sanstha, SWM on 25<sup>th</sup> and 26<sup>th</sup> Nov. 2013 respectively. The students /Children benefitted by Collage, Tensil art, Painting, Paper sand art, Clay Modelling, moulding and casting of fruits. A Documentary film was also projected on wildlife and nature for audio-visual quiz competition.

### Earth Day

- **NMNH, New Delhi:** A National Level “Poster Making Competition” was organized on the occasion of Earth Day on 22<sup>nd</sup> April, 2013 for the children born between 1<sup>st</sup> April 1993 and 31<sup>st</sup> March 1998. The theme for the competition was “**The Face of Climate Change**”. 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 17-20 April 2013. A maximum of 200 children were allowed to register on first cum first served basis.



The best Regional Prize entry from each venue was pooled to select one National Winner who was given the “Young Environmentalist of the Year Award-2013” (YEYA-2013) at a function held in Hotel Ashoka at New Delhi on 5th June 2013 on the occasion of World Environment Day.

### World Environment Day

- **NMNH, New Delhi-** World Environment Day and the 35th Anniversary of the NMNH Foundation Day were organised on 05 June, 2012. On this special occasion Dr. Jayanthi Natarajan, Hon'ble Minister of state of Environment & Forests (Independent Charge), Govt. of India presented “Young Environmentalist of the Year Award (YEYA)-2013 to Ms. Arundhati Srivastava from Sanskriti School, Chanakya Puri, New Delhi. She has been selected for this year's award through National Level Poster Making Copetitions held on the occasion of Earth Day on the theme “Face of Climate Change”.
- **RMNH Bhubaneswar-** Museum celebrated World Environment Day 2013 and Valedictory programme of Summer Vacation Programme for Children on 5<sup>th</sup> June 2013. Dr (Mrs.) P. Mohanty Hejmadi former Vice Chancellor, Sambalpur University graced the occasion as Chief Guest.
- **RMNH Mysore-** RMNH Mysore organized the World Environmet Day -2013 on 5th June 2013. The programme was attended by the students, public and invitees. Sh. Santhosh, Secretary, Mysore Science Foundation shared his experiences with students about Museum programmes and other activities/programmes conducted by Mysore Science Foundation. Dr. HKS

Swamy, Prof. of Pharmacy, SJM College of Pharmacy, Chitradurga delivered excellent lecture along with materials demonstration about Nature and Natural resources conservation and also explained a need of developing and practicing in day to day life about eco friendly lifestyle.

- **RMNH Bhopal-** Regional Museum of Natural History (RMNH), Bhopal organized World Environment Day – 5<sup>th</sup> June 2013. Prof. Anup Swarup, Vice Chancellor, Jagran Lake City University Bhopal was the Chief guest. During the programme prizes and cash awards were distributed to regional level participants of Poster Design Contest held on 22<sup>nd</sup> April 2013.
- **Rajiv Gandhi RMNH, Sawai Madhopur-** Prize distribution Function was organized on 5<sup>th</sup> June, 2013 for the winners of Poster Design Contest held on 22<sup>nd</sup> April 2012. Sh. Rahul Bhatnagar, D.F.O. Ranthambhore National Park was the Chief Guest. All the entries of poster making competition were exhibited in the Museum.

### Summer vacation programmes

- **NMNH New Delhi-** NMNH HQ New Delhi organised Summer Vacation Programme-2012 from 17<sup>th</sup> to 31<sup>st</sup> May, 2013 in two groups- Summer Vacation Programme for Green Teens and Summer Vacation for Green Cubs. The programme for Green Teens included Talk/Presentation sessions on “Learn to write articles/poems, Reintroduction”-as a tool for conservation, Environmental Health Hazards and Nature in our surrounding. The programme also included interesting activity of observing microorganisms under the microscope, Create Art out of waste, an outdoor visit to Aravalli Biodiversity Park to study the fauna and flora of the Aravalli and get firsthand

experience about the Green surroundings in Delhi. The programme for Green Cubs included making items out of clay using potter wheel, Artificial flower making, Still life pencil shading, Mask making, Origami, Clay modelling and Nature Painting.

- **RMNH Mysore-** The RMNH Mysore organized Summer Vacation Programme for Children 2013 in two groups i.e. Green Teens and Green Cubs. The programme included various activities like Mural painting using M-Seal base and Acrylic paints, Science behind Magic, Model preparation, lecture on Flora & Fauna of Chamundi Hills, Zoo visit, Nature trail to Karanji Lake, field trip to Ranganathittu bird sanctuary and skit on Nature.
- **RMNH Bhopal-** The RMNH Bhopal organized Summer Vacation Programme for Green Cubs during 17 – 27 May 2013 and Summer Vacation Programme for Green Teens during 17 – 31 May 2013.
- **RMNH Bhubaneswar-** The RMNH Bhubaneswar organised Summer Vacation Programme for Children -2013 from 15-24 May 2013 in two different groups i.e. Green Teens and Green Cubs. The programme is being organized to create an understanding about the natural resources of Odisha, the impact of development like urbanization, over exploitation etc. for a meaningful summer vacation. The programme included art & craft, drawing, painting, clay modelling, lectures and demonstration on various topics. Apart from this visit of Nandankanan Zoological Park, Khandagiri, Tribal Museum, Maritime Museum, Astaranga etc are the part of the 10 days programme.

### Van Mahotsava

- **RMNH Mysore-** To mark the Van Mahotsav week (1–7 July). About 60 species of

various tree of fruit yielding and flowering plants were planted in the campus. The programme concluded with the film shows on wildlife and Environment along with discussion.

- **RMNH Bhubaneswar-** To mark the Van Mahotsav week (1–7 July) some important medicinal, ornamental, fruit yielding and shade giving plant species were planted in the campus to make the campus more environment friendly. Visitors were also encouraged to be the part of this plantation programme.

### International Ozone Day

- **NMNH New Delhi-** To commemorate International Day for the Preservation of Ozone Layer (16<sup>th</sup> Sept., 2013), NMNH organized Essay writing, Poem writing and Poster making competitions to sensitize school children on the matters for preservation of Ozone layer and inculcate awareness about the environmental issues among student community. The competitions were open for the students from class IX to XII of schools in Delhi-NCR. The Topic for Essay Writing and Poster Making Competitions was based on this year's UNEP Theme: "A Healthy Atmosphere, The Future We Want". The participants were allowed to write either



**Fig-49.** Summer Vacation Programme for Children-2013 (Green cubs)



- in Hindi or English. The topic for poem writing was "Saving the Ozone Layer, Effects of Climate Change, Biodiversity, Conserving our Forests and Wildlife".
- **RMNH Mysore-** Painting Competition was organised on Ozone Layer Depletion for High school and Higher Primary School Students and simultaneously the film shows on wildlife & Environment screened for other students who were not participating in the drawing competition.
  - **RMNH Bhubaneswar-** Written and Oral quiz competitions were organized by the museum to create awareness among children about the ill-effects of ozone layer depletion, green house gases, global warming etc. for the students of Class VIII to X on the occasion of International Day for Preservation of Ozone Layer on 16<sup>th</sup> September, 2013.
- environmental awareness among the student community; (b.) To develop scientific attitude among the students; and (c.) To emphasize the importance of Environmental Conservation
- **RMNH Bhopal- Cell Phone Competition:** To increase wildlife photography as a tool for conservation a cell phone camera photographic contest was arranged during the wildlife week and three best entries were awarded.
  - **RMNH Bhubaneswar-** In collaboration with the wildlife wing of Forest Department, Govt. of Odisha, museum organized a week long film shows on various protected areas of the state. The documentaries on Bhitarkanika National park, Chilika Lake, Nandankanan Zoological Park and Chandaka Wildlife Sanctuary were screened for the benefit of public to create awareness about wildlife conservation.

### Wildlife Week

- **NMNH New Delhi-** In order to sensitize the school children on the matters for preservation and to arouse a general awakening in favour of protection of wildlife, schools in Delhi/NCR were invited to NMNH where education staff interacted with them and made them aware about the wildlife of India through guided tour of the museum galleries. This included a talk on wildlife of India followed by exhibit interpretation in the museum galleries and film show in the museum auditorium. The special guided tour was available on prior booking and registration by the schools.
- **RMNH Mysore-** To observe Wildlife Week Regional Museum of Natural History, Mysore, organized a Painting Competition on 04<sup>th</sup> October 2013 at Regional Institute of Education, Mysore. The objectives of the programme were: (a.) To develop

### Winter Programme

- **NMNH, New Delhi:** "Winter Nature Camp -2013" was held at "Aravalli Biodiversity Park", Vasant Vihar, Delhi on 14th & 15th December, 2013. A selection test was conducted on 7th December, 2013 to select 15 children in the age group of 13 to 16 years to participate in the Winter Nature Camp. An orientation to the programme was done on 13th December, 2013. All the participants were in the Nature Camp for two days and one night stay.
- **RMNH, Mysore:** The winter Nature Camp was organised at Bandipur Tiger Reserve on January 2-4, 2014.
- **RMNH, Bhopal:** Winter Nature Study Programme 2013-2014 to be held at Madai River Sanctuary on January 16-17, 2014.
- **RMNH, Bhubaneswar:** The winter Nature Camp to be held at Bhitarkanika National

Part for PG Life Science students on 18<sup>th</sup> – 20<sup>th</sup> January 2014. The objective of the programme is to explore the mangrove biodiversity at Bhitarkanika National Park, to make students aware of the conservation aspects of the mangrove ecosystem, wild life of Bhitarkanika National Park, habitat of Olive Ridley nesting sites and also to understand the impact of socio-cultural aspects of Bhitarkanika National Park. The students will be selected through written test based on nature, wildlife and environment from the various universities of Odisha.

- **RGRMNH, Sawai Madhopur:** Two days Winter Nature Camp i.e. one day each at Ranthambhore National Park, Sawai Madhopur & Rameshwar Ghat, (Khandar) Dist. SWM, during third/fourth week of January, 2014.

#### Other Activities

- **RMNH, Bhubaneswar:** Museum also organized various competitions (on the spot painting, written quiz and Fancy dress competition) in two categories for the student of class I to IV and Class V to VII on the occasion of **9th Foundation day on 4<sup>th</sup> August 2013**. During this day all the winners of the various competitions were awarded with prizes and certificates.



Fig-50. NMNH-HT PACE Essay Writing Competition-2013

Museum's Annual Newsletter, folder with inset and museum brochure in English & Odia was also released during the occasion.

A special programme Regional Science Congress 2013 of JNVS on 17<sup>th</sup> November, 2013 was organized by the museum for students, teachers & Principals of different JNVs of Bhopal region consisting of MP, Chattisgarh and Odisha. The programme included Gallery visit and detailed discussion was held on the questionnaire in the form of power point presentation. Film show on Snakes of India followed by a demonstration on venomous and non venomous snakes was held.

#### Comparison of Achievements/Progress made in 2013-14 vis-à-vis that in 2012-13 (For on-going programmes)

**Physical targets:** Most of the physical targets were achieved in 2012-2013. During the current financial year 2013-14, most of the physical targets are being achieved. (Table-66)

#### Empowerments of women/ weaker sections

- **Outreach programmes were organized for underprivileged 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

**Table-66.** Comparison of Achievements/Progress made in 2013-14

Financial Year	Physical Target for educational/ exhibition programme	Achievement	Financial implication
2012-13	50 nos.	Target achieved	28.35 lakhs
2013-14	45 nos.	Being achieved	17.84 lakhs

**Financial targets:** In 2012-13, out of the RE of ₹ 17.20 Crores in Plan budget head, about ₹ 14.17 Crores were spent. The summary is given below:

2012-13		BE	RE	Exp	%
	<b>PLAN</b>	<b>13.15</b>	<b>17.20</b>	<b>14.17</b>	<b>85.87</b>
	Revenue	08.15	08.20	07.77	
	Capital	05.00	09.00	07.00	

During the current financial year (2013-14, up to end of December 2013), the position of Plan budget expenditure is given below:

2013-14			Budget Estimates	Revised Estimate	Total Exp. up to end of Dec 2013	% of Exp. to B.E.
	PLAN		1762.00	1656.00	1037.72	58.89
	Revenue		862.00	856.00	629.81	73.06
		NMNH HQ	448.00	402.00	295.14	65.88
		RMNH	414.00	454.00	334.67	80.84
	Capital		900.00	800.00	407.91	45.32

### Budget Allocation and Expenditure

The summary of budget expenditure during 2013-14 (up to end of December 2013) is given below:

(in ₹ Lakh)

2013-14			Budget Estimates	Revised Estimate	Total Exp. up to end of Dec 2012	% of Exp. to B.E.
	PLAN		1762.00	1656.00	1037.72	58.89
	Revenue		862.00	856.00	629.81	73.06
		NMNH HQ	448.00	402.00	295.14	65.88
		RMNH	414.00	454.00	334.67	80.84
	Capital		900.00	800.00	407.91	45.32



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 to be organised on 2<sup>nd</sup> Feb. 2014 for specially challenged children.

- **RMNH Mysore**- Painting Competition, Singing Competition, Modelling Competition, and Museum Visit for 10 days, Prize Distribution Function to be organised during the month of February 2014.

### Important Committees/ Commissions

An Advisory Committee common to all Museums under the NMNH was recently constituted with Dr. Saroj Ghose (Former President of International Council of Museums) as Chairman and experts members (non-officials) are

- Prof. S.C. Batla, Head, Department of Botany, University of Delhi
- Dr. S.D. Biju, Associate Professor, Department of Environmental Biology, University of Delhi
- Shri G. S. Rautela, Director General, National Council of Science Museums, Kolkata

### Forestry Education, Training and Extension

The present system of forestry education and training is tailored to produce skilled forest managers to manage, protect and conserve the forests in consonance with National Forest Policy, 1988, forestry action programmes etc. The activities related to forestry education, training and extension are performed by the different institute of the Ministry like Indira Gandhi National Forest Academy (IGNFA),

Dehradun; Directorate of Forest Education (DFE), Dehradun; Indian Council of Forestry Research and Education (ICFRE), Dehradun; Indian Institute of Forest Management (IIFM), Bhopal; and Indian Plywood Industries and Training Institute (IPIRTI), Bengaluru.

### Progress of activities undertaken by various institutes

#### Indira Gandhi National Forest Academy (IGNFA), Dehradun

Indira Gandhi National Forest Academy (IGNFA) is a premier institution in the country for training the officers of Indian Forest Service. The Academy was constituted in the year 1987 by upgrading and renaming the erstwhile Indian Forest College, established in 1938. The Academy imparts professional training to the Indian Forest Service Probationers and has been accorded the status of “Staff College” for imparting mid-career training for officers of the Indian Forest Service (IFS).

The motto of the Academy is “*Aranya Te Prithvi Syo Namastu*” which means “We bow to the forests on this earth”:

#### Mandate of the Academy

The mandate of the Academy is to impart training to IFS Probationers by way of knowledge and skills to mould them as the professional foresters. The training programmes include training the new entrants to the service, in-service training (Mid Career training programme) to IFS officers, skill up gradation training to officers inducted into the IFS on promotion from the State Forest Service (SFS). The Academy also provides orientation courses to various other stakeholders like Joint Training for members of All India Services, Indian Revenue Services Probationers, members of higher judiciary etc.



## Organisational Structure

IGNFA is directly under the administrative control of the Ministry of Environment and Forests (MOEF), Government of India (GOI). It is headed by a Director assisted by one Additional Director, two Professors, six Additional Professors, six Associate Professors and office staff.

## Facilities

The training classes are held in the main building comprising of an administrative block, faculty rooms, lecture theatres, conference rooms, boardroom, library, computer lab, bio-science lab, geomatics lab, engineering lab, wildlife lab and a reprographic unit.

Accommodation is provided to the probationers in two hostels viz New Hostel and Old Hostel located in FRI campus itself. The in-service officers are accommodated in the 30 rooms Executive Hostel. These hostels are provided with adequate mess and sports facilities. Adjoining the New Hostel, a spacious assembly hall named 'Hari Singh Auditorium', with a seating capacity of 600 persons, is provided for holding cultural and academic functions. The Academy has a Guest House having 18 rooms, which is located adjacent to the New Hostel.

A residential complex for faculty and staff of IGNFA is situated along Chakrata Road, opposite the FRI campus. Medical facilities for both outdoor and indoor patients are available at the New Forest Hospital. Services of a Post Office and Bank are available within the campus. An STD/ISD pay phone and ATM facilities are available in the New Hostel.

## Geomatics Lab

Geomatics, involving applications of Remote Sensing, GIS and GPS, has immense

use in forest management. Technological tools of geomatics are in operational use in management of forests for variety of applications ranging from forest cover mapping, to forest fire monitoring, spatial data based decision support system, boundary demarcation, monitoring of forestry schemes for forest inventory and carbon assessment etc.

## Computer Centre

Information technology and computers have been given due emphasis in the curriculum of IFS probationers. For meeting the IT requirements, the Academy has set up a new computer training lab to provide hardware and software facilities to the probationers.

## Library

The IGNFA library has a rich collection of nearly 29200 titles in various disciplines. The resources include books, journals, maps, technical reports, slides, audio-video CDs & cassettes, conference documents, compendium, microfilms, photographs, atlas, etc. Besides these, about 250 periodicals, popular magazines and newspapers are available in the IGNFA Library. Library is also subscribing to fourteen online journals through consortium NFLIC. The Library has important encyclopedia on different subjects.

## Progress of activities undertaken

### Basic Professional Training Programme

During the year IGNFA conducted the basic professional training for three batches of Indian Forest Service probationers and foreign trainees. 66 Probationers of 2011-13 Course passed out of the Academy in August, 2013. Two probationers among them have been awarded 'Hari Singh Fellowship' to undergo Advanced Diploma in Wildlife Management

at Wildlife Institute of India. The Convocation of this batch was held on 24th August, 2013. The Chief Guest of the function was Shri K Jude Sekar, IFS, Director General of Forests and Special Secretary, MoEF, Government of India, New Delhi.

79 IFS probationers of 2012-14 Course including two foreign trainees from Bhutan, and 77 Probationers of 2013-15 Course are presently undergoing their Professional Training in the Academy.

Besides, in-service courses were organized for senior forest officers at different levels of seniority. It included three thematic workshops, four promotion linked Mid Career Training programmes, one professional skill-upgradation course (10-weeks) for officers inducted into IFS from SFS and orientation

modules on Natural Resource Management for IRS Probationers, IRTS Probationers and members of Judiciary. These courses were well spread out over the year 2013-14.

### Mid Career Training Programme

Starting from the year 2009-10, the in-service trainings are conducted as Mid Career Training Programmes in three phases. Phase III of the programme is for IFS officers of 7-9 years, Phase IV for 16-18 years and Phase V for 26-28 years of seniority. During this year, one phase IV, and two phase V training courses were conducted.

### Coordination Training programme for IAS, IPS & IFS

Three coordination training programmes were organized at the Academy for the officers

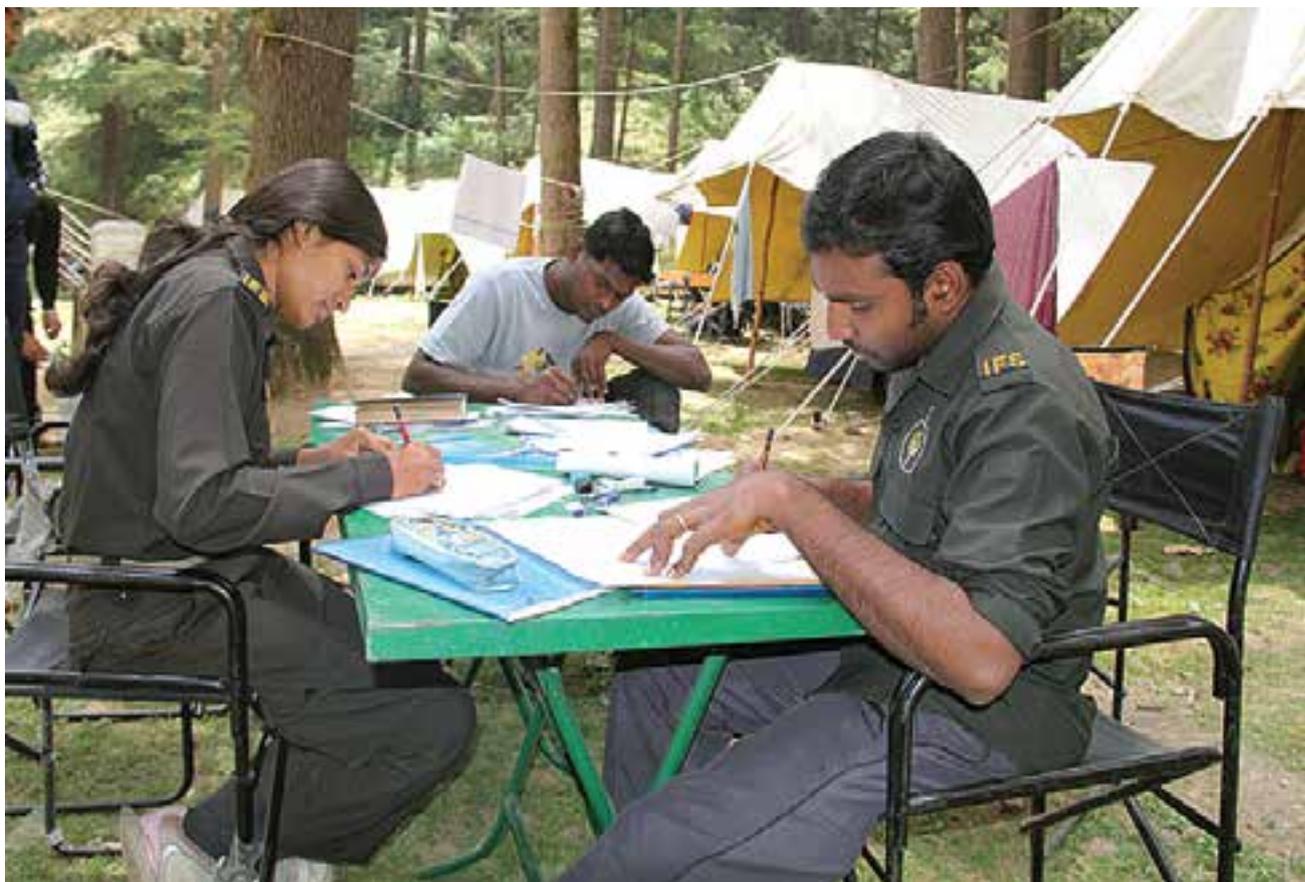


Fig-51. IGNEA Training programme for IFS Officers



of IAS, IPS and IFS. During the period three such courses were organised. The themes of the training programme were “Ecological Security: Sensitisation on Key Environment and Forestry Issues”, “Natural Resource Management with special emphasis on Biodiversity Conservation” and “Challenges of Forests Conservation and role of interdepartmental coordination”.

### Kirti Chakra P. Srinivas Memorial Lecture

The Academy organized the Kirti Chakra P. Srinivas Memorial Lecture on 27th November, 2013. Shri K Jude Sekar, IFS, Director General of Forests and Special Secretary, MoEF, Government of India, New Delhi delivered the lecture titled, “**Challenges in Forest Management in Areas Affected by Left Wing Extremism**”.

### 27th Professional Skill Upgradation Course

The 27th Professional Skill Up gradation course has been organised from 14.10.2013 to 20.12.2013. Twenty four Officers from Assam, Andaman and Nicobar, Arunachal Pradesh, Madhya Pradesh, Meghalaya, Gujarat, Jammu & Kashmir, TamilNadu, & West Bengal participated in the course.

### Workshops and Special Programmes

The Academy organizes workshops and special training courses on the emerging issues in the field of forestry, wildlife and environment conservation having regional, national and international importance. Also, to commemorate the memory of forest officers, who laid down their lives in the service of nation, two memorial lectures namely and ‘Kirti Chakra P Srinivas Memorial Lecture’ and ‘Sanjay Kumar Singh Memorial Lecture’ are organized every year.

### Senior Foresters’ Workshop

- A theme based workshop of Senior Foresters’ of 1977 Year of Allotment on the theme “**Future of Forestry in India**” was conducted from 16<sup>th</sup> April to 17<sup>th</sup> April, 2013.
- “**Reunion Workshop**” of Senior Foresters’ of 1963-1965 Year of Allotment was conducted from 25<sup>th</sup> April to 26<sup>th</sup> April, 2013.
- Workshop for IFS officers of 1988 year of Allotment on theme “**Biodiversity Conservation: Issues & Challenges**” was conducted from 11<sup>th</sup> June to 12<sup>th</sup> June, 2013.
- Workshop for IFS officers of 1983 year of Allotment on the theme “**Sustainable Livelihood and Forestry in Development Paradigm**” was conducted from 3<sup>rd</sup> October to 4<sup>th</sup> October, 2013.
- Workshop for IFS officers of 1978 year of Allotment on the theme “**Need for Revisit National Forest Policy 1988 to Address Emerging issues at National and International Level**” was conducted from 14<sup>th</sup> November to 15<sup>th</sup> November, 2013.

### Coordination Training of IAS, IPS & IFS Officers at IGNTA

- Three coordination training programmes for officers of IAS, IPS and IFS were organised at the Indira Gandhi National Forest Academy, Dehradun during the year 2013-14.

### Sensitization Programme for members of Higher Judiciary and other stakeholders

- A three day sensitization programme on ‘Forest and Environmental Issues’ was conducted for the members of



Higher Judiciary from 27<sup>th</sup> November to 29<sup>th</sup> November 2013. An orientation module on 'Natural Resource Management' was organized for Probationers of Indian Revenue Service from 30<sup>th</sup> July to 1<sup>st</sup> August, 2013.

### Academic Cells

- IGNFA has constituted four different cells to equip itself to impart latest knowledge and skills to various stakeholders especially Indian Forest Service Probationers, in-service Indian Forest Service Officers, participants of Joint Trainings for IAS/IPS/IFS, Higher Judiciary Courses, Indian Revenue Service, Indian Railway Traffic Service and other Courses conducted by IGNFA from time to time. The following four cells on the emerging issues are working to create the curriculum for various training being imparted in the academy.
- Cell for REDD-plus in relation to global warming and climate change
- Cell for Technology Based Monitoring of Forest
- Cell for Forest Biodiversity
- Cell for Sustainable Livelihood and Poverty Alleviation.

### Other Activities

#### Meghotsav

The IGNFA organizes a cultural & sports festival every year. This year, the club organized a cultural fest named "MEGHOTSAV" during which various competitions were held. A cultural evening was also organized at the end of the festival.

### Directorate of Forest Education (DFE), Dehradun

#### Introduction

The Directorate of Forest Education (DFE) under the Ministry is responsible for imparting professional/technical training of direct recruit of the State Forest Service (SFS) Officers and Forest Range Officers (FROs). 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 the respective Forest Training Institutes. There are three Academies and One College under the Directorate. The names and intake capacity (Per batch) of these colleges is as under:

- Central Academy for State Forest Service, Dehradun 40
- Central Academy for State Forest Service, Coimbatore 40
- Central Academy for State Forest Service, Burnihat 40
- Eastern Forest Rangers College, Kurseong 30

Besides this Directorate also conducts Forest Range Officers Induction training Forestry through Forestry Training Institute/Academy under the control of State Government viz:-

- Forest Rangers College, Balaghat (Madhya Pradesh)
- Forestry Training Institute, Haldwani (Uttarakhand)
- Andhra Pradesh Forest Academy, Dullapaly (Andhra Pradesh)
- Forestry Training Institute, Sundernager (Himachal Pradesh)



## Objectives

- To cater to the training needs of SFS Officers and FROs of States/ Union Territories in the country.
- To ensure standard and quality of training being imparted to SFS Officers and FROs.
- To develop appropriate and relevant training contents and evaluation standards for forestry training at various levels.
- To suggest training policy for effective Human Resource Management and Development.
- To supplement the efforts of State Governments in the training of Forest Frontline Staff (Forest Guards, Foresters and Deputy Rangers).

## Activities undertaken/ achievements during the year (upto 31<sup>st</sup> Dec., 2013)

- One fresh batch (course 2014-16) will commence at Central Academy for State Forest Service (CASFOS), Dehradun with effect from 1-2-2014 for Induction training in the form of "Two year Diploma Course" for the newly recruited SFS Officers of various States/Union Territories.
- Two batches (course 2012-14) commenced from 03-01-2012 & 5-9-2012 of newly recruited SFS Officers are undergoing training at Central Academy for State Forest Service (CASFOS), Dehradun & Central Academy for State Forest Service (CASFOS), Coimbatore respectively.
- Two batches (course 2011-13) of newly recruited SFS officers passed out on 13-07-2013 & 20-07-2013 from CASFOS, Dehradun & CASFOS, Coimbatore respectively.
- Three fresh batches (course 2013-14/2013-15) commenced from 17-06-2013/ 20-08-

2013/ 10-09-2013 respectively at Central Academy for State Forest Service (CASFOS), Burnihat (Assam), Andhra Pradesh Forest Academy, Dullapally (Andhra Pradesh) and Central Academy for State Forest Service (CASFOS), Coimbatore respectively for Induction training in the form of "Eighteen months certificate course" for the newly recruited FROs of various States/Union Territories.

- Three batches (course 2012-14) & Two batches (course 2013-14) of newly recruited FROs commenced from 02.7.2012, 09.07.2012, 28.8.2012, 1.1.2013 & 1.2.2013 are undergoing training at CASFOS, Burnihat (Assam)/Forest Rangers College, Balaghat (Madhya Pradesh), Forestry Training Institute, Sundernager (Himachal Pradesh), Forestry Training Institute, Haldwani (Uttarakhand) and Forest Rangers College, Balaghat (Madhya Pradesh) respectively.
- One batch (course-2011-13) and One batch (Course 2012-13) of newly recruited FROs passed out from CASFOS, Burnihat (Assam) and Andhra Pradesh Forest Academy, Dullapally (Andhra Pradesh) respectively.
- Fifty two Participants participated in four thematic area General Refresher Course, each of two weeks duration, were conducted for in-service SFS Officers at CASFOS, Dehradun, Burnihat and Coimbatore.
- Fifty eight participants participated in five workshop of one week duration on Community Forestry & JFM, Human Resource Management, Wildlife Management for in-service FROs at CASFOS, Burnihat & Eastern Forest Rangers College, Kurseong.



- One hundred seven participants participated in Eight Workshops, each of one week duration, on Legal issues in Forestry/Wild life Management/Community Forestry and JFM /Human Resource Management/Training of Trainers for in-service SFS Officers at CASFOS, Dehradun/Coimbatore.
- Around 1877 participants participated in sixty eight General Refresher Courses, each of two weeks duration, were conducted for in-service Forest Frontline Staff (Deputy Rangers, Foresters & Forest Guards) through 49 Forestry Training Institutions of 29 States.
- Around one hundred fifteen participants participated in Five Theme based Workshop of one week duration conducted for in-service FROs through State Forest Training Institute.
- One, three day training programme on "Green Teacher" & "wild life trade and trafficking" sponsored by the Ministry was conducted at Eastern Forest Rangers College, Kurseong during November 2013 for other stakeholders.

## **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.

## **Post Graduate Diploma in Forest Management (PGDFM)**

The two year fully residential post graduate programme leading to the award of the Post Graduate Diploma in Forestry Management (PGDFM) was launched in July 1988. The admission to this course is through CAT (Common Admissions Test) being conducted by IIMs followed by Group Discussion and Personal Interview (GD & PI) at IIFM. Students with diverse academic backgrounds from all over the country are groomed to meet the managerial requirements of the corporate and development sectors. The structure of the programme provides for application of the skills. The programme is designed to produce young managers who are sensitive to both natural and social environment.

To address changing needs of the sector, the PGDFM programme was made broad based by introducing three major specialisation modules, viz., Conservation & Livelihood (C&L), Environmental Management (EM) and Development Management (DM).

### **Activities of PGDFM 2012-14**

The 84 students of PGDFM 2012-14 batch completed their summer internship for 10 weeks during April 02 – June 07, 2013 in 28 organisations.

Field Work – II component for PGDFM 2012-14 batch was organized during 02.12.2013 to 13.12.2013, wherein the *Environmental Management Group* was exposed to the concepts of environment friendly energy production, environmental care, energy conservation, ecological aspects, wildlife management, ecotourism, research and conservation aspects, nursery management etc. in Madhya Pradesh, Gujarat and Rajasthan. Similarly, *Conservation and Livelihood Management Group* was taken



to Uttarakhand giving them exposure to many conservation and livelihood aspects such as water conservation, biodiversity conservation, sustainable agriculture, environmental sanitation, depot management and timber trading, silvicultural aspects etc. and *Development Management Group* was taken to Madhya Pradesh, Uttar Pradesh, Rajasthan and Uttar Pradesh to get firsthand knowledge about socioeconomic analysis, opportunities and challenges in development sector, women empowerment aspects, watershed development, organic farming, entrepreneurship development, capacity building, land productivity development and rural infrastructure development.

The placement week for the PGDFM 2012-14 batch is scheduled during January 06-11, 2014. The Institute has received around 25 job offers from 10 prospective organizations by the 10<sup>th</sup> of December 2013.

### Activities of PGDFM 2013-15

The programme of PGDFM 2013-15 commenced from July 01, 2013 with 83 students selected following the reservation policy as per the GOI norms. For admission of this batch, 1545 applications were received and 505 candidates were shortlisted for Group Discussions/Personal Interview conducted at Bhopal (April 02-04, 2013); Bangaluru (April 02-03, 2013); Kolkata (April 02-03, 2013); and New Delhi (April 02-04, 2013).

Field work – I component for PGDFM 2013-15 batch was organized during 09.12.2013 to 27.12.2013. Students will be given exposure to forestry operations management, fundamentals of forestry, wildlife conservation, ecotourism, social aspects of JFM, forest settlements etc. in MP, Gujarat and Maharashtra during this fieldwork.

Summer Internship for the batch of PGDFM 2013-15 batch is scheduled during 31<sup>st</sup> March 2013 till June 06, 2014.

### Admissions

The admission announcement for 2014-16 batch has been published in leading national dailies. The last date for receiving the applications is January 21, 2014.

### M.Phil (Natural Resource Management)

The programme is affiliated to Saurashtra University, Rajkot, Gujarat. The degree is granted by the Faculty of Science, Saurashtra University, Rajkot and the course will be conducted at IIFM, Bhopal.

The programme of M.Phil. (NRM) 2013-14 commenced from July 01, 2013 with five candidates selected against the admission announcement. During the admission process, the Institute received 34 applications, out of which 09 candidates were called for Group Discussion/Personal Interview.

### Fellow Programme in Management (FPM)

The FPM programme is open to postgraduates from various disciplines and is designed to provide specialised knowledge, skills, and attitudes for positions requiring conceptual and application skills. The FPM programme aims to develop and equip students for career opportunities in management education and research. The programme offers financial assistance and contingency grants to selected non-sponsored candidates.

Two students have been inducted in the FPM 2013-17 batch which commenced from July 01, 2012. During the admission process, the Institute received 54 applications, out of which 27 candidates were called for Group Discussion/Personal Interview.



### Ph.D. Programme

The Institute functions as one of the research nodes for the FRIDeemed University for higher studies leading to Doctor of Philosophy. Currently, 15 candidates are pursuing doctoral programme of which three candidates joined in 2013.

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

Training is an important tool to facilitate the industries for efficient utilization of manpower resources, increase the productivity and reduce the overall cost of production. Human Resources Department needs of the mechanical wood industries are met by the Institute by conducting one year post graduate diploma course and short term vocational courses. Training enhances the professional competency of managers, supervisory staff and industrial workers. IPIRTI is the only training institute of its kind in the country in the field of mechanical wood industries.

### Progress/Achievements made during the year

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 24<sup>th</sup> 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 26 candidates completed the course successfully and 100% placement was arranged through campus selection process. Also, the 25<sup>th</sup> Training Course was started with an enrolment of 28 students.

### Short term vocational training courses

14 training courses on Resin manufacture and in all aspects of Plywood Technology are conducted in Bengaluru, and in Field stations Kolkatta and Mohali for fresh graduates and technicians from plywood factories.

### Special Training Courses for Students of Kannur University

One Training course is being conducted on Saw milling and Saw Doctoring for PG students in Wood Science and Technology of Kannur University.

IPIRTI Industry Meet: During the year Two IPIRTI-Industry meet organized at Mohali and Kolkata.

### Training Workshop for IFS Officers

Two training courses for senior IFS officers from various states and union territories of India.

### Budget Allocation

A sum of ₹7.52 Crores towards PLAN Expenditure and ₹2.3 Crores towards NON-PLAN Expenditure is allocated for 2013-14.

### Wildlife Education and Training

#### Wildlife Institute of India (WII)

Wildlife education and training is primarily looked after by Wildlife Institute of India (WII), Dehradun; an autonomous institute of the Ministry for imparting training to government and non-governmental personnel to carry out research and training activities and advice on matters of conservation and management of wildlife resources. The details of educational and training programmes conducted by the Institute are as follows:



## Academic and Training

### Courses and Training Programmes

- **XIV M.Sc. (Wildlife Science) Course, June 2013 to June 2015.** The XIV M.Sc. in Wildlife Science commenced in June 2013 for duration of two years, with 13 students from different States of the country. The candidates were selected through National Eligibility Test. Eight students were awarded WII fellowships; and five students were self sponsored.

The students were taken to Kotdi Range of Lansdowne Forest Division and Palain Range of Kalagarh Tiger Reserve Division for their field visit during July 22-27, 2013. The students were taken to Beribada Range, Rajaji National Park during October 19 -November 1, 2013 for techniques tour to train them in different wildlife techniques and provide knowledge regarding identification of flora and fauna.

- **XXXIV P.G. Diploma Course in Advanced Wildlife Management concluded, September 1, 2012 to June 30, 2013.** One of the important training courses, the 10-month P.G. Diploma Course in Advanced Wildlife Management was concluded on June 30, 2013. During the month of April, the Management Term Paper Exercise was held at Bandhavgarh Tiger Reserve in Madhya Pradesh. The trainees were assigned specific topics on various aspects of protected area management. These were presented in a seminar by officer trainees on April 16-17, 2012, followed by interaction and discussion among faculty members and officer trainees. The Management Plan Exercise with the objective to collect first-hand information on Tiger Reserve resources, its problems

and existing management practices was held at Periyar Tiger Reserve in Kerala during May 6 -June 4, 2013.

All the 20 officer trainees have successfully completed the course. Seven officer trainees were awarded the Honours Diploma for securing 75% and above marks.

- **XXXV P.G. Diploma Course in Advanced Wildlife Management commenced, September 1, 2013 to June 30, 2014.** To train the officials in the field of Wildlife Management, XXXV P.G. Diploma Course in Advanced Wildlife Management commenced at the Institute on September 1, 2013. Twenty officer trainees of the rank of Deputy Conservator of Forests/ Assistant Conservator of Forests/Assistant Veterinary Surgeon and equivalent levels joined the 10-month course. Fourteen of them represented different States of the country viz. one each from Kerala, Himachal Pradesh, Meghalaya, Tripura and Uttar Pradesh; two each from Mizoram and Odisha; and four from Andhra Pradesh. Two IFS officers of 2011-13 batch, who completed their professional forestry training of two years at Indira Gandhi National Forest Academy, Dehradun in August 2013, joined the course as Hari Singh Fellows. In addition, there are 6 foreign nationals (one from Vietnam sponsored by the Global Tiger Forum and 5 from Peoples' Republic of Bangladesh, sponsored by their own Govt.) also joined the prestigious course.

The officer trainees undertook their Orientation Tour at Kalagarh, Corbett Tiger Reserve and adjoining areas during September 23-28, 2013. They also attended the Annual Research Seminar of the



Institute during September 30 - October 1, 2013.

- **XXIX Certificate Course in Wildlife Management**, November 1, 2013 to January 31, 2014. The course commenced on November 1, 2013 for a duration of 3 months. A total of 20 international officers of the rank of Forest Range Officers and equivalent levels joined the course. Wildlife Management & Nature Conservation Division Dhaka, Bangladesh sponsored 14 participants from Bangladesh and Department of Wildlife and National Parks, Peninsular Malaysia sponsored 2 participants from Malaysia. Global Tiger Forum sponsored one each participant from Bhutan, Bangladesh, Vietnam and Nepal.

Apart from inputs in the classroom, the Officer Trainees were taken to Kanha National Park during November 16-30, 2013 for their Techniques Tour. The objective of the tour was to provide first-hand experience of various management practices related to habitat management for endangered species, wildlife protection, control of human activities, wildlife interface conflicts and tourism. They were taken to Rajaji National Park during December 5-7, 2013 for Wildlife Management Tour. They also visited Subir Raha Oil Museum, Dehradun; Ecotourism Centre, Dhanaulti; and Assan Conservation Reserve for Visitor Use Management Tour. The Management Tour was conducted at Bhitarkanika, Sunderbans and Kaziranga during January 4-21, 2014.

#### **Workshops, Seminars, Meetings and Other Activities**

- **Meeting of the Regional Steering Committee (RSC) on Conservation of**

**Vultures, New Delhi**, April 3, 2013. A meeting of the regional steering committee was held at New Delhi. The meeting was chaired by the RSC Chair, Dr. V. Rajagopalan, Secretary, Environment & Forests and was co-chaired by Dr. S.S. Garbyal, Additional Director General (Wildlife) and Ms. Aban Marker Kabraji, Regional Director, IUCN-Asia, Bangkok. The meeting was attended by Government and Non-Governmental Organization members from Bangladesh, India and Nepal. During the meeting, stock taking on initiatives by the range countries for vulture conservation and status on notification of national committee of the four countries was made. The participating members presented country updates for vulture conservation. India, Nepal and Pakistan have constituted the National Committee for Vulture Conservation.

- **Study tour of senior officers of Government of Bangladesh, Dehradun**, June 10-18, 2013. A study tour for senior officers of Government of Bangladesh was conducted by Wildlife Institute of India. It was funded by Strengthening Regional Cooperation for Wildlife Protection Project (SRCWPP) of Government of Bangladesh. A total of 10 participants from Department of Forests attended the programme. The first part of the programme was conducted at the Institute during which interactive classroom sessions were held on contemporary wildlife issues to familiarize the participants with Indian scenario. The participants also visited Forest Research Institute, Dehradun to acquaint themselves with the activities of the Institute. During the second part of the visit, the participants were taken to various protected areas and zoos in Uttarakhand, Rajasthan and



- Delhi. They visited Rajaji National Park, Sariska Tiger Reserve, Keoladeo National Park and National Zoological Park. They could observe the wildlife management practices in the field and appreciated the excellent work being done in the protected areas.
- **One-week Compulsory Training Course on "Human-Wildlife Conflict: Issues and Mitigation", Dehradun, July 22-26, 2013.** The course was organized for in-service IFS Officers in which 21 officers from various states participated. The participants also shared their experiences and case studies from the field. A field trip to Narendra Nagar Forest Division was also organized to familiarize the participants with some of the approaches being tried out in the field. The course ended with a panel discussion on the topic "Improvement in the working of Forest Department –Need for career development through training and improvement of skills".
  - **School in Herpetology, Dehradun, August 17-31, 2013.** An intensive course in Herpetology (study of amphibians and reptiles) called the "School in Herpetology" was conducted at the Wildlife Institute of India. It was sixth course in the series conducted since 2007 in different parts of the country. The programme was supported by the Science Engineering and Research Board, Department of Science and Technology, Government of India. This course targeted doctoral students and young faculty in Universities in India and neighbouring South Asian Association for Regional Cooperation (SAARC) countries. The course was designed to assist the students pursue careers in Herpetology. In all 25 participants, comprising of 21 students from India, two from Sri Lanka, two from Nepal were selected the course. The selection of these participants was made after advertising the course and screening from 223 online applications received.
- The Inaugural lecture was made by Prof. K.S. Krishnan, National Centre for Biological Sciences, Bengaluru. Apart from eminent herpetologists from India, some herpetologists from USA, France and Japan were invited as resource persons. The students were also trained in laboratory techniques such as preservation, curation, morphometry, behavioural observation of larvae and regeneration experiments. A field trip was organized at Dhanaulti. The participants were exposed to field techniques in herpetology and photo-documentation. During the field trip, the participants used various field techniques and recorded amphibians and reptiles in the field.
- **IX Internal Annual Research Seminar, September 24, 2013 and XXVII Annual Research Seminar of WII, September 30-October 1, 2013.** The IX Internal Annual Research Seminar (IARS) was conducted on September 24, 2013. The IARS was chaired by Shri Vinod Rishi, Former, ADG (WL), MoEF, Govt. of India, New Delhi. During IARS, a total of 14 presentations were made in 3 technical sessions, viz., Diversity, Distribution, and Population Assessment; Molecular Genetics and Captive Management and Animal-Habitat Interactions and Impacts of Climate Change. The presentations were based on recently initiated and ongoing research studies and were made by research fellows of the Institute. Three presentations were adjudged as the best oral presentations and the research personnel were awarded book prizes.



The XXVII Annual Research Seminar (ARS) of the Institute was conducted during September 30-October 1, 2013 at WII. Prof. R. Sukumar, Chairman, Training, Research and Academic Council (TRAC), chaired the ARS. A total of 22 presentations were made in 4 technical sessions viz., Landscape Ecology; Tools and Techniques in Wildlife Conservation; Conservation Breeding and Phylogenetics and Species Ecology. The presentations were based on the ongoing or completed research studies. They were made by research fellows and faculty members of the Institute. In addition, 18 poster presentations were also made by the researchers. The oral and poster presentations were evaluated by a panel of judges.

About 330 delegates attended the ARS that included the Principal Chief Conservators of Forests, Chief Wildlife Wardens and other senior officials representing State Forest Departments, delegates representing NGOs, scientists, wildlife experts, faculty members, researchers, students, P.G. Diploma Course officer trainees of WII and IFS probationers from the Indira Gandhi National Forest Academy, Dehradun.

A panel of eminent scientists and wildlife managers evaluated the relevance and quality of research made through oral and poster presentations. Three presentations were adjudged the 'best presentations' and researchers were awarded the book prize.

- **Wildlife Week Celebration, 2013** - The XI<sup>th</sup> 'Wildlife & Environment Quiz 2013' - a collaborative activity of Wildlife Institute of India (WII) and Friends of Doon (FoD) Society was organized on October 5, 2013 to mark the celebrations of the

Wildlife Week 2013 at Wildlife Institute of India. Thirteen schools participated in the preliminary round. The final quiz had six rounds, viz. Uttarakhand; Guess who; Pictionary; Audio round; Taboo round; and Biogeographic zones & Landscapes round.

Brightlands School topped the list and won the WII-FoD Rolling Trophy, Book Prize and Sameer Ghosh Memorial Nature and Wildlife Rolling Trophy. Dr. Mahendra Shrestha, Program Director, Smithsonian Conservation Biology Institute, USA graced the occasion as Chief Guest and distributed the prizes to the winning team.

- **One-week training workshop on 'Biodiversity Conservation', Dehradun, November 11-15, 2013.** The training workshop was sponsored by Department of Science and Technology. Twenty two women scientists and technologists working in the Government departments/ institutions/ organizations/universities participated in the course. Participation in this training programme enabled the candidates aware of: (i) principles/ approaches in Biodiversity Conservation; (ii) causes of decline in natural resources/ habitats and species; (iii) good practices in Biodiversity Conservation; (iv) conservation issues in the field; and (v) to establish linkages and facilitate sharing of information among scientist.

The workshop was inaugurated by Ms. Mahua Pal, Pro Accountant General (A&E), Uttarakhand. She gave a keynote address on "Biodiversity Conservation -Accountability". A field visit to Rajaji National Park was organized wherein the institute's students and faculty sensitized the participants to the field



techniques related to wildlife science, including camera-trapping use of GPS and radio-tracking. Human dimensions of conservation were also discussed and the participants visited the *Gujjar* deras still located inside the forests. A visit to the *Gujjar* Relocation sites at Gandikhatta was also made and the participants could get first-hand experience of interactions with the *Gujjars* and the forest department.

- **Implementation of Kailash Sacred Landscape Conservation and Development Initiative** - In recent years, the International Centre for Integrated Mountain Development (ICIMOD) initiated and facilitated a process in collaboration with other partners to engage regional, national, local partners and other stakeholders among ICIMOD's Regional Member Countries (RMCs), namely China, India, and Nepal towards delineation of a trans-boundary cultural and biodiversity conservation landscape -the Mt. Kailash Sacred Landscape (KSL) for developing a trans-boundary Regional Cooperation Framework (RCF). In India, the nodal ministry i.e., the Ministry of Environment & Forests, Government of India after thorough consultation with concerned ministries and organizations agreed to the concept of the proposal 'Kailash Sacred Landscape' and developing a trans-boundary framework for conservation and sustainable development in the Greater Mt. Kailash Region of China, India and Nepal, and designated the G.B. Pant Institute of Himalayan Environment & Development (GBPIHED) as the lead institute, while the Wildlife Institute of India (WII), Uttarakhand Forest Department (UKFD), State Biodiversity Board (SBB) -Uttarakhand, and Central Himalayan

Environment Association (CHEA) as major partner organizations for the implementation of the KSLCDI on the Indian side.

Kailash Sacred Landscape Conservation and Development Initiative project relates to a trans-boundary landscape straddling in 3 countries (China, India, and Nepal). The project primarily aims to conserve biodiversity i.e. maintenance of ecological and biological diversity at hierarchal scales (landscape, ecosystem, community, and species level), ecological integrity, continued ecological processes and services besides reduction of vulnerability of local communities. The project also aims to promote development in the landscape for human well-being, sustainable livelihoods and economic prosperity, and resiliency to climate change. The LoA signed by ICIMOD and WII for the period 2013-2016 has spelt diverse activities to be performed by WII's team under 3 different components (ecosystem management for sustaining services, biodiversity conservation and long-term monitoring and regional cooperation, enabling policies and knowledge management) of the project.

Considering above, the project incorporates a multi-disciplinary outlook as they relate to biological, ecological, social, and management aspects of natural resources and involve a large number of scientific and social disciplines to envisage an output in the form of a 'Landscape Management Plan' for KSL.

- **Implementation Plan of "Kailash Sacred Landscape Conservation and Development Initiative, November 11-16, 2013.**

WII executed the Implementation Plan of “Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) facilitated by the International centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal and supported by the GIZ and DFID-UKAID, under which following three sequential workshops were organized at the Zila Parishad Auditorium, Pithoragarh:

**(i) Project Consultation Workshop, Pithoragarh, November 11-12, 2013.**

To initiate the process of execution of Implementation Plan - KSLCDI, the workshop was conducted to bring the prominent stakeholders (Forest Department, Pithoragarh District Administration, Project Director, District Rural Development Agency, Heads of concerned Departments, and Partner Organizations (GBPIHED and CHEA) together for the development of the landscape. Dr. L.M.S. Palni, Former Director, GBPIHED, Kosi-Katarmal, Almora inaugurated the workshop and addressed the participants about the Kailash Sacred Landscape as a whole. The participants made a presentation highlighting developmental activities undertaken by respective departments, including the representative of Eco Task Force, Pithoragarh.

The workshop was able to establish contact with the District Administration and garner their confidence and support for smooth conduct of KSLCDI in the landscape.

**(ii) Workshop on ‘Participatory Natural Resource Management in context of van panchayat’, Pithoragarh, November 13, 2013.** The second

workshop in a series focused on the PNRM in context of van panchayats. Sarpanch and representatives of 15 van panchayats located across the ‘horizontal transect’ in KSL-India were invited along with Range Officers from Pithoragarh Forest Division. The workshop was chaired and inaugurated by Dr. Neeraj Khairwal, IAS, District Magistrate, Pithoragarh and Dr. R.S. Bisht, Chief Conservator of Forests (Research); Uttarakhand Forest Department gave the keynote address on van panchayats. In all 45 villagers/van panchayats representatives took active part in the workshop.

District Magistrate, Pithoragarh interacted with participants one to one and assured full support from line agencies for effective implementation of KSLCDI and its synergies with the Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP) and other similar projects implemented by the state government in the landscape.

**(iii) Workshop on ‘Capacity building of forest frontline staff in field techniques and wildlife management’, Pithoragarh, November 14-16, 2013.** The third workshop was primarily focused on capacity building of frontline staff of Pithoragarh Forest Division. Field staff including RFOs/Deputy Rangers (6) and Forest Guards (20 in number) attended the workshop besides KSLCDI project biologists (6) working with WII, Project Assistants (3) with WII and newly recruited staff (6) of BCRLIP by Pithoragarh Forest Division. A field visit to adjacent forest area



was organized for the demonstration of field techniques on vegetation and animals, specially the use of modern gadgets in recording evidences of wild animals.

- **Attachment of Officer Trainees of Indian Revenue Service (Customs & Central Excise) Group-A 64th Batch with Wildlife Institute of India, Dehradun**, January 6-17, 2014 and January 20-31, 2014. The present training module basically aimed at sensitizing the young Officer Trainees of Indian Revenue Service (Customs & Central Excise) of 64<sup>th</sup> Batch towards wildlife trade in the country and their role in checking it. The course is being attended by 87 Officer Trainees in two groups.

Various inputs, included introduction on importance of biodiversity and its conservation, status of endangered species and special inputs on illegal trade in wildlife articles including butterflies, shahtoosh, rhino horn, skins and tiger bones. Inputs were given on the role of wildlife forensics in dealing with wildlife cases. Officer Trainees were also given basic information on the implementation of Wildlife (Protection) Act, 1972, CITES and other international conventions. The Officer Trainees were provided an opportunity to interact with the IFS Officer Trainees at Indira Gandhi National Forest Academy, Dehradun to improve inter-service coordination.

Apart from providing classroom inputs, the participants were also taken to Rajaji National Park and Corbett Tiger Reserve. Jungle safaris in Dhikala and Bijrani area of Corbett Tiger Reserve sensitized them towards flagship and keystone species.

- **Kishenganga Hydroelectric Project Arbitration** - Based on a request from Indus Wing of the Ministry of Water Resources, Govt. of India, the WII provided technical inputs on biodiversity aspects related to the Kishenganga Hydroelectric Project (HEP) Arbitration with Pakistan in the Court of Arbitration (CoA), The Hague, Netherlands. WII faculty provided technical inputs in the preparation of Biodiversity Profile of the Kishenganga HEP area, and salient points for the preparation of India's counter memorial to Pakistan. WII also carried out field visits to the Kishenganga HEP and downstream areas in Jammu & Kashmir and Pakistan occupied Kashmir and also participated in several meetings regarding this matter and submitted reports. Based on India's memorial, arguments and written submissions, the CoA in its partial award in early 2013 permitted India to go ahead with construction of Kishenganga HEP through inter-tributary transfer. In its final award made in December 2013, the CoA requested India to release 9 cumec of water downstream of Kishenganga HEP during all times of the year.
- **Preparation of Fifth National Report to the Convention on Biological Diversity and Updation of National Biodiversity Action Plan of India** - The Ministry of Environment & Forests, Government of India assigned the work of 'Preparation of the 5th National Report to CBD and Updation of National Biodiversity Action Plan of India under GEF Director Access project' to the Wildlife Institute of India. The Institute prepared a 'Zero Draft' of the 5th National Report of CBD, which was discussed in a national stakeholder consultation held on July 30, 2013. Further

work is ongoing to meet the deadline of submission in March, 2014.

### Indo-German Biodiversity Programme (GIZ)

Wildlife Institute of India was assigned to undertake 'Capacity Needs Assessment for participatory management of Coastal and marine protected areas in India, to guide the development of a tailor-made comprehensive capacity building plan. The Capacity Needs Assessment exercise is being conducted in a highly participatory manner with detailed consultations at national, state, district and local levels in four coastal states of India with a special focus on the forest sector. Based on the Capacity Needs Assessment, relevant project activities will be designed and implemented in the partner states in cooperation with National and International institutions.

### Development of Climate Change Adaptation Workbook for World Heritage Sites in India

Wildlife Institute of India in collaboration with Rajasthan and Uttarakhand Forest Departments has developed the Climate Change Adaptation Workbooks for Keoladeo National Park and the Nanda Devi National Park World Heritage Sites with technical help from the United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris.

### All India survey on dugongs and their habitats

The Ministry of Environment & Forests, Government of India assigned the Wildlife Institute of India to carry out a survey on dugong to gather information on the status and distribution pattern, habitat and risks due to fisheries and other anthropogenic activities in India. This survey was conducted as part of UNEP/CMS dugong memorandum of

understanding (MoU). WII has completed this survey and submitted the report to MoEF with suggestion for species recovery plan during the reporting period.

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

The BCRLIP implementation started with the signing of the project document between parties on 14th June, 2011. The WII was included in the project as one of the partners and assigned the task of scientific backstopping and micro planning support to pilot sites, and knowledge management for dissemination of landscape approach. In terms of scientific backstopping, WII has been provided the task of Ecological Mapping and Identification of the Biological Indicator at Askot Landscape.

- (i) **Ecological Mapping and Biological Indicator:** In terms of Ecological Mapping a draft report on the first year's work on mapping of various layers and validation of satellite data has been prepared by the mapping team. A preliminary report of the first year's work on socio-economic profiling of Askot landscape has been prepared.
- (ii) **Preparation of Model Micro-plans:** Draft Model micro-plans were completed for two villages, namely *Pantha* and *Wafthi* of Askot Landscape. These two villages consist of many *Thoks* (scattered settlements within the ambit of the village and its *Van Panchayat*), which is, in effect, micro-planning in several small villages. The exercise has also been used to impart necessary competence based training to the newly recruited staff for facilitating micro-planning in the landscape.
- (iii) **Identification of two additional Sites:** The MoEF has approved Satpura and



**Fig-52.** Northern Shoveler (*Anas Acuta*) at Surajpur Bird Sanctuary

Agasthiyamalai as the additional landscape sites for project implementation and the State Governments of the Madhya Pradesh and Maharashtra for Satpura and Tamil Nadu-Kerala for Agasthiyamalai have been informed by the MoEF accordingly.

**(iv) Field Learning Centres:** One of the major responsibilities given to WII was to provide technical expertise and support for the development of field learning centers. The focus is on providing hands on training through cross visits, exchange assignments, work experience and training sessions and distillation of conservation best practices.

*Kalakkad Mundanthurai Tiger Reserve (KMTR) Learning Centre:* The KMTR team has prepared draft manuals and resource material on the following: (i) Community mobilization and empowerment; (ii) Micro-

planning and participatory monitoring; and (iii) Management of self help group.

*Periyar Tiger Reserve (PTR) Learning Centre:* The PTR team has prepared draft manuals and resource material on the following: (i) Community institutional development and organizational; (ii) Sustainable financing for protected areas and community livelihood; and (iii) Private public corporation.

*Gir Learning Center:* The Gir team has prepared draft manuals and resource material on the following: (i) Regional conservation planning for biodiversity conservation; (ii) Multi-sectoral coordination; (iii) Eco development; (iv) Improved management practices; (v) Rescue, treatment and rehabilitation; and (vi) Community participation.

**(v) Institutional Strengthening and Core Course Preparation:** Dr. Kathy McKinnon,

international consultant visited WII during September 12-30, 2013 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.

- **Policy level workshop was held at Indian Institute of Management, Ahmedabad**, September 19, 2014 and **site level workshop, Bajana, Little Rann of Kutch (LRK)**, September 20, 2014. WII along with Gujarat Forest Department also conducted the policy level and site level workshops in Gujarat. These workshops helped in discussing the issue of landscape management at the level of higher bureaucracy of the Gujarat government and with the line departments and stakeholders operating at site.

### Wildlife Forensics

Wildlife Forensic Cell (WFC) of the Institute received 239 wildlife offence cases from the State forest departments, Police, and Central Bureau of Investigation (CBI), Courts, Department of Customs and Central Excise, etc. Besides, a few cases were also received from Nepal. Report on species identification was provided in 174 wildlife offences. In a few cases, enforcement agencies have requested to establish linkages from the evidences collected from the crime scenes to the evidence recovered from the accused.

Sensitization of enforcement agencies through appropriate hands-on training was undertaken and a training program was also conducted on “How to investigate wildlife crime scene”.

**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:

- (i) Centre for Environment Education (CEE), Ahmedabad
- (ii) CPR Environmental Education Centre (CPREEC), Chennai
- (iii) Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru
- (iv) Centre of Mining Environment (CME), Indian School of Mines, Dhanbad
- (v) Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore
- (vi) Centre for Environment Management of Degraded Ecosystem (CEMDE), University of Delhi, Delhi
- (vii) Madras School of Economics (MSE), Chennai
- (viii) Foundation for Revitalization of Local Health Traditions (FRLHT), Bengaluru
- (ix) The Tropical Botanic Garden and Research Institute (TBGRI), Thiruvananthapuram
- (x) Centre for Animals and Environment, CARTMAN, Bengaluru. This COE has however not undertaken any work as a CoE in this year.

Brief details about these Centres of Excellence are as follows:

## Centre for Environment Education (CEE), Ahmedabad

### Introduction

Centre for Environment Education (CEE) was established in 1984 as a Centre of Excellence in Environmental Education, supported by the Ministry of Environment and Forests (MoEF), Government of India, in recognition of the importance of environmental education in India's overall environment and development strategy. CEE is a national institution engaged in developing programmes and material to increase awareness and concern, leading to action, regarding the environment and sustainable development. It has inherited the rich multidisciplinary resource base and varied experience of Nehru Foundation for Development (NFD), its parent organization, which has been promoting educational efforts since 1966 in the areas of science, nature study, health, development and environment.

### Paryavaran Mitra Programme

Paryavaran Mitra programme is an initiative of CEE in partnership with the Ministry of Environment and Forests (MoEF) and is supported by Arcelor Mittal. It was launched in July, 2010. Paryavaran Mitra programme envisions creating 'Friends of the Environment' in schools across India. The goal of the programme is to create a network of young people across the nation who has the knowledge, awareness and commitment to meet the challenges of global citizenship and climate change. The Paryavaran Mitra programme aims to guide, facilitate, capacity building among students through curriculum-linked activities and co-curricular action projects to take positive environmental action at individual, community, national and global level.



The programme has reached out to more than two lakh schools mostly government schools, mainly in rural India. The annual Paryavaran Mitra Puraskar (Paryavaran Mitra Award) is presented to schools, teachers, students and districts of India for efforts in environment education and education for sustainable development. The benchmark case studies are shared with the network to demonstrate to various stakeholders what ESD could look like in a school.

The programme has been able to get recognitions, the latest being listed as one of the best practices in ESD for schools globally by UNESCO and International Business Leaders Forum, London, 2012.

### 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 2012-13 focusing on themes such as 'Clean Ganga and Save Ganga' awareness campaign, Safe Holi, and Cracker free Diwali.

### Gangetic River Dolphin – Conservation Education Programme

In order to focus public attention on the conservation of the Ganges River dolphin, an endangered species, the Ganges river dolphin conservation education programme is being implemented in the schools of major riverside areas where Ganges river dolphins are found.

### Children's Forest Programme (CFP)

Children's Forest Programme (CFP) has been initiated in six districts under the Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project (UP-PFMPAP) of UP Forest Department supported by Japan International Cooperation Agency (JICA). The programme is for a period of five years (2010-2015) and aims to reach out to 100 schools in six districts, namely, Agra, Allahabad, Gautam Budh Nagar, Kanpur, Lucknow and Varanasi. A list of 28-32 species of indigenous varieties of plants, available have been identified with the Forest Department nurseries, for plantation in CFP schools.

### 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 following mechanisms have been set up at CEE for fulfilling the ENVIS responsibilities and objectives.

- ENVIS collection at CEE Information Service Centre (ISC)
- Education for Change newsletter
- Green Teacher Website
- Query Response Service

The Green Teacher website [www.greenteacher.org](http://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.ceeenvvis.nic.in](http://www.ceeenvvis.nic.in) compatible with the NIC platform is being redeveloped, which will help to meet the ENVIS objectives more effectively.



## Science Express Biodiversity Special (SEBS)

'Science Express' is a unique, state of the art exhibition train which had been refurbished as a 'Biodiversity Special' with exhibition on biodiversity of India across the country, bringing science awareness to the doorsteps of million of children, youth and other citizens. This train became the Biodiversity Special and carried special exhibits on biodiversity of India in its first run in 2012. In partnership with the MoEF, Department of Science & Technology, CEE has specially designed eight coaches for this purpose. Through visuals, models, audio-video and interactive exhibits, it portray India's unique biodiversity in national and eco-regional thematic modes, its relationship with mankind, its place in our diverse and ancient cultures, its importance, status, threats, conservation needs, action being taken by government and other agencies, along with some success stories.

The train in its second phase from April 2013 to October 2013 stopped at 62 locations. Activities to engage visitors across different age groups were conducted with a view to reinforce the message of biodiversity conservation. Specific outreach programmes were also conducted with local schools and institutions associated with the Ministry's Natural Environmental Awareness Programme and National Green Corps. During this journey, SEBS received over 22 lakh visitors, which included 6005 schools, five lakh students, 29000 teachers and 14 lakh general public. Take-away material complementing the exhibition, mostly in the regional languages, was also distributed to the visitors in large numbers.

## National Environmental Awareness Campaign

The National Environment Awareness Campaign (NEAC) is an annual scheme of the MoEF, operation since 1986. 'Biodiversity Conservation' was the campaign theme for 2012-13. CEE was associated with the campaign in its capacity of the Centre of Excellence. CEE representatives worked with 20 Regional Resources Agencies (RRAs). An expert group was constituted by the Ministry for the effective implementation of the NEAC programme, which includes a CEE representative.

## C.P.R. Environmental Education Centre (CPREEC)

### Introduction

C.P.R. Environmental Education Centre (CPREEC) is a Centre of Excellence of the Ministry of Environment and Forests, Government of India, jointly set up by the Ministry and the C.P. Ramaswami Aiyar Foundation.

To create awareness among various stakeholders about current environmental issues and our responsibilities towards the preservation of our environment. The programmes have been conducted in the States of Andhra Pradesh, Goa, Karnataka, Kerala, Odisha, Maharashtra and Tamil Nadu, Union Territories of Andaman and Nicobar Islands and Puducherry.

### Progress /achievements made during the year

#### Environmental Education for Teachers

Teachers selected by the state Departments of Education in the states of Andhra Pradesh, Karnataka, Kerala, Goa, Odisha, Maharashtra and Tamil Nadu were trained to teach environmental concepts. Updated resource materials were distributed.



## Green Schools of India (Environmental Education Animal Welfare)

CPREEC's Green Schools of India (GSI) is an environmental management programme for school students, which aims to convert environmental awareness and education into action. Students from schools involved in five areas of environmental management: reducing energy and water consumption, waste management, greening the campus and animal welfare. Several schools have introduced the concept of GSI and have reduced their consumption of water and energy. Composting pits for effective waste management, rain water harvesting pits to harness nature's bounty, and greening the campus are included in their activities. Some schools maintain herbal gardens. Green School Awards are given annually to the best performing schools.

## Biodiversity Conservation Education

Workshops on biodiversity conservation education were conducted for teachers, students, women and villagers in the states of Andhra Pradesh, Karnataka and Tamil Nadu. The focus was on tropical forests, degraded eco systems and wetlands. The participants were taken on field visits to reserve forests. Teachers and students were trained in the preparation of biodiversity register.

## Sacred Groves

CPREEC has been conserving and restoring sacred groves since 1993-94. Tree plantation and maintenance have been going on in the existing eight sites in the states of Karnataka and Tamilnadu. Orientation programmes for school students were organized at the sacred grove sites to motivate them towards sacred grove conservation. CPREEC has established a nakshatra van on the lands of the Meenakshi Temple at Madurai. This has been extended to

a grove of kadamba and mahua trees, sacred to Goddess Meenakshi.

## Women and the Environment

CPREEC trained women of selected villages in waste management, vermicomposting, organic farming, health and nutrition in the states of Tamilnadu and Karnataka 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, Mysore and Chamraja Nagar districts in Karnataka. 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.

Organised a series of awareness programmes on Participatory Rural Approach in the Nilgiris.

## Andaman & Nicobar Islands Conservation Education

Teachers, teachers trainees, students and women were chosen for programmes on the importance of the island ecosystem. Exhibition on Coastal and Marine Biodiversity was put up for the benefit of the islanders.

## Exhibition

An exhibition on '*Clean Adyar, Clean Cooum, Solve Madras' water problem*' in August,

2013. The exhibition was sent to various city schools. Another exhibition on *The Elephant* was put up at Chennai in October/November 2013. Dr. R. Sukumar, Professor; Centre for Ecological Sciences, Indian Institute of Science, Bengaluru delivered a talk on '*Elephants: Biology, Culture & Management*' at CPREEC, Chennai. A booklet on Elephant in English was conducted in October 2013. The third exhibition titled '*Green Pilgrimage*' was put up at Chennai from February 18 to March 1, 2014.

### Publications

Four issues of the quarterly newsletter ECONEWS were brought out.

Indian journal of Environmental Education is a peer-reviewed journal published annually.

CPREEC's publications are regularly updated and reprinted. Appropriate resource materials produced by CPREEC were distributed to the participants of the various training programmes. The proceedings of the Seminars on the 'Ecological Traditions of Rajasthan' and Inventory and Preparation of Management Plan of Sacred Groves for the state of Tamil Nadu were published. CPREEC's publication on Plant and Animal Diversity in Valmiki's Ramayana was released by Dr. M.S. Swaminathan, Chairman of CPREEC on September 23, 2013.

### Research and Surveys

CPREEC carried out survey on water quality, ambient air quality, noise levels at various locations in Chennai. In addition to the above, CPREEC also analysed water samples collected from various river basins of Tamil Nadu. CPREEC also analysed water samples collected from Temple Tanks of Kanchipuram district. The samples were analysed for chemical and microbial parameters.

### 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 Bi-Annual ENVIS newsletter ECOHERITAGE.COM was published.

### National Green Corps (NGC)

Being the Resource Agency of NGC, CPREEC printed and distributed a booklet on Biodiversity in English, Tamil, Telugu, Kannada, Malayalam, and Oriya to NGC schools in the southern states. Workshops were organised for selected district NGC teacher-coordinators of various states.

Organised 13 National Nature Camping's of various states of Tamil Nadu, Karnataka, Odisha for the NGC students, supported by the Ministry of Environment and Forests, Government of India.

### Waste Management

CPREEC conducted a series of workshops on E-Waste Management for bulk consumers and recyclers in collaborations with the concerned State Pollution Control Boards, and Pollution Control Committee. CPREEC developed a booklet on '*E-waste Management*' and printed '*E-waste (Handling & Management) Rules, 2011*'.

### National Environment Awareness Campaign (NEAC)

National Environmental Awareness Campaign (NEAC) Regional Committee meeting of Eastern & Southern Region was organized at Chennai and Bhubaneswar.



## Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru

### Introduction

The Centre of Ecological Sciences (CES) in the Indian Institute of Science, Bangalore, is one of the Centres of Excellence of the Ministry. The Centre conducts research in the broad area of ecology with practical application in conservation and sustainable development of natural areas with special emphasis on the biodiversity of the Western Ghats, one of the hotspots of biodiversity in the world.

### Activities undertaken so far

The Centre conducts research which ranges from micro-fauna such as ants and termites to mega-fauna such as elephants, as well as the floristic and ecology of tropical forests. These projects have been grouped into four broad themes – Community, forests and wildlife ecology; Animal behaviour and evolution; Human and Landscape Ecology; Climate Change and Conservation Outreach, Training and Education. It also imparts education, extension & training for field managers in the broad area of ecology on the Western Ghats.

### Progress/ Achievements made during the year

The important progress made out by this Centre w.r.t. Western Ghats includes the following:

- The Centre created extensive distribution database for frogs, snakes and lizards of the Western Ghats to study patterns of distribution and diversity and diversification processes. Following are the important studies made during the year.

- Study on predator-prey interactions between bats and katydids (insects), the behaviour of a prey katydid species, *Onomarchus uninotatus* were found that the females of this species respond to male calls with a silent tremulation response which has specific phase relationships to their calls. These tremulation responses are robust and provide a possible solution to communicating safely and effectively in the presence of acoustically eavesdropping bat predators.
- A study on relationship between weather variables (seasonal rainfall, relative humidity, temperature) and days of fire during the dry seasons of 2004-2010 based on Moderate-resolution Imaging Spectroradiometer (MODIS) fire incident data in the seasonally dry tropical forests of Mudumalai in the Western Ghats, southern India. This study forms a quantitative framework for assessing risk of a fire day to assist forest managers in anticipating fire occurrences in this seasonally dry tropical forest, and possibly for those across South Asia.
- From a study made on chemical ecology of a keystone species *Ficus racemosa* and its relationship with a variety of important ecosystem engineers such as *Oecophylla* ants, it was observed that ants respond to chemical emitted by the figs of *Ficus racemosa* and can respond to these chemical as attractants. Since *Oecophylla* ants can be important predators of pest insects in orchards, this research on the chemical attraction of *Oecophylla* is important in devising ant attraction strategies.
- In a study on a sensory and visual network for pollinators in a seasonal cloud forest



in Maharashtra within the Bhimashankar Wildlife Sanctuary, it is noticed that diversity of unusual pollinators that are servicing the plants in this area. More attention needs to be paid to neglected pollinators such as flies and ground-nesting Andrenid bees as honey bees alone are insufficient as pollinators of forest plants.

- A study of impact of *Lantana camara* (invasive plant species), on butterfly diversity and behaviour at Biligiri Rangaswamy Temple Tiger Reserve in Karnataka. Butterflies are good indicator taxa for the assessment and monitoring of habitats and disturbance. Preliminary analyses indicate that butterfly abundance declines with lantana cover and that species composition varies substantially with lantana cover.
- A study on the valuation of the forest ecosystem in Uttara Kannada district has been done considering provisioning, regulating, cultural and supporting services it provides. The value of provisioning goods and services are computed by market price method. The value of regulating, cultural and supporting services is based on the values derived from literature. The total value of provisioning goods and services from the forests of Uttara Kannada district was estimated at ₹ 15,171 crore per year, which amounts to about ₹ 2 lakh per hectare per year. The total economic value was estimated to be ₹ 84,321 crore per year.
- Gross District Domestic Product (GDDP) of Uttara Kannada is about ₹ 5,978 crores and the contribution of forests' goods is accounted as ₹ 180 crore (3% of GDDP), in contrast to the estimated valuation of

provisioning services (ranges from ₹9707 to ₹15171 crore per year). This highlights the undervaluation of forest resources in the regional accounting system

### **Budget allocation of the Scheme during the year and Progress of Expenditure**

An amount of ₹ 1,25,00,000/- was allocated and ₹ 1, 24,50,000/- was released on 2013-2014.

### **Implementing organizations along with details of responsibilities**

The Centre is functioning under the Administrative Control of Indian Institute of Science, Bengaluru.

### **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**

#### **Introduction**

Sálím 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

### Progress / achievement made during 2012-13

SACON's research and conservation activities are taken up under various thematic and interactive divisions. Under "Conservation Ecology" SACON have continued the work on conservation of the Edible-nest Swiftlet in the Andaman and Nicobar Islands, which has resulted in very encouraging outcomes. A reassessment of the overall status of the species in the islands, done during the year, shows that the species in unprotected caves face substantial pressure. However, of the 325 caves surveyed in 1998, 249 caves are still occupied by Edible-nest Swiftlet. This study emphasizes the need for more bread based and participatory conservation actions with respect to the species.

On the Narcondam Hornbill, restricted to the island of same name, SACON have continued the study. The study shows in overall the disturbances to the Narcondam Hornbill seems to have reduced and the species is doing relatively well in the island with significant role by security forces stationed there. Coming to the mainland, under the same theme SACON is pursuing a study in the Agasthiyamalai Hills (Western Ghats, Kerala) to bring out the patterns of faunal (birds and reptiles) distributions and the factors determining the same. Considerable primary data is acquired and this would be used for modeling species distribution in view of the altitudinal changes and in view of impending climatic changes.

Under "Conservation Biology", (1) A study of the endemic Nicobar Long-tailed Macaque (*Macaca fascicularis umbrosa*) focusing on its social organization, behavior,

and phylogeography is progressing well with generation of valuable data on the social organization and behaviour. (2) In the islands, upon the request from the Andaman & Nicobar Forest department SACON made an estimation of abundance of feral elephants in the Interview Island Sanctuary. As per the study the estimated (minimum) population size of feral elephants in the islands was only 11. (3) The distribution survey of the nocturnal primate Slender Loris in parts of Kerala and Tamil Nadu is in progress; the survey is completed, and data analysis and report preparation is in progress. (4) In continuation of the previous studies on the largest populations of Lion Tailed Macaque (in Aghanashini-Liontailed Macaque Conservation Reserve, Western Ghats), SACON attempted developing a model for sustainable harvest of Garcinia fruit with minimal effect on the macaques and the forest, its stand structure and regeneration. We hope that the model would bring out a sustainable resource conflict resolution between the macaque and the local people.

Under "Landscape Ecology" an ecological investigation in the riverine forests of Athikkadavu Valley (Western Ghats) focusing on nest tree use by birds was undertaken. From the study area 31 cavity-nesting bird species, 23 cavity-bearing tree species belonging to 18 families were recorded. Another study on Avian frugivory and seed dispersal of endemic tree species (Thai shola forest of Nilgiri hills) 12 endemic fleshy-fruited tree species and 24 species of birds depending on those tree species were recorded. These studies bring out valuable quantitative data on the unique interrelations between the birds and the tree species.

SACON's ecotoxicology work included 1) a comparative study of pesticide residues

in an agro-ecosystem adopting organic and chemical farming (Padayetti village, Palakkad District, Kerala), and 2) Monitoring and Surveillance of Environmental Contaminants in Birds in India. With reference to the second project, a large number of bird tissue samples from across the country are obtained and they are being processed.

Ecological assessment has been an important activity of SACON since its inception. The three year study SACON have taken up on the impacts of Jangi wind power farm (91.8 mw) with special reference to birds and bats. The study, perhaps the longest in the country on such an important alternative source of energy project, has generated valuable information. SACON have also partnered with other organizations in Cumulative EIA of hydro electric projects in Sutlej river basin and river Yamuna, Tons and tributaries.

Keoladeo National Park is widely studied with respect to various ecological aspects. In this context, a historical review of environment in Keoladeo National Park and its catchment was done for the Planning Commission of India. In view of wide and crucial interactions between the park ecosystem and its catchment SACON have taken up a study on impact of agrochemicals on avifauna in the catchment of the Keoladeo National Park funded by Department of Science and Technology (DST) (Gol).

Wetlands and wetlands birds have been an important theme for SACON. During the reporting period the study on morphological diversity of colonial water birds using a novel approach, essentially photogrammetric, is being field-tested with excellent results. The study is funded by the Department of Science & Technology (Gol).

SACON has been running the ENVIS centre on theme "Wetland ecosystems including the inland wetlands" for the MoEF.

Under our extension research activities a documentation of ecological and ethno-cultural aspects of rice paddies is in progress. The study has documented valuable traditional ecological knowledge focusing on several indigenous and endemic varieties in south India and has brought out information on some rare and unique varieties of rice that is being cultivated by small and unique group of people or sometime families.

SACON's nature education programmes have been taking the message of conservation to thousands of students and public. Nature education activities regularly being taken up in Coimbatore, includes Sálim Ali Trophy Nature Competitions and nature camps for the students.

SACON has been pursuing human resource development and capacity building in the field of conservation science since its inception. During the reporting period, 17 students are working on their PhD dissertation. Publication being the second most crucial aspects of research SACON has published 30 papers in journals of repute, and 43 papers were presented in international and national conferences.

## **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 so far:

The Centre of Excellence Programme of MoEF 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.

#### Progress/Achievements made during

The major achievements in some of the programmes during 2013-2014 are as follows:

##### Ecological restoration of mined out areas

Two coal mined out sites in the coal fields of Bharat Coking Coal Fields (BCCL), Dhanbad and Central Coalfields (CCL), Ranchi, Jharkhand were selected for ecological restoration. Each site spreads over an area of 20 hectares. In the first year, five selected species of native grasses were introduced on the sites so as to enhance soil development and moisture retention. In the second year about 10,000 bamboo saplings and about 8000 saplings of native tree species were planted. After two years of ecological restoration, the sites have more than 85 % grass cover and the survival rate of the saplings is nearly 90% and the growth rate of saplings is also very high as evident by the

height attained in a single growing season. The use of ecological restoration technology on the coal mined out sites has resulted in improving the soil biological and physico-chemical characteristics of these sites. It has also resulted in the reduction of mobility of toxic trace elements.

##### Management of Invasive Species

The cut rootstock method developed under the Centre of Excellence Programme has been used extensively to remove Lantana successfully from different parts of the Corbett Tiger Reserve (CTR) especially in the entire Jhirna valley of the Corbett Tiger Reserve which spreads over hundreds of hectares. Monitoring of areas from where Lantana has been removed in CTR during the last five years has clearly demonstrated that the removal of Lantana with the cut rootstock method coupled with ecological restoration of weed free landscapes is successful in control of Lantana. The ecologically restored sites after removal of Lantana are preferred sites in CTR visited by large number of herbivores. The Centre has further expanded the areas where Lantana is being removed in CTR using the cut rootstock method under the programme. The management strategy developed under the programme is being actively put to use by the CTR management on a large scale. Further, in order to overcome the shortage of grasses, grass nurseries have been developed and methods of multiplication of grasses have been standardized.

The success of the new management strategy in CTR has led to many state Forest Departments adopting the same strategy for control of Lantana in forest areas under their control. In fact, during one of the site visits at CTR, the then Director General of Forests, Government of India, had observed that that the 'cut rootstock' method coupled with



ecological restoration is an effective method for control of *Lantana* in forest ecosystems.

### Restoration and management of grasslands in protected areas

The sustainability of grasslands in the Dhikala Range of Corbett Tiger Reserve have been studied with respect to the management regimes adopted to maintain the grasslands. Survey of the Dhikala grasslands indicate that these grasslands can be categorized into (i) grasslands present in the Kalagarh reservoir basin, (ii) floodplain grasslands of Ramganga river and (iii) upland grasslands. Field observations have indicated that reservoir basin grasslands and floodplain grasslands are regulated and rejuvenated by the annual flood cycle of Ramganga river and the upland grasslands are regulated by grazing of herbivores and fire. It has been observed that grasslands in Dhikala are regulated through interplay of grazing pressure and annual flooding cycle of Ramganga. In case of disturbance of this equilibrium between grazing pressure and annual flooding of Ramganga river controlled burning may be needed to maintain the grasslands.

### Long-term monitoring of already restored ecosystems

Studies on the structure and composition of the communities established in the ecologically restored sites of Purnapani (Rourkela) and Asola- Bhatti Wildlife Sanctuary (Delhi) demonstrate that the restored ecosystems are sustainable and enrichment of species has happened over a period of time due to natural migration of propagules from neighboring areas.

### Interface Programme

The Scientists of the Centre of Excellence Programme participated in a Brainstorming

session on '*Lantana* Management' held at Bandipur Tiger reserve (Karnataka) from 4-5<sup>th</sup> October 2013. A case study on the sustenance of grasslands of Dhikala Rrange in Corbett Tiger Reserve was presented in the National Workshop on 'Grassland Management in Protected Areas (PAs): Prospect and Retrospect' held at Badhavgarh Tiger Reserve, Umeria (Madhya Pradesh) from 4-6<sup>th</sup> April 2013. About 25 officials and staff consisting of Forest Guards, Foresters, Rangers and SDOs of Corbett Tiger Reserve and other Forest Divisions of Uttarakhand and U.P were trained in cut rootstock method of *Lantana* removal during the workshop on Habitat Management held at Corbett Wildlife Training Centre, Kalagarh.

### Comparison of progress vs-a-vis that achieved in previous years (in case of ongoing schemes) supported by time-series graphs and charts, etc.

The targets set forth for 2013-2014 are achieved.

### Budget Allocation of the scheme during the year and Progress of Expenditure

The Budget Estimates (BE) of CoE-CEMDE for the year 2013-14 was ₹ 43 lakh and the Revised Estimates (RE) was ₹ 83 lakh. A total amount of ₹ 29.59 lakh was released during the year upto 30th September, 2013 (as per Utilization Certificate and Statement of Expenditure submitted to MoEF).

### Madras School of Economics (MSE), Chennai

#### Introduction

The Centre of Excellence in Environmental Economics, Madras School of Economics (CoE-MSE), Chennai was set up under the 'Centres of Excellence' (CoE) Plan Scheme of the Ministry on the basis of a Memorandum of Understanding (MoU) entered into between



the Ministry of Environment and Forests and Madras School of Economics in 2002. Its objective is to address issues of national importance with focus on economic aspects of the environment. 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 Steering Committee is headed by the Senior Advisor of the Ministry and includes the Additional Secretary & Financial Adviser and Economic Adviser among its Members, apart from the Coordinator at MSE of the Centre and other Experts. The funds are released to the Centre in project specific mode to meet approved expenditures on the conducting of research studies, executing projects, holding Workshops, Seminars, etc. and for the maintenance of its website and so on.

### Activities undertaken from its inception till close of previous year; cumulative performance

Among the significant research and study products are two of research reports, which were brought out as books, as follows:

- *“Eco-Taxes for Pollution Inputs and Outputs”* by R. J. Chelliah, U. Sankar, Paul P. Appasamy and Rita Pandey, published by Academic Foundation in 2007.
- *“Trade and Environment: A Study of India’s Leather Exports”*, by U. Sankar and others, published by Oxford University Press in 2006.

In January 2009, in anticipation of the change in India’s indirect taxation by bringing in a comprehensive Goods and Service Tax (GST) and the proposal placed by the Ministry through its Memorandum before the Thirteenth Finance Commission for incorporation of environmental taxes as part of the proposed GST regime, a six-month study was sanctioned by the Ministry in January 2009 at a cost of ₹ 0.06 crore to CoE-MSE. The broad objective of the study was to provide adequate space for environmental taxes in the proposed GST regime, supplemented by eco-subsidies as may be found necessary. A draft Discussion Paper was submitted by CoE-MSE in August, 2010, and based on comments and suggestions, the CoE-MSE submitted another significant report in 2010-11 titled *“Coping with Pollution: Eco-Taxes in a Goods and Services Tax (GST) Regime – A Discussion Paper”*. During 2012-13, the Centre has provided policy inputs to the Ministry on (i) *‘India 2030 – Vision for an Environmentally Sustainable Future’*; a World Bank Report; (ii) *‘National Manufacturing Policy’*; (iii) *‘Road Map for Green National Accounting System’*; and (iv) *‘Union Budget 2012-13’*. Among the other on-going capacity-building projects, a training workshop was conducted by the World Bank on its recent report to the Ministry on *‘Diagnostic Assessment of Select Environmental Challenges Facing India’*. The Centre held a two-day *Conference on Environmental Economics* in collaboration with the Lancaster University Management School in the last quarter of 2012-13.

### Performance/ Achievements/ Progress made in 2013-14, including projected activities, with physical and financial targets and actual performance:

During 2013-14, the Centre has provided policy inputs to the Ministry on:-



**Fig-53.** Coppersmit Barbet (*Megalaima haemacephala*) - widely found in gardens, groves and sparse woodland

- Policy note prepared for formulating the Ministry's inputs to the 14th Finance Commission on its Terms-of-reference was submitted to the Ministry in April 2013.
- Two policy notes with comments on the World Bank studies under the rubric of Diagnostic Assessment of Select Environmental Challenges in India and on Inclusive Wealth Report 2012 were submitted to the Ministry in May and July 2013 respectively

#### **Research Projects in 2013-14 (till 31.03.2014)**

- It has prepared the draft report of the project '*Trade and Environment: India Export of Textile and Textile Products and Environmental Requirements*'. Based on experience gained through the study on leather exports, this study focuses on India's

textile exports in the context of growing environmental regulations from several importing countries including European Union and United States of America. The study attempts to address the structural adjustment problems facing the industry, global supply chains and environmental compliance requirements in order to create an enabling policy environment for the growth of the textile industry in India. It also addresses, *inter alia*, issues like status of pollution abatement in textile industry in India, trade competitiveness of Indian textile industry, assessment of pollution abatement costs in textile industry (with focus on textile processing), and linkages between pollution abatement and textile trade. The study was assigned to be carried out in two years starting from July 2008 at an estimated cost of ₹ 0.2089 crore.



The Report, submitted in October 2012, is presently under consideration of the Ministry.

The Centre has continued its work on the 18-month project '*Economy-wide Impacts of Pollution in India: Meta Analysis*' started in October 2010. The project aims to carry out meta-analysis of various environmental valuation studies relating to air and water pollution in India to assess macro-level estimates of overall impacts of pollution. The draft final report was submitted to the Ministry in October 2013 after incorporating the comments and suggestions made in the review workshop held in March 2013. The draft final report was sent for independent expert review for comments/suggestions by MSE and also by the Ministry to concerned subject experts.

#### Dissemination Papers

- Four Dissemination Papers identified by the Steering Committee for 2013-14 were completed viz; 'Economics of Biodiversity Conservation', 'Statistical Value of Life', 'Choice of Pollution Control Instruments' and 'Energy-Economy-Environment Models'.

#### Newsletters: "Green Thoughts" (biannual publication)

- Two issues were brought out by the Centre as per its approved Annual Action Plan for 2013-14.

#### 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. Suneetha Subramaniam, a Senior Research Fellow, United Nations University, Institute of Advanced Studies, Tokyo, was invited as Visiting Researcher during the Summer of 2013. She completed her term during September-October 2013 and gave a public seminar on 4<sup>th</sup> November 2013 on, 'The Economics of Biodiversity and Ecosystems: Finding Reasons to secure your Food, Health and Wellbeing'.
- Prof. Peter Lambert had visited the Centre during January-February 2014. Thus the Centre hosted two Visiting Researchers during 2013-14 within the allocated budget.

#### 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.
- The suggestions of the Steering Committee meeting held on April 2013 were as follows (i) Putting summaries of the project reports on the website (ii) Identifying a theme, say at an initial periodicity of a month, and posting relevant information in attractive

manner on the website. For the financial year 2013-14, the Centre was assigned target to prepare bibliographic series on 'Climate Change Adaptation' and 'Air Pollution Impacts' which were completed within timeline.

### Training Programmes

The Vision Document, 2012-17 of CoE-MSE also envisages conducting of at least one training programme per year on issues related to Environmental Economics, either through funding from the Ministry or other sources. For the current year 2013-14, the Centre organized a three-day training programme on 'Environmental Fiscal Reforms: International Experience and Relevance for India' for the North-Eastern States during 6 to 8<sup>th</sup> November 2013 at Tripura University, Agartala. The training programme was organized in collaboration with the Department of Commerce, Tripura University and was inaugurated by the Senior Economic Adviser, MoEF. The Centre had submitted its report to the Ministry on successful completion of the training programme, in the first week of November 2013.

### Budget allocation during 2013-14

The Budget Estimates (BE) of CoE-MSE for the year 2013-14 was ₹ 0.51 crore and the Revised Estimates (RE) was ₹ 0.55 crore. A total amount of ₹ 0.4822 crore was released during the year which includes ₹ 0.0379 crore towards amount due for 2012-13; ₹ 0.0197 crore towards Visiting Researchers Programme and ₹ 0.0267 crore towards Training Programme.

### Foundation for Revitalisation of Local Health Traditions (FRLHT), Bengaluru

#### Introduction

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.

Having successfully completed the above focal activities during the 10<sup>th</sup> and 11<sup>th</sup> five year plans, the Centre expanded its focus for the 12<sup>th</sup> plan period so as to address the emerging needs of the sector. Accordingly two more initiatives were added to the action plan for the year 2013-14 and they are: a) Threat assessment of medicinal plants, and b) Ground truthing of status of medicinal plant populations.

Following are the highlights of the progress during the year under its different key areas:

**Bio-Cultural Herbarium:** Development of a unique Bio-cultural Herbarium of Indian medicinal plants was one of the key activities of the Centre. In the direction of fulfilling this goal, the botanical team of the Centre took up detailed floristic surveys in select locations in Uttarakhand, Arunachal Pradesh, Gujarat, Chhattisgarh and Karnataka states. The floristic



**Fig-54.** Flame lily (*Gloriosa superba*) – know worldwide as an ornamental, medicinal and a poisonous plant

surveys during the year were quite productive as the team could collect 2000 voucher specimens corresponding to 632 collection numbers.

Rigorous study of the voucher specimens collected during 2012-13 helped the team to bring to light a new variety of the plant, ***Bauhinia bassacensis*** (Leguminosae: Caesalpinioideae), collected from Great Nicobar Island (*Phytotaxa*, 149 (1):12-18, 2013), and a species, new to science, described and named as *Aristolochia gurinderii* (accepted for publication in the journal *Phytotaxa*).

Further, ~900 images of different plants depicting their medicinal parts and habitats were added to the image library. During the year, more than 300 raw drug samples procured from different markets and 150 samples procured from the field were added to Raw Drug Repository.

In order to do a Status survey of *Coscinium fenestratum*, one of the Critically Endangered medicinal liana species, the team did a detailed

assessment of its select populations at Dehalli in Yellapura forest division, Uttara Kannada district and Charmadi Forest division in Dakshina Kannada districts in Karnataka.

Trying to consolidate its research findings, the Herbarium team published 6 Research papers during the year

**Ethno-Medicinal Garden:** During the year, the collections at the Ethno medicinal garden were enriched by the addition of 75 species, while the garden's user-friendliness was further diversified by adding 5 more theme specific plant assemblages viz., 1) Charakavana, 2) Medicinal

Gymnosperms, 3) Anti-cancerous medicinal plants, 4) Medicinal plants for women and child care, and 5) Representation of Botanical families

The team also developed a draft of the Trainer's Manual on "Hands-on-Training on Nursery techniques". Appropriate signage boards for the 5 theme specific plant assemblages and 100 individual plant species were designed and erected in the garden.

**Pharmacognosy Studies:** Ayurveda recognizes *Musta* (*Cyperus rotundus*) as a substitute to *Ativisha* (*Aconitum heterophyllum*), which is an endemic and rare species. The Pharmacology & Pharmacognosy team of CoE during the year initiated comparative studies with the crude drugs of these two species to compare three select pharmacological activities, namely, anti-pyretic (*jwarahara*), anti-diarrhoeal (*atisaraghna*) and hypolipidemic (*medohara*) using rat models. It was found that the three activities of these two species were similar, indicating that, *Musta* can be used as a

substitute to *Ativisha* for the above purposes. However, the LC-MS analysis of the fractions of the extracts of these two crude drugs did not show the presence of similar compounds in them. It is thus apparent that different compounds could be causing similar biological effects. Further study is required to identify these compounds.

The Traditional Quality Standards (TQS) study with turmeric showed that the samples collected during night time had significantly higher bio activity as compared to the samples collected during day time, which was established by brine shrimp bio assay. The HPLC analysis indicated a possible difference in the quantity of curcuminoids between these two sets of samples. The pre-final draft of the monograph on *Vidanga* was kept ready for the external review by subject experts at the end of the year.

**Distribution Mapping:** During the year, Geo-distribution maps for 250 species and Eco-distribution maps for 25 species occurring in North Eastern India were prepared. These maps were incorporated into the 2<sup>nd</sup> volume of the Digital Atlas (on CD-RoM), along with the search facility to navigate the database and maps.

Maps depicting backward linkages with the regions of occurrence for *Asoka* (*Saraca asoca*), *Raktachandan* (*Pterocarpus santalinus* and *Daphniphyllum himalayense*) and *Guggul* (*Commiphora wightii* and *Commiphora caudata*) were prepared.

**Outreach Training & Educational material on Plants of Indian System of Medicines (ISM):** The Conservation Training team of CoE engaged in implementing two major tasks during the year.

- **Developing a ToT module on “Threat assessment and Conservation Assessment and Management Prioritisation (CAMP) Methodology”:** The training need assessment exercises conducted amongst the partner institutes in Uttarakhand, Arunachal Pradesh and Chhattisgarh during the previous year (2012-13) helped the Conservation Training team to identify the learning needs of the target audience. Keeping in view these learning needs and the expected outputs under the project, “*Mainstreaming Conservation and Sustainable Use of Medicinal Plant Diversity in Three Indian State*” being implemented by FRLHT, the team developed a ToT module for the use of the Master Trainers. Priority topics including, a) Identification of Threats and their different categories, b) Threat assessment methodology, c) CAMP exercise, d) Strategies for long term monitoring of the conservation status of threatened medicinal plants resources were illustrated in the module. A draft version of the ToT module was presented to MoEF during September 2013.
- **2-day Orientation Training on Medicinal Plants Conservation & Sustainable Use for IFS Probationers:** The training team developed a 2-day capsule course for the IFS probationers from the Indira Gandhi National Forest Academy, Dehradun. The course offers a quick exposure to priority topics, such as Medicinal plants diversity, Endemic and threatened species, Threat assessment methodology, Strategies for Conservation, Medicinal importance and Cultural significance of medicinal plants, Collection and Trade Dynamics, Trans disciplinary research, Informatics and Database of medicinal plants. The



Conservation Training team administered this course to two successive batches of IFS probationers during 1-2 January and 8-9 January 2014. Eighty probationers from the 2012-13 IFS batch took part in this orientation training.

In respect of developing educational materials on medicinal plants and traditional knowledge, the informatics team initiated two major tasks during the year as below:

- **Development of a database on *Raja Nighantu*:** *Raja Nighantu* (17<sup>th</sup> Century AD) considered as one of the important classical *Materia medica*, available today, deals with synonyms and properties of many plant drugs. This database developed by the Informatics team captures many significant elements of *Raja Nighantu* including the detailed information on plants, their medicinal properties and uses, and botanical correlations along with their plant images. The information in the database is further supplemented by Sanskrit verses, along with their English translation.
- **Periodical maintenance and updating of the website on Indian Medicinal Plants** ([www.indianmedicinalplants.in](http://www.indianmedicinalplants.in)): The CoE's web portal on *Plants in Indian Systems of Medicine and Traditional Knowledge* hosts and maintains a beta version of the website [www.indianmedicinalplants.in](http://www.indianmedicinalplants.in). Many user friendly information sources were added to it during the year, such as Annual report of CoE and different interfaces related to 'Plants in Indian Systems of Medicine', 'Plants in *Caraka Samhita*' and 'Plants in *Dhanvantri Nighantu*' for the use of the students of Ayurveda and Indian Systems of Medicine.

### **Conservation and Sustainable management of medicinal plants:**

A 5-day Orientation training on Conservation Assessment and Management Prioritisation (CAMP), for select Forest Officers, Taxonomists and Ethnobotanists from Nagaland was organized during 11-15<sup>th</sup> November 2013 at Bangalore. The program attempted to orient and build the necessary capacity among the officers in respect of threat assessment of medicinal plants in Nagaland. The deliberations helped the team to develop a draft list of prioritized plant species of Nagaland for threat assessment and a panel of experts to be involved in the process.

The team conducted two field visits to Arunachal Pradesh in order to identify suitable sites for taking up the ground truthing of select species of high conservation concern. Sites with adequate representation of priority species were identified as below: New Melling-Thigbu Garampani belt for *Taxus wallichiana*, Bomdila and Mandla in West Kameng district for *Illicium griffithii* and Rama Camp for *Gymnolcadus assamicus*.

### **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**

#### **Introduction**

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**

**FELLOWSHIPS AND AWARDS**

## Indira Gandhi Paryavaran Puraskar (IGPP)

### Introduction

In reverential memory of late Prime Minister Smt. Indira Gandhi, the Ministry of Environment and Forests, 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. In the beginning, one cash prize of ₹ 1,00,000/- was awarded to either an individual or an organization of India in recognition of their exceptional and outstanding contributions in the field 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.

As per the 'Regulations governing IGPP', revised in 2010, any citizen of India having at least 10 years work experience in the field of Environment (substantiated in support of his experience by published/ field work)/ NGO working in the field of environment with at least five years experience/ Environment and Forests Departments of States/UTs/State Pollution Control Board/District Collector/Magistrate can propose a name of any citizen or organization of India who has at least five years working experience in the field of environment. There is no age limit for nomination of individual. However, self nominations and nominations proposed by relatives are not considered.

Shortlisting of nominations received for IGPP is carried out by three Expert Members, selected by the Prime Minister's Office, out of a panel of 9 eminent environmentalists/ persons prepared by the Ministry of Environment and Forests. Selection of awardees out of the shortlisted nominations is done by the Environmental Prize Committee constituted under the Chairmanship of Hon'ble Vice President of India. The composition of the Prize Committee is as follows:

- (i) Vice –President of India (Chairman)
- (ii) Speaker of Lok Sabha
- (iii) Minister for Environment and Forests
- (iv) 3 Expert Members selected by the Prime Minister's Office
- (v) Secretary, Ministry of Environment and Forests (Member Secretary)

While selecting the awardees the term 'environment' is interpreted in the broadest sense possible and comprising of following areas of work:

- Prevention of pollution.
- Conservation of natural resources.





- Rational use of depletable resources.
- Environmental planning and management.
- Environmental impact assessment.
- Outstanding field work (innovative research work) for enrichment of environment e.g. afforestation, land reclamation, water treatment, air purification etc.
- Environmental education.
- Creating awareness of environmental issues.

### Present Status

A meeting of the Prize Committee was held under the Chairmanship of Hon'ble Vice President of India on 30 July, 2013 and the awardees of IGPP -2010 were selected as below.

Organisation (₹ 5.0 lakhs)	21 <sup>st</sup> Battalion the Jat Regiment
Organisation (₹ 5.0 lakhs)	21 <sup>st</sup> Battalion the Jat Regiment
Organisation (₹ 5.0 lakhs)	Joygopalpur Gram Vikas Kendra, 24 Parganas (South), West Bengal
Individual (₹ 5.0 lakhs)	Dr. Anil Sharma, Sirmour, Himachal Pradesh
Individual (₹ 3.0 lakhs)	Shri Kartick Satyanaryanan, Delhi
Individual (₹ 2.0 lakhs)	Dr. N. Ramesh, Puducherry

Process of selection of 3 Expert Members for the IGPP Prize Committee by the Prime Minister's Office has been completed. The Expert Members will serve the Committee for 2 years. Nominations received for IGPP-2011 and IGPP-2012 have been processed and briefs prepared. Advertisement for inviting nominations for IGPP-2013, under both Individual and Organisation Categories, were issued on 15 July, 2013. More than 100 nominations have been received for IGPP-2013.

## Indira Priyadarshini Vriksha Mitra (IPVM) Awards

### Introduction

The Indira Priyadarshini Vriksha Mitra (IPVM) Awards were instituted in 1986 to recognize the pioneering and innovative contribution made by individuals and institutions in the field of afforestation/wasteland development every year.

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, Uttarakhand, Uttar Pradesh and



UT of Chandigarh), **East** (Bihar, Jharkhand, Odisha 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 Puducherry), **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. Sh. A.T. Mishra, DFO Dhalbhum Forest Division, Jamshedpur (Jharkhand) was given award under category "Individual including Government Servant". Forestry extension wing

Tamilnadu Forest Department, Chennai under category "Institution/organizations under Government" and Village Forest Protection & Management Committee" Dani Talai Rajasthan under category "Joint Forest Management Committee" were also given award for the year 2010.

The exercise for IPVM Awards for the calendar year 2011 as well as 2012 is under process.

### IPVM Awards for States and Union Territories

The IPVM Awards for States and Union Territories were instituted in the year 2008 for enhancing the percentage of Forest and Tree Cover in States/UTs. The Awards are divided into three categories and only one award is given in each category (Table-67).

The IPVM Awards for States/UTs were conferred upon on 19th November, 2010. Next IPVM Awards for States/UTs for the calendar year 2012 are under process.

### 'Pitamber Pant National Environment Fellowship Award' and 'B.P.Pal National Environment Fellowship Award for Biodiversity'

Pitamber Pant National Environment Fellowship Award instituted in 1978 is awarded every year to encourage and recognize

**Table-67.** Categories under IPVM Awards for States and Union Territories

Sl. No.	Category	Award	Awards for 2010
a)	Big State having geographical area of 80,000 Sq. Km and above	₹ 8.00 lakhs (one)	J&K
b)	Small State having geographical area below 80,000 Sq.Km.	₹ 5.00 lakhs (one)	Mizoram
c)	Union Territories	₹ 5.00 lakhs (one)	UT of Chandigarh



excellence in any branch of research related to the environmental sciences. The fellowship is awarded every year and is in recognition of significant important research/development contributions and is also intended to encourage talented individuals to devote themselves to R&D pursuits in the field of environmental sciences. The duration of the fellowship is two years. So far, 27 fellowship Awards have been given to various Scientists throughout the country.

B.P.Pal National Environment Fellowship Award for Bio-diversity was instituted during 1993 and is awarded annually with a view to further develop, deepen and strengthen the expertise on Bio-diversity available in the country.

The fellowship is in recognition of significant important research and development contributions and is also intended to encourage talented individuals to devote themselves whole-time to R&D pursuits in the field of Bio-diversity. Duration of the fellowship is two years. So far, 10 Fellowship Awards have been awarded to various scientists throughout the country.

Guidelines for Dr. B.P. Pal National Environment Fellowship Award for Biodiversity (2013) and Pitamber Pant National Environment Fellowship Award (2013) published.

### **National Environmental Sciences Fellows Programme**

The National Environmental Sciences 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.

### **E.K. Janaki Ammal National Award on Taxonomy**

Biological diversity refers to the variability in the living organisms and the ecosystems of which they form part. Preservation of biological diversity is vital for maintaining ecological balance and for evolutionary processes. It has direct bearing on food security, agriculture, medicine, industry etc. The advances in biotechnology and development of products based on the use of biological resources are increasingly becoming motivating factor for greater use of biological resources.

Taxonomy is the science of identification, classification and naming of living organisms. Taxonomic work involves study of morphological characteristics and phylogenetic relationship of organisms which is essential for applied biological sciences,

such as medicine, agriculture, forestry and fisheries. Development of biotechnologies and their industrial applications depend heavily on taxonomy. Current requirements of taxonomic work and available expertise and studies indicate urgent need for encouraging excellence and for motivating experts to work in hitherto neglected groups of organisms e.g. microbes, lower groups of plants, animals etc. The challenge is quite serious, as while the existing expertise is ageing and retiring, not many young scholars are opting for studies in taxonomy.

In order to encourage work of excellence in taxonomy and also to encourage young students and 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 on Taxonomy covering all the three fields viz Botany, Zoology and study of Micro-organisms. It has now been decided to enlarge the scope of the Award and increase the number of Awards to two, one each for excellence in Plant and Animal Taxonomy. The outstanding work done in Microorganisms will also be eligible for consideration under either of the two categories, as the case may be. The two Awards will be known as 'E.K. Janaki Ammal National Award on Plant Taxonomy' and 'E. K. Janaki Ammal National Award on Animal Taxonomy'.

The award will be given on the 5th June, coinciding with the World Environment Day. Each award will carry ₹1,00,000/- 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 Awards for Prevention of Pollution and the Rajiv Gandhi Environment Award for Clean Technology are given each year, in the following identified categories of highly polluting industries, which have made a significant and measurable contribution towards development or use of clean technologies, products or practices that prevent pollution and find innovative solution to environmental problems:-

#### **Large Scale industries:**

1) Sugar 2) Fertilizer 3) Cement 4) Fermentation and Distillery 5) Aluminium 6) Petro-chemicals 7) Thermal Power 8) Caustic Soda 9) Oil Refinery 10) Sulphuric Acid 11) Tanneries 12) Copper Smelting 13) Zinc Smelting 14) Iron and Steel 15) Pulp and Paper 16) Dye and Dye Intermediates 17) Pesticides 18) Pharmaceuticals.

#### **Small Scale Industries:**

1) Tanneries 2) Pulp and Paper 3) Dye and Dye Intermediates 4) Pesticides 5) Pharmaceuticals. The National Awards for Prevention of Pollution are bestowed on 23 industries (18 large scale and 5 small scale industries), one each for the above mentioned categories of industries based upon their performance during the Award financial year. The Rajiv Gandhi Environment Award for Clean Technology is given to the one which is the best among these industries, particularly from the angle of adoption of the clean technology. The Awards comprise a

Cash Award of Rupees Two lakh in addition to a silver Trophy and a Citation.

In the MoEF's Annual Report 2012-13, on page 323, in column 2, para 2, under the heading 'Small Scale Industries' is replaced as follows: 'The National Award for Prevention of Pollution and Rajiv Gandhi Award for Clean Technology for the year 2010-11 is in process and will be awarded shortly. Nominations were invited for the 2011-12. Thirty three nominations have been received and the evaluation of the same, are being undertaken for consideration of Award Selection Committee.'

### **Awards in the Wildlife Division**

Wildlife Division in the Ministry provides the Rajiv Gandhi Wildlife Conservation Award, the Amrita Devi Bishnoi Wildlife Protection Award and fellowships, namely, the Salim Ali Fellowship and Kailash Sankhla Fellowship for outstanding work in the field of wildlife conservation.

#### **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



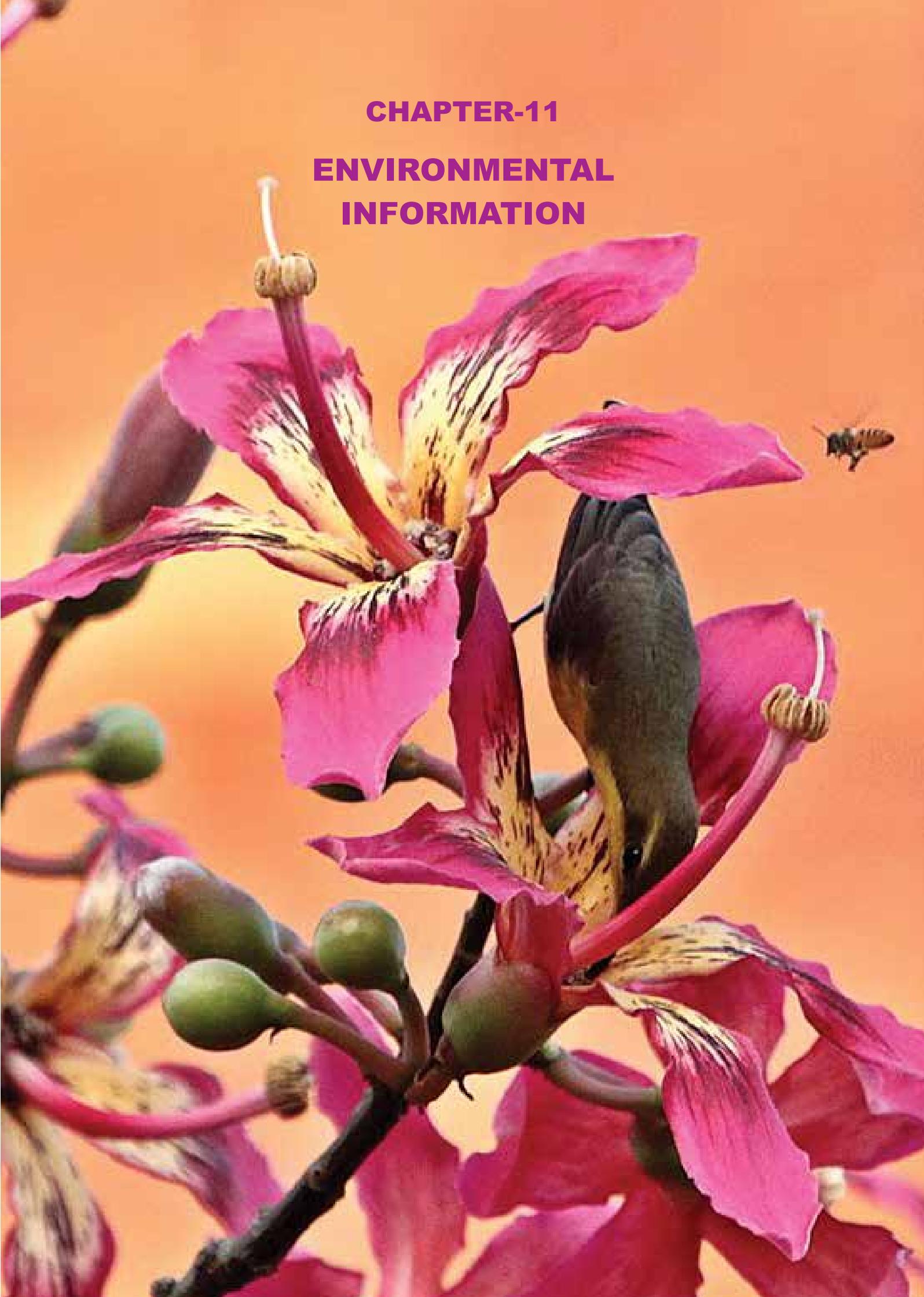
exemplary courage or having done exemplary work for the protection of wildlife. Two cash awards of Rupees One lakh is presented to individuals and institutions involved in wildlife protection.

### **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 ₹ 20,000/- per month. In addition, an amount of ₹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.

**CHAPTER-11**  
**ENVIRONMENTAL**  
**INFORMATION**





## Environmental Information (EI) Division

### Introduction

Environmental Information (EI) Division of the Ministry is responsible for the following areas of work:

- Formulation, implementation and monitoring of the Environmental Information System (ENVIS) Scheme with a view to making it a single-stop, web-enabled, comprehensive information system, including the following:
  - Formulation and issuance of guidelines for administration of the Scheme.
  - Periodic convening of the Scientific Advisory Committee (SAC) to review the functioning of the Scheme.
  - Review and approval of Annual Plan of Activities of each of 68 ENVIS Centres country-wide set up for providing scientific, technical and semi-technical information on various environmental issues.
  - Monitoring and oversight of the functioning of ENVIS Centres.
  - Coordination of all activities of the ENVIS Centres through the ENVIS Focal Point located in EI Division.
  - Auditing and upgrading of ENVIS Centres' Websites maintained on National Informatics Centre (NIC) Portal.
  - Development and maintenance of an ENVIS Portal connecting all ENVIS Centres.
  - Development and maintenance of the Ministry's Website which has also been linked with various Divisions.
- Supporting and promoting research, development and innovation in environmental information technology.
- Supporting capacity building in development of repositories and dissemination of environmental information, including through holding of National/ Regional Workshops.
- Coordination of independent overall evaluation of the Scheme as well as conducting annual performance review of each ENVIS Centre, including through National Evaluation Committees of Experts on both subject-specific matters and Status of Environment and Related Issues.
- 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.
- All matters related to Green National Accounting in India.
- Disposal of Parliament matters regarding the ENVIS scheme.
- Disposal of Right to Information Act, 2005 matters regarding the ENVIS Scheme.
- Coordinating all matters regarding the conferring of the 'Indira Gandhi Paryavaran Puraskar' (IGPP), including development of 'Regulations governing IGPP'.
- Coordinating and representation of the Ministry on UNEP's Global Environment Outlook (Geo-5)'s High-Level Inter-Governmental Advisory Panel and Summary for Policy-Makers' (SPM) Drafting



- Group under its global inter-Governmental and multi-stakeholder consultations.
- Coordinating the development, publishing and dissemination of the Annual Reports of the Ministry.
- Coordinating the development, publishing and dissemination of the annual National 'Report to the People on Environment and Forests' since 2009-10.
- Coordinating the development, publishing and dissemination of periodic State-of-Environment (SoE) Reports of Nation/ States/ UTs/ Cities/ Towns/ various environmental 'Hot-Spots'.
- Coordination and liaison with various national information systems.
- All financial matters relating to the Schemes and Programmes handled by the Division.

## Environmental Information System (ENVIS)

### Introduction

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.

The long-term objectives of the Scheme are as follows:

- To build up a repository and dissemination Centre in environmental science and engineering.
- To gear up state-of-art technologies of information acquisition, processing, storage, retrieval and dissemination of environmental nature.
- To support and promote research, development and innovation in environmental information technology.

Its short-term objectives are as follows:

- To provide national environmental information service relevant to present needs and capable of meeting the future needs of the users, originators, processors and disseminators of information.
- To build up storage, retrieval and dissemination capabilities, with the ultimate objective of disseminating information speedily to the users.
- To promote national and international cooperation and liaison for exchange of environment-related information.
- To promote, support and assist education and personnel training programmes designed to enhance environmental information processing and utilizing capabilities.
- To promote and exchange of environment-related information amongst developing countries.

Functionally, it is a decentralized system of Centres mandated to develop a distributed network of subject-specific databases. With the association of the various State Governments/Union Territories' Administrations in promoting the ENVIS network to cover a wide range of subjects, 28 ENVIS Centres are operating from State/ UT Departments/ Pollution Control Boards



on State/ UT-wide status of environment and related issues.

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 ENVIS is located in the Ministry and assists the EI Division in coordinating the activities of all the ENVIS network partners. The list of ENVIS network partners is given at Annexure-IX.

### Progress/ Achievements made in 2013-14

In 2013-14, the ENVIS network continued its mandated annual information-related activities, database development, publication of requisite information packages through newsletters, abstracting services, etc. It also continued its query-response services during the year. This has entailed, *inter alia*, updating and maintaining an information database that includes both descriptive information as well as numerical data. Descriptive information in the form of publications, reports, reprints and abstracts on related subjects was stored for dissemination. Numerical data on the subject concerned was collected, compiled, processed and analyzed for the purpose of dissemination through the Centres. Documentation in the form of publications and reports were brought out. All the information thus compiled was made available on the websites of the respective ENVIS Centres.

The ENVIS Scheme was appraised by the SFC on 25 March 2013 and 9 May 2013, and approved to for continuation in the XII Plan period. Revised Guidelines for the Scheme approved by the SFC have since been

implemented. The Scheme was reviewed by the Planning Commission on 21<sup>st</sup> June, 2013. The meeting of 10-member re-constituted SAC under the chairmanship of the Secretary (Environment & Forests) was held on 24-25 June 2013, and 39 Thematic Centres were reviewed in detail. A new thematic ENVIS Centre on 'Forest Genetic Resources and Tree Improvement' was set up at Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore.

ENVIS Focal Point maintained and continuously updated the Website of the Ministry (**URL: <http://www.moef.gov.in>**) and disseminated information through the Website to all concerned throughout 2013-14. The Website (Fig-55) is also linked with the various Divisions of the Ministry in order to have up-to-date information on the subjects concerned. It was upgraded to an open-source Content Management System (CMS), in accordance with the Guidelines for Indian Government Websites (GIGW) in 2013-14, and also rendered bilingual from 27 May 2013. Real-time verification and updation of the Website has been enabled with decentralisation of updating procedures to the Divisions of the Ministry. In 2013-14, an average of 2.6 lakh hits per month was recorded on the Ministry's website.

A Portal of ENVIS (URL <http://www.envis.nic.in>) connecting all ENVIS network partners is updated regularly. The Portal (Fig-56) acts as a catalyst for inter-Centre interaction and for information on several broad categories of thematic and State-specific subjects assigned to the Centres. The Websites of all ENVIS Centres are also directly accessible from the homepage of the Portal enabling sourcing of information on major events, activities and current updates of the entire network. A

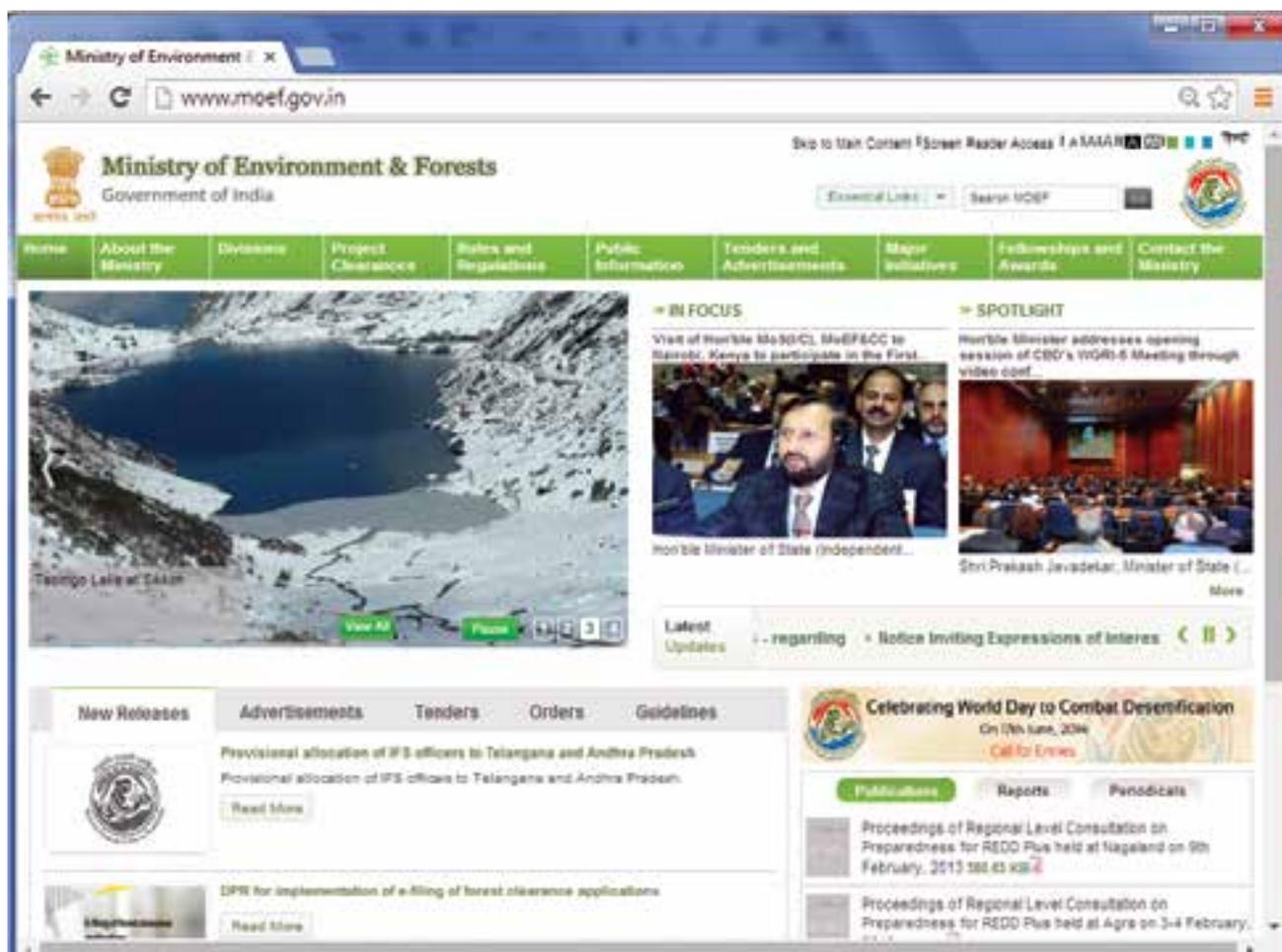


Fig-55. Ministry's Website (<http://www.moef.gov.in>)

comprehensive and dynamic ENVIS Portal also enabling online monitoring and evaluation of the upgraded ENVIS Websites is under development.

Query-Answer service is one of the major responsibilities of the ENVIS Network. The ENVIS Focal Point and all its partners responded to a large number of queries during the year and provided substantive information as far as possible. Further, wherever, information is not readily available, the network also provided 'Referral Service' to the concerned users.

The fifth National Evaluation Workshop was organised on 28-30 March, 2014 at Gangtok, Sikkim. The Centres were evaluated by two Independent Expert Committees

constituted by the Ministry, one State/ UT Centres and the other for Thematic Centres. The participating ENVIS Centres made presentations on their activities in 2013-14, highlighting the collection, compilation, verification and updating of databases on the subject area by them, in particular bringing out the new databases developed and publications/ information products brought out. The Centres also highlighted various hurdles – technical, financial and administrative – presently faced by them while carrying out ENVIS activities. The Committees made recommendations for the improvement of functioning of the ENVIS Centres and ENVIS Scheme as a whole.

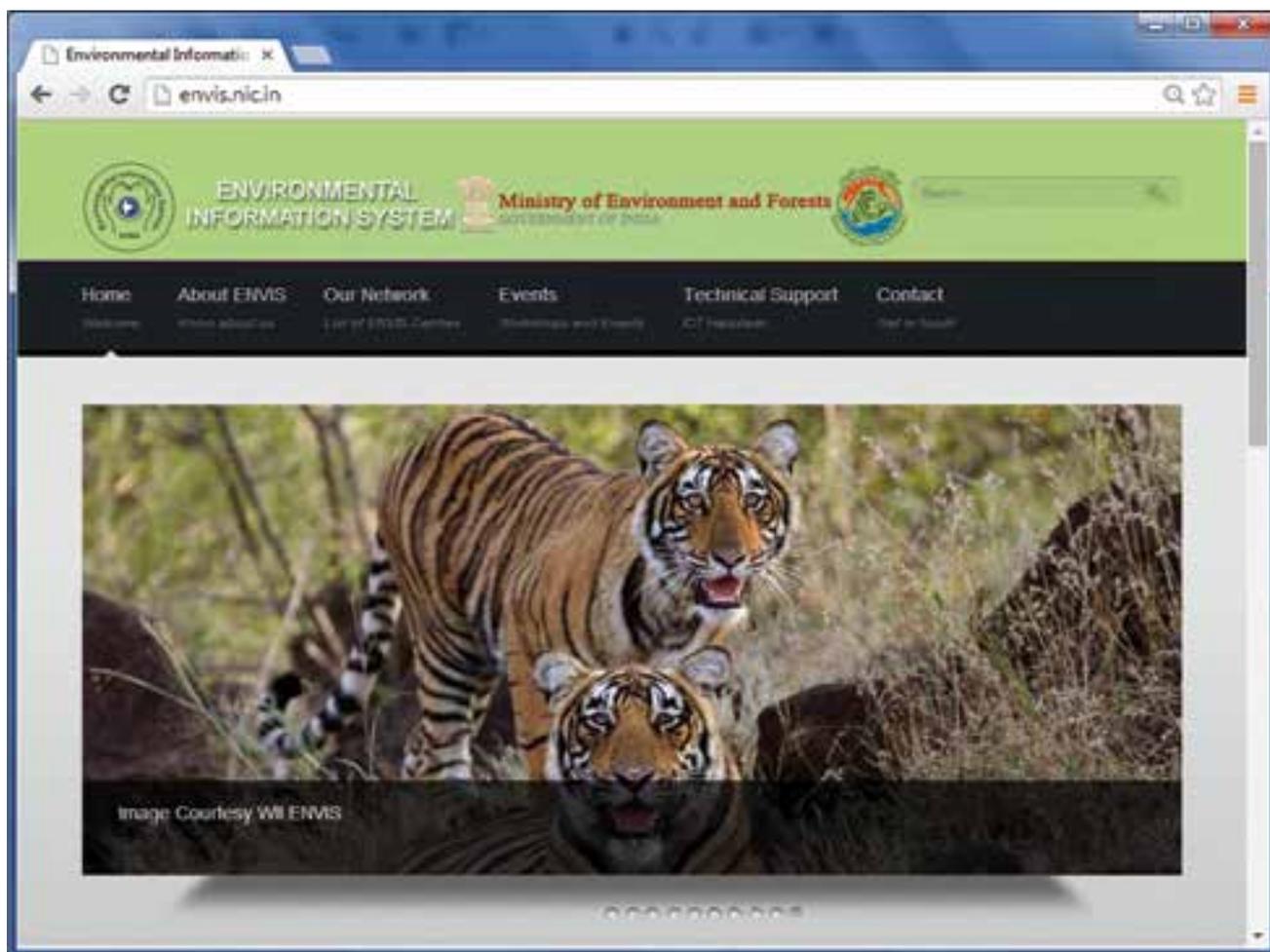


Fig-56. ENVIS Focal Point Website (<http://www.envis.nic.in>)

Based on the performance evaluation of each Centre by the respective National Evaluation Committee as well as SAC, the recommendations of the physical visit by an officer of the Ministry, and online evaluation of the ENVIS Centre, the Division extended financial support to 64 Centres. Also, 49 Centres have been supported with non-recurring grant for procuring IT equipments.

#### Activities of some ENVIS Centres during the year 2012-13 (as on 31.01.2013)

- **ENVIS Centre at the Bombay Natural History Society (BNHS), Mumbai:** Databases uploaded by this Thematic Centre on 'Avian Ecology and Inland Wetlands' on its Website ([bnhsenvis.nic.in](http://bnhsenvis.nic.in)) include threatened birds (time-series data), threatened birds in trade, birds listed in CITES, etc. The Website is being updated every two days. The Centre published a special issue of newsletter on 'Review of existing global guidelines, policies, and methodologies for the study of impact of windmills on birds and bats: requirements in India'. Workshops and conferences attended by ENVIS staff for promoting ENVIS project include 'Geomatics: Space and Applications' organized by CEPT University, in June 2013, Seminar on Environmental Literacy in Maharashtra organized by BNHS–Conservation Education Centre and Students' Conference on Conservation



Science in Bangalore in September 2013.

– **ENVIS Centre at Consumer Education and Research Centre (CERC), Ahmedabad:**

This thematic centre on 'Eco-labeling and Promotion of Eco-friendly Products' updates its Website ([www.cercenviis.nic.in](http://www.cercenviis.nic.in)) with information on latest development on eco-labeling schemes across the world. The centre also undertakes research and uploads the information on products which are eco-friendly. With latest developments, it features news, views, and information on eco-labeling, eco-mark, and different eco-schemes. It publishes researched articles on green products, sustainability, and relevant information. It has compiled the information on eco-labeling and eco-products in the form of abstracts from books, reports, and articles published in journals/periodicals. A page on Facebook (<https://www.facebook.com/EcoProductsEcoLabeling>) with information on latest development sensitizes youth towards eco-products.

- **ENVIS Centre at Wildlife Institute of India (WII), Dehradun:** This thematic Centre on 'Wildlife and Protected Area Management' released an ENVIS bulletin on 'Arthropods and their Conservation in India (Insects and Spiders)' Volume 14 during the Annual Research Seminar of the Institute on 30 September, 2013. The issue includes a review of important Orders of Insects and Spiders. Three new sections were introduced in the Centre's Website during 2013-14, namely, 'Wild Bytes' in which articles on human-wildlife conflicts, threatened species, protected areas, climate change etc. are included; New Discoveries section having information on new discoveries made in the field of

wildlife and protected areas; and Wild Science section with information on articles published in the field of wildlife conservation. The Centre can be accessed online at [wienviis.nic.in](http://wienviis.nic.in).

– **ENVIS Centre at Department of Forests, Environment & Wildlife Management Department, Government of Sikkim, Gangtok:**

The State Centre has a databank on more than 17 key State-specific environmental parameters. The restructured website (<http://sikenviis.nic.in>) has been updated with comprehensive information, publications and journals on environment and its related issues. Being designated as one amongst the five 'Guru Centres', Sikkim ENVIS centre assisted several other centres, namely, DMI Bhopal ENVIS Centre, Jharkhand ENVIS Centre, BSI Kolkata ENVIS Centre, Mizoram ENVIS Centre, Assam ENVIS Centre and BNHS ENVIS Centre in creative usage and content re-organization of CMS-driven website. Other key developments of the Centre during the year 2013-14 include: more than 2,700 ISBEID updates; responded to 602 online queries, 210 physical queries; 7,343 unique website visitors, 90,471 total visits, 160 registered site users; published theme-based quarterly newsletter among others.

– **ENVIS Centre at CPR Environment Education Centre, (CPREEC), Chennai:**

The thrust area of CPREEC ENVIS is on 'Conservation of Ecological Heritage and Sacred Sites of India' and has 9 specific components on ecological traditions: sacred plants, gardens, groves, animals, mountains, rivers, water bodies, cities and seeds of India. There are about 42 abstracts on sacred groves, while 585 new sacred groves have been included, (103 sacred

forests in Madhya Pradesh, 16 in Jammu and Kashmir, 32 in Uttar Pradesh, 29 in Uttarakhand, 40 in Gujarat and 365 in Kerala). 21 mountains, 1 river, 14 cities, 2 gardens and 2 seeds have been uploaded under the respective headings. About 74 sacred water bodies and temple tanks have also been uploaded. The Website [cpreecenvnis.nic.in](http://cpreecenvnis.nic.in) has recorded about 3,56,766 hits (77,851 worldwide, rest from India), in addition to numerous personal interactions. Queries were answered by email and telephone. CPREEC continues to collect and update its database on the ecological traditions of various States of India on a regular basis.

- **ENVIS Centre on Hygiene, Sanitation, Sewage Treatment Systems and Technology, (Sulabh-ENVIS), New Delhi:** During year 2013-2014, the ENVIS centre worked on creation and updation on databases, publication of regular annual reports, newsletters, booklets, and query response services. The Centre has also provided a three-week vocational training programme on Health Hygiene and Sanitation to Class XI students from Nirmal Bhartia School, New Delhi. The ENVIS centre participated, represented and exhibited information in different National Conferences/Seminars such as the 1<sup>st</sup> National Distinguished Lecture Series on Sociology of Sanitation, World Toilet Day 2013, the National Conference on 'Sociology of Sanitation: Environmental Sanitation, Public Health and Social Deprivation' as well as week-long Water Sector Training and Capacity Building Programme, New Delhi. Sulabh-ENVIS Centre has recently tied up with HELP-O Biogas Program, Sri Lanka, for toilets in different places to protect the environment and human

health. The Centre's website ([sulabhenvnis.nic.in](http://sulabhenvnis.nic.in)) also provides information on all environmental sanitation technologies.

- **ENVIS Centre at National Botanical Research Institute (NBRI), Lucknow:** NBRI ENVIS, a thematic Centre on 'Indicators of Plant Pollution' published newsletters on 'Plants in Urban Planning' and 'Constructed Wetlands', and Bibliography on 'Transgenic plants for phytoremediation', for circulation among different stakeholders in India. Monthly e-News Bulletins and News bulletins were prepared on various themes like Nature and Health, Atmospheric Nutrient etc. and were uploaded on the website. The Kids Centre was updated on different topics like 'Biology- G.K', 'Awareness of pollution' and 'Types of climate'. The Centre expanded the scope of its activities by including a new module namely 'Case study' in Publication Section. At present five case studies on 'phytoremediation' have been recorded. Different sections of bibliography were updated with latest references. During the year NBRI-ENVIS website received 44,096 hits and 97 queries, all have been answered. New databases have been developed and uploaded in website on subject 'indoor pollution', 'drought', 'smog', Ozone and role of plants. Different modules of NBRI ENVIS website (<http://nbrienvnis.nic.in>) including Hindi web-pages have been regularly updated.
- **ENVIS Centre at Zoological Survey of India, (ZSI), Kolkata:** ZSI ENVIS is one of the major sources of digital research information on 'Faunal diversity of India'. Its data bank is one of the most extensive and authentic sources on the subject



serving scientists and researchers as well as policy makers in India and abroad. The Centre is disseminating information related with faunal diversity through its website ([www.zsienviis.nic.in](http://www.zsienviis.nic.in)). During 2013-14 the centre uploaded 8,620 nos. of information bits on its website. Apart from the regular publications, the centre has brought out an international standard e-journal PROMMALIA (ISSN: 2320-4311). All the published papers of the journal have been registered with Zoo Bank.

- **ENVIS Centre at Environment Management and Policy Institute (EMPRI), Bengaluru:** The State Centre on the thrust area of 'Status of Environment and related issues' has a dedicated website at [karenvis.nic.in](http://karenvis.nic.in) hosted by NIC, which is updated regularly. The website is updated with green information, environment reports, ENVIS newsletter, news bulletins, National database (ISBEID) and Eco-clubs established in Karnataka. The centre publishes newsletters named 'Parisara' on themes like Air Pollution and Pollutants, Lake Conservation Strategies: an intensive study by EMPRI, E-Waste study: pilot project taken up by EMPRI, etc. On ISBEID, data has been updated on all 17 modules. A library with 4,000+ titles has also been digitized.
- **ENVIS Centre at Environment and Ecology Wing, Forests and Environment Department, State Government of Manipur, Imphal:** The Centre maintains and updates information on 'Status of Environment and Related Issues' pertaining to Manipur. The Centre works towards regional environmental database development, development of expert

database, abstract database, management of regional environmental information system, website content management, data collection and editing for ISBEID, information dissemination through publications like quarterly newsletter, reports, etc. as well as through electronic media. Published research papers on environment-related topics of Manipur state, clippings of daily environment related news of Manipur and the daily district-level weather data of Manipur have been uploaded on website [manenviis.nic.in](http://manenviis.nic.in). Besides, a Digital Library of Flora and Fauna of Manipur has also been developed. The Centre facilitates state-related environment information to most of the state government agencies, NGOs, institutions, individuals, etc.

### India State-Level Basic Environmental Information Database (ISBEID)

In order to develop databases on environment and its related parameters and to make it online for to-and-fro information flow, a web-enabled application, namely, India State-Level Basic Environmental Information Database (ISBEID) is being developed by the Division in collaboration with NIC. ISBEID is especially intended to help the ENVIS Centres hosted by States/ UTs to collect, compile and disseminate information on a centralised server and to fill their gaps in environmental data dissemination. The developments of the system are based on a pilot project conducted in two States (Odisha and Madhya Pradesh) with 6 modules of the proposed 23 modules, which was extended to 7 more States with 6 additional modules. Based on its results, it was decided to review the 23 modules down to 17 in consultation with the ENVIS Centres and to extend ISBEID to all States/UTs.

# 11



**Fig-57.** Verditer Flycatcher (*eumyias thalassina*) — found especially in the Lower Himalaya

The two components of ISBEID application, namely, Management Information System (MIS) and Geographic Information System (GIS) have been developed by NIC in collaboration with ENVIS Focal Point. The MIS component is primarily intended to (a) provide one-stop information source to users, (b) query data from its repositories with advance search and filters, (c) prepare charts and graphs to visualise data, and (d) provide statistical tables in PDF and XLS formats to the users for their custom use. The GIS module is intended to (a) provide internet-based GIS application, interactive maps capable of handling operations like zoom in/out, pan, print, measure etc., and (b) enable querying ISBEID interactively on dynamic maps with layers such as rivers, railway lines, roads, location of National Parks, Reserves etc. A User Workshop

on ISBEID and ENVIS Network websites was organised on 18-19 February 2013 at New Delhi. The Workshop deliberated on inter-linking and unifying various environmental databases of the ENVIS network. A new user-interface for the ISBEID application has also been taken up keeping in view modern technologies, which will enable dynamic access to maps on the homepage and interactive querying and generation of customised summary reports using its databases. It was found that 23 State ENVIS Centres have now advanced to the stage of entering data into the 17 modules, which is close to completion.

#### **Indira Gandhi Paryavaran Puraskar (IGPP)**

The Ministry, in the year 1987, instituted the Award called '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. The award comprises of two prizes under 'Organisation Category' and three prizes under 'Individual Category'.

Under the regulations governing IGPP revised from 2010 onwards, any eligible citizen of India having at least 10 years work experience in the field of Environment can propose a name of any citizen or organisation of India who has at least five years working experience in the field of environment. The advertisement is to be issued on 15 July every year. The last date for receipt of nominations shall be 29 August every year. Shortlisting of nominations received for IGPP is carried out by three Expert Members, selected by the Prime Minister, out of a panel of 9 eminent environmentalists/ persons prepared by the Ministry. Selection of awardees out of the shortlisted nominations is done by the Environmental Prize Committee headed by the Hon'ble Vice President of India.

In 2013, the meeting of the Prize Committee was held on 30 July, 2013 and the awardees of IGPP-2010 were finalised. The process of selection of 3 Expert Members for the IGPP Prize Committee has been completed, who have been mandated to shortlist the nominees for IGPP-2011 and IGPP-2012. The process for inviting nominations for IGPP-2013 was launched on 15 July, 2013, and the briefs of the nominations, once prepared, would be sent to the 3 Expert Members for shortlisting, so that the conferment of the Awards can be concluded in 2014 pursuant to the selection of awardees by the Prize Committee which has also been now re-constituted as per the regulations.

## Annual Report of the Ministry

The Annual Report of the Ministry for 2012-13 was published in 2013 and got distributed to Central/ State Government Departments, professional institutions, universities, research organizations, embassies/ High Commissions of various countries in India, etc.

## State of Environment Reporting (SoER) Scheme

Since the Tenth Plan, 100% Central Assistance is provided to States/UTs to prepare their SoE Report highlighting the upstream and downstream linkages with environmental issues, besides creating a baseline document in each State/ UT. SoER reporting was merged with the ENVIS Scheme in 2008-09. Since 2004-05, one National SoE Report and 32 States/ UTs/ City/ Hot-Spots Reports have been published which include SoE Reports for Karnataka, Jammu & Kashmir and Lakshadweep published in 2013-14.

## Budget allocation and progress of expenditure during 2013-14

Total Twelfth Plan outlay for the ENVIS Scheme is ₹ 70.00 crore. Against this, the Annual Plan outlay for its first year, 2012-13 was ₹ 7.86 crore, which was reduced to ₹ 7.36 crore at RE stage. Actual expenditure incurred was ₹ 6.51 crore. For 2013-14, the Annual Plan outlay was ₹ 10.39 crore, which was reduced to ₹ 9.19 crore at RE stage. Actual expenditure incurred is ₹ 8.98 crore.

In terms of physical performance, as compared to extension of support to 47 ENVIS Centres in 2011-12 and 60 Centres in 2012-13, in 2013-14, 64 Centres were supported. This has also entailed visit by

officers to these Centres for verification of the performance of the Centre concerned against the mandated annual activities. In addition to recurring grant for regular ENVIS activities, 49 Centres have also been supported with non-recurring grant for procuring IT equipments.

### Important Committees/ Commissions

The Environmental Prize Committee for the Indira Gandhi Paryavaran Puraskar (IGPP) has the following composition:

1.	Vice-President of India	Chairperson
2.	Speaker of Lok Sabha	Member
3.	Minister for Environment and Forests	Member
4.	Expert Members	Members
5.	Secretary, Ministry of Environment & Forests	Member Secretary

The Committee was re-constituted on 7 February, 2014 with the introduction of 3 fresh Expert Members selected by the Prime Minister of India. The Committee henceforth will have a tenure of 2 years.

The **Scientific Advisory Committee (SAC) of ENVIS**, which oversee and monitor the functioning of the Scheme, was reconstituted on 9 April, 2012. The SAC is chaired by Secretary (E&F), and consists of another 4 officials (Director General of Forests & Special Secretary or his representative, Additional Secretary dealing with EI Division, Additional Secretary & Financial Adviser and Economic Adviser (EI Division), who acts as Member Secretary), and 5 non-official Members or experts selected with the approval of Minister for Environment & Forests. A meeting of the SAC under the chairmanship of the Secretary (Environment & Forests) was held on 24-25 June 2013, and 39 Thematic Centres were reviewed in detail.

### Conferences, including nature of participation, subjects discussed, outcomes, and implementation/ action taken on its outcomes

The fifth National Evaluation Workshop for ENVIS Centres was organised on 28-30 March, 2014 at Gangtok, Sikkim. The purpose of the Workshop was to evaluate the performance in 2013-14 of the 68 ENVIS Centres, 28 of which are hosted by State Governments/ UT Administrations. Around 125 delegates participated in the Workshop, including 90 representatives from 36 out of 40 Thematic ENVIS Centres and 21 out of 28 State/ UT ENVIS Centres. The Centres were evaluated by two Independent Expert Committees constituted by the Ministry, one State/ UT Centres and the other for Thematic Centres. The participating ENVIS Centres made presentations on their activities in 2013-14, highlighting the collection, compilation, verification and updating of databases on the subject area by them, in particular bringing out the new databases developed and publications/ information products brought out. The Centres also highlighted various hurdles – technical, financial and administrative – presently faced by them while carrying out ENVIS activities. The Experts evaluated the various Centres based on the criteria outlined in the Guidelines of the Scheme, which broadly include parameters like Website updation, Database development, Publication of Newsletters/ Reports/ other information products, User engagement and interaction depicted through Visitor Counts and Query-Response Statistics, new initiatives, action taken to fill up information/ data gaps, etc. The evaluation by the Experts at the Workshop would be converged with the



**Fig-58.** Wiretailed swallow-found near water and human habitation

regular and periodic online assessment by MoEF as well as through the physical verification, and the Centres would be graded on the basis of the consolidated marks earned against their activities in 2013-14, as Category A: Very Good ( $\geq 80$ ), B: Good ( $\geq 50$  and  $< 80$ ) and C: Non-Performing ( $< 50$ ) prior to consideration of grant of funds for the next financial year 2014-15. The Committees also made recommendations for the improvement of functioning of the ENVIS Centres and ENVIS Scheme as a whole.

### Report to the People on Environment and Forests

As a follow-up to the Hon'ble President of India's address to the joint session of the Parliament on June 4, 2009, the Division of the Ministry published its First Report to the people on Environment and Forest. In

2012-13, the Second Report for 2010-11, the third Report for 2012-13 is being published. The purpose of the Reports is to generate a national debate on environmental issue, which will form the basis for suitable revision in the policy framework, wherever required and ultimately result in improved performance in Environment and Forests Sector. The Reports have been hosted in the Ministry's website and widely distributed to all stakeholders concerned.

### Statistical Cell

The role of statistical cell in the Ministry inter alia includes assistance to different Division of the Ministry in providing Statistical inputs and also to liaise with other Central environment and forestry statistics. During the year, the Cell provided inputs for

various publications of Central Statistical Organizations on environment and forests.

Environmental Information Division has been representing the Ministry and providing inputs in various committees of the Government, especially those constituted by Ministry of statistics and Programme Implementation such as 'Development of Database on climate Change', 'Issues in the Estimation of GDP of Forests Sector' etc. It also provided necessary information for publication of compendium of Environmental Statistics, Statistical Abstracts, etc., periodically as per the recommendation of the National Statistical Commission. Statistical Advisor served as a member of the Organizing Committee constituted by the CSO for the International Seminar on Green GDP to be held during 5-6 April, 2013

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.

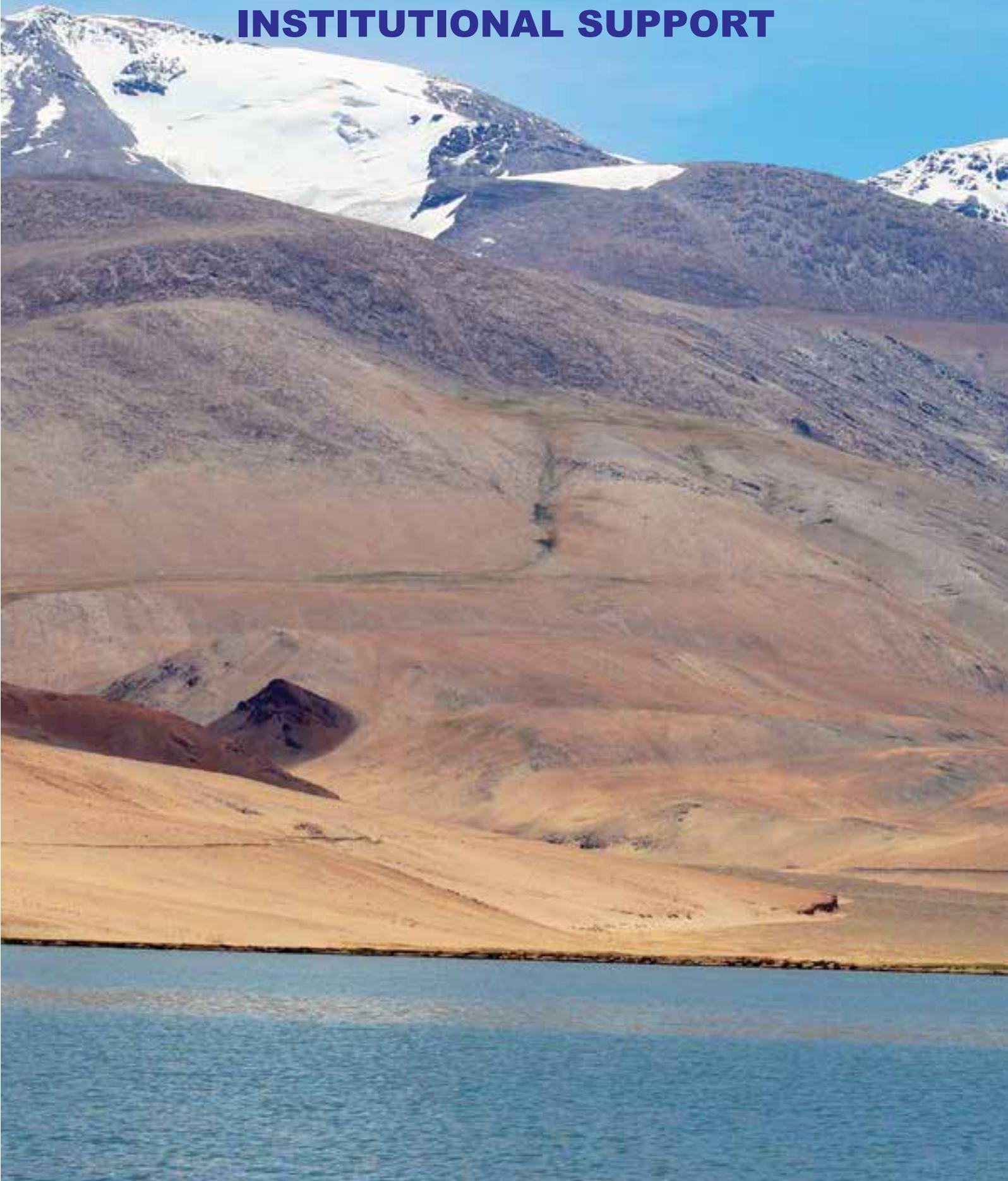
### **Non-Governmental Organization (NGO) Cell**

A Non-Governmental Organization (NGO) Cell has been set up in the Ministry to handle various matters relating to NGO's working in diverse field of environment. The basic functions of the Cell are:

- Collection and dissemination of information to various NGOs.
- Liaison with the Planning Commission and other government Ministry to create a database of various NGO's working in the field of environment and its associated areas.

Besides replying to Parliament Questions/ Assurance, the NGO Cell also disposed of 11 number of RTI application.

**CHAPTER-12**  
**LEGISLATION AND**  
**INSTITUTIONAL SUPPORT**





## Policy and Law

### Introduction

The Policy and Law Division is partly 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 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 6 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 ordinary places of sitting of the Tribunal. Except Kolkata, all the Benches have become operational. Kolkata Bench of the Tribunal is likely to become functional in January, 2014.

The present Chairman of the Tribunal, Hon'ble Justice Mr. 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 10 Expert Members are presently working in the Tribunal.

Since its inception and upto 05.12.2013, the Tribunal has received a total of 3500 cases. A total of 1944 cases have been disposed off and 1556 cases are pending as on 03.12.2013.

### Economic Cell

#### Functions of the 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.
- Nodal Division for handling and coordinating all matters referred by the Ministry of Finance.
- Nodal Division to monitor implementation of specific announcements in the Union Budget concerning Ministry of Environment & Forests.
- 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

#### Introduction

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.
- Implementation of any on-going Project on Trade and Environment.
- Acting as Export Promotion Cell in the Ministry.

#### Activities undertaken during the year

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 (E&F) has been nominated as Official Member of the 2nd Task Force on Transaction Cost in international trade constituted by Minister of Commerce & Industry. The task force is 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.

The Division has furnished its views on the Draft Cabinet Note on signing Memorandum of Understanding between Department of Industrial Policy & Promotion and South Centre, keeping in view capacity building for climate change mitigation and adaption. It has also commented on Draft Cabinet Note on Expansion India-Chile Preferential Trade Agreement (PTA) providing views on sensitive items of imports & exports. As a part of its routine task, the Division has been actively providing talking points to the speeches of Minister of Environment & Forests. One of the speeches is 'India calling' conference at Joensuu, Finland on inviting foreign investors to India to invest.

As nodal Cell to deal with references received from M/o Commerce & Industry, Trade & Environment Division examined and supported the Draft Note for the Expenditure Finance Committee (EFC) on the sub-Scheme for continuation of the Central Sector Plan 'Indian Leather Development Programme' during the XII Five Year Plan.

As a new initiative, the Division started compiling a time series data on 'Environmental Goods Imports & Exports of India' with the database of Directorate General of Commercial Intelligence & Statistics (DGCI&S), Kolkata to help the stakeholders to know about the status and prospects available in producing environmental goods (Annex-I).

During the year, various regional trade agreements under negotiation by India were examined and Ministry's contributions were provided, including on the (i) India-Chile PTA; (ii) India-Australia Free Trade Agreement (FTA); (iii) India-New Zealand FTA; (iv) India-Japan Comprehensive Economic Partnership Agreement (CEPA) and (v) India-Israel FTA in Environmental services.

In coordination with Economic Cell of the MoEF, the Division has brought out a working paper on the 'Trade in Environmental Services'. Economic Adviser (E&F) has significantly contributed to the same in order to provide material to Ministry of Finance Quarterly Economic Updates on 'Service Sector in India'.

On the request received from the Lok Sabha Secretariat for the comments on 'Expanding Trade through Innovation and the Digital Economy' for the Annual WTO Forum, 1-3 October, 2013, Geneva, the Division has provided its critical inputs on the 'Innovation & Trade' and 'Green the Economy: What role for innovation'.

The Division also contributed to the ongoing negotiations on various bilateral investment treaties and bilateral investment protection agreements, These include issues such as transfer of environmentally sound technology under bilateral investment agreements to meet India's environmental requirements, Under the Model Texts of India-US Bilateral Investment Promotion and Protection) Agreement (BIPA) in the context of the Indo-US Strategic Dialogue. The Division suggested various environmental measures which were necessary to protect human, animal or plant life or health and/or conservation of natural resources.

**CHAPTER-13**  
**SUSTAINABLE DEVELOPMENT**  
**AND CLIMATE CHANGE**



## Sustainable Development Division

### Introduction

The National Environment Policy, 2006 has sustainable Development as its core principal. The theme of 12<sup>th</sup> Five Year Plan (2012-2017) is “Foster More Inclusive and Sustainable Growth”. Sustainable Development calls for economic well being, social cohesion and environmental protection to go hand in hand with each symbiotically dependant on each other. Sustainable development is one of the thrust areas of Ministry of Environment and Forests and it is responsible for interacting with various United Nations agencies and international bodies and try to ensure that the sustainable development programmes and policies at international level are in line with national reality, capacity, level of development and national policies and priorities.

The United Nations Conference on Sustainable Development (UNCSD) also known as Rio+20 Summit was held from 20-22 June, 2012 at Rio de Janeiro, Brazil. The Rio+20 Summit was attended by Heads of states and Governments, high level representatives, civil society organization etc. India was represented by the Hon’ble Prime Minister. The Rio+20 Summit adopted the Outcome Document entitled “The Future We Want”. It witnessed the renewal of the commitment to sustainable development and ensured the promotion of economically, socially and environmentally sustainable future for the planet and for the present and future generations. The Rio+20 Summit recognized eradication of poverty and hunger as the greatest global challenge.

The Outcome Document has launched mainly four processes post Rio+20. These processes are : (i) An Inter-governmental process on setting up of High Level Political

Forum (para 86); (ii) An Inter-governmental process on Sustainable Development Goals (SDGs) (para 248); (iii) An Inter-governmental process for Sustainable Development Financing (Para 255); and (iv) Facilitation mechanism to promote the development, transfer and dissemination of clean and environmentally sound technologies (para 273).

Vide United Nations General Assembly (UNGA) Resolution No.A/RES/67/290, the High Level Political Forum (HALF) was set up. The first (inaugural) meeting of HALF was held on 24<sup>th</sup> September, 2013. The HLPF has been mandated to review the progress in the implementation of sustainable development commitments and enhance integration of the three dimensions of sustainable development in the holistic and cross sectoral manner at all levels.

### United Nations Convention to Combat Desertification

The United Nations Convention to Combat Desertification (UNCCD) is dealt by Desertification Cell of the Ministry.

The objective/activities of the Cell include:

- 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).

### Progress/achievements made during the year

- The Elucidation Report of India's Fifth National Report has been finalized for printing and dissemination. The report elaborates upon India's progress on the strategic objectives and operational objectives of the UNCCD 10 year Strategy. Further, the report also highlights 47 programmes and projects reported for the period 2010-2011, their key objectives and achievements. In addition, the report showcases 15 best practices which are measures, methods or activities that are considered successful in terms of achieving desired outcomes (good performance) and contributing to expected impacts formulated in the 10-year strategic plan and framework to enhance the implementation of the Convention.
- The National Steering Committee (NSC) for the Sustainable Land and Ecosystem Management (SLEM) programme was constituted on 31 March 2010 with the mandate to endorse the work plans of the SLEM projects and review progress. Accordingly the fifth meeting of

the NSC was held on 13th February, 2014 in Bhopal under the chairpersonship of Shri. Susheel Kumar, Additional Secretary, Ministry of Environment and Forests, Government of India.

- The World Day to Combat Desertification (WDCD) is observed every year on 17th June. The theme of the 2013 WDCD was "Drought and Water Scarcity" and the slogan "Don't let our future dry up" calls for everyone to take action to promote preparedness and resilience to water scarcity, desertification and drought. On this occasion Indian Council of Forestry Research and Education (ICFRE), Dehradun organized a one-day Seminar highlighting the achievements under the Sustainable Land Ecosystem Management Project.
- To firm up India's position for the Eleventh Session of United Nations Convention to Combat Desertification (UNCCD) Conference of parties (COP 11), A preparatory meeting was organized at The Ministry of Environment and Forests (MoEF) on 29th August 2013 under the chairmanship of Shri Susheel Kumar, Additional Secretary, MoEF. The meeting was attended by over 25 participants from different ministries, civil society organizations, funding agencies, think tanks and academia. The purpose of the meeting was to seek the views of the various stakeholder groups on the agenda points of COP 11.
- The eleventh session of the Conference of the Parties to the UN Convention to Combat Desertification (UNCCD COP 11) convened from 16-27 September 2013, in Windhoek, Namibia. The eleventh meeting of the Committee on Science and Technology (CST 11) and the twelfth

meeting of the Committee for the Review of the Implementation of the Convention (CRIC 12) convened in parallel to the COP. The Indian delegation comprising of a seven member team from the Ministry of Environment and Forests, Ministry of Agriculture, Ministry of Rural Development and Ministry of External Affairs participated in the deliberations at COP 11.

- An inception meeting for Preparation of India's 6th National Report to UNCCD and New National Action Programme to combat Desertification was organized on 27th January 2014 at, MoEF under the Chairmanship of Shri Susheel Kumar, Additional Secretary, MoEF to seek to seek inter-ministerial engagement for addressing the crucial issues of Desertification, Land Degradation and Drought (DLDD) in the country as well as strengthen India's engagement with the United Nations Convention to Combat Desertification (UNCCD) processes.

## Climate Change

### Introduction

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. The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), 2001 indicated a collective picture of a warming world and other changes in the climate system. Recent

report published by IPCC in 2013 indicated that the human influence on the climate system is unambiguous and since 1950 many changes have been observed in most regions of the globe.

Global warming has begun to affect the sea level, snow cover, ice sheets and rainfall. Shifts in regional patterns of climate marked by rising air temperatures are already affecting watersheds and ecosystems in many parts of the world. This increased temperature and sea level rise could further impact freshwater availability, oceanic acidification, food production, flooding of coastal areas and increased burden of vector and water borne diseases associated with extreme weather events, etc.

The First World Climate Conference (1979) identified climate change as an urgent world problem and issued a declaration calling on governments to anticipate and guard against potential climate hazards. The United Nations General Assembly addressed climate change for the first time by adopting Resolution 43/53 and recognized that climate change is a common concern of mankind and suggested for necessary and timely action within a Global Framework.

At the Global level, many countries joined an international treaty titled 'United Nations Framework Convention on Climate Change (UNFCCC)' in 1992 with an objective to limit the average global temperature by taking various measures to combat the challenges of climate change. Further, Kyoto Protocol was adopted in 1997, with legal bindings for developed countries to emission reduction targets. The first commitment period started in 2008 and ended in 2012. The second commitment period began on January 1, 2013 and will end in December 31, 2020. The Conference of



Parties (COP) to the UNFCCC has also proposed to develop a protocol, and the agreement or agreed outcome with legal force applicable to all parties by 2015 which will come into force from 2020.

### Intergovernmental Panel on Climate Change (IPCC)

IPCC since its inception has produced four assessment reports in the year 2007, 2001, 1995 and 1990 and several other special reports. IPCC is currently engaged in the preparation of Fifth Assessment Report (AR5) on Climate Change through three Working Groups. India is engaged with the IPCC in analyzing and critically examining the work being done under three Working Groups of the IPCC in a phased manner. The Summary for Policymakers of the IPCC Working Group-I AR5 titled "Climate Change 2013: The Physical Science Basis" was approved at the Twelfth Session of IPCC Working Group-I meeting held in Stockholm, Sweden, during September 23 to 26, 2013 and was released on September 27, 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" are expected to be released in March 2014 and April 2014 respectively. The synthesis report comprising of key findings emerging from the three Working Groups of AR5, will be published by IPCC in October, 2014.

The Working Group-I report titled "Climate Change 2013: The Physical Science Basis", which was released on September 27, 2013, highlights that the climate system is influenced by human activity and has led to warming of climate system since 1950. The report also indicates an increased level of certainty regarding human induced global warming (90-95%), more robust projections

on rise of temperature, sea-level warming and data on loss of ice sheet, melting of glaciers, change of precipitation and the carbon budget for limiting to 2 degree Centigrade or below target. Continued emission of Greenhouse Gas (GHG) will cause further warming and changes in the climate system. The impact of committed climate change will persist for many centuries even if emissions of Carbon dioxide stop.

### India's actions on Climate Change

#### National Communication submitted to the UNFCCC

In pursuance of the reporting obligations under the UNFCCC, India has undertaken to communicate information about the implementation of the Convention, taking into account the common but differentiated responsibilities and respective capabilities and specific regional and national development priorities, objectives and circumstances. The elements of information provided in the communication include a national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases, a general description of steps taken to implement the Convention including an assessment of impacts and vulnerability, and any other relevant information. The communication is meant to provide the context and the national circumstances inter alia India's geography, imperative of development needs, climate and economy; based on which India would be addressing and responding to the challenges of climate change.

India has submitted its Second National Communication (NATCOM) to the UNFCCC in 2012. The second NATCOM provides information of the emissions of Green house gases (GHG) for the years 2000 and 2007; information of impacts and vulnerability of key sectors such as Water, Agriculture, Natural Ecosystems and Biodiversity, Infrastructure etc.



The Ministry is currently preparing India's Third National Communication (TNC) and 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.

### **National and State Action Plan on Climate Change**

India's domestic strategy for addressing climate change is reflected in many of its social and economic development programmes. The National Action Plan on Climate Change (NAPCC) coordinated by the Ministry of Environment & Forests is being implemented through the Nodal Ministries in specific sectors/ areas. Eight national missions in the area of solar energy, enhanced energy efficiency, sustainable agriculture, sustainable habitat, water, Himalayan eco-system, increasing the forest cover and strategic knowledge for climate change form the core of NAPCC. All national missions were approved by the Prime Minister's Council on Climate Change and are at different stages of implementation. The Missions are under constant review of the Prime Minister's Council on Climate Change. An Executive Committee on Climate Change under the Chairmanship of Principal Secretary to Prime Minister has been set up for assisting the Prime Minister's Council on Climate Change in evolving a coordinating response to issues relating to climate change at national level, regular monitoring of the eight National missions and other initiatives on Climate Change and coordinating with various agencies on issues relating to climate change. Prime Minister's Office has entrusted the

responsibility of convening and servicing the Prime Minister's Council on Climate Change as well as the Executive Committee on Climate Change to the Ministry of Environment & Forests.

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, 24 States namely Andaman and Nicobar, Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Jammu & Kashmir, Kerala, Karnataka, Haryana, Himachal Pradesh, Lakshadweep, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Puducherry, Rajasthan, Sikkim, Tripura, Uttarakhand and West Bengal have prepared and submitted document on SAPCC to the MoEF. As of now, nine SAPCCs documents namely Arunachal Pradesh, Rajasthan, Madhya Pradesh, Sikkim, Tripura, Manipur, Mizoram, West Bengal and Andhra Pradesh have been endorsed by the NSCCC in May 2012 and April 2013.

### **Climate Change Action Programme**

At the initiative of the Ministry, Planning Commission has recognized climate change as a major area of environmental intervention. 'Climate Change Action Programme (CCAP)' - a new thematic/umbrella Scheme has been approved by the Planning Commission for implementation during the 12<sup>th</sup> Five year Plan. The scheme aims at advancing scientific research information and assessment of the phenomenon of climate change, building an institutional and analytical capacity for research and studies in the area of climate change, and supporting domestic actions to address climate change through specific programmes and actions at the national and state level. The



scheme comprises of eight activities, of which, three relate to scientific studies on climate change, two to institutional and capacity building and three relate to domestic and international actions on climate change.

Various other science initiatives are planned by the Ministry as part of the Climate Change Action Programme (CCAP). These include National Carbonaceous Aerosols Programme (NCAP), Long Term Ecological Observatories (LTEO), and Coordinated Studies on Climate Change for North East Region (CSCCNER). The NCAP is a major activity involving multi-institutional and multi-agency study launched in 2011. In this initiative, Ministry of Environment and Forests will collaborate with the Ministry of Earth Sciences, the Indian Space Research Organization, the Ministry of Science and Technology and other associated agencies to enhance the understanding the role of Black Carbon in climatic change through monitoring and assess the impacts of black carbon through various modeling techniques. The work programme envisages three Working Groups namely Long term Monitoring of Aerosol (Working Group-I), Impact of Aerosol on Himalayan Glaciers (Working Group-II) and Modeling of Black Carbon emissions inventory India and assessment of its impacts (Working Group-III).

### 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. After a decade, at the end of 2013, 1465 out of total 7,407 projects registered by the CDM Executive Board are from India, which is the second highest in the world. As on date Certified Emission Reductions (CERs) issued to Indian projects is 188 million. The National CDM Authority (NCDMA) in the Ministry has accorded Host Country Approval to 2856 projects facilitating possible investment of about ₹ 554,990 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). If all these projects get registered by the CDM Executive Board, they have the potential to generate 740 million CERs by 2013.

Low ambition for emissions reductions expressed by developed countries under the Kyoto Protocol is a major cause of slowdown of CDM market. In addition, the unilateral decision taken by some key parties to restrict the benefits of CDM to LDCs thereby denying CDM projects of large developing countries like India and China has further reduced the confidence in the ability of market mechanisms to help the cause of climate change. There are other areas of technology transfer and financing where higher ambition is needed. The Technology Mechanism envisaged under the Cancun Agreements has become functional, but, there is no significant progress on development and transfer of technologies for large scale transformation in developing

countries. Similarly, the Green Climate Fund set up at Cancun is yet to see any major flow of funds from the developed countries. In the coming years, effective fulfilment of commitments by developed countries will be an important aspect in the evolving action on climate change.

### **India's Low Carbon Strategy**

The government has declared a voluntary domestic mitigation pledge of reducing emissions intensity of Gross Domestic Product (GDP) by 20-25% by 2020 in comparison with 2005 level. The energy intensity of India's output has shown a declining trend owing to improvements in energy efficiency, autonomous technological changes and economical use of energy. This domestic goal and the objectives of the NAPCC are proposed to be achieved through a sustainable development strategy under the twelfth five year plan (12<sup>th</sup> FYP). Several thrust areas have been identified in the 12<sup>th</sup> FYP for this purpose and a coordinated approach to identify Nationally Appropriate Mitigation Actions and implement them towards this end will be taken during the Plan period.

### **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, KfW, World Bank, USAID and ADB. GIZ has been supporting the Ministry under ASEM programme for a CDM Cell and an adaptation project. A new project titled "Supporting the development and management of Nationally Appropriate Mitigation Actions (NAMAs) in India" with the support from GIZ is under consideration. With the assistance of this Ministry, the World Bank has sanctioned a US

\$ 400 million project for climate change and sustainable development in Himachal Pradesh. A project with World Bank on 'Partnership for Market Readiness' is also being implemented. The Global Environment Facility (GEF) has also approved a number of activities in relation to climate change during the fifth cycle of funding (2013-17). Some of the important activities that will be carried out with GEF support are in the area of energy efficiency, renewal energy, national communication and the state action plans. ADB has been involved in the Bhutan initiative on climate change for the four Himalayan countries, namely, India, Bhutan, Bangladesh and Nepal. Projects for adaptation have also been submitted to the Adaptation Fund.

### **International Negotiations on Climate Change**

#### **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 13<sup>th</sup> COP held in 2007 adopted a Bali Road Map to propel action on the shared vision, mitigation, adaptation, technology and financing. Copenhagen Accord was adopted by Parties in 2009 during its 15<sup>th</sup> 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 19<sup>th</sup> Conference of Parties (COP) of the UNFCCC and 9<sup>th</sup> Meeting of Parties to Kyoto Protocol (CMP) took place in Warsaw, Poland from 11 to 23<sup>rd</sup> November, 2013. The major outcomes of 19<sup>th</sup> Conference of Parties held at Warsaw included the following:

- It was decided to intensify domestic preparation for 'intended nationally determined contributions' towards the agreement that will come into force from 2020. All Parties are required to plan for the same by first quarter of 2015. As a result, India needs to get an assessment of its 'intended nationally determined contributions' by

first quarter of 2015. Developing countries including India ensured that the attempt by developed countries to bring the developing countries within the ambit of 'commitments' was successfully thwarted. The Parties have now agreed to undertake domestic preparations for their intended nationally determined contributions, without prejudice to the legal nature of the contributions, in the context of the 2015 agreement, which would be under the Convention. Developing countries ensured that there was no attempt by developed countries to re-open the UNFCCC framework agreement of 1992 and the COP decision in Warsaw did not prejudice the ongoing negotiations for the 2015 agreement.

- In the context of pre-2020 ambitions, under the Ad Hoc Working Group on Durban Platform for Enhanced Actions (ADP), the developed countries were urged to ratify the 2<sup>nd</sup> commitment period of Kyoto Protocol (KP) and revisit their targets in 2014. Countries that have not joined KP were also requested to do so and undertake quantified emission reduction targets.
- The "Warsaw International Mechanism for Loss and Damage" was created with a provision for setting up of an International Mechanism to provide technical support, finance and capacity building to help the poorer and vulnerable countries affected by typhoons, floods, droughts and other extreme weather events leading to loss and damage.
- There was a set of decisions to help developing countries reduce greenhouse gas emissions from deforestation and the degradation of forests. The Warsaw

Framework for Reduction in Emission from deforestation and degradation (REDD+) is backed by pledges of 280 million dollars financing from the US, Norway and the UK.

- The developed countries had pledged at Cancun in 2010 for mobilization of funds to the tune of US dollars 100 billion a year by 2020. The developing countries including India suggested that a roadmap should be prepared for achieving this target. No firm commitments were made by developed countries. It was agreed that developed countries will prepare biennial submissions on their updated strategies and approaches for scaling up finance between 2015-2020.
- Developing countries stood together to prevent any decision to impose mitigation obligations in agriculture sector. Developing countries retained the focus in agriculture on adaptation, keeping in mind the sensitivity of any mitigation obligation imposed on farmers.
- Developing countries ensured that International Cooperative Initiatives (ICIs) remained voluntary and are not imposed on developing countries without following the principles of Common But Differentiated Responsibility (CBDR) and Equity.
- On the issue of Hydrofluorocarbons (HFCs) phase down, the final ADP text deleted the reference to HFCs despite efforts by the European Union to have it included in the Montreal Protocol. Parties are now working to evolve a new architecture to be adopted in 2015. The new framework aims to be all inclusive and ensure that global action result in meaningful control of GHG emission.

## 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 year 2013 was also marked by several parallel international initiatives on climate change. India hosted the 14<sup>th</sup> BASIC Ministerial Meeting on climate change in Chennai, on February 15-16, 2013. H.E. Mrs. Jayanthi Natarajan, former Minister for State (Independent Charge) Environment and Forests of India, H.E. Mr. Xie Zhenhua, Vice Chairman of the National Development and Reform Commission of China, H.E. Mr. Carlos Augusto Klink, Secretary for Climate Change and Environment Quality, Ministry of Environment, Brazil and Mr. Alfred James Wills, Deputy Director General, Department of Environmental Affairs of South Africa, participated in the meeting. In line with 'BASIC-Plus' approach, H.E. Mr. Abdullah Bin Hamad Al-Attiyah, President of COP18/CMP8, Qatar also participated in the meeting. BASIC Ministers welcomed the Doha Climate Gateway as a balanced outcome of COP-18/CMP8. In this regard, Ministers expressed their appreciation for the leadership of Qatar as the COP-18/CMP8 Presidency and the contribution of H.E. Mr. Abdullah Bin Hamad Al-Attiyah to its success.

At the regional level, India partnered with Bhutan, Nepal and Bangladesh to address adverse effects of climate change through adaptation actions in the four thematic areas of Food, Water, Energy and Biodiversity.



## Ozone Layer Protection

### Introduction

- 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 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.
  - India was mainly producing and using nine of the 96 Ozone Depleting Substances (ODSs) controlled under the Montreal Protocol. These are Chlorofluorocarbons (CFCs) viz. CFC-11, CFC-12, CFC-113; Carbon Tetrachloride (CTC), Hydrochlorofluorocarbons (HCFCs), Halon-1211, Halon-1301, Methyl Chloroform and Methyl Bromide.
  - The Government of India has entrusted the work relating to ozone layer protection and implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer to the Ministry of Environment and Forests.
  - A detailed India Country Program for phase out of ODSs was prepared in 1993 to ensure the phase out of ODSs according to the National Industrial Development Strategy, without undue burden to both consumers and industry by accessing the Protocol's Financial Mechanism in accordance with the requirements stipulated in the Montreal Protocol. The Country Program was updated in 2006.
  - The Ministry has set up the Ozone Cell as a National Ozone Unit (NOU) to render necessary services for effective and timely implementation of the Protocol and its ODS phase-out program in India. The Ministry has also established an Empowered Steering Committee (ESC) Chaired by the Secretary (E&F) which is supported by two Standing Committees viz. Technology and Finance Standing Committee (TFSC) and Standing Committee on Monitoring. The ESC is overall responsible for implementation of the Montreal Protocol provisions, review of various policy and implementation options, project approval and monitoring.
- The Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer**
- The Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer are the international treaties specific for the protection of the Earth's ozone layer. Montreal Protocol

has been recognized as the most successful international environmental treaty in history. It has received universal ratification from all the 197 Parties of the world. In the 26 years of its operation, extraordinary international cooperation under this agreement has led to phase-out of production and consumption of several major ODSs such as Chlorofluoro Carbons (CFCs), Carbon Tetrachloride (CTC) and halons globally from 1<sup>st</sup> January, 2010. This amounts to phase-out of 98% of the ozone depletion weighted level of the global production and consumption of all the chemicals controlled by the Montreal Protocol. It has not only put the stratospheric ozone on the path of recovery to pre-1980 level but it has also immensely benefitted the climate system. As per experts estimates, the Montreal Protocol has reduced Green House Gas (GHG) emissions by 11 giga tonnes Carbon Dioxide (CO<sub>2</sub>) equivalent per year through its ODS phase-out activities.

- However, the job of protection of the ozone layer is not yet over. On the mass basis, about 45% ODSs are yet to be phased out globally, especially the next category of controlled chemicals, commonly known as HCFCs. The Protocol is currently addressing the phase-out of HCFCs with an accelerated phase-out schedule.

### Regulatory Measures

- The Ozone Depleting Substances (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986 has been notified in the Gazette of India on 19.7.2000. These Rules set the deadlines for phasing out of various ODSs, besides regulating production, consumption, trade, import and export of ODSs and

the products containing ODSs. The ODS Rules were amended in 2001, 2003, 2004, 2005 and 2007 to facilitate implementation of ODS phase-out by the enterprises in various sectors.

- These Rules prohibit the production and consumption of CFCs, 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. The production and consumption of HCFC's are allowed upto 1.1.2030.
- The ODS rules is being amended to align with the accelerated phase-out of HCFCs. The draft notification of the Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2013 was published in the Gazette of India in May, 2013 and also uploaded on the Ozone Cell's website to make it public

### Fiscal Measures

- Customs duty exemption has been extended for Multilateral Fund (MLF) assisted ODS phase-out projects or establishment of new capacities and expansion of capacity with non-ODS technology during the financial year 2013-2014.

### Activities undertaken so far

- India has taken a series of fiscal and regulatory measures to facilitate ODS phase-out in the country. Among fiscal measures taken, the Government has accorded customs duty exemptions on



- capital goods required for ODS phase-out projects and new investment and expansion of established industries with non-ODS technologies.
- The UN General Assembly on 19<sup>th</sup> December, 1994 adopted a resolution 49/114 which proclaims 16<sup>th</sup> September as the International Day for the Preservation of the Ozone Layer, to commemorate the signing of the Montreal Protocol on Substances that Deplete the Ozone Layer which was signed on 16<sup>th</sup> September, 1987.
  - Awareness activities at the national and state levels were organized to sensitize the stakeholders to phase-out the ODSs in various sectors. The International Day for the Preservation of the Ozone Layer is being organized every year in the country on 16<sup>th</sup> September, at national and state levels since 1995.
  - "Montreal Protocol: India's Success Story", posters, stickers are brought out every year on the occasion of International Day for the Preservation of the Ozone Layer giving latest information on ODS phase-out in the country and technologies adopted.
  - A bi-monthly newsletter Value Added Technical Information Service titled 'VATIS UPDATE-Ozone Layer Protection' is being published and distributed to more than 2000 individuals and institutions in collaboration with United Nations Asia and Pacific Centre for Technology Transfer (APCTT). This newsletter covers the latest technologies and developments relating to ozone layer, including technical options evolved to ODSs around the world.
  - Participation in the meetings of the Open Ended Working Group (OEWG) of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, Meeting of the Parties (MOP) to the Montreal Protocol on Substances that Deplete the Ozone Layer, Executive Committee (Ex-Com) of the MLF, South Asia Network meeting and joint meeting of Regional Ozone Networks, Multilateral Environmental Agreement Regional Enforcement Network (MEA-REN) meeting and other Montreal Protocol related meetings.
  - Data on production, consumption, export and import of ODSs is submitted to the Ozone Secretariat by the end of September every year.
  - Organization of TFSC meetings for recommending ODS phase-out projects for submission to the MLF Secretariat and recommending projects for fiscal incentives. In the year 2013, three meetings of TFSC were held and 28 duty exemption certificates were issued.
  - No Objection certificates for 127 enterprises were issued to DGFT for import and export of ODSs and ODS based equipments.
  - Project Management Unit (PMU) was set up in 2002 to implement the National ODS Phase-out Plans.
  - The phase-out of HCFCs was accelerated by 10 years with certain reduction schedule vide decision XIX/6 of the 19<sup>th</sup> MOP in 2007.
  - A Roadmap for phasing-out of HCFCs was developed describing the long term vision and action plan including the policy instruments for phasing out of production and consumption of HCFCs in India.
  - An Action Plan for implementation of the Roadmap for phasing out of HCFCs in India has been developed indicating the



- responsibilities of agencies/ organizations and timeline for its smooth and effective implementation.
- Hydrofluorocarbons (HFCs) have emerged as the main alternatives to ODSs. HFCs do not deplete the ozone layer but have certain Global Warming Potential (GWP) but significantly lower than that of most of the ODSs that have been replaced by HFCs. Currently, HFCs are widely used chemicals in various sectors. Emissions of HFCs are already controlled under the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol. Some of the countries, including United States of America have been submitting amendments to the Montreal Protocol to phase-down production and consumption of HFCs under the ambit of the Montreal Protocol.
  - An India-US Task Force was established to enhance the understanding of stakeholders on issues related to HFCs. The Members of the Task Force were drawn from Government, industry associations and scientific and technical institutions from India as well as USA. A draft report of the Task Force on HFCs has been prepared in consultation with the stakeholders and Members of the Task Force from India and USA. The finalization of the Task Force report is in progress.
  - The HCFC Phase-out Management Plan (HPMP) Stage-I, to comply with 2013 and 2015 targets, was prepared in close cooperation with the UNDP, the lead implementing agency, UNEP and GIZ in consultation with the stakeholders, industry, industry associations, line Ministries and other concerned Government Departments, large HCFC consuming organizations including Defence, Indian Railways, Department of Science and Technology etc.
  - The HPMP Stage-I has been approved by the Ex-Com of the MLF in its 66<sup>th</sup> Meeting held in April, 2012 for the period 2012-2015 to reduce 341.77 ODP tonnes of HCFC from the starting point of 1691.25 ODP tonnes with a total funding of US \$23,011,537 including implementing agency support cost.
  - The India's HPMP Stage-I addresses the conversion of manufacturing facilities from HCFCs to non-ODS technologies in foam sector, technical assistance to the systems house for developing pre-blended polyol system for Small and Medium Enterprises (SMEs) of foam manufacturing and initiation of some activities in the servicing sector.
  - The following workshops were conducted during 2013 :
    - Organized a Stakeholders Workshop on 20<sup>th</sup> February, 2013 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 HPMP Stage-I was launched on this occasion.
    - Organized a Technology and Policy Workshop on HCFC Phase-out in India : Challenges and Opportunities on 9<sup>th</sup> April, 2013 in New Delhi in association with UNEP Compliance Assistance Program (CAP), Regional Office for Asia and the Pacific (ROAP), Bangkok. The objectives of the workshop were to deliberate on modalities of implementation of HPMP Stage-I, its

synergies with other programs related to energy efficiency program in the country particularly in buildings and understanding of perspective of key stakeholders. The workshop was well attended by the stakeholders from Refrigeration and Air-Conditioning (RAC) and foam manufacturing sectors, building sector, Government agencies etc.

- A workshop was organized in New Delhi in association with GIZ, Government of Germany on 9<sup>th</sup> October, 2013 for result sharing on Godrej Hydrocarbon – 290 Pilot Project to the stakeholders especially the RAC manufacturing industry.
- Five awareness workshops were organized by UNEP as implementing agency for the awareness and other enabling activities at various locations viz. Mumbai, Chennai, Kolkata, Guwahati and Ahmadabad for the stakeholders especially from servicing sector.
- Training, workshops were organized across the country in association with GIZ, Government of Germany for RAC service technicians on good servicing practices of HCFC based appliances/equipments.
- In addition to these, Workshops, Seminars and consultative meetings with the stakeholders were also organized on a regular basis for interaction with industry, Government departments and organizations etc.

### Achievements made

- India has met the following compliance targets either on or ahead of the control schedule of the Montreal Protocol:-



**Fig-59.** Shri Susheel Kumar, Additional Secretary, Ministry of Environment & Forests releasing the "Poster" during the 19<sup>th</sup> International Day for the Preservation of the Ozone Layer, 2013

- Phase-out of production and consumption of virgin halons as early as 2002, eight years prior to the Montreal Protocol schedule, being high ODP ODSs.
- Prohibition of use of CFCs and halons in manufacturing of new equipments as early as 1.1.2003. This not only facilitated early phase-out of these ODSs in the country, but also reduced the inventory of ODS based equipments which resulted in reduction of use of CFCs and halons for servicing.
- Phase-out of production and consumption of CFCs with effect from 1.8.2008, 17 months prior to the Montreal Protocol schedule except use of Pharmaceutical grade CFCs in manufacturing of MDIs.
- Complete phase-out of production and consumption of CTC and halons with effect from 1.1. 2010.
- Successful implementation of the National Strategy for transition to non-CFC MDIs and plan for phase-



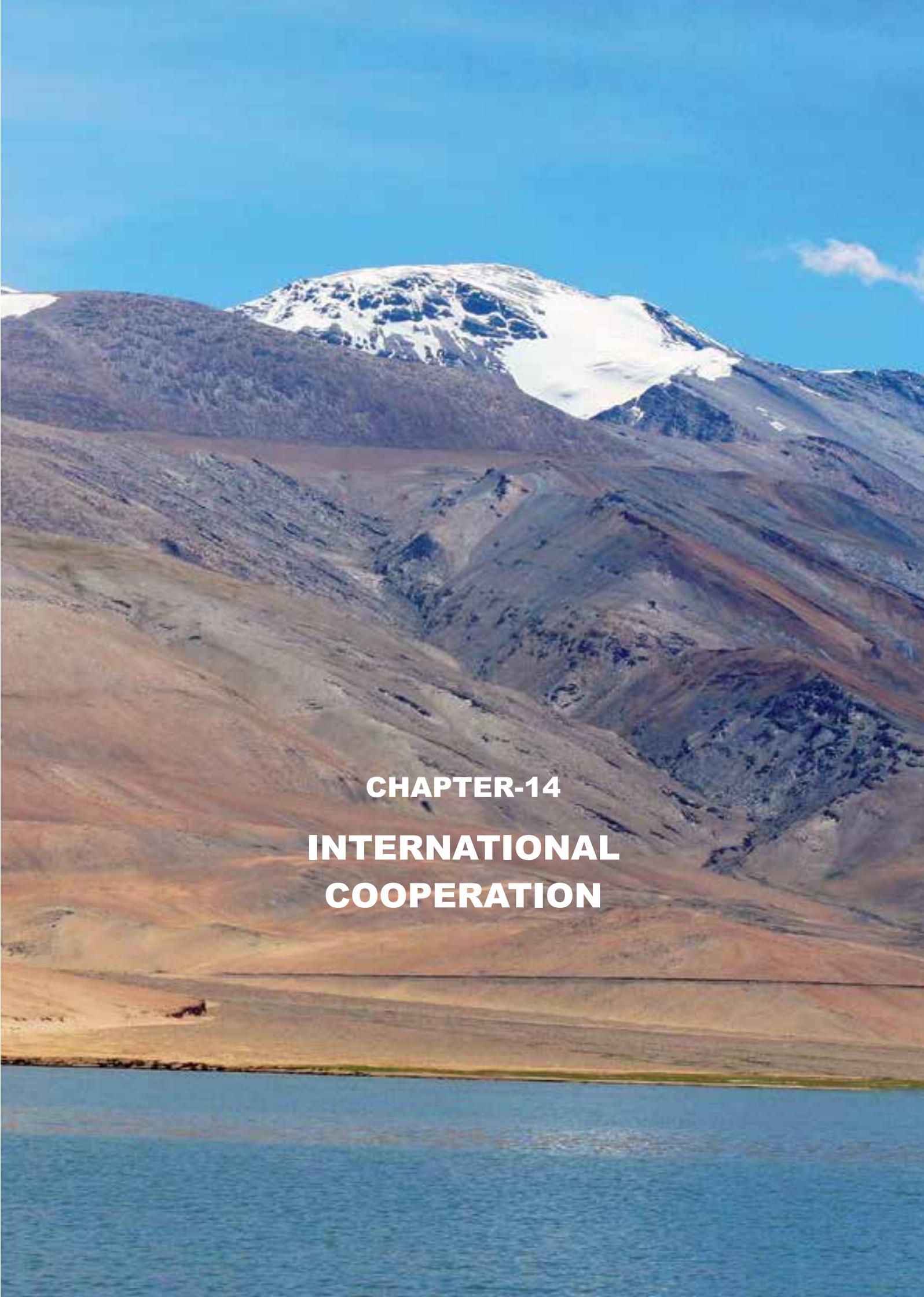
- out of CFCs in the manufacture of pharmaceutical MDIs in India.
- India in consultation with the MDI manufacturers withdrew the EUN for 2011 and also committed not to seek any EUN for pharmaceutical grade CFCs in future. This was one of the commendable achievements in the MDI sector
  - Approval of HPMP Stage-I by the 66<sup>th</sup> Ex-Com of the MLF held in April, 2012 for the period from 2012 to 2015 to reduce HCFC consumption to meet the 2013 and 2015 targets with a total funding of US \$23,011,537. The 66<sup>th</sup> Ex-Com also approved the first tranche of Stage-I of HPMP and corresponding implementation plan at the amount of US \$12,265,080.
  - The HPMP Stage-I is being implemented successfully in close cooperation with the implementing agencies and the stakeholders based on the performance report, the 71<sup>st</sup> Ex-Com of the MLF held in December, 2013 approved the second tranche of US \$8,846,064 for HPMP Stage-I and the 2014-2015 implementation plan.
  - The Ex-Com of the MLF so far has approved a total of 302 projects involving MLF funding of US \$278,722,203 to the Indian industry for phase-out of production and consumption of 58,980 ODP tonnes of the ODSs in India.
  - The Ozone Cell, MoEF organized the 19<sup>th</sup> International Day for the Preservation of the Ozone Layer on 14<sup>th</sup> September, 2013 at Chennai. The theme for the 19<sup>th</sup> International Day for the Preservation of the Ozone Layer for year 2013 was: **“A healthy atmosphere, the Future We Want”** that emphasized environmental benefits achieved globally through the operation of the Montreal Protocol. A large number of stakeholders and school children participated in the event.
  - On this occasion, the publication “Montreal Protocol: India’s Success Story” was released and distributed to the participants. In addition, poster design, painting, slogan writing competitions were organized among school children. Prizes for the best 3 in each competition were awarded.
  - The 25<sup>th</sup> MOP to the Montreal Protocol on Substances that Deplete the Ozone Layer was held at Bangkok, Thailand from 21<sup>st</sup> to 25<sup>th</sup> October, 2013. India played a key role during the deliberations of various issues, including proposed amendments to the Montreal Protocol to bring phase-down of HFCs under the ambit of the Montreal Protocol, additional funding for the MLF for the implementation of the Montreal Protocol to maximize the climate benefits of the accelerated phase-out of HCFCs, Terms of Reference (TOR) for the Study on 2015-2017 Replenishment of the MLF, funding of production facilities for HCFCs etc.
  - India has been elected as a Co-opted Member of the Ex-Com of the MLF for the implementation of the Montreal Protocol for the year 2014
- Awards & Appreciations received so far**
- Certificate of Appreciation awarded to Dr. A. Duraisamy, Director, Ozone Cell by the Montreal Protocol, Ozone Secretariat, UNEP on 30 November, 2006 for his invaluable contribution as the Host Government Focal Point and Conference Coordinator towards organization of the 18th MOP to the Montreal Protocol on Substances that Deplete the Ozone Layer from 30th



- October, 2006 to 3rd November, 2006 in Vigyan Bhawan, New Delhi, India.
- The Ozone Cell of India was conferred "The Montreal Protocol Implementers Award, 2007" by the Montreal Protocol, Ozone Secretariat, UNEP, on the occasion of the 20<sup>th</sup> Anniversary of the Montreal Protocol held on 16<sup>th</sup> September, 2007 at Montreal, for its extraordinary contributions in effective implementation of the Montreal Protocol and the global effort to protect the Ozone Layer.
  - The Ozone Cell of India was conferred "The Montreal Protocol Exemplary Project Recognition Award", for India's contribution to the project "Foam Sector Umbrella Project for conversion to CFC free technology". Projects on Ecological Refrigeration (ECOFRIG), Human and Institutional Development for Ecology Refrigeration (HIDECOR) and National CFC Consumption Phase-out Plan (NCCoPP) were conferred "The Montreal Protocol Exemplary Project Recognition Award" by the Montreal Protocol, Ozone Secretariat, UNEP, on the occasion of the 20<sup>th</sup> Anniversary of the Montreal Protocol held on 16<sup>th</sup> September, 2007 at Montreal.
  - Two industries, M/s Kirloskar Copeland Ltd. and M/s Satya Deeptha Pharmaceuticals were Conferred "The Montreal Protocol Exemplary Project Recognition Award" by the Montreal Protocol, Ozone Secretariat, UNEP, on the occasion of the 20<sup>th</sup> Anniversary of the Montreal Protocol held on 16<sup>th</sup> September, 2007 at Montreal.
  - The Stratospheric Ozone Protection Award, 2008 : In recognition of exceptional contributions to global protection, was conferred on Dr. A. Duraisamy, Director, Ozone Cell by the United States Environmental Protection Agency (USEPA), Washington DC for "Leadership in Ozone Layer Protection" at a special ceremony on 19<sup>th</sup> May, 2008 at The Kennedy Center for the Performing Arts in Washington DC, U.S.A.
  - The Montreal Protocol, Ozone Secretariat awarded a certificate of recognition to Dr. A. Duraisamy, Director, Ozone Cell, MoEF in appreciation of extra ordinary efforts and leadership in phasing-out of CFCs in MDI Manufacturing sector.
  - Awarded Recognition to the Ozone Cell, India by the Montreal Protocol, Ozone Secretariat, UNEP on the occasion of the 21<sup>st</sup> MOP to the Montreal Protocol held from 4<sup>th</sup> to 8<sup>th</sup> November, 2009 at Port Ghalib, Egypt, for its Ratification of the Vienna Convention on 18<sup>th</sup> March, 1991 and the Montreal Protocol on Substances that Deplete the Ozone Layer on 19<sup>th</sup> June, 1992 and its efforts in ozone layer protection.
  - The 22<sup>nd</sup> MOP of the Montreal Protocol held from 8<sup>th</sup> to 12<sup>th</sup> November 2010 at Bangkok, Thailand congratulated Ozone Cell of India for its outstanding achievements for not seeking any CFCs for manufacturing of MDIs under the EUN provisions of the Montreal Protocol for the year 2011 and beyond.
  - The 22<sup>nd</sup> MOP of the Montreal Protocol held from 8<sup>th</sup> to 12<sup>th</sup> November 2010 at Bangkok, Thailand appreciated the role of Indian delegation for raising the issue of pre-blended polyols as a controlled substance and arriving at the decision to provide funding to the enterprises in A-5 Parties for conversion from pre-blended polyols with HCFC-141b to non-ODS technologies.



- A Certificate of Recognition was conferred to the Ozone Cell of India for compliance with 2010 obligations to the phase out of Annexure-A, Group-I, Group-II and Annexure-B, Group-I, Group-II Substances in October, 2011 by the Ozone Secretariat for the Vienna Convention and the Montreal Protocol.
- Letter of Appreciation/ Recognition awarded to Dr. A. Duraisamy, Director Ozone Cell by the Chief, Montreal Protocol unit, UNDP on 31st January, 2012 for proactive and effective leadership and efficient management in the implementation of transitioning from CFCs to non-ozone depleting propellant technologies in the manufacturing of pharmaceutical MDIs.
- Certificate of Appreciation / Recognition was awarded to the Ozone Cell of India by The Ozone Secretariat for the Vienna Convention and the Montreal Protocol, UNEP on 16<sup>th</sup> September, 2012 on the occasion of the 25<sup>th</sup> Anniversary of the Montreal Protocol for its vital role in protecting the ozone layer for generations to come.
- Certificate of Appreciation / Recognition conferred to Dr. A. Duraisamy, Director, Ozone Cell by The Ozone Secretariat for the Vienna Convention and the Montreal Protocol, UNEP on 16<sup>th</sup> September, 2012 on the occasion of the 25<sup>th</sup> Anniversary of the Montreal Protocol for his vital role in protecting the ozone layer for generations to come.



**CHAPTER-14**  
**INTERNATIONAL**  
**COOPERATION**



## International Cooperation

### Introduction

The Ministry of Environment and Forests is the nodal Ministry in the Government of India for all Multilateral Environmental Agreements. These include UN Framework Convention on Climate Change (UNFCCC), Convention on Biological Diversity (CBD), Basel Convention on Trans-boundary Movement of Hazardous Substances, Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances that deplete Ozone Layer, UN Convention to Combat Desertification (UNCCD), Kyoto Protocol, Stockholm Convention on Persistent Organic Pollutants, Rotterdam Convention, Ramsar Convention etc.

International Co-operation (IC) Division within the Ministry coordinates all issues related to international environmental cooperation. The IC Division is the nodal Division for United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), the World Bank, United Nations Industrial Development Organization (UNIDO), Global Environment Facility (GEF) and regional bodies like Economic & Social Commission for Asia & Pacific (ESCAP), South Asian Association for Regional Cooperation (SAARC), South Asia Cooperative Environment Programme (SACEP), 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), etc.

### Progress/Achievements during the year

#### United Nations Environment Programme (UNEP)

- The United Nations Environment Programme (UNEP) established in 1972, is the principle entity within the UN System to assist the developing countries in building scientific and technical capacity, fostering partnership and knowledge development & promoting environment for sustainable development. Based in Nairobi, Kenya, UNEP activities range from assessment of environmental trends, especially early warning systems to deal with environmental disasters and emergencies to promotion of environmental science and information. One of the main responsibilities of the UNEP is to keep under review the world environment situation and ensure that emerging environmental problems of wide international significance are prioritized and receive appropriate and adequate consideration by the Governments. UNEP has six priority areas viz.: (i) climate change (ii) ecosystem management (iii) disasters and conflicts (iv) resource efficiency (v) harmful substances and hazardous waste and (vi) environment governance.
- The 27<sup>th</sup> Session of UNEP Governing Council/Global Ministerial Environment Forum was held at Nairobi, Kenya from 18-22 February, 2013. This was the first Universal session of UNEP Governing Council wherein the UNEP Governing Council has been designated as the United Nations Environment Assembly. India participated in the 1<sup>st</sup> Universal Session of the Council/Forum. The Indian Delegation



led by Secretary (E&F), comprised of officers of this Ministry alongwith the representative of Ministry of External Affairs and High Commission of India, Nairobi.

- Government of India provides annual financial contribution of US \$ 100,000 to the UNEP Environment Fund annually.

### **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.
- The International Resource Panel consists of 25 experts from leading institutions around the world involved with all aspects of resource use and management. The panel is co-chaired by Prof. Ernst Ulrich von Weizsacker, former Chairman of the Bundestag Environment Committee (Germany) and Dr. Ashok Khosla, President of the International Union for Conservation of Nature (IUCN) and Founder of the Development Alternatives, New Delhi, India. The panel is supported by a Steering Committee made up of representatives of many governments, the European Commission and other inter-governmental and civil society organizations. India is a member of the Steering Committee and takes part in annual meetings of International Resource Panel and Steering Committee.
- The IRP Secretariat had organized a Workshop on Cities at Nantes, France on 24-25 September, 2013 inviting the members of the Steering Committee of

the Panel with the aim of identifying several thematic options for the future work of the Panel on Cities. This Ministry was represented in the above meeting

### **Global Environment Facility (GEF)**

- The Global Environment Facility (GEF) is one of the largest multilateral funding mechanism of the Convention on Biological Diversity (CBD), UN Framework Convention on Climate Change (UNFCCC), Stockholm Convention on Persistent Organic Pollutants, UN Convention to Combat Desertification (UNCCD) and Minamata Convention on Mercury. Set up in 1991, it provides project grants to developing countries for addressing global environmental issues while supporting national development initiatives. The GEF is partnership of 183 governments, international institutions, non-governmental organizations and private sector. India is a founder member of GEF. It is both a recipient and donor of GEF funds. The GEF has a cycle of four years. The GEF-6 cycle begins on 1<sup>st</sup> July 2014.
- The GEF funds five focal areas – biodiversity, climate change, land degradation, international waters and chemicals. Since its inception, India has accessed about USD 473 m of GEF grant with the following break-up for different projects: USD 290.09 m (climate change), USD 77.24 m (biodiversity), USD 40.25 m (chemical), USD 4.7 m (land degradation) and USD 60.5 m (multi-focal area). These projects cover a range of issues like promoting energy efficiency and renewable energy in different industrial and commercial sectors, mainstreaming biodiversity concerns into major developmental sectors

to conserve marine and coastal areas, promoting sustainable land and ecosystem management practices for sustainable livelihoods, demonstrating environment friendly technologies of handling PCBs and health care waste and facilitating the preparation of India's national reporting to CBD, UNFCCC and UNCCD.

- 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.
- The 8<sup>th</sup> meeting of GEF South Asia Constituency was organized by the GEF Council Member and hosted by the Royal Government of Bhutan at Thimpu from Oct. 28-29, 2013 wherein Mr. Shashi Shekhar, Additional Secretary, MoEF and GEF Operational Focal Point India participated. The GEF South Asia Constituency comprises of countries – Bangladesh, Bhutan, India, Nepal, Maldives and Sri Lanka. The meeting deliberated on the agenda items to be discussed during the Nov. 2013 GEF Council meeting and developed a constituency perspective. Various constituency coordination issues were also discussed.
- The 3<sup>rd</sup> GEF-6 Replenishment Meeting was held at Paris, France from 10-12 December, 2013. The India side was represented by Department of Economic Affairs (DEA) as the Political Focal Point for GEF and the MoEF as the Operational Focal Point. The meeting focused on the challenges ahead, allocation of resources, the need to work together and to build consensus on the contentious issues so as to finalize the 6<sup>th</sup> Replenishment of GEF Resources

### 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 as and when considered necessary by the Member States known as SAARC Summit. So far 17 SAARC Summits have been held.
- During the reporting year, SAARC Secretariat has organized workshops/ meetings/conferences including the following in which this Ministry was represented:
  - 2<sup>nd</sup> Meeting of SAARC-UNEP Cooperation held on 2-3 July 2013 in Kathmandu, Nepal.
  - 7<sup>th</sup> Governing Board Meeting of SAARC Forestry Centre held on 25-26 Sept. 2013 in Thimphu, Bhutan.
  - 3 days Expert Group Meeting on adaptation to Climate Change Impacts and Risks to different Forest types of South Asia held on 22-24 October, 2013 at Jorhat, Assam, India.
  - 10<sup>th</sup> Governing Board Meeting of SAARC Coastal Zone Management Center held on 9-10 November, 2013



in Maldives.

- 5<sup>th</sup> Meeting of Technical Committee on Environment & Forests (TCEF) held on 15-16 January, 2014 in Thimphu, Bhutan

### 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.
- The thirty-fifth Session of the SAARC Standing Committee (Colombo, 29-30 July 2008), endorsed the offer of the United Nations Environment Programme for Asia and Pacific (UNEP ROAP), Bangkok, to fund and host an Annual Meeting between SAARC and UNEP to develop a joint work-plan and to review collaboration within the framework of the MoU.
- An Indian delegation from Ministry of Environment and Forests attended the Second Meeting of the SAARC-UNEP Cooperation held at Kathmandu on July 2-3, 2013. The meeting after extensive discussions agreed to undertake capacity building initiatives in the following areas of cooperation: Solid Waste Management; Safe Drinking Water; Air Pollution; Land Degradation; Payment for Eco-System Services; Watershed Management; Multilateral Environment Agreements (MEAs) and Climate Change.

### South Asia Cooperative Environment Programme (SACEP)

- The South Asia Cooperative Environment Programme (SACEP) was set up in 1982 with headquarters in Colombo, Sri Lanka. It aims to promote regional Co-operation in South Asia in the field of environment, both natural and human, in the context of sustainable development and on issues of economic and social development which also impinge on the environment and vice versa. It supports conservation and management of natural resources of the region by working closely with all national, regional, and international institutions, governmental and non-governmental, as well as experts and groups engaged in such co-operation and conservation efforts.
- Secretary, Ministry of Environment and Forests is the SACEP Focal Point for India. The SACEP holds its Governing Council (GC) meetings, which concentrate on current regional issues as well as global concerns.
- This Ministry provides Government of India's annual contribution to the SACEP @ US\$ 31,850 per annum

### The World Bank

- International Cooperation Division is the nodal division for coordination with World Bank concerning various environmental projects of the Ministry.
- The World Bank completed ongoing study titled "Diagnostic Assessment of Select Environmental Challenges: Valuation of Biodiversity and Ecosystem Services in India".

### Bilateral Cooperation

Ministry of Environment and Forests has entered into bilateral cooperation



agreements with a number of countries such as Norway, Sweden, France, Finland, Canada, Bangladesh, etc. Most of these agreements are operated through the Joint Working Groups. These agreements provide a mechanism for international interactions and consultation in the field of environment.

### The main activities undertaken during the year

- The 7<sup>th</sup> India-Norway Joint Working Group meeting on environment was held at Hurtigruta, Norway on 29<sup>th</sup> May, 2013. The Indian delegation, led by Shri Hem Pande, Addl. Secretary participated in the meeting. The international environment issues of common interest, in particular negotiations on bio-diversity, climate change and Rio+20 were discussed. As a follow up, a joint letter from Ministers of Environment of India and Norway calling for rapid ratification of the Nagoya Protocol has been issued in June, 2013.
- Indo-Finnish Joint Working Group meeting on Clean Technology and Waste Management was held at Helsinki, Finland on 16<sup>th</sup> September, 2013. The Indian delegation, led by Sh. Maninder Singh, Joint Secretary participated in the meeting. The JWG exchanged views on specific areas of concern such as waste water treatment, pulp and paper industries, waste management including e-waste, hazardous waste and municipal solid waste. Areas of cooperation in clean technology was also explored.
- 3<sup>rd</sup> Koli Forum meeting was held at Joensuu, Finland from 17 – 19 September, 2013 wherein Mrs. Jayanthi Natarajan, Minister of State (I/C) for Environment & Forests delivered the key note address. The Koli Forum is an initiative to establish a discussion forum on natural resources and the issues range from the availability of raw materials and their economic use, to environmental aspects and their competitiveness. It brings together eminent European leaders from the spheres of business, science, politics and culture. In her key note address, Mrs. Natarajan touched upon various issues relating to forests and water.
- A bilateral meeting between Mrs. Jayanthi Natarajan, Minister of State (I/C) for Environment & Forests and Mr. Ville Niinisto, Minister of Environment, Finland was held on 18<sup>th</sup> September, 2013 where issues relating to UNFCCC Climate Change negotiations and topical issues like REDD+ and LULUCF were discussed.
- A bilateral meeting between Mrs. Jayanthi Natarajan, Minister of State (I/C) for Environment & Forests and Ms. Keit Pentus-Rosimannus, Minister of Environment, Estonia was held at Tallinn, Estonia on 21<sup>st</sup> September, 2013. Issues pertaining to environmental cooperation between the two countries were discussed.
- 3<sup>rd</sup> Meeting of India – Canada Environment Forum was held at Toronto, Canada from 30 September – 02 October, 2013. A delegation led by Mr. Shashi Shekhar, Additional Secretary, MoEF attended the meeting. The meeting discussed various issues of waste water management including STP technologies, industrial effluent treatment, municipal solid waste, e-waste management and recycling, as also eco-sustainable cities. Further, a number of presentations were made by Canadian companies operating in the field of waste water treatment, industrial effluent treatment, water quality management, etc.



The meeting provided an opportunity to assess and to explore areas for future collaboration with Canadian companies especially regarding projects pertaining to Ganga River Basin

### Activities Scheduled

- The bilateral Joint Working Group Meetings on Environment with the European Union (EU), Sweden, India Brazil South Africa (IBSA) and Bangladesh are in the pipeline.

### 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), 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 govt. schemes with a view to augment the income of the people, help in better living conditions and employment generation as well as addressing the sustainability in perpetuity once the funding ceases to flow due to completion of the project.

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, U.P, 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 Table-68.

### Projects under consideration for external assistance

The following forestry projects have been included for consideration under the Rolling Plan for FY 2013-14 for external funding:

- Uttarakhand Forest Resources Management Project (UFRMP). (MoD Signed)
- Punjab Bio-diversity & Natural Resources Conservation Project
- Nagaland Afforestation and Eco-development project

### Projects under appraisal/ clearance stage for external assistance

The following projects are proposed to be forwarded to external agencies for consideration in 2014-15:

- Simultaneous Treatment of Fringe Forest and Adjoining Non- forestlands for Conservation of Water, Bio-diversity, Sustainability of JFM and Poverty Alleviation (Central Sector Project), NRAA.

- "PALAS- Project for Advancement of Livelihood and Forestry for ecological security" in the State of Jharkhand.
- Andhra Pradesh Forest Productivity Enhancement Project.
- Karnataka Sustainable Forest Management and Biodiversity Conservation Project Phase-III.

### Projects pending with DEA for posing to an External Agency:

Integrated Forest Resources Management Project in Jammu & Kashmir

**Table-68.** Details of Ongoing Externally Aided Projects

Sl. No.	Name of the Project	Implementing Agency/ State and date of Sanction	Cost (in Rs. Crores)	Funding Agency	Project Objectives	Components	Project Period
1	2	3	4	5	6	7	8
1.	Assam Project on Forest and Bio-diversity Conservation	Assam 8 <sup>th</sup> June, 2012	390	AFD	(i) restoring forest ecosystem, in collaboration with the forest dependent communities. (ii) Enhancing the forest dependent communities' livelihood, and (iii) Ensuring conservation and sustainable use of biodiversity. In order to achieve this, the project is organized around four main technical components and one component for project management	(i) Institutional Strengthening (ii) Multi-level Strategic Planning (iii) Sustainable Forest Management (iv) Adding value and opening markets/ opportunities for forests and biodiversity goods and services.	2012-13 to 2016-17 (Preparatory Phase)



1	2	3	4	5	6	7	8
2.	West Bengal Forestry and Biodiversity Conservation Project	West Bengal 18 <sup>th</sup> Oct., 2011	406	JICA	To improve forest ecosystem and conserve biodiversity by undertaking afforestation, regeneration and wildlife management activities through Joint Forest Management approach, including institutional capacity development, thereby contributing to environmental conservation and harmonized socio-economic development of West Bengal	(i) Afforestation (ii) Biodiversity Conservation (iii) Community Development (iv) Institutional Capacity Development	2011-12 to 2019-20 (Preparatory Phase)
3.	Rajasthan Forestry and Biodiversity Project (Phase-II)	Rajasthan 22 <sup>nd</sup> Dec., 2010	1152	JICA	To enhance forest area and livelihood opportunities of the forest dependent people and to conserve biodiversity by undertaking afforestation and biodiversity conservation measures through JFM approach, thereby contributing to environmental conservation and socio-economic development of Rajasthan.	(i) Afforestation (ii) Agro Forestry (iii) Water conservation Structures (iv) Biodiversity Conservation (v) Community Mobilization (vi) Poverty Alleviation and Livelihood Improvement (vii) Capacity Building, Training & Research (viii) Monitoring and Evaluation (ix) Consulting Services	2011-12 to 2018-19 (Preparatory Phase)



1	2	3	4	5	6	7	8
4.	Tamil Nadu Biodiversity Conservation and Greening Project	Tamil Nadu 20 <sup>th</sup> Sept., 2010	686	JICA	To strengthen biodiversity conservation by improving ecosystem and the management capacity as well as undertaking tree planting outside the recorded forest areas, thereby contributing to environmental conservation and harmonized socio-economic development of Tamil Nadu	(i) Biodiversity Conservation (ii) Increasing the Natural Resources base (iii) Institutional Capacity Development (iv) Consulting Services	2011-12 to 2018-19 (Preparatory Phase)
5.	Sikkim Biodiversity Conservation and Forest Management Project	Sikkim 22 <sup>nd</sup> Jan., 2010	330	JICA	To strengthen biodiversity conservation activities and forest management capacity, and improve livelihood for local people who are dependent on forests by promoting sustainable biodiversity conservation, afforestation and income generation activities including eco-tourism for the community development, thereby contributing environment conservation and harmonized socio-economic development of Sikkim.	(i) Forest and biodiversity conservation (ii) Eco –tourism (iii) Joint Forests Management (iv) Supporting Activities (v) Consulting Services	2010-11 to 2019-20 (Implementation Phase)



1	2	3	4	5	6	7	8
6.	Capacity Development for Forest Management and Training of Personnel	Central Sector Project 13 <sup>th</sup> June, 2008	225	JICA	To improve training environment for frontline staff through the rehabilitation of States Forest Training Institutes and through capacity building of frontline forestry staff putting emphasis on Joint Forest Management (JFM), thereby strengthening human resource development for sustainable forest management	(i) To improve training environment for frontline staff through the rehabilitation of States (ii) Forests Training Institutes and through capacity building of frontline forestry staff putting emphasis on Joint Forests Management (JFM), thereby strengthening human resource development for sustainable forest Management.	2008-09 to 2013-14 (5 years and 3 months) (Closing Phase)
7.	Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project	Uttar Pradesh 6 <sup>th</sup> Nov., 2007	575	JICA	To restore degraded forests, to augment forest resources and to improve livelihood and empower the local people who are dependent on forest by promoting sustainable forests management including JFM plantation and community development, thereby improving environment and alleviating poverty	(i) Plantations, regeneration of forests, etc. (ii) Institutional Strengthening of PMU/DMUs/FMUs (iii) Rehabilitation of Forest Training Institute at Lucknow. (iv) Communication and Publication. (v) Monitoring and Evaluation. (vi) Physical Contingency (vii) Consulting Services	2008-09 to 2015-16 (Implementation Phase)



1	2	3	4	5	6	7	8
8.	Gujarat Forestry Development Project – Phase II	Gujarat 16 <sup>th</sup> Nov., 2006	830	JICA	To restore degraded forests and improve the livelihoods for and empower the local people who are dependent on forests by promoting sustainable forest management including JFM plantation and community/ tribal development, thereby improving environment and alleviating poverty.	<ul style="list-style-type: none"> <li>(i) Preparatory works</li> <li>(ii) Departmental Forest Development and Management</li> <li>(iii) JFM Forest Development and Management</li> <li>(iv) Social Forestry Development and Management</li> <li>(v) Forest Research</li> <li>(vi) Communication and Publication</li> <li>(vii) Wildlife Conservation and Management</li> <li>(viii) Monitoring and Evaluation</li> <li>(ix) Phase-out works</li> <li>(x) Consulting Services (including price and physical cont.</li> </ul>	2007-08 to 2014-15 (Implementation Phase)



1	2	3	4	5	6	7	8
9.	Tripura Forest Environmental Improvement and Poverty Alleviation Project	Tripura 5 <sup>th</sup> Dec., 2006	460	JICA	To restore degraded forests and improve the livelihood aspects of villagers, including tribal families engaged in traditional shifting cultivation, and promoting sustainable forest management through JFM, thereby improving environment and alleviating poverty	<ul style="list-style-type: none"> <li>(i) Preparatory Works.</li> <li>(ii) Strengthening of implementing organisation.</li> <li>(iii) Training for implementing organization.</li> <li>(iv) Special package for 16 regrouped villages of shifting cultivators.</li> <li>(v) JFM community Development.</li> <li>(vi) Forest rehabilitation through JFM.</li> <li>(vii) Farm forestry development.</li> <li>(viii) NTFP centre for excellence.</li> <li>(ix) Biodiversity conservation</li> <li>(x) Monitoring and Evaluation</li> <li>(xi) Consulting Services</li> </ul>	2007-08 to 2014-15 (Implementation Phase)



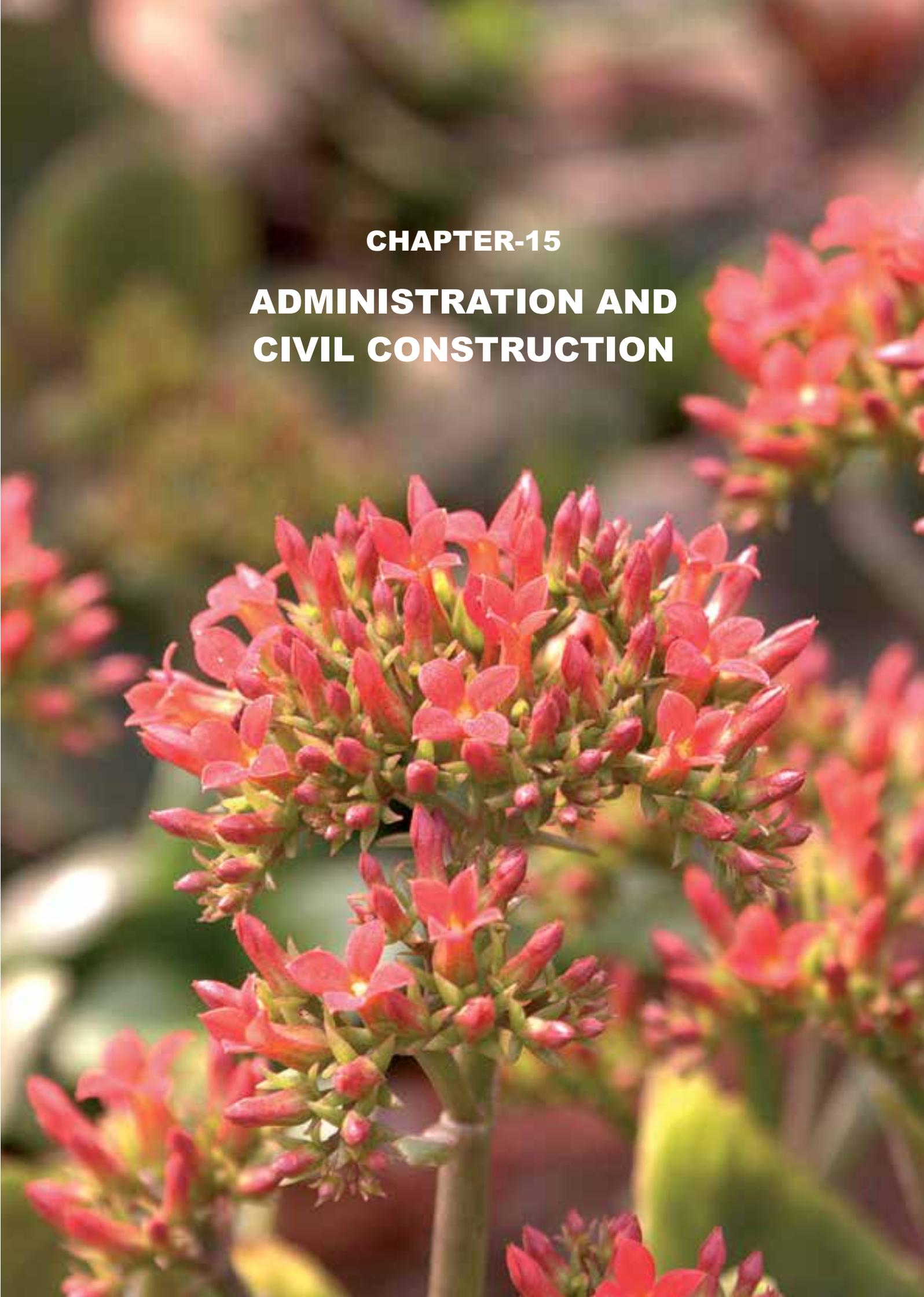
1	2	3	4	5	6	7	8
10.	Swan River Integrated Watershed Management Project	Himachal Pradesh 2 <sup>nd</sup> Dec., 2005	162	JICA	To regenerate the forests, protect the agricultural land, and enhance agricultural and forestry production in the catchment area of the Swan River, Himachal Pradesh State, by carrying out the integrated watershed management activities including afforestation, civil works for soil and river management, soil protection and land reclamation, and livelihood improvement activities, thereby improving living conditions of people including the poor in the catchment area.	(i) Afforestation (ii) Civil Work for Soil & River Management (iii) Soil Protection & Land Reclamation (iv) Livelihood Improvement (v) Institutional Development	2006-07 to 2013-14 (Closing Phase)
11.	Odisha Forestry Sector Development Project	Odisha 26 <sup>th</sup> Nov., 2005	660	JICA	To restore degraded forests and improve the income level of villagers by promoting sustainable forest management including JFM plantation and Community/tribal development, thereby improving environment and alleviating poverty.	(i) Protection and Conservation of Biodiversity of forests (ii) Improving productivity of natural forests. (iii) Providing livelihood options for the people (Support to VSS) (iv) Eco-development and ecotourism activities (v) Catering to commercial and industrial demands. (vi) Capacity building of the Forest Department.	2006-07 to 2012-13 (Closing Phase)



1	2	3	4	5	6	7	8
12.	Karnataka Sustainable Forests Management & Bio-diversity Conservation Project.	Karnataka 5 <sup>th</sup> Nov., 2004	745	JICA	To restore forest to bring about ecological restoration and also to facilitate livelihood improvement of the inhabitants of the project villages by afforestation through Joint Forest Planning and Management (JFPM) in the State of Karnataka, which further contributes to reducing poverty and preserving biodiversity conservation of the area.	(i) Afforestation  (ii) Income Generation Activities for Poverty Alleviation  (iii) Biodiversity Conservation  (iv) Provision of Basic Infrastructure Support for Field work.  (v) Supporting Activities for Forest Management (Research and Training, Consultancy, and Enhancement of Geographic Information System (GIS) and Management Information System (MIS)	2005-06 to 2012-13  (Closing Phase)



1	2	3	4	5	6	7	8
13.	Tamil Nadu Afforestation project phase-II	Tamil Nadu 5 <sup>th</sup> Oct., 2004	567	JICA	To restore forests to bring about ecological restoration and also to facilitate livelihood improvement of the inhabitants of the project villages by afforestation through Joint Forest Management in the State of Tamil Nadu, which further contributes to reducing poverty in the area.	(i) Integrated Watershed Development (ii) Integrated Tribal Development (iii) Forestry Extension (iv) Urban Forestry (v) Capacity Building Research Support (vi) Human Resources Development (vii) Establishment of Modern Nurseries (viii) Improving the infrastructural facilities (ix) Administration (x) Monitoring and Evaluation	2005-06 to 2012-13  (Closing Phase)
14.	Integrated Natural Resources Management and Poverty Reduction Project in Haryana	Haryana 7 <sup>th</sup> Nov., 2003	286	JICA	A. To rehabilitate forest lands in an ecologically sustainable manner.  B. To improve the quality of life of the villagers and adjoining forests	(i) Soil and Water Conservation (ii) Plantation model and nursery development (iii) Poverty reduction and institution building (iv) Technical assistance (v) Supporting activities (vi) Administration Staff.	2004-05 to 2010-11  Project is under grace period (Closing Phase)
	<b>Total</b>		<b>7474</b>				



**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 conceived and created in the Ministry to function as a separate, distinct, centralized and confidential unit for the purpose for recruitment (through Direct Recruitment/ Deputation) as well as promotion under FCS (Flexible Complementing Scheme) in the Group 'A' Scientific posts of the Ministry (proper), its Regional Offices and all the Attached/Subordinate Offices having such posts.

### Recruitment

During the year three posts of Scientist 'C' were filled by way of Direct Recruitment in the Ministry (Proper).

### Extension of services of Scientists beyond superannuation

Two Scientists of this Ministry were granted extension of services beyond superannuation from 60 to 62 years.

### 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 1<sup>st</sup> 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.
- 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.

### Progress/Achievements during the year

- The IFS Cadre Management Division of the Ministry deals with the broad items of work relating to the Indian Forest Service.
- Direct Recruitment to the Indian 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](http://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.
- Seventy Six Direct Recruit Officers on the basis of IFS Examination, 2012 were included into the Service in different State Cadre, and are undergoing mandatory Training at IGNFA, Dehradun.
- Seventy nine IFS Probationers of 2011 Examination undergoing Mandatory training at Indira Gandhi National Forests Academy, Dehradun.

- Ninety Seven State Forest Service officers were included into the Indian Forest Service included into the Indian Forest Service under IFS (Appointment by Promotion) Regulations, during the year 2013.
- 22 IFS officers joined at various levels under the Central Staffing Scheme of the Ministry and 15 IFS officers joined under the Central Staffing Scheme of the Department of Personnel & Training.
- Cadre review of IFS of Chhattisgarh was notified after approval of Cadre Review Committee. Proposal for review of IFS cadre of Bihar and Punjab sent to DoPT for approval of Cadre Review Committee.
- Around 50 Court Cases pending in various Courts across the Country were liquidated.
- Around 300 Court Cases relating to the issues of Indian Forest Service are pending in various Tribunals / Courts all over the Country.
- For the first time, online system for filling up of the deputation posts under CSS was introduced.
- For the first time, distribution of vacancies for direct recruits of IFS Exam 2012 was successfully done through integrated software developed by DoPT.
- A Committee under the Chairmanship of Shri J.C. Kala, Director General of Forests (retired) was established to map Annual Recruitment Plan for Indian Forests Service for the next 20 years. The report of the Committee was received and follow up action on the same in consultation with the various stake holders is under process.



## Vigilance

The Vigilance Division is responsible for all vigilance/disciplinary matters relating to the Officers/staff of this Ministry, Indian Forest Service (IFS) officers, its attached and subordinate offices including autonomous organizations/Public Sector Undertakings (PSUs) and IFS officers posted in the State Governments. It functions under the direct control of Joint Secretary & Chief Vigilance Officer (CVO) with overall supervision by the Secretary, Environment & Forests.

The Vigilance Division is mandated to examine and process the disciplinary cases, appeals, reviews and memorials of Indian Forest Service Officers of all States/Union Territories, investigation of complaints, obtaining and maintenance/scrutinization of Annual Immovable Property Returns (APRs) and placing them in the public domain i.e. on the website of the Ministry.

Cases filed in Supreme Court, High Courts, various Benches of Central Administrative Tribunal and other Courts relating to disciplinary matters are also dealt with in the Vigilance Division. The prosecution cases initiated against IFS Officers by various States/Union Territories, as well as other Officers/Staff of the Ministry are also dealt with in Vigilance Division.

The Division requires frequent consultation with the Central Vigilance Commission (CVC), Union Public Service Commission (UPSC), Central Bureau of Investigation (CBI) and Department of Personnel & Training (DOPT) as per laid down rules/procedures.

During the year 2013-14, 14 disciplinary proceedings cases, 20 appeal cases and 6 prosecution cases were dealt with in the Vigilance Division. Court cases were pursued

in the respective Court/Central Administrative Tribunal (CAT) Benches and counter replies were filed in about five cases. 54 complaints were received during the year, of which 9 were finally disposed of after obtaining and considering the investigation reports. 37 numbers of applications/appeals were received under RTI Act and replies sent in all the matters.

About 1675 Annual Property Returns for the year 2012 (as on 01.01.2013) were received from Group 'A' & 'B' officers of the Ministry as well as autonomous/subordinate/statutory organisations under it. Whereas the APRs of Indian Administrative Service (IAS) and Central Secretariat Service (CSS) officers were sent to DOPT, the APRs of IFS officers were placed in public domain on the website of the Ministry.

Vigilance Awareness Week was observed in the Ministry during the period from 28<sup>th</sup> October to 2<sup>nd</sup> November, 2013. The theme for the year was "Promoting Good Governance-Positive Contribution of Vigilance", and a pledge was administered by the Secretary (E&F) to the officers & staff to bring about integrity and transparency in all spheres of activities and to work unstintingly towards eradication of corruption.

## Parliament

### Introduction

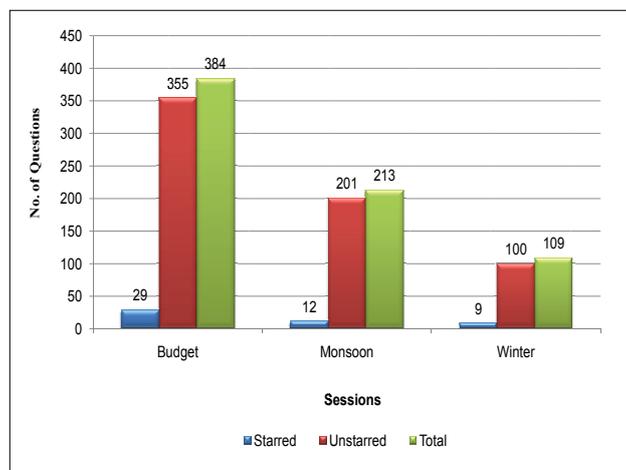
The Parliament Division in the Ministry is responsible for co-ordination of all parliament matters related to the Ministry of Environment and Forests. During the year 2013-14, a total number of 1103 Parliament Questions pertaining to various aspects of environment were answered by the Ministry (706 questions in the Lok Sabha, out of which 50 were starred and 656 were un-starred. A total of 397



questions were asked in the Rajya Sabha, out of which 47 were starred and 350 were unstarred). The questions covered a wide range of issues with which the Ministry is concerned, prominent among them being questions related to water and air Pollution, Wildlife Management, Forest Conservation, EIA, Freshwater and Marine Conservation, Environmental Conservation, Climate Change and Meteorology, Energy Studies, Environmental Education, NGOs and Media, Water Management, Health and Sanitation etc.

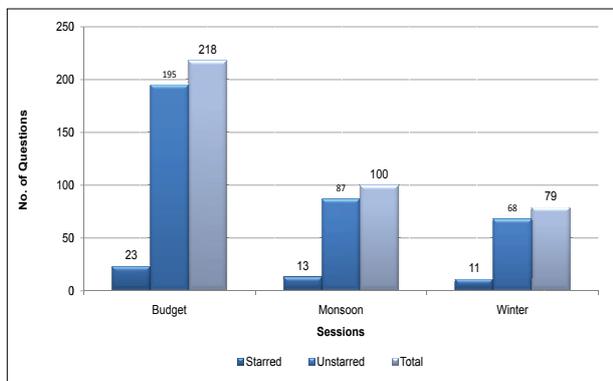
The ENVIS Centre at WWF-India, under ENVIS scheme of the Ministry compiles the above mentioned Parliament Questions as replied by MoEF and other Ministries pertaining to various environmental issues. Graphical representation of the Parliament Questions replied by the Ministry during 2013-14 both in Lok Sabha and Rajya Sabha in various Sessions are given in Fig-60 and Fig-61.

	Budget	Monsoon	Winter	Grand Total
Starred	29	12	9	50
Unstarred	355	201	100	656
<b>Total</b>	<b>384</b>	<b>213</b>	<b>109</b>	<b>706</b>



**Fig-60.** Number of questions replied by the Ministry in all sessions of Lok Sabha during 2013-2014

	Budget	Monsoon	Winter	Grand Total
Starred	23	13	11	47
Unstarred	195	87	68	350
<b>Total</b>	<b>218</b>	<b>100</b>	<b>79</b>	<b>397</b>



**Fig-61.** Number of questions replied by the Ministry in all sessions of Rajya Sabha during 2013-14

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 1093 and 612 respectively. After classification, the total no. of questions in both Lok Sabha and Rajya Sabha rises in comparison to the unclassified data, because of the fact that a single question can 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 2013-14 is given in Table-69 and Table-70.

The centre is currently working on the compendium of Environment in the Indian Parliament: An Analysis 2012 in collaboration with Parliament Section, MoEF. The preparation of the Trends & Analysis of the above-mentioned Parliamentary questions replied by the Ministry of Environment &

**Table-69.** Subject-wise depiction of questions replied by the Ministry in Lok Sabha during 2013-2014

Subjects	Budget	Monsoon	Winter	Grand Total
Agriculture	12	1	3	16
Alternative Technologies	9	9	4	22
Biosafety	9	2	2	13
Climate Change and Meteorology	24	18	11	53
Disaster Management	4	6	1	11
Energy Studies	14	11	6	31
Environment and Forest Trade	11	6	2	19
Environmental Conservation	39	19	11	69
Environmental Education, NGOs and Media	18	16	7	41
EIA	69	31	23	123
Forest Conservation	83	49	28	160
Freshwater and Marine Conservation	64	31	14	109
Health and Sanitation	15	6	2	23
Medicinal Plants	1	0	4	5
Pollution	109	64	30	203
Water Management	14	13	2	29
Wildlife Management	94	47	25	166
<b>Total</b>	<b>589</b>	<b>329</b>	<b>175</b>	<b>1093</b>

**Table-70.** Subject-wise depiction of questions replied by the Ministry in Rajya Sabha during 2013-2014

Subjects	Budget	Monsoon	Winter	Grand Total
Agriculture	12	1	2	15
Alternative Technologies	4	1	1	6
Biosafety	5	1	2	8
Climate Change and Meteorology	16	12	5	33
Disaster Management	0	5	4	9
Energy Studies	4	20	7	31
Environment and Forest Trade	5	2	0	7
Environmental Conservation	17	1	18	36
Environmental Education, NGOs and Media	8	12	4	24
EIA	34	7	16	57
Forest Conservation	39	24	25	88
Freshwater and Marine Conservation	31	12	14	57
Health and Sanitation	6	2	3	11
Medicinal Plants	2	3	1	6
Pollution	64	21	24	109
Water Management	7	2	3	12
Wildlife Management	63	27	13	103
<b>Total</b>	<b>317</b>	<b>153</b>	<b>142</b>	<b>612</b>



Forests and other Ministries related to Environment is available with the ENVIS Centre at WWF-India. Online accessibility is also there with the Centre's website: www.wwfenvis.nic.in.

The meetings of the Department related Parliamentary Standing Committee of Science and Technology, Environment and Forests were held eight times and deliberated over the demand for grants of 2013-14 and other issues like mitigation of pollution in various sector.

## Results-Framework Document (RFD), 2012-13

### Introduction

The Prime Minister approved the outline of a "Performance Monitoring and Evaluation System (PMES) for Government Departments" vide PMOI.D.No.1331721/PMO/2009-Pol dated 11.09.2009. Under PMES, each department is required to prepare a Results-Framework Document (RFD).

A 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, 2012-13**

The Performance Evaluation Report of RFD of the Ministry for 2012-13 is at Annexure-X. The Ministry achieved a composite score of 77.00 for the year 2012-13 which implies that most of the targets were largely achieved in 2012-13.

### **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



## Progress/Achievements made during 2013-14

- The IT infrastructure of the Ministry and Zoological Survey of India was strengthened.
- Unicode based bilingual software has been installed at Botanical Survey of India and Zoological Survey of India for bilingualisation of all computer systems.
- Photographic digitization of Economic Herbarium at Botanical Survey of India, Kolkata has been undertaken.
- Digitized and updated the Annual Property Returns (APR) of Indian Forest Service (IFS) Officers in the website of the Ministry for the year 2012-13.
- Coordination of 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 is being undertaken.
- Re-structuring and re-designing of the IFS Cadre Management System (IFSCMS) website in to .NET platform from the existing ASP platform.
- Examination of all policy issues pertaining to Information Technology.

## RTI Cell

- The Ministry received 2,938 applications and 325 appeals under RTI Act, 2005 during the year 2013-14 as per RTI-MIS software.
- Central Public Information Officers (CPIOs) and Appellate Authority (AAs) have been designated for effective implementation of RTI Act, 2005. The notification designating CPIOs/AAs is revised periodically as and when there

is change in allocation of work among CPIOs/AAs. All the subordinate offices/ Institutions/Autonomous bodies have been requested to periodically revise the Notification for CPIOs/AAs.

- A training programme for training of CPIOs/ AAs on direction of CIC was organised during June, 2013 in collaboration with ISTM.
- Directions from the Central Information Commission (CIC) and DoPT, relevant to this Ministry are being circulated to the CPIO/AAs for better understanding and implementation of RTI Act.
- Periodical reports being sent regularly to DoPT and Central Information Commission.

## Protocol Section

The Protocol Section deals with following activities:

- Providing comprehensive protocol arrangement for the Minister/Minister of State of Environment and Forests and Secretary (E&F) of this Ministry. This includes booking of passage, baggage handling, customs/ immigration/ security checks both at the time of Departure/ Arrival of Minister/Secretary as well as Security Passes for Airport and Reserved/ Ceremonial Lounge for MEF.
- To receive and see off foreign delegations VIPs who visits Paryavaran Bhawan to meet Minister/Minister of State/ Secretary.
- To handle issue/ revalidation of Diplomatic/ Official Passports and getting note verbal and arranging visas from Embassies.
- To arrange passes for Independence Day/ Republic Day for under Secretary and above officers of this Ministry,



- To arrange Domestic/ International ticketing of Minister/ Secretary (E&F)/ Special Secretary/DGF and various officers of the Ministry and payment of Bills thereof.
- Handling of work relating to Receptions at Rashtrapati Bhawan for VIPs upto Additional Secretary levels.
- Examining /Passing of canteen bills on hospitality of US & above officers, India Tourism Development Corporation (ITDC), Ashoka at IGI Airport, Parliament House (N.Rly Catering), Tea Board/Coffee Board and VIP Guests of Hon'ble Minister/Minister of State/ Secretary.
- Protocol division provided 746 Air tickets for domestic & International Sectors and arranged visas & visa notes for various countries during the period.

### 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. One of the major initiatives/activities of the Division during the year 2013-2014 was the completion of construction of Ministry's own office building 'Indira Paryavaran Bhawan' at Aliganj, Jorbagh Road, New Delhi through CPWD. The GA Division, working in tandem with Central Public Works Department (CPWD) and various other agencies involved in the project to complete the building. The building was inaugurated on 25.02.2014. The building has been constructed to conform to the stringent green building parameters of Five Star GRIHA Rating of

Ministry of New and Renewable Energy and LEED Platinum Rating of Indian Green Building Council. The building also incorporates various innovative systems like :

- Net Zero Energy building
- 100% on site power generation
- Geothermal heat exchange for water cooling towers
- Chilled beam system for HVAC
- High efficiency terrace mounted solar panels to meet its total energy demand
- Automated car parking to optimise space utilisation + Net Zero surface parking
- Low energy EM technology for bio digestion of organic waste
- Regenerative lifts
- Solar passive design to minimise indoor heat ingress and maximise natural light
- Grass paver blocks to enable ground water recharge.

### 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. Shri Anil Sant, 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:

#### **Shri Anil Sant**

Joint Secretary (PG)  
R. No. P111 (1<sup>st</sup> Floor),  
Indira Paryavaran Bhawan,  
Jor Bagh, New Delhi-110003

The PG Cell receives grievance in two modes namely through Centralized



**Fig-62.** New Office Building of the Ministry at Jorbagh Road, New Delhi

Public Grievance Redress and Monitoring System (cpgrams) portal of Department of Administrative Reforms and Public Grievances (DARPG) and directly by post from the public. The grievances received online through portal are directly sent online to the various sections/divisions of this Ministry for disposal and the grievance received through post.

To run the Centralized Public Grievance portal the 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 Operationalisation 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 concerned authorities such as District

magistrates, Municipal Corporations, Pollution Control Boards, State Governments, etc. Most of complains related to:

- Unauthorized industries located in residential areas discharging harmful gases and hazardous effluents in the immediate neighborhood:
- Environmental degradation due to mismanagement of civic amenities like location of waste dump, water logging etc.
- Poor maintenance of open area and parks; and
- Commercial establishments operating illegally in the residential buildings causing nuisance to people living in the immediate vicinity.
- Non-settlement of payment of salary dues and retirement dues, benefits like pension etc. to staff.

As on 6<sup>th</sup> June, 2014, out of total 3066 public grievance, 1261 have been disposed



off and 1809 grievances remain pending for disposal. The rate of disposal is 41%. Efforts are however, being made by the PG Cell to raise the disposal rate to about 70-75% by issuing periodical reminders to the concerned Divisions/Sections for settlement/disposal of pending grievances.

## **Implementation of Official Language Policy**

### **Introduction**

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**

The meetings of Official Language Implementation Committee were organised in every quarter under the Chairmanship of Joint Secretary (AS), 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 in every quarter 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 G.B. Pant Himalayan Institute of Environment and development and NRCD. In addition to these inspections, some 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.

### **Hindi Fortnight**

Hindi Fortnight was organised from 12<sup>th</sup> to 27<sup>th</sup> September, 2013 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 in these competitions.

### **Civil Construction Unit (CCU)**

Civil Construction Unit (CCU), headed by Chief Engineer (Civil), was set up in the Ministry of Environment & Forests in August 1987 for taking up important works of the Ministry on priority basis, in pursuance of the Government of India decision that major scientific departments with a substantial annual civil works budget should have a Civil Construction Unit. The technical posts of CCU are manned by officers drawn from Central Public Works Department (CPWD).

The works being taken up by CCU consist of construction of office-cum- laboratory buildings, herbariums, national museums of natural history, staff quarters and other building works relating to various units of the Ministry of Environment & Forests viz. Botanical Survey of India, Zoological Survey of India, National Museum of Natural History, State Forest Service Colleges, Indira Gandhi

**Table-71.** Budget allocation and progress of expenditure during 2012-13

(Amount in lakhs of Rupees)

Name of the Object Head	B.E. 2013-14	RE 2013-14	Expenditure upto previous month	Expenditure during 01/03/2014 to 30/03/2014	Progressive Expenditure	Percentage of Column No. 3
1	2	3	4	5	6	7
<b>A. Capital Outlay on Forestry &amp; Wildlife</b>						
MAJOR HEAD "4406" (PLAN)						
1. SFSC	0	0	0	0	0	0
2. IGNFA	0	0	0	0	0	0
3. FSI	0	0	0	0	0	0
4. RO	50.00	50.00	50.00	0.00	50.00	100.00
5. NZP	600.00	500.00	207.75	43.88	251.64	50.33
<b>Total (A) Major Head "4406"</b>	<b>650.00</b>	<b>550.00</b>	<b>257.75</b>	<b>43.88</b>	<b>301.64</b>	<b>54.84</b>
<b>B. Capital Outlay on Ecology &amp; Environment</b>						
MAJOR HEAD "5425" (PLAN)						
1. BSI	375.00	309.00	309.00	0.00	309.00	100.00
2. BGIR	125.00	67.00	67.00	0.00	67.00	100.00
3. ZSI	300.00	237.00	237.00	0.00	237.00	100.00
4. NMNH	900.00	450.00	452.32	0.00	452.32	100.52
5. New MoEF Building at Jorbagh	3912.00	2300.00	2300.00	0.00	2300.00	100.00
<b>Total (B) Major Head "5425"</b>	<b>5612.00</b>	<b>3363.00</b>	<b>3365.31</b>	<b>0.00</b>	<b>3365.31</b>	<b>100.07</b>
<b>Total (A+B) Capital Plan</b>	<b>6262.00</b>	<b>3913.00</b>	<b>3623.07</b>	<b>43.88</b>	<b>3666.95</b>	<b>93.71</b>
<b>(C) (Non Plan) Civil Engineering Wing</b>	<b>545.00</b>	<b>545.00</b>	<b>533.35</b>	<b>7.65</b>	<b>541.01</b>	<b>99.27</b>



National Forest Academy, Forest Survey of India, National Zoological Park, New Delhi and Regional Offices of Ministry located in different part of the Country.

Besides above, construction of offices, staff quarters and herbariums, etc. in respect of autonomous institutes viz. Indian Council of Forestry Research & Education (ICFRE), G.B. Pant Institute of Himalayan Environment & Development, Indian Institute of Forest Management, Indian Plywood Industries Research and Training Institute, Institute of Wood Science and Technology, Central Zoo Authority are also executed by CCU. The CCU has three field divisions with subdivisions at Delhi, Dehradun, Almora, Sawai Madhopur, Bengaluru, Bhopal, Coimbatore and Hyderabad for execution of various works. 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 is 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 selected areas. 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) are being used in place of conventional fluorescent lights in houses and guest houses. Important buildings are also being designed on solar passive architecture.

**CHAPTER-16**  
**PLAN COORDINATION**  
**AND BUDGET**





## Plan Coordination Division

### Introduction

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 reports and reports under the 20-Point Programme (Point XV item Nos. 52 & 53).

### Activities undertaken during year 2012-13

The progress of the programmatic variegated 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.

From 2012-13 onwards, the Ministry has rationalized eight CSS of the Eleventh Five Year Plan (2007-2012) to five in the Twelfth Five Year Plan (2012-17) by suitable merger/clubbing, thereby reducing the total number of thematic/ umbrella schemes from 22 to 18, comprising of five CSS and 13 CS Schemes, including one on Climate Change which has been approved by the Planning Commission. The details are given in Table-72. Amongst sub-Schemes, the Schemes of Industrial Pollution Abatement through Preventive Strategies and

Clean Technologies have been merged into a single scheme under the thematic scheme of Pollution Abatement. Similarly, the schemes of NLCP and Wetlands have been merged into a single scheme on "National Plan for Conservation of Aquatic Eco-Systems" (NPCA) under the thematic scheme of "Conservation of Natural Resources & Eco Systems". The Scheme of Taj Protection has also been clubbed under this thematic Scheme. Under the thematic Scheme of International Cooperation Activities, a new sub-Scheme on Desertification Cell has been added. The Civil Construction Unit Scheme is a non-Plan Scheme and has been shown to account for Plan expenditure on construction of New Building of the Ministry (Indira Paryavaran Bhavan), which is likely to be completed by June 2014.

New Initiatives in the Twelfth Plan include:

- Recasting the Scheme of Common Effluent Treatment Plant (CETPs)
- Enhancement of Sewage Treatment Capacity
- National Plan for Conservation of Aquatic Eco Systems (NPCA)
- National Environmental Monitoring Programme
- National Forestry Information System
- Invasive Species Management
- Coastal and Marine Conservation
- Valuation of Ecosystem Services and Biodiversity
- Environmental Performance Index
- Rangeland and Silvi Pasture Development Scheme
- Satellite-based Forest Resource Assessment
- Green India Mission.

**Table-72.** Rationalization of Centrally Sponsored Schemes in the Twelfth Plan

Existing Composition of CSS XI Plan	Restructured composition XII Plan
<b>1. National River Conservation Plan</b> <ul style="list-style-type: none"> <li>• NRCB</li> <li>• NRCP</li> <li>• NGRBA</li> </ul>	<b>1. National River Conservation Plan</b> <ul style="list-style-type: none"> <li>• NRCB</li> <li>• NRCP</li> <li>• NGRBA</li> </ul>
<b>2. Conservation of Natural Resources and Eco-Systems</b> <ul style="list-style-type: none"> <li>• Conservation of Wetlands, Mangroves, Coral</li> <li>• NLCP</li> <li>• Biosphere Reserves</li> <li>• BCRLIP</li> </ul>	<b>2. Conservation of Natural Resources and Eco-Systems</b> <ul style="list-style-type: none"> <li>• National Plan for Conservation of Aquatic Eco-Systems (incl. NLCP and Wetlands)</li> <li>• Conservation of Mangroves, Coral</li> <li>• Biosphere Reserves</li> <li>• BCRLIP</li> <li>• Environmental Management in Heritage &amp; Tourist Centres incl. Taj Protection</li> </ul>
<b>3. Environmental Management in heritage &amp; Tourist Centres, incl. Taj Protection</b>	
<b>4. National Afforestation Programme</b>	<b>3. Afforestation &amp; Forest Management</b> <ul style="list-style-type: none"> <li>• National Afforestation Programme</li> <li>• Green India Mission</li> <li>• Intensification of Forest Management Scheme</li> </ul>
<b>5. Intensification of Forest Management Scheme</b>	
<b>6. Integrated Development of Wildlife Habitats</b>	<b>4. Wildlife Management</b> <ul style="list-style-type: none"> <li>• Integrated Development of Wildlife Habitats</li> <li>• Project Elephant</li> </ul>
<b>7. Project Elephant</b>	
<b>8. Project Tiger</b>	<b>5. Project Tiger</b>

### Eleventh Five Year Plan (2007-2012)

Ministry of Environment & Forests had an approved outlay of ₹10,000 crores for the Eleventh Five Year Plan, 2007-12. Within the Five Year Plan, the approved outlays and expenditure incurred in each of the five Annual Plans have been given sector-wise in Table-73. As may be seen, Annual Plan 2007-08 had an approved outlay of ₹1,351.00

crores against which the actual utilization amounted to ₹1,349.73 crores. In 2008-09, it was allocated an outlay of ₹ 1,500.00 crores, against which the actual utilization amounted to ₹1,483.02 crores. Annual Plan 2009-10 had an approved outlay of ₹1,880.00 crores, reduced at RE stage to ₹1,650.00 crores under economy instructions, against which the actual utilization amounted to ₹1,630.69 crores. Annual Plan 2010-11 had an approved outlay



**Table-73.** Sector-wise Summary of Eleventh Plan Outlays/ Actual Expenditure

(₹ crore)

Sector	Environment	NRCD#	Forests & Wildlife	NAEB@	Animal Welfare	Total
Period						
<b>XI Plan Approved Outlay</b>	<b>1,246.01</b>	<b>2,540.00</b>	<b>2,943.99</b>	<b>3,150.00</b>	<b>120.00</b>	<b>10,000.00</b>
2007-08						
Outlay	259.16	340.00	371.61	359.23	21.00	1351.00
Expenditure	224.22	320.94	361.73	422.05	20.79	1349.73
2008-09						
Outlay	261.38	340.00	475.00	398.62	25.00	1,500.00
Expenditure	240.42	326.12	520.87	370.71	24.90	1,483.02
2009-10						
Outlay	291.42	577.33	599.63	386.62	25.00	1,880.00*
Expenditure	253.03	426.69	572.00	354.97	24.00	1,630.69
2010-11						
Outlay	480.17	751.71	592.12	352.00	24.00	2,200.00
Expenditure	465.87	755.02	582.92	353.93	23.84	2,181.58
2011-12						
Outlay	621.21	751.71	573.08	330.00	24.00	2,300.00
Expenditure	465.42	421.94	579.84	334.92	23.32	1,825.44
<b>Total [2007-12]</b>						
<b>Outlay</b>	<b>1,913.34</b>	<b>2,760.75</b>	<b>2,611.44</b>	<b>1,826.47</b>	<b>119.00</b>	<b>9,231.00</b>
<b>Expenditure</b>	<b>1,648.72</b>	<b>2,250.71</b>	<b>2,617.36</b>	<b>1,836.58</b>	<b>116.85</b>	<b>8,470.46</b>

# Includes Schemes of National River Conservation Plan (NRCP) and National Plan for Conservation of Aquatic Eco Systems (NPCA).

@ Includes Schemes of National Afforestation & Eco-Development Board (NAEB), National Afforestation Programme (NAP), and Green India Mission (GIM).

\* Under Finance Ministry's economy instructions, RE 2009-10 was reduced to ₹ 1,650.00 crore.

of ₹ 2,200.00 crores, against which the actual utilization amounted to ₹2,181.58 crores. In the last year of the Eleventh Plan, the Annual Plan 2011-12 had an approved outlay of ₹2,300.00 crores, against which the actual expenditure amounted to ₹1825.44 crores.

### Twelfth Five Year Plan (2012-2017)

The Twelfth Plan Document, approved by the National Development Council (NDC) on 27<sup>th</sup> 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 crores, which works out to 0.41% of the Plan allocation across various Ministries/ Departments as against a share of 0.42% or ₹ 9231.00 crores in the Eleventh Plan. At current prices, the enhancement in this Ministry's Twelfth Plan



outlay over the Eleventh Plan outlay, however, works out to 109%.

Twelfth Plan has identified **13 Monitorable Socio-Economic targets** for this Ministry, which has been taken up for regular monitoring of progress made by the Ministry. These targets are as follows:

– **Environment and Climate Change**

- Assess and remediate 12 identified contaminated sites (hazardous chemicals and wastes) with potential for ground water contamination by 2017.
- Clean 80 per cent of critically polluted stretches in rivers by 2017 and 100 per cent by 2020.
- States to meet National Ambient Air Quality Standards (NAAQS) in urban areas by 2017.
- To reduce emission intensity of Gross Domestic Product (GDP) in line with the target of 20 to 25 per cent reduction over 2005 levels by 2020.

– **Forests and Livelihood**

- Greening 5 million ha under GIM including 1.5 m.ha. of degraded lands, afforestation and eco-restoration of 0.9 m.ha. of ecologically sensitive areas.
- Technology-based monitoring of forest cover, biodiversity and growing stock including change-monitoring on periodical basis through dedicated satellite by 2017 and establishment of open web-based National Forestry & Environmental Information system for research and public accessibility by 2015.
- Engagement of Village Green Guards/ Community Foresters for every Joint

Forest Management (JFM) village by 2016.

- Establish forestry seed bank in forest circles and Model Nursery in every district with information on public portal by 2014.

– **Wildlife, Ecotourism and Animal Welfare**

- Twenty per cent of veterinary professionals in the country will be trained in treating wildlife.
- Integrated Ecotourism District Plans covering 10 per cent of all potential Protected Areas (PAs) by 2017.
- Promoting participation of private sector, civil societies, NGOs and philanthropists in animal welfare.

– **Ecosystem and Biodiversity**

- Restore 0.1 mha. of wetlands/ inland lakes/ water bodies by 2017.
- Mapping and preparation of biodiversity management plans for deserts (both cold and arid), coastal areas, important coral zones, wetlands, mangroves and so on to be completed by 2017.

Besides, **14 Goals** have also been identified in the Plan Document, which would receive focus and special attention, *inter alia*, through the Annual Plans of the Ministry. These 14 Goals are set out below:

– **Environment**

- Epidemiological studies to assess improvement in health status due to better management of environment and ecology.
- Promotion and adoption of cleaner technology, strengthening and initiation of reforms in regulations,



**Fig-63.** Rain lily (*Zephyranthes sp.*) – grown in wild

policy making and enforcement institutions for environmental governance.

- Move towards cumulative and strategic Environmental Impact Assessment (EIA).
- Ensure ecological flows in all rivers by regulating abstractions so as to allow conservation of riverine ecosystems through developing a legal framework and management strategy for conservation of river basins.
- Promotion of recycling and reuse of treated sewage in urban projects such as sanitation, landscaping, central air conditioning and so on.
- **Forests and Livelihood**
  - Improve forest productivity, production and sustainable management of biodiversity (equity in access to benefit sharing with local people).
  - Restore and intensify forest-rangelands/ grazing-land management and establish community grazing land around forest fringe villages.

- Build capacity of Village Forest Committees/ Joint Forest Management Committees (JFMCs) for management of forest resources including ecotourism.
- Revive seed orchards and silviculture plots for various forest types of the country, as well as for enlisted species under Minor Forest Produce (MFP)/ Non Timber Forest Produce (NTFP), including genetic improvement, and establishment, of clonal orchards.
- **Wildlife, Ecotourism and Animal Welfare**
  - Reducing and managing human-wildlife conflict.
  - Commercialisation of permissible marine products rich in poly unsaturated fatty acids (PUFAs), vitamins and so on.
  - Promotion of ecotourism and participatory eco-development support livelihood of local population.
- **Ecosystem and Biodiversity**
  - Develop national targets and indicators related to biodiversity and support actions to strengthen implementation of Biological Diversity Act, 2002 and ensure bio-safety for economic and social development of local communities.
  - Assess coastal biodiversity resources, ensure sustainable management, restoration of mangroves, coral reefs and wetlands and support livelihood.

### Annual Plan 2013-14 and Annual Plan 2014-15

In the current financial year (2013-14), the second year of the Twelfth Five Year Plan,

**Table-74.** Sector-wise Summary of Twelfth Plan Outlays/ Actual Expenditure (as on 31<sup>st</sup> January 2014)

(₹ crore)

Sector	Environment	NRCD#	Forests & Wildlife	NAEB@	Animal Welfare	Total
Period						
<b>XII Plan Approved Outlay</b>	<b>3,802.00</b>	<b>4,273.00</b>	<b>4,818.80</b>	<b>4,780.00</b>	<b>200.20</b>	<b>17,874.00</b>
<b>2012-13</b>						
Outlay (BE)	580.42	771.80	606.09	446.49	25.20	2430.00
Actual Expenditure	388.13	421.02	577.81	224.08	25.09	1636.13
<b>2013-14</b>						
Outlay (BE)	614.37	619.80	719.14	451.49	25.20	2430
Outlay (RE)	431.10	530.26	580.31	300.93	7.40	1850
Expenditure as on 31.01.2014	349.59	505.79	553.35	285.62	5.73	1700.08
<b>2014-15</b>						
Outlay (BE)	678.01	632.79	713.11	432.89	23.20	2480.00

# 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)

the Ministry has been allocated an outlay of ₹ 2,430.00 crores which has subsequently been reduced at RE stage to ₹ 1,850.00 crores. The Annual Plan outlay of the Ministry for 2014-15, the third year of this Plan, is ₹ 2480.00 crore. The sectoral summary of the two Annual Plans is given in Table-74.

#### Other current important activities during 2013-14

Preparation of the Annual Plan 2014-15 was also done in respect of all Demands/ Appropriations controlled by the Ministry. This includes regular monitoring of physical and financial progress of the Annual Plan for 2013-14 against the targets set out therein.

Matters relating to State Plans were also taken up. Issues with regard to Special Component Plans, notably the Scheduled Caste Sub-Plan (SCSP), the Tribal Sub-Plan

(TSP) and the North Eastern Region (NER) Plan are also taken up in consultation with the Planning Commission and Ministry of Finance. All other references on environmental planning and issues referred to by Planning Commission to this Ministry were handled in the Plan Coordination Division.

The Division also took up furnishing of the Half-Yearly Progress Report on Point No. 15 [*Paryavaran Sanrakshan evam Van Vridhi* (Environment Protection and Afforestation)] of Revised 20-Point Programme 2006 to M/o Statistics & Programme Implementation as well as any matters referred to it by the Parliamentary Standing Committee on Time and Cost Overruns of projects. A half yearly Performance Review Meeting on Annual Plan 2013-14 was held in Planning Commission on 31<sup>st</sup> October 2013 where both physical and financial performances of all the Plan Schemes were reviewed.

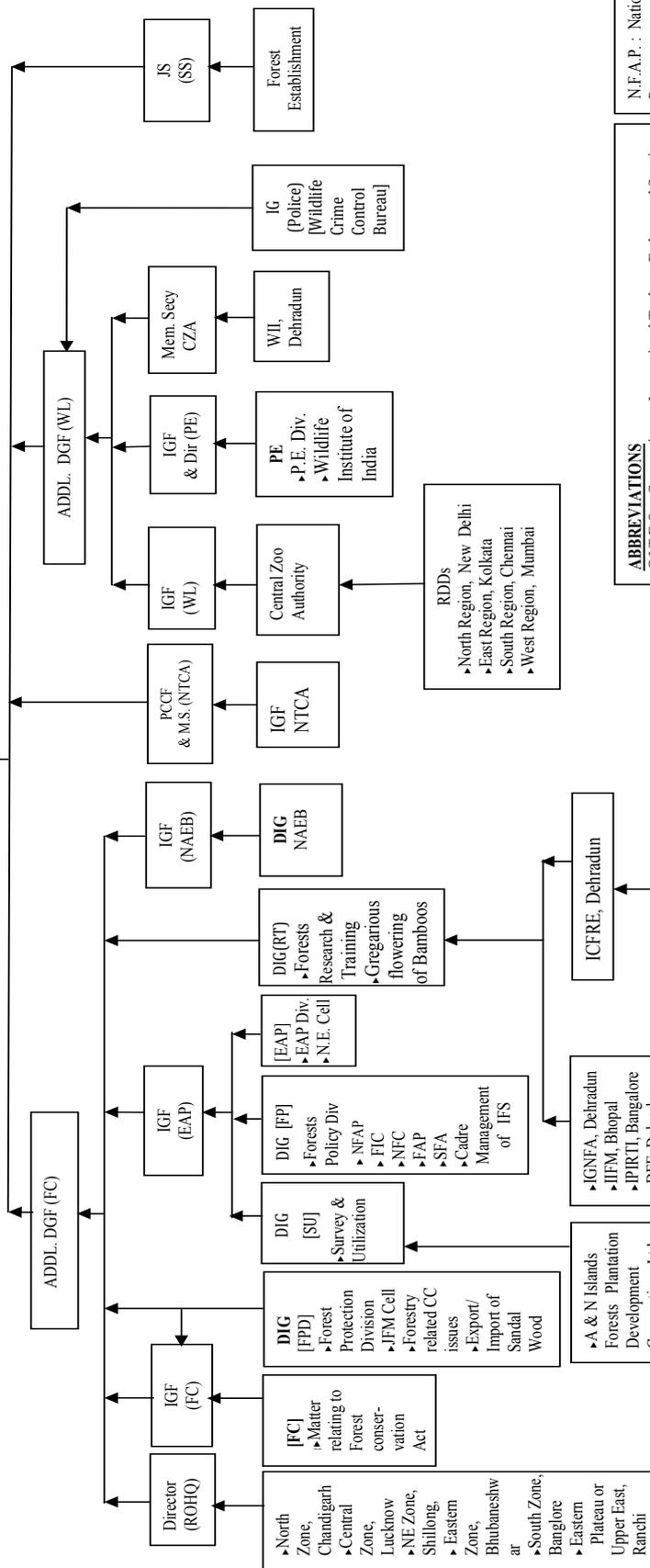


**ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT & FORESTS (DIVISIONS UNDER FORESTRY & WILDLIFE SECTOR)**

MINISTER FOR ENVIRONMENT & FORESTS

SECRETARY

DGF & SS



**ABBREVIATIONS**  
 C.I.T.E.S. : Convention on International Trade on Endangered Species  
 D.F.E. : Directorate of Forests Education  
 E.A.P. : Externally Aided Projects  
 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.F.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.Z.P. : National Zoological Park  
 P.E. : Project Elephants  
 P.T. : Project Tigers  
 R.O.s : Regional Offices  
 R.T. : Research & Training  
 S.U. : Survey & Utilization  
 W.H.C. : World Heritage Convention  
 W.I.I. : Wildlife Institute of India  
 W.L. : Wildlife



**Regional Offices of the Ministry of Environment & Forests**

<b>S. No.</b>	<b>Regional Office</b>	<b>Phone and Fax Number</b>	<b>Jurisdiction of the Regional Offices</b>
1.	Shri K.S Reddy, IFS Additional Principal Chief Conservator of Forest (Central), Ministry of Environment and Forests, Regional Office (SZ), Kendriya Sadan, IVth Floor, E&F Wings, 17th Main Road, 2nd Block, Koramangala, Bangalore-560034 (Karnataka) Email: roszef@yahoo.co.in	Ph. No. 080-25635901 Fax No. 080-25537184	Andhra Pradesh, Goa, Karnataka, Kerala, Lakshadweep, Puducherry and Tamil Nadu
2.	Shri J.K. Tewari, IFS Additional Principal Chief Conservator of Forest (Central), Ministry of Environment and Forests, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar-751023 Email: mef.or@nic.in	Ph. No. 0674-2301213 Fax No. 0674-2302432	Andaman & Nicobar Islands, Bihar, Jharkhand, Odisha and West Bengal
3.	Shri Lakhwinder Singh, IFS Additional Principal Chief Conservator of Forest (Central), Ministry of Environment and Forests, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal-462016 Email: rccfbhopal@gmail.com	Ph. No. 0755-2466525 Fax No. 0755-2463102	Chhattisgarh, Dadra & Nagar Haveli, Daman & Diu, Gujarat, , Madhya Pradesh and Maharashtra
4.	Shri A.K. Goyal, IFS, I/c Additional Principal Chief Conservator of Forest (Central), Ministry of Environment and Forests, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg, Chandigarh-160030 <a href="http://nromoef.gov.in">http://nromoef.gov.in</a> Email: nromoefchd@rediffmail.com	Ph No. 0172-2638135 Fax No. 0172-2638061	Chandigarh, Delhi Haryana, Himachal Pradesh, J&K and Punjab



S. No.	Regional Office	Phone and Fax Number	Jurisdiction of the Regional Offices
5.	Shri Azam Zaidi, IFS Additional Principal Chief Conservator of Forest (Central), Ministry of Environment and Forests, Regional Office (CZ), Kendriya Bhawan, 5th Floor, Sector "H", Aliganj, Lucknow-226020 <a href="http://moefrolko.org">http://moefrolko.org</a> Email: m_env@rediffmail.com	Ph. No. 0522-2326696 Fax No. 0522-2324340	Rajasthan, Uttarakhand and Uttar Pradesh
6.	Shri, Anil Kumar, IFS Additional Principal Chief Conservator of Forest (Central), Ministry of Environment and Forests, Regional Office (NEZ), Law-U-Sib, Lumbatngen, Near MTC Workshop, Shillong 793021 Email: moefshil_09@rediffmail.com	Ph. No. 0364-2537609 Fax No. 0364-2536041	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura



**Regional Centres of National Afforestation and Eco-Development Board**

<b>S. No.</b>	<b>Name &amp; Address of Regional Centre</b>	<b>State/UTs covered as per MOU</b>
1.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. B-1/9, Community Centre, Janakpuri, New Delhi-110058	Haryana, Rajasthan, Uttar Pradesh, Uttarakhand and UT of Delhi
2.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. Dhanraj Mahal, 1st Floor, CSM Marg, Mumbai-400001	Maharashtra, Gujarat, Goa and UTs of Daman & Diu, Dadar & Nagar Haveli
3.	Regional Centre for NAEB North Eastern Hill University, Shillong – 793 014	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura
4.	Regional Centre for NAEB University of Agricultural Sciences, GKVK Campus, Bengaluru-560065	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and UTs of Puducherry and Lakshadweep
5.	Regional Centre for NAEB Indian Institute of Forest Management, Nehru Nagar, Post Box no. 357, Bhopal-462003	Chhattisgarh, Madhya Pradesh and Orissa
6.	Regional Centre for NAEB Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan-173230	Himachal Pradesh, Jammu & Kashmir, Punjab and UT of Chandigarh
7.	Regional Centre for NAEB Jadavpur University, Kolkata-700032	Bihar, Jharkhand, Sikkim, West Bengal and UT of Andaman & Nicobar Islands



## Annexure-II C

**Centres of Excellence/Autonomous/Associated Agencies etc.  
of Ministry of Environment & Forests**

S. No.	Centres of Excellence	Contact Details
1.	Centre for Environment Education (CEE), Nehru Foundation for Development, Thaltej Tekra, Ahmedabad – 380 054	Tel : 079-26858002-05, 26844745 Fax : 91-079-26858010 email: cee@ceeindia.org
2.	C.P.R Environmental Education Centre (CPREEC), 1 A, Eldams Road, Chennai – 600 018, Tamil Nadu	Tel : 044-24346526, 24338470 Fax : 91-44-24320756 email: cpreec@vsnl.com
3.	Centre for Ecological Sciences (CES), Indian Institute of Science (IISc) Bengaluru – 560 012, Karnataka	Tel:080-23600985 Fax:080-23601428 email: chairman@ces.iisc.ernet.in
4.	Centre for Mining Environment (CME), Indian School of Mines, Dhanbad – 826 004, Jharkhand	Tel : 0326-2296624, 2202486 Fax : 0326-2296563, 2296624 email:cme@ismdhanbad.ac.in
5.	Salim Ali Centre for Ornithology and Natural History (SACON), Anaikatty, Coimbatore – 641 108	Tel: 0422-2657101-105, 2657086 Fax : 0422 2657088 email:centre@sacon.ernet.in
6.	Centre for Environmental Management of Degraded Ecosystems (CEMDE), School of Environmental Studies, University of Delhi, Delhi – 110 007	Telefax: 011-27666237, 27667125 email : crb26@hotmail.com
7.	Madras School of Economics (MSE), Gandhi Mandampam Road, Kottur, Chennai – 600 025, Tamil Nadu	Telefax: 044-22300304, 22354847 Fax. : 044-22352155 email: info@mse.ac.in, mse@envs.nic.in
8.	Foundation for Revitalization of Local Health Traditions (FRLHT), 74/2, Jarakbande Kaval, Yelahanka, Attur P.O., Bengaluru – 560106	Tel.: 080-28568007, 28568000 Extn 205, Fax.: 080-28567926 email : dk.ved@frlht.org
9.	Jawaharlal Nahru Tropical Botanic Garden and Research Institute (JNTBGRI), Pacha Palode, Thiruvananthapuram – 695562, Kerala	Tel : 0472 - 2869246 Fax : 0472-2869646 email: director_tbgri@rediffmail.com
10.	Centre for Animals and Environment, CARTMAN, Koramangala, 6th Block, Bengaluru – 560 095, Karnataka	Tel.: 080-25530121, 25530304 email: cartmanblr@hotmail.com
<b>Autonomous Agencies</b>		
<b>a) Environment Wing</b>		
1.	Central Pollution Control Board, Parivesh Bhawan CBD-cum-Office Complex, East Arjun Nagar, Delhi - 110 032	Tel : (011) 22308902, 22301932 Fax: (011) 22307233, 22304948 email: ccb.cpcb@nic.in



S. No.	Centres of Excellence	Contact Details
2.	Gobind Ballabh Pant Institute of Himalayan Environment and Development, Kosi - Katarmal, Almora - 263 643, Uttarakhand	Tel : 05962-241015 Fax : 05962-241014 email: psdir@gbpihed.nic.in
<b>b) Forest Wing</b>		
1.	Indian Institute of Forest Management, P.B. No. 357, Nehru Nagar, Bhopal - 462 003	Tel : (0755) 2775716, 2773799 Fax: (0755)2772878, 2775988 email:director@iifm.ac.in
2.	Indian Plywood Industries Research and Training Institute, P.B. No. 2273, Tumkur Road, Bengaluru - 560 022	Tel : (080) 8394231, 8394232/33 Fax : 91-80-8396361 email: contactus@ipirti.gov.in
3.	Indian Council of Forestry Research and Education P.O. New Forests Dehradun - 248 006	Tel : (0135) 2758614 Fax: (0135) 2755353 email: dg@icfre.org
<b>Research Institutes</b>		
1.	Forest Research Institute P.O. New Forests, Dehradun - 248 006	Tel : (0135) 2755277 Fax: (0135) 2756865 email : dir_fri@icfre.org
2.	Institute of Forest Genetics and Tree Breeding, Forest College Campus P.B. No.1061, R.S. Puram P.O. Coimbatore - 641 002	Tel : (0422) 2484100, 2484101 Fax : (0422) 2430549 email: dir_ifgtb@icfre.org
3.	Institute of Wood Science and Technology, 18th Cross, Malleswaram, Bengaluru - 560 003	Tel : (080) 22190102, 22190100 Fax : (080) 23340529 email:scjoshi@icfre.org
4.	Arid Forest Research Institute, P.O. Krishi Upaj Mandi, Basni, New Pali Road, Jodhpur – 342 005, Rajasthan	Tel: (0291) 2722549 Fax: (0291)2722764 email: dir_afri@icfre.org
5.	Tropical Forest Research Institute P.O. RFRC, Mandla Road, Jabalpur - 482 021 Madhya Pradesh	Tel : (0761) 2840482 Fax: (0761) 2840484 email: dir_tfri@icfre.org
6.	Rain Forest Research Institute 'Deovan' P.B. No. 136, A.T. Road (East) Jorhat - 785 001, Assam	Tel : (0376) 2350273/74 Fax: (0376) 2350274 email : dir_rfri@icfre.org
7.	Himalayan Forests Research Institute Conifer Campus, Panthaghathi, Shimla - 171 009, Himachal Pradesh	Tel : (0177) 2626778 Fax: (0177) 2626779 email : dir_hfri@icfre.org



S. No.	Centres of Excellence	Contact Details
8.	Institute of Forest Productivity Ranchi - 834 001, Jharkhand	Tel : (0651) 2948505, 2948515 email : dir_ifp@icfre.org
<b>Centres</b>		
9.	Centre for Social Forestry & Eco-rehabilitation Allahabad - 211 002, Uttar Pradesh	Tel : (0532) 2440795 email : head_csfre@icfre.org
10.	Centre for Forestry Research & Human Resource Development, Nagpur Road, Chhindwara-480001	Tel: (07162) 282444 Fax: (07162) 254473 email: head_cfrhrd@icfre.org
11.	Forest Research Centre Dulapally, Kakimpet (P.O.), Hyderabad-500014	Tel: 040-23194188 Fax: 040-23095926 email: head_frc@icfre.org
12.	Advanced Centre for Bamboo and Rattan Aizawl, Mizoram	Tel: 0389-2301159, 2301157 email : imtienla@icfre.org
<b>c) Wildlife Wing</b>		
1.	Wildlife Institute of India, P.B. No. 18, Chandrabani, Dehradun - 248 001, Uttarakhand	Tel: 0135-2640111-15 Fax: 0135-2640117 email : wii@wii.gov.in
2.	Central Zoo Authority Bikaner House, Annexe VI Shahjahan Road , New Delhi - 110011	Tel : 011-23381585 Fax : 011-23386012 email : cza@nic.in
<b>Subordinate Offices</b>		
<b>a) Environment Wing</b>		
1.	Botanical Survey of India CGO Complex, 3rd MSO Building, Block F, (5th & 6th floor) Sector 1, Salt Lake City, Kolkata – 700 064	Tel : 033-23346040/4963 Fax : 033-23215631, 23346040
2.	Zoological Survey of India Prani Vigyan Bhawan, M-Block, New Alipur, Kolkata - 700 053	Tel : (033) 24986820 Fax : (033) 24006893 email: venkyzsi50@yahoo.com
3.	National Museum of Natural History, FICCI Building, Barakhamba Road, New Delhi - 110 001	Tel : (011) 23314849 Fax : (011) 23314932 URL: www.nmnh.org
<b>Regional Centres of ZSI</b>		
1.	Zoological Survey of India North Eastern Regional Centre Fruit Garden, Risa Colony, Shillong - 793003, Meghalaya	Tel: 0364-2223638 Fax: 0364- 2226495 Email: zsishillong@rediffmail.com



S. No.	Centres of Excellence	Contact Details
2.	Zoological Survey of India, Western Regional Centre, Vidyanagar, Sector-29, PCNT Post, Rawet Road, Akurdi, Pune-411 044. Maharashtra.	Tel: 020-27655213/27651927 Fax: 020- 27652564 Email: wrszsi@dataone.in
3.	Zoological Survey of India Northern Regional Centre 218, Kaulagarh Road, Dehradun - 248195, Uttarakhand	Tel: 0135-2756349, 2754939, 2755279 Telefax: 0135 2758362 Email: zsisawal@sancharnet.in
4.	Zoological Survey of India Central Zone Regional Centre 168-169, Vijay Nagar Jabalpur, 482 002 Madhya Pradesh	Tel: 0761-2641792/2641421 Fax: 0761- 2641421 Email: zsicrs@dataone.in
5.	The Officer-in-Charge Zoological Survey of India Desert Regional Centre Jhalamand, Pali Road, Jodhpur - 342005	Tel: 0291 - 2728551, 2726213 Email: drczsi@gmail.com
6.	Zoological Survey of India Southern Regional Centre 130 Santhome High Road, Chennai 600 028,	Tel: 044-24642898, 24643255, 24643378 Email: srszsi@gmail.com
7.	Zoological Survey of India Arunachal Pradesh Regional Centre Senki Valley, Itanagar - 791113, Arunachal Pradesh	Tel: 0360 - 2203652, 2203689 Email: srideep@rediffmail.com
8.	Zoological Survey of India Gangetic Plains Regional Centre 11 - D, Rajendra Nagar, Patna - 800016, Bihar	Tel: 0612 - 2670686, 2664049 Email: gprszsipatna@rediffmail.com
9.	Zoological Survey of India Marine Aquarium & Research Center, Foreshore Road, Digha- 721428 East Midnapore, West Bengal.	Tel: 03220-266310,266311, 266312 Fax: 03220-266310 Email: marczsi@yahoo.co.in
10.	Zoological Survey of India High Altitude Regional Centre Saproon, Solan - 173211, Himachal Pradesh	Tel: 01792-221060, 225721, 220413, 224483 Fax - 01792-221060, Email: hazoology@dataone.in
11.	Zoological Survey of India Marine Biology Regional Centre 130, Santhome High Road, Chennai - 600 028.	Tel: 044 - 24642680/24643191 Fax: 044 - 24642680 Email: cvramanmbs@yahoo.com
12.	Zoological Survey of India 11, Horticulture Road, Haddo, Port Blair 744 102 Andaman & Nicobar Islands	Tel: 03192 230115/237582/233148 Fax: 03192 230115 Email: anrszsi@gmail.com



S. No.	Centres of Excellence	Contact Details
13.	Freshwater Biology Regional Centre Zoological Survey of India Plot No 366/1, Attapur (V), Near O/o DFO Flying Squad, Hyderguda (P.O.) Ring Road, Hyderabad - 500 048, Andhra Pradesh.	Tel: 040-2400 2251, 2400 2250 Email: fbszsihyd@yahoo.com
14.	Sunderbans Regional Centre Zoological Survey of India, Canning- 743 329, 24 Pargana(s) West Bengal	Tel: 03218-255211, 256721
15.	Zoological Survey of India Estuarine Biology Regional Centre Hilltop, Gopalpur-on-Sea, Ganjam District, Odisha -761002	Tel: 0680-2243995, 2243996 Fax: 0680- 2243996 Email: zsiestuary@rediffmail.com
16.	Zoological Survey of India Jafer Khan Colony, Eranhipalam (P.O), Kozhikode (Calicut) -673 006	Tel: 0495-2771929, 2771324 Fax: 0495-2771929 Email: zoolsurcalicut@dataone.in
<b>Regional Centres of BSI</b>		
1.	Botanical Survey of India, Central Regional Centre, 10 Chatham Lines, Allahabad - 211 002, Uttar Pradesh	Phone: (0532) 2441192 Fax No.: (0532) 2250179 2
2.	Botanical Survey of India, Northern Regional Centre, 192, Kaulagarh Road, Dehradun-248195, Uttarakhand.	Fax: (0135) 2757951 Phone: (0135) 2753433, 2755478 E-mail: bsinc2001@rediffmail.com
3.	Botanical Survey of India, Arid Zone Regional Centre, Near Khema Ka Kuan, Pal-Basni Canal Link Road, P.O. Nandan Van, Jodhpur- 342 008, Rajasthan.	Fax: (0291) 2741736 Phone: (0291) 2740415, 2747163 E-mail: bsi_azc@sancharnet.in
4.	Botanical Survey of India, Western Regional Centre 7, Koregaon Road, Pune-411 001	Tel/Fax: (020) 2612 4139 Phone: (020) 26122125, 26139512 E-mail: bsi_wcpune@vsnl.net
5.	Botanical Survey of India, Southern Regional Centre, T.N.A.U. Campus, Lawley Road, Coimbatore-641003, Tamil Nadu.	Phone:(0422)2432123, 2432788, 2432487 Fax:(0422) 2432835 E-mail: bsisc@md4.vsnl.net. in
6.	Botanical Survey of India, Eastern Regional Centre, Woodlands, Laitumkhrah, Shillong - 793 003, Meghalaya.	Fax: (0364) 2224119 Phone: (0364) 2223971 E-mail: bsi_ec@neline.com bsibsishll@yahoo.co.in



S. No.	Centres of Excellence	Contact Details
7.	Botanical Survey of India, Arunachal Field Station, Post Box No. 127, Sankie View, Itanagar - 791111, Arunachal Pradesh.	Phone: 2212405 Fax: (0360) 2211713 E-mail: bsiafs@yahoo.com, botsurvey@sancharnet.in
8.	Botanical Survey of India, Andaman & Nicobar Regional Centre. P.O. No.: 692, Haddo, Port Blair - 744102	Phone: (03192) 233224 Fax: (03192) 230120 E-mail: bsi_anc@rediffmail.com
9.	Botanical Survey of India, Sikkim Himalayan Regional Centre Below Rajbhawan Campus, P.O. - Rajbhawan, Gangtok - 737103, Sikkim.	Phone: (03592) 202789 Fax: (03592) 204717 E-mail: bsigangtok@hotmail.com bsigangtok@india.com
10.	Botanical Survey of India, Deccan Regional Centre, In Zoological Survey of India Campus, Plot No. 366/1, Attapur (v), Hyderguda (P.O.), Inner ring road, Hyderabad - 500 048, Andhra Pradesh.	Tel:(040)-2002 0666 Fax: (040) - 2400 2287 Email : bsi_deccancircle@rediffmail.com
<b>b) Forest Wing</b>		
1.	Forest Survey of India, Kaulagarh Road, P.O. IPE, Dehradun-248195, Uttarakhand	Telefax:(0135) 2756139, 2755037 email: akw1954@gmail.com URL: www.fsi.nic.in
2.	Indira Gandhi National Forest Academy P.O. New Forest, Dehradun - 248 006, Uttarakhand	Tel : (0135)2757316 Fax: (0135) 2757314 email: director@ignfa.gov.in
3.	Directorate of Forest Education P.O. New Forest, Dehradun - 248 006, Uttarakhand	Tel: 0135-2757326 Fax : 0135-2750125
<b>Regional Offices of Forest Survey of India</b>		
1.	Regional Director (Central Zone) Forest Survey of India, Central Zone C.G.O. Complex, Block 'A', Ground Floor, East Wing, Seminary Hills, Nagpur-440006	Tel : 0172-2510194 email: tejinder_84@rediffmail.com
2.	Regional Director (Eastern Zone) Forest Survey of India, 1B-198, Sec. 3, Salt Lake City, Kolkata - 700106	Telfax : 033-23355904 email: regdirez@hotmail.com
3.	Regional Director (Southern Zone) Forest Survey of India, 8th Floor, B-Wing, Kendriya Sadan, Koramangala, Bengaluru - 560034	Tel : 080-25520136 Fax : 080-25520136 email: fsisz@blr.vsnl.net.in



S. No.	Centres of Excellence	Contact Details
4.	Regional Director (North Zone) Forest Survey of India, North Zone, 1st Floor, Himlok Parisar, "Shivalik Khand", Batsley Longwood, Shimla - 171001, Himachal Pradesh	Tel : 0177-2658285 Fax : 0177-2655572, 2657517
<b>c) Wildlife Wing</b>		
1.	Director, National Zoological Park, Mathura Road, New Delhi - 110 003	Tel : (011) 24359825, 24358500 Fax : (011) 24352408
<b>Regional Offices</b>		
1.	Regional Dy. Director (SR) Wildlife Crime Control Bureau C2A, Rajaji Bhavan, Besant Nagar, Chennai-600 090.	Tel : 044-24916747 Fax: 044-24463477 email: rddwccbsr@nic.in
2.	Regional Dy. Director(ER) Wildlife Crime Control Bureau Nizam Palace, 2nd MSO Building, 6th Floor, A.J.C Bose Road, Kolkata-700020.	Telefax:033-22878698 email: wlper1234@dataone.in
3.	Regional Dy. Director(WR) Wildlife Crime Control Bureau 11, Air Cargo Complex, Sahar, Mumbai-400099.	Telefax:022-26828184 email: rddwr@vsnl.com
4.	Regional Dy. Director (CR) Wildlife Crime Control Bureau R.F.R.C, Mandla Road, T.F.R.I. Campus, Jabalpur-482021.	Telefax:0761-2840689 email: rddcr@yahoo.co.in
5.	Regional Dy. Director(NR) Wildlife Crime Control Bureau Bikaner House, Shahjahan Road, New Delhi-110 011.	Telefax:011-23384556 email: ddrwildlife@yahoo.co.in
<b>Public Sector Undertaking</b>		
6.	Andaman & Nicobar Islands Forests and Plantation Development Corporation Ltd. Van Vikas Bhawan, Port Blair, Andaman & Nicobar Islands.	Tel: 03192-232869 Fax: 03192-233254

**List of Projects Sanctioned during 2013-14****Environment Research Programme (EnvRP)**

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
1.	Dev Metal Oxides Based Advanced Oxidation Technology for Industrial Pollution Control	Dr. K. Byrappa, DOS in Geology, University of Mysore, Manasagangothri, Mysore-570 006.
2.	Sequential Production of Bio-diesel, Ethanol, Hydrogen and Methane as a "Biorefinary" Concept using Leather Solid Wastes and Effluent Treatment Sludges.	Dr. P. Shanmugam Scientist EII, Central Leather Research Institute, Adyar, Chennai-600 020.

**Ecosystem Research Programme (EcRP)**

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
1.	In vitro Multiplication and eco restoration of Habenaria Panchganiensis-Critically Endangered Orchid.	Dr. Nitin Manohar Dongarwar, Assistant Professor, Post Graduate Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, University Campus, Amravati Road, Nagpur-440033.
2.	Studies on Population structure, distribution pattern and regeneration potential of some lesser known commercially potent non-timber forest product yielding species in tropical west evergreen forests of Assam.	Dr. Roshan Sarmah Deptt. of Botany, Debraj Roy College, P.O. & District: Golaghat, Assam-785 621
3.	Assessment of Bryophytes diversity in Eastern Ghats	Dr. A.K. Asthana, Senior Scientist, National Botanical Research Institute, Lucknow-226001
4.	Fragmentation of humid subtropical broad leaved forest and its impact on plant diversity and ecosystem function in Meghalaya, Northeast India	Dr. Krishna Upadhaya, Asst. Prof, in Environmental Sciences, Deptt. of Basic Sciences And Social Sciences School Of Technology, North -Eastern Hill Univ. Shillong- 793 022
5.	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	Dr. Pawan Kumar, Scientist –C (Forrest Entomology), Himalayan Forest Research Institute, (Indian Council of Forestry Research & Education), Conifer Campus, Panthaghati, Shimla (H.P.)-



Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
6.	A study on appraisal of systematic and life history strategies of strepsipteran parasitoids (Insects: strepsiptera) with special emphasis on stylopisation of pests of rice agro ecosystem in West Bengal.	Dr. Niladri Hazra, Associate Professor, Department of Zoology, The University of Burdwan, P.O. Rajbati, City –Burdwan, Dist.Burdwan, W.B. -713104.
7.	Studies on the bryoflora of the Megamalai Hills on the Western Ghats and Kolli Hills on the Eastern Ghats of Tamil Nadu.	Dr. A.E. Dulip Daniels Associate Professor of Botany Bryology Laboratory Department of Botany & Research Centre Scott Christian College (Autonomous) Nagercoil – 629 003 Tamil Nadu.
8.	In-vitro conservation of Memecylon flavescens Gamble-an endangered taxon.	Dr. D.H. Tejavathi, Prof., Deptt. of Botany, Jnanabharathi, Bangalore Univ., Bangalore – 560056.
9.	A pilot study on the effects of forest fire and removal of leaf litter on the herbaceous vegetation, soil physic-chemical characteristics and hydrology in a sample reserve chir pine forest of Uttarakhand	Dr. Subodh Airi, G. B. Pant Institute of Himalayan Environment & Development, Kosi-Katarmal, Almora (UK)-263643
10.	Diversity and microhabitat utilization pattern of spiders in Satpuda landscape	Dr. Atul Keshavrao Bodhke, Assistant Professor, Department of Zoology, J D Patil Sangdkar Mahavidyalaya Daryapur, Distt. Amravati

### National Natural Resource Management System (NNRMS) Scheme

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
1.	To Develop a Management Information Systems of Wildlife Sanctuaries and National Parks- Arunachal Pradesh using Remote Sensing & GIS Technology (Phase-II)	Dr. G. Areendran, Head, Indira Gandhi Conservation Monitoring Center, WWF – India, 172-B Lodhi Estate, New Delhi- 110003
2.	Development of knowledge based decision tool to simulate mechanism of vegetation change due to climatic change in Western Himalayan Ecoregion (part of Uttarakhand) -a precursor to understanding responses to climate change and developing scenarios for adaptive'	Dr. P. K. Joshi, Department of Natural Resources TERI University, 10 Institutional Area, Vasant Kunj, New Delhi-110070



<b>Sl. No.</b>	<b>Title of the Project</b>	<b>Name of Principal Investigator (PI) &amp; Institute</b>
3.	Development of Biodiversity Spatial Data Infrastructure for Western Ghats, India	Dr. S. Narendra Prasad, Secretary, Open Source Geospatial- India, Lab for Spatial Informatics, International Institute of Information Technology, Gachibowli, Hyderabad-500032.
4.	'Application of Remote Sensing for Integrated Land use, Water and Energy Management in Rural Areas: Exploring Energy Plantation Opportunities'	Prof. Amit Garg & Prof. P. R. Shukla, Public Systems Group, Indian Institute of Management Ahmedabad, Vastrapur, Ahmedabad-380015



## Annexure-IV

## List of Projects completed during 2013-14

## Environment Research Programme (ERP)

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
1.	A Study of gene-environmental interaction in preterm delivery cases with special reference to organochlorine pesticide levels in the north Indian population.	Dr. B.D. Banerjee, University College of Medical Sciences & GTB Hospital, Dilshad Garden, Delhi-110095.
2.	An Assessment of Stabilizer: Bisphenol A in Leachates of Plastic Feeding Baby Bottles	Dr. V.P. Sharma, Development Toxicology Division, Indian Institute of Toxicology Research (CSIR), Post Box No.-80, MG Marg, Lucknow-226001.
3.	Bioconversion of cotton gin Waste to value-added Product.	Dr. (Mrs.) Krishna Pramanik, Department of Chemical Engineering, National Institute of Technology, Rourkela-769008 Orissa.
4.	Bryophytes-tool for National Multi-Elemental atmospheric survey of 100 years	Dr. Dinesh K. Saxena, Department of Botany, P.G. D. Environment Management, Bareilly College Bareilly, U.P.
5.	A process development for ameliorating alarming environmental and health hazards posed by phthalates in plastics via chemical, biochemical and bioremediation approaches.	Dr. S. Benjamin, Department of Botany, University of Calicut, Thenhipalam.
6.	Some Mathematical Model for pollutant uptakes in plants.	Dr. Arun Kumar, Department of Mathes, Govt. College Kota, Kota-324001 (Raj).
7.	Analysis of Surface and Groundwater pollution by Indiscriminate use of Agrochemicals (Pesticides) in selected Paddy, Cotton and Vegetable Growing Farms of India	Dr. Tanu Jindal, Amity Centre for Biocontrol and Plant Disease Management, Amity University campus, Block A, Expressway, Sector 125 Noida.
8.	Degradation of Organic Pollutants, colored dyes and pesticides in water Resources using polymer protected metal nanoparticles: A Nanotechnological approach	Dr. K. Pandian, Department of Inorganic Chemistry University of Madra, Guindy Campus, Chennai-600025, Tamil Nadu.
9.	Impact of Bottomm Trawling on infaunal communities of inshore waters of Parangipettai and Cuddalore	Dr. P. Murugesan, Centre of Advance Study in Marine Biology, Annamalai University Parangipettai – 608502 Tamilnadu.
10.	Occurrence and impact of endocrine disrupting substances in the chosen fin and shell fishes of southeast coast of India	Dr. P. Subramanian, Department of Animal Science, Bharathidasan University Tiruchirappalli – 620024.



Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
11.	Photocatalytic degradation of organic pollutants from industry wastes using heteropolytungstic acid-encapsulated nano-sized TiO <sub>2</sub> supported nanoporous materials.	Dr. S. Anandan, Department of Chemistry, National Institute of Technology, Tiruchirappalli -620015 (TN).
12.	Utilization and recycling of farm, industrial and urban solid wastes as eco-friendly approach for augmenting yield maximization in lectro delta region.	Dr. (Mrs.) A Sundari, Professor of Agronomy Faculty of Agriculture Annamalai University Annamalainagar – 6080021.
13.	Defluoridation of ground water using electrochemical coagulation technology.	Dr.S.Mahesh, Deptt.OfEnvironmentEngineering, S.J. College of Engineering, Mysore-570006.
14.	Phytoremediation using mangrove species for sustainable water quality in Uppanar estuary of Cuddalore district, Tamilnadu – A novel approach.	Dr. P.Mullai, Department of Technology, Annamalai University, Annamalai nagar-608002 (TN).
15.	GIS based groundwater modelling for seawater intrusion of Pondicherry coastal region.	Dr. R.Saravanan, Assistant Professor (Senior Grade) in Civil Engg, Centre for Water Resources, CEG, Anna University, Sardar Patel Road, Chennai-600025.
16.	Ecotoxicological Study of Engineered Oxide Nanoparticles: A Microcosm Approach.	Dr. Amitava Mukherjee, Senior Professor & Asst. Director, Centre for Nanobiotechnology, VIT – University Vellore – 632014 Tamil Nadu.
17.	Optimization and application of microbial formulation for removal of Toxic metals from effluents of small scale industries.	Dr.AnushreeMalik, Centre for Rural Development & Technology, IIT Delhi-110016.
18.	Impact of Natural Gas Flare on Growth and Yield Development in Rice	Dr. K.K. Baruah, Prof. & Head, Department of Environmental Science, Tezpur University, Tezpur-784028, Assam.
19.	Development of a low cost process for fluorides removal from fluoride contaminated of water specific to NE region for public use.	Dr. (Mrs.) Aradhna Goswami, Chemical Engineering Division, North East Institute of Science and Technology, Jorhat-785006, Assam.
20.	Impact assessment of continuous fertilization on heavy metals and microbial diversity in soils under long term fertilizer experiment.	Dr.Tapan Adhikari, Indian Institute of Soil Science, Nabibagh, Berasia Road, Bhopal-462038
21.	Study on macrofungal diversity in forest litter and screening their ligninolytic properties to explore the feasibility of using litter-decomposing fungi as bioremediants	Prof. Sujata Chaudhuri, Deptt. of Botany, University of Kalyani, Kalyani-741235, Dt. Nadia, West Bengal
22.	Effects of Elevated CO <sub>2</sub> and Temperature on some important plant diseases of India.	Dr. Rupam Kapoor Department of Botany, University of Delhi, Delhi-110 007.



Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
23.	Trace element analysis of Loktak lake and rivers draining into it and its impact on health	Dr. N. Ramuhon Singh, Department of Chemistry, Manipur University, Canchipur, Imphal-795003.
24.	Phytoremediation of Saline soils by a Novel Arbuscular Mycorrhiza- like Fungus for value addition and growth promotion of selected medicinal plants.	Dr. Amit C. Kharakwal, Amity Institute of Biotechnology, Amity University, Noida, UP.
25.	Seasonal influence of effluents released in Uyyakondan channel, on the ground water quality of Tiruchirappalli district, Tamilnadu and the management strategies.	Dr. J. Sirajudeen, Department of Chemistry, Jamal Mohamed College, Tiruchirappalli-620020, Tamilnadu.

### Ecosystem Research Programme (EcRP)

Sl. No.	Title of the project	Name of Principal Investigator (PI) & Institute
1.	Distribution and Conservation Strategy of an endangered ornamental fish species Chaca chaca (Ham.Buch) in Arunachal Pradesh.	Dr. Keshav Kumar Jha, Head, Deptt. Of Zoology, Jawahar Lal Nehru College, Pasighat, P.O. Hill Top, East Siang District-791 103, Arunachal Pradesh.
2.	Micromycete Diversity of North Western Himalayas Monographic Study and Screening for Lignocellulolytic Enzymes	Dr. I.B. Prasaher, Reader, Deptt. of Botany, Panjabi University, Chandigarh.
3.	"Impact of cell-phone technology on selected plants and animals"	Dr. R.K. Kohli, Professor, Centre for Environment and Vocational Studies, Punjab University, Chandigarh-160 014
4.	Diversity of Endophytic fungi in selected Medicinal Plants of Melghat Forest	Dr.M.K. Rai, Professor & Head, Deptt. of Biotechnology, Sant Gadgebaba Amravati University, Amravati-444602 (Mah.)
5.	Assessment of Biodiversity in Uttarakhand, Western Himalaya	Dr. Geeta Asthana, Reader, Deptt. Of Botany, University of Lucknow, Lucknow(UP)
6.	Dung specificity, Guild structure, seasonality and species composition of Dung beetles ( <i>Coleoptera: scarabaeinae</i> ) associated with the dung droppings of major mammals (elephants, Guar, wild board, deer and Macaque) and composition of Arboreal dung beetles in the wet and dry forests of Western ghats.	Sh. Sabu K. Thomas, Post Graduate, Research Deptt. of Zoology, St. Stephen's College, Devagiri, Calicut-673008, Kerala



Sl. No.	Title of the project	Name of Principal Investigator (PI) & Institute
7.	Biodiversity of Predatory Hemipteran Insects in southern Western Ghats and their utility in Biological Control	Dr. K. Sahayaraj, Deptt. of Advanced Zoology and Biotechnology, St. Xavier's College (Autonomous), Palayamkottai- 627 002 Tamil Nadu,

### National Natural Resource Management System (NNRMS) Programme

Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
1.	Geospatial Analysis of Climate Change in Different Agro-Climate Regions in Andhra Pradesh	Dr. Valli Manickam, Environment Area, Administrative Staff College of India, Hyderabad-500082, Andhra Pradesh
2.	An Integrated Environmental Analysis of Liddar Watershed using Satellite Remote Sensing and GIS : A Step Towards Sustainable Development	Dr. Shakil Ahmed Romshoo, Department of Geology & Geophysics, University of Kashmir, Hazratbal Srinagar, Kashmir – 190 006 (J&K).
3.	Impact Assessment, Monitoring and Management of Resources due to Changes in the IGNP Command Area using Remote Sensing	Dr. Sarvesh Palria, Department of Remote Sensing, Maharshi Dayanand Saraswati University, Pushkar By-Pass Road, Ajmer – 305 009 Rajasthan
4.	Assessment of Present Status of Ground Water Quality with reference to Drinking and Irrigation and Delineation of Ground Water Pollution Zones with Reference to Heavy Metals and trace elements in Gorakhpur and Maharajganj Districts of Uttar Pradesh, India.	Dr. S. Ravi Prakash, Uttar Pradesh Remote Sensing Applications Centre, Sector-G, Jankipuram Kursiroad, Lucknow-226021 (UP).
5.	Forests in Carbon Sequestration: Estimating Carbon sequestration Potential using Remote Sensing and GIS in Kerala, Western Ghats	Dr. P. V. Karunakaran, Natural Resource Management, Centre for Environment and Development, Thozhuvancode, Vattiyookavu, P.O. Thiruvananthapuram, Kerala-695013
6.	An Integrated Technique for Monitoring Desertification using Intelligent GIS	Dr. M. V. Khire, Centre of Studies in Resource Engineering, Indian Institute of Technology, Powai, Mumbai-40076, Maharashtra
7.	Biomass estimation of Teak forests using microwave Remote Sensing	Dr. S. Jayaseelan, Centre for Remote Sensing and Geo-Informatics, Sathyabama Institute of Science & Technology, Deemed University, Jeppiar Nagar, Old Mamallapuram Road, Chennai – 600 119 Tamil Nadu



Sl. No.	Title of the Project	Name of Principal Investigator (PI) & Institute
8.	'Monitoring of Coastal Environment with special reference to disaster mitigation using high resolution Satellite data and GIS'	Dr. A. Surendran, Centre for Remote Sensing and Geo-informatics, Sathyabama Institute of Science & Technology Jeppair Nagar, Old Mamallapuram Road, Chennai – 600 119 Tamil Nadu
9.	'Monitoring of Arsenic in Ground Water of Ballia District, Uttar Pradesh Using Remote Sensing and GIS Techniques'	Dr. Imran Ali, Department of Chemistry, Jamia Millia Islamia, New Delhi- 110025.
10.	Development of Forest Fire Management System for Shimla Forest Division in Himachal Pradesh (India) Using Geospatial Information System'	Dr. Laxmi Kant Sharma, Department of Remote Sensing, Birla Institute of Technology, Mesra- 835215, Ranchi Jharkhand
11.	'Impact of Joint Forest Management on Protection and Development of Forest in Rajpipla Division in Narmada District – An RS-GIS approach'	Dr. (Mrs.) Garge Sandhya Kiran, Department of Botany, M.S. University of Baroda, Vadodara – 390 001 Gujarat



## National River Conservation Plan States

	<b>NODAL DEPARTMENT</b>	<b>NODAL IMPLEMENTING AGENCY</b>
<b>1.</b>	<b>ANDHRA PRADESH</b>	
	Principal Secretary, Municipal Administration & U.D. Development, Govt. of Andhra Pradesh, A.P. Secretariat, Hyderabad-500 022 Tel+Fax- 040-23450622	Engineer-in Chief, Public Health Engg. Department, A.C.Guards, Hyderabad-500004 Phone: 040-23391208 Fax: 040-23393371
		Managing Director, Hyderabad Metropolitan Water Supply & Sewerage Board, Khairtabad, Hyderabad –500 004 Phone : 040-23442844 Fax: 23442855
<b>2.</b>	<b>BIHAR</b>	
	Secretary, Deptt. of Urban Development, Govt. of Bihar, Vikas Bhawan, Patna-800 015. Phone: 0612-2223580(O) Fax: 2223059	Managing Director, Bihar Urban Infrastructure Dev. Corp. (BUIDCO) 303, 3rd Floor , Maurya Tower, Maurya Lok Complex, Budh Marg, Patna, Bihar –800 001 Fax- 0612-2210103, 2210100
<b>3.</b>	<b>GOA</b>	
	Director/Joint Secretary, Deptt. Of Science, Technology & Environment, Govt of Goa, opp. Saligao Seminary, P.O-Saligao Bardez, Panaji-403 511 Tel./ Fax.- 0832-24152201(O)	
<b>4.</b>	<b>GUJARAT</b>	
	Principal Secretary, U.D. & Urban Housing Department, Sachivalaya, 9th floor, Block no-14 Gandhi Nagar, Gujarat-382 010 Phone : 079-23251001 Fax: 079-23251005	Municipal Commissioner, Ahmedabad Municipal Corporation, Ahmedabad-380 001 Phone : 079- 25352828 Fax : 079-25354638



	<b>NODAL DEPARTMENT</b>	<b>NODAL IMPLEMENTING AGENCY</b>
<b>5.</b>	<b>HARYANA</b>	
	Fin. Commissioner & Pr. Secretary, Public Health Engineering Deptt, Govt. of Haryana Civil Sectt., Chandigarh Tel./Fax.- 0172-2704453 (O)	Engineer-in-Chief Public Health Engineering Deptt, Govt. of Haryana Bay No. 13-18 Sector-4, Panchkula, Haryana Fax: 0172-2561673, 2560270 Tel. 0172-2561672
<b>6.</b>	<b>JHARKHAND</b>	
	Secretary, Deptt. Of Urban Development, Govt. of Jharkhand, Project Building, Dhurwa, 4th floor, Ranchi.-834004 Phone: 0651-2403961(O) Fax: 0651-2400966	
	Director Municipal Administration Govt of Jharkhand 3rd Floor, Project Building Dhurwa, Ranchi-834004 Fax- 0651-2400966/2400961	
<b>7.</b>	<b>KARNATAKA</b>	
	Principal Secretary (Env) Govt. of Karnataka Bengaluru	For Core Scheme: i) Chairman & Managing Director, Bangalore Water Supply & Drainage Board, KHB Complex, Cauvery Bhawan, K.G. Road, Bengaluru-560 009. Fax: 080-2217743(O)/6686855 (R) Phone: 080-2217743/2230080
		For Non-core Scheme: ii) Member Secretary, Kr S.P.C.B., 6, 7, 8 & 9 <sup>th</sup> floor, Public Utility Building, M.G. Road, Bangalore-560 001 Karnataka
<b>8.</b>	<b>KERALA</b>	
	Principal Secretary Water Resources (Irrigation) Deptt, Public Officer Building Government of Kerala, Thiruvananthapuram- 695033 Tel: 0471-2324394 Fax: 0471-2324394	The Managing Director Karnataka Urban Water Supply & Drainage Board, Jalbhavan 1 <sup>st</sup> stage, 1 <sup>st</sup> phase, BTM Layout, Bannerghatta Road, Bangalore -560029 Phone: 080-41106504 Fax: 080-26539206



	<b>NODAL DEPARTMENT</b>	<b>NODAL IMPLEMENTING AGENCY</b>
<b>9.</b>	<b>MADHYA PRADESH</b>	
	Chief Secretary, Govt. of Madhya Pradesh Bhopal	i) Member Secretary, M.P. Pollution Control Board, Paryavaran Parisar, E-5, Arera Colony, Bhopal-462 013 Phone: 0755-564428 Fax: 0755-2463742, 0755-2462136
	Principal Secretary, Housing and Environment Deptt. Govt. of Madhya Pradesh, Paryavaran Parisar, E-5, Arera Colony Bhopal-462016 Phone: 0755- 466859/2460189/2427004 Fax: 0755-2462136	ii) E-N-C, PHED, Govt. of M.P. Satpura Bhawan, Bhopal Phone: 2561260, 2566990
		iii) Executive Director, Environment Planning & Coordination Organization (EPCO) Paryavaran Bhawan, E-5, Area Colony, Bhopal-462016 Fax: 0755-2462136
<b>10.</b>	<b>MAHARASTRA</b>	
	Secretary, 15th Floor, New Admn Building, Environment Department, Govt. of Maharashtra, Mantralaya, Madam Cama Road, Mumbai-400 032 Phone: 022-22793132 Fax : 022-22813947	i) Member Secretary, Maharashtra Jeevan Pradhikaran (MJP) 4th floor, Express Tower, Nariman Point, Maharashtra Phone: 022-22025354(O) Fax: 022-22029348
		ii) Municipal Commissioner, Nasik Municipal Corporation Nasik, Maharashtra Phone: 0253-2578206(O) Fax: 2577936
<b>11.</b>	<b>NAGALAND</b>	
	Addl. Chief Secretary, Govt. of Nagaland, Kohima, Fax: 0370-2290470	Secretary, PHED Kohima
<b>12.</b>	<b>NCT DELHI</b>	
	Chief Secretary Govt. of NCT of Delhi Delhi Secretariat IP Estate, New Delhi-1100 02	Chief Execurtive Officer, Delhi Jal Board, Varunalaya Phase-II, Jhandewalan, Delhi-110 005. Phone: 23511658 Fax: 23516182



	<b>NODAL DEPARTMENT</b>	<b>NODAL IMPLEMENTING AGENCY</b>
	Principal Secretary(UD) cum Commissioner, Govt. of NCT of Delhi, Delhi Secretariat, IP Estate, New Delhi.-110 002 Phone: 23392167, Fax: 23392253	Additional Commissioner (Eng. DEMS&IT) Municipal Corporation of Delhi, I.P. Estate, New Delhi-110 002 Phone: 23370571,23379983(O) Fax: 23370965/23370281
	Secretary (Environment), Govt. of NCT of Delhi, Delhi Secretariat, IP Estate New Delhi. Fax: 23392034/23392102	Commissioner, Municipal Corporation of Delhi Town Hall Chandni Chowk, Delhi-110 006 Phone: 23961012, 23967315 Fax: 23965016/23392102
	Member Secretary, Central Pollution Control Borad, Parivesh Bhawan, East Arjun Nagar, CBD Shahadra, Delhi- 110032 Phone: 22307078( O)	Adviser (E&F) Planning Commission, Yojana Bhawan, New Delhi – 110 001. Phone: 23096536, 23096666/2300
	Chairman, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, CBD Shahadra, Delhi – 110 032 Phone: 22304948 (O)	
<b>13.</b>	<b>ODISHA</b>	
	Commissioner cum Secretary, Housing & Urban Development, Govt. of Odisha, Civil Secretariat Bhubaneswar-751 001 Phone: 2536903 Fax: 2394984	Member Secretary Odisha Water Supply and Sewerage Board, Satya Nagar, Bhubaneswar. Phone: 0674-2571185 (O) Fax: 2571348
<b>14.</b>	<b>PUNJAB</b>	
	Principal Secretary, Department of Local Govt. Govt. of Punjab, Punjab Civil Secretariat, Chandigarh	Managing Director, Punjab Water Supply & Sewerage Board, Plot I-B, Sector-27A, Madhya Marg, Chandigarh Phone : 0172- 2651164(O) Telefax : 0172: 2656526 E-mail : pwssbchd@hotmail.com
<b>15.</b>	<b>RAJASTHAN</b>	
	Secretary, Local Self Govt. Deptt., Govt. of Rajasthan, Secretariat, Jaipur-302005 Fax: 0141-2227744	(i) Chief Engineer (HQS) Public Health Engg. Department, Govt. of Rajasthan, F-18, New Building, 1st Floor, 2, Civil Lines, Jaipur-302006 Fax: 0141- 2222585 / 2220553



	<b>NODAL DEPARTMENT</b>	<b>NODAL IMPLEMENTING AGENCY</b>
		(ii) Secretary, Urban Improvement Trust, Near C.A.D. Circle, Kota, Rajasthan Fax: 0744-2500828
<b>16.</b>	<b>SIKKIM</b>	
	PCE-cum-Secretary, Govt. of Sikkim, Water Security & PHED, Nirman Bhawan, Gangtok-737101 Tele/Fax: 03592-202671	PCE-cum-Secretary, Govt. of Sikkim, Water Security & PHED, Nirman Bhawan, Gangtok-737101 Tele/Fax: 03592-202671
<b>17.</b>	<b>TAMIL NADU</b>	
		Member Secretary (EMAT), G F, Pangal Building, No.1 Jeenis Road, Saidapet, Chennai-600 015. Phone: 044-24336421(O) Fax: 044-24336594 (R)
		Managing Director, CMWSSB, No-1, Pumping Station Road, Chintadripet, Chennai-600 002 Phone: 044-28549000 Fax: 044-28419643
		Managing Director, TWAD Board No. 32, Kamarajar, Chepauk, Chennai-600 005 Phone: 044-25670491(O) Fax: 044-25679866
<b>18.</b>	<b>UTTAR PRADESH</b>	
	Principal Secretary, Department of Urban Development, Govt. of U.P., Babu Bhawan, Secretariat, Lucknow – 226 001 Phone: 0522-2237314(O) Fax: 0522-2235241	Managing Director, U.P. Jal Nigam, 6, Rana Pratap Marg, Lucknow (UP) Phone: 0522-2626497 Fax: 0522-2622389, 2626360
	Chief Secretary, Govt. of Uttar Pradesh Vidhan Bhawan, Lucknow, UP	
<b>19.</b>	<b>UTTARAKHAND</b>	
	Principal Secretary, (Peyjal) Govt. of Uttarakhand, Dehradun Secretariat, 4 Subhash Road, Uttaranchal Fax: 0135- 2712114/2712922	Managing Director Uttarakhand Peyjal Sansadhan Vikas Evam Nirman Nigam, 11, Mohini Road, Dehradun Phone: 0135-2676812 (O) Fax: 0135-2672337



	<b>NODAL DEPARTMENT</b>	<b>NODAL IMPLEMENTING AGENCY</b>
<b>20.</b>	<b>WEST BENGAL</b>	
	<b>For NRCP</b>	
	Principal Secretary to the Government of West Bengal, Department of Urban Development, Nagarayan Bhawan, DF-8, Sector-I, Salt Lake City, Kolkata, Fax: 033-23347880	Programme Director, SPMG, WB, Nagarayan Bhawan, DF-8, Sector-I, Salt Lake City, Kolkata, Fax: 033-23347880
		Chief Executive Officer, KMDA, Prashasan Bhawan, DD-I, Sector-I, Kolkata-700 064 Phone: 033-23597915/7988 Fax: 033-23597881/23593563
	<b>For CETP</b>	
	Principal Secretary, Department of Municipal Affairs, Writers Building, Kolkata-700001, Fax: 033-22143853	Special Secretary, Commerce & Industries Dept. Govt. of West Bengal, 4 Camac Street, Kolkata – 700 016 Fax: 033 – 22820790
<b>21.</b>	<b>JAMMU &amp; KASHMIR</b>	
	Secretary Housing & Urban Development Government of J&K, Srinagar	Vice Chairman, J&K Lakes and Waterways Authority Development, Wali's House, Braine, Nishant, Srinagar (J&K) Fax: 0194-2464015/16



## 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 <sup>MR</sup>	Manipur	23.03.90
22.	Sambhar Lake	Rajasthan	23.03.90
23.	Wular Lake	Jammu & Kashmir	23.03.90
24.	Chilika Lake	Odisha	01.10.81
25.	Keoladeo National Park <sup>MR</sup>	Rajasthan	01.10.81
26.	Nalsarovar	Gujarat	29.09.12

MR – Montreux Record

## Annexure-VI B

## List of Wetlands Identified under National Wetland Conservation Programme

Sl. No.	State/UT	No.	Name of Wetlands
1.	Andhra Pradesh	1.	Kolleru
2.	Assam	2.	Deepar Beel
		3.	Urpada Beel
		4.	Sone Beel
3.	Bihar	5.	Kabar
		6.	Barilla
		7.	Kusheshwar Asthan
4.	Gujarat	8.	Nalsarovar
		9.	Great Rann of Kachh
		10.	Thol Bird Sanctuary
		11.	Khijadiya Bird Sanctuary
		12.	Little Rann of Kachh
		13.	Pariej
		14.	Wadhvana
		15.	Nanikakrad
5.	Haryana	16.	Sultanpur
		17.	Bhindawas
6.	Himachal Pradesh	18.	Renuka
		19.	Pong Dam
		20.	Chandratal
		21.	Rewalsar
		22.	Khajjiar
7.	Jammu & Kashmir	23.	Wullar
		24.	Tso Morari
		25.	Tisgul Tso & Chisul Marshes
		26.	Hokersar
		27.	Mansar-Surinsar
		28.	Ranjitsagar
		29.	Pangong Tsar
		30.	Gharana
		31.	Hygam,
		32.	Mirgund
		33.	Shalbugh
		34.	Chushul & Hanley
8.	Jharkhand	35.	Udhwa
		36.	Tilaiya Dam
9.	Karnataka	37.	Magadhi



Sl. No.	State/UT	No.	Name of Wetlands
		38.	Gudavi Bird Sanctuary
		39.	Bonal
		40.	Hidkal & Ghataprabha
		41.	Heggeri
		42.	Ranganthittu
		43.	K.G. Koppa wetland
10.	Kerala	44.	Ashtamudi
		45.	Sasthamkotta
		46.	Kottuli
		47.	Kadulandi
		48.	Vembnad Kol
11.	Madhya Pradesh	49.	Barna
		50.	Yashwant Sagar
		51.	Wetland of Ken River
		52.	National Chambal Sanct.
		53.	Ghatigaon
		54.	Ratapani
		55.	Denwa Tawa wetland
		56.	Kanha Tiger Reserve
		57.	Pench Tiger Reserve
		58.	Sakhyasagar
		59.	Dihaila
		60.	Govindsagar
		61.	Sirpur
12.	Maharashtra	62.	Ujni
		63.	Jayakawadi
		64.	Nalganga wetland
13.	Manipur	65.	Loktak
14.	Mizoram	66.	Tamdil
		67.	Palak
15.	Orissa	68.	Chilka
		69.	Kuanria wetland
		70.	Kanjia wetland
		71.	Daha wetland
		72.	Anusupa
16.	Puducherry	73.	Ousteri lake
17.	Punjab	74.	Harike
		75.	Ropar
		76.	Kanjli
		77.	Nangal



Sl. No.	State/UT	No.	Name of Wetlands
18.	Rajasthan	78.	Sambhar
19.	Sikkim	79.	Khechuperi (Holy Lake)
		80.	Tamze Wetland
		81.	Tembao Wetland Complex
		82.	Phendang Wetland Complex
		83.	Gurudokmar Wetland
		84.	Tsomgo wetland
20.	Tamil Nadu	85.	Point Calimere
		86.	Kaliveli
		87.	Pallaikarni
21.	Tripura	88.	Rudrasagar
		89.	Gumti reservoir
22.	Uttar Prdaesh	90.	Nawabganj
		91.	Sandi
		92.	Lakh Bahoshi
		93.	Samaspur
		94.	Alwara Wetland
		95.	Semarai Lake
		96.	Nagaria lake
		97.	Keetham Lake
		98.	Shekha wetland
		99.	Saman Bird Sanctuary
		100.	Sarsai Nawar
		101.	Patna Bird Sanctuary
		102.	Chandotal
		103.	Tal Bhaghel
		104.	Taal Ganbhirvan & Taal Salona
		105.	Aadi jal Jeev Jheel
23.	Uttarakhand	106.	Ban Ganga Jhilmil Tal
		107.	Asan
24.	West Bengal	108.	East Calcutta Wetland
		109.	Sunder bans
		110.	Ahiron Beel
		111.	Rasik Beel
		112.	Santragachi
		113.	Patlakhawa- Rasomati
25	Meghalaya	114.	Umiam lake
26.	UT (Chandigarh)	115.	Sukhna



## The details of lake proposals sanctioned under National Lake Conservation Plan (NLCP)

S. No.	State	Lake	Date/year of sanction	Approved cost (cr.)
1.	Karnataka	3 lakes of Bangalore namely Vengaiakhkere, Nagavara and Jarganahalli	February, 2002	11.48
2.	-do-	Bellandur lake, Bangalore	January, 2003	5.54
3.	-do-	Kotekere lake, Belgaum	-do-	5.64
4.	-do-	Bhishma lake, Gadag	Sep, 2003	2.50
5.	-do-	Lal Bagh, Bangalore	Dec, 2003	1.66
6.	-do-	Channapatna lake, Hasan	2004-05	4.97
7.	-do-	Sharanbhasveshwara lake, Gulbarga	2004-05	4.89
8.	-do-	Akkamahadevi lake, Haveri	2004-05	2.64
9.	-do-	Kundawada lake, Davangere	2006-07	3.41
10.	-do-	Kote Tavarekere lake, Chikmagalur	2006-07	3.64
11.	-do-	Tripuranthkeshwar lake, Bidar	2006-07	4.67
12.	-do-	Gowramma and Hombalamma lakes, Magadi town, Bangalore Rural	2007-08	4.77
13.	-do-	Amanikere Lake, Tumkur	2008-09	13.37
<b>Sub Total</b>				<b>69.18</b>
1.	Andhra Pradesh	Banjara lake, Hyderabad	May, 2009	4.30
<b>Sub Total</b>				<b>4.30</b>
1.	Maharashtra	Powai lake, Mumbai	June, 2001	6.62
2.	-do-	9 lakes in Thane	Dec, 2002	2.53
3.	-do-	Mahalaxmi lake, Vadagaon		1.85
4.	-do-	Rankala lake, Kolhapur	2006-07	8.65
5.	-do-	Varhala Devi lake, Bhiwandi	2006-07	4.60
6.	-do-	Siddheshwar Lake, Solapur	2008-09	4.32
<b>Sub Total</b>				<b>28.57</b>
1.	Rajasthan	Mansagar lake, Jaipur	Dec, 2002	24.72
2.	-do-	Anasagar lake, Ajmer	2007-08	18.27
3.	-do-	Pushkar sarovar, Ajmer	2007-08	48.37
4.	-do-	Fatehsagar lake, Udaipur	2008-09	41.86
5.	-do-	Pichola lake system, Udaipur	2008-09	84.75
6.	-do-	Nakki Lake, Mount Abu	2010-11	7.33
<b>Sub Total</b>				<b>225.30</b>



S. No.	State	Lake	Date/year of sanction	Approved cost (cr.)
1.	Tamilnadu	Ooty lake	June, 2001	1.75
2.	-do-	Kodaikanal lake, Dindigul	Dec, 2001/Jan, 2007	10.42
		Sub total		12.17
1.	Tripura	3 lakes of Agartala	March, 2005	2.02
		Sub total		2.02
1.	Uttrakhand	4 lakes in Nainital	July, 2003	16.85
2.	-do-	Nainital lake, Nainital	August, 2003	47.97
<b>Sub Total</b>				<b>64.82</b>
1.	West Bengal	Rabindra Sarovar	Oct, 2002	6.96
2.	-do-	Mirik lake, Darjeeling	August, 2004	4.01
3.	-do-	22 km stretch of Adi Ganga in South 24 Parganas	May, 2008	24.94
4.	-do-	Sahib Bundh lake, Purulia	July, 2010	12.60
<b>Sub Total</b>				<b>48.51</b>
1.	J&K	Dal lake, Sri Nagar	Sep, 2005	298.76
<b>Sub Total</b>				<b>298.76</b>
1.	Kerala	Veli Akkulum lake, Thiruvananthpuram	Sep, 2005	24.56
<b>Sub Total</b>				<b>24.56</b>
1.	Orissa	Bindu sagar lake, Bhubaneshwar	March, 2006	3.50
<b>Sub Total</b>				<b>3.50</b>
1.	Madhya Pradesh	Rani talab, Rewa	2006-07	3.31
2.	-do-	Sagar lake, Sagar	2006-07	21.33
3.	-do-	Shivpuri lakes, Shivpuri	2007-08	51.99
<b>Sub Total</b>				<b>76.63</b>
1.	Nagaland	Twin lakes in Mokokchung	Oct, 2009	25.83
<b>Sub Total</b>				<b>25.83</b>
1.	Uttar Pradesh	Mansi Ganga lake, Govardhan	March, 2007	22.71
2.	-do-	Ramgarh Tal, Gorakhpur	April, 2010	124.32
<b>Sub Total</b>				<b>147.03</b>
<b>Grand Total</b>				<b>1031.18</b>



**Names of Nodal Agencies of NGC Programme**

S. No.	State/Union	State Nodal Agency
1.	Jammu & Kashmir	Dr. Mohit Gera Member Secretary, J & K Pollution Control Board Rajbagh, Bhilawad Silk Factory Srinagar, Jammu & Kashmir, Email: mohitgera87@gmail.com Website : <a href="http://www.jkspcb.in/">http://www.jkspcb.in/</a>
2.	Himachal Pradesh	Mr. Ravi Sharma Senior Scientific Assistant , SCSTE State Council for Science, Technology And Environment 34, SDA Complex Kasumpti, Shimla, Himachal Pradesh-171009 Mob. No. 9418084973 Email: ravism17@yahoo.com Website : <a href="http://www.hpscste.gov.in/">http://www.hpscste.gov.in/</a>
3.	Punjab	Dr. Satnam Singh Ladhar Joint Director ( Environment), Punjab State Council for Science and Technology Near Scared Heart School, Sector - 26 Chandigarh-160019 Mob. No.: 9463200886 Email: ssladhar@yahoo.com, ngcpunjab@yahoo.com Website : <a href="http://www.pscst.com/">http://www.pscst.com/</a>
4.	Chandigarh	MR. P.J. S. Dadhwal, Additional Director Department of Environment Chandigarh Administration, Additional Town Hall Building II Floor, Sector -17, Chandigarh Mob. No.: 09855616338 Email: dadhwal@yahoo.com, dadhwalpjsd@gmail.com Website : <a href="http://chandigarhenvi.gov.in">http://chandigarhenvi.gov.in</a>
5.	Uttar Pradesh	Mr. Neeraj Chaturvedi Accounts Officer Uttar Pradesh Pollution Control Board, Picup Bhawan, 3rd Floor, B-Block, Gomti Nagar, Vibuthi Khand, Lucknow, Uttar Pradesh Email: info@uppcb.com Website : <a href="http://uppcb.com/">http://uppcb.com/</a>



S. No.	State/Union	State Nodal Agency
6.	Bihar	Mr. Manoj Singh Member Secretary Bihar State Pollution Control Board Beltran Bhawan Shastri Nagar Patna – 800023, Bihar Mob. No.: 09431081204 Email: issingh123@rediffmail.com, mjkr09@gmail.com Website : <a href="http://bspcb.bih.nic.in">http://bspcb.bih.nic.in</a>
7.	Uttarakhand	Mrs. Pushpa Manas Additional State Project Director Sabhi ke liye (Kendriya) Shiksha Parishad S-1, C-10 Defence Colony, Dehradun, Uttarakhand Mob. No.: 9412056645 Email: euadpep@vsnl.net Website: <a href="http://gov.ua.nic.in/ssaua/register.html">http://gov.ua.nic.in/ssaua/register.html</a>
8.	Odisha	Prof. Sailadala Padhi Nodal Officer, Centre for Environmental Studies Forests & Environmental Department Govt. of Odisha, N-1/247 I. R. C. Village, Bhubaneswar-15 Odisha Mob. No.: 09937095353 Email: cesorissa@rediffmail.com Website : <a href="http://www.cesorissa.org/">http://www.cesorissa.org/</a>
9.	West Bengal	Mr. Sandipan Mukharjee Member Secretary West Bengal Pollution Control Control Board (WBSPCB), Paribesh Bhawan, 10A Block-L.A. Sector III , Salt Lake, Kolkata 700098 Mob. No.: 9830672363 Email: wbpcbnet@wbpcb.gov.in Website : <a href="http://www.wbpcb.gov.in/">http://www.wbpcb.gov.in/</a>
10.	Jharkhand	Mr. Sanjay Kumar Sinha Nodal Officer Member Secretary, JSPCB Jharkhand State pollution Control Board, T A Division Building H.E.C. Dhurwa Ranchi, 834004, Jharkhand Mob. No.: 9835907525 Website : <a href="http://www.jspcb.org/">http://www.jspcb.org/</a>
11.	Haryana	Dr. Raj .K. Chauhan Scientist G-I Haryana State Pollution Control Board, Madhya Marg, SCO-11-12, Sector -7-Chandigarh Haryana-160001 Mob. No.: 9417153589 Email: rajkc52@yahoo.co.in Website : <a href="http://hspcb.gov.in/">http://hspcb.gov.in/</a>



S. No.	State/Union	State Nodal Agency
12.	Delhi	Dr. B.C. Sabata Senior Scientific Officer Department of Environment Government of NCT Delhi Room No. C-610, Level-6, C-Wing, Delhi Secretariat, I.P. Estate, New Delhi-02 Mob. No.: 9717593506, 23392032 Email: bcsabat@yahoo.com, ecoclub_delhigovt@yahoo.com Website : <a href="http://www.delhi.gov.in/wps/wcm/connect/Environment">http://www.delhi.gov.in/wps/wcm/connect/Environment</a>
13.	Rajasthan	Dr. S.R. Jain State Secretary Rajasthan State Bharat Scout & Guide, State Headquarters, JLN Marg, Bajaj Nagar, Jaipur-302015 Contact Person : Mr. Goparam Mali Rajasthan Mob. No.:9414405255 Email: rajscoutguide@yahoo.com
14.	Gujarat	Mr. N.K. Nanda Deputy Director Gujarat Ecological Education and Research Foundation (GEER), Near Indrora park, Sector - 9, Gandhi Nagar, Gujarat - 382009 Website : <a href="http://www.geerfoundation.gujarat.gov.in">http://www.geerfoundation.gujarat.gov.in</a>
15.	Dadra & Nagar Haveli	Sh. M.R.G. Reddy Member Secretary Pollution Control Committee (PCC), Dadra & Nagar Haveli, Silvassa Tele-fax: 0260-2630260 Website : <a href="http://www.pccdaman.info/">http://www.pccdaman.info/</a>
16.	Daman & Diu	Sh. M.R.G. Reddy Member Secretary Pollution Control Committee (PCC), Daman & Diu Tele-fax: 0260-2630260 Website : <a href="http://www.pccdaman.info/">http://www.pccdaman.info/</a>
17.	Madhya Pradesh	Mrs. Sadhna Tiwari Scientific Officer Environment Protection and Coordination Organization -EPCO Bhopal (Housing Env't dept), Parayavaran Parisar, E-5 sector, Arera Colony, Bhopal – 462078, Madhya Pradesh Mob. No.: 9827285487 Email: sadhana@epco.in,sadhanahk@yahoo.co.in



S. No.	State/Union	State Nodal Agency
18.	Goa	Shri Joseph S R De Souza Chief scientist Goa State Council of Science & Technology Department of Science, Technology & Environment Opp. Saligac Seminary, Saligao, Barcez Goa – 408511 Mob: 9623255354 Website : <a href="http://dstegoa.gov.in/aboutus.htm">http://dstegoa.gov.in/aboutus.htm</a>
19.	Maharashtra	Shri Tasneem Ahmad Director Maharashtra ekatmik padik jamin vikas yantrana Directorate of social forestry Maharashtra state Central administrative building ground floor, pune-411001 Mob. No. 09421788704 Email id: <a href="mailto:dirdsfpune@vsnl.net">dirdsfpune@vsnl.net</a>
20.	Chattisgarh	Mr. Amar Savant Nodal Officer I/C, Chattisgarh Environment Conservation Board (CECB), Raipur <a href="mailto:dr.apsawant@rediffmail.com">dr.apsawant@rediffmail.com</a> Chattisgarh Mob. No.: 9425584333 Email: <a href="mailto:cececb@rediffmail.com">cececb@rediffmail.com</a> , <a href="mailto:dr.apsawant@rediffmail.com">dr.apsawant@rediffmail.com</a> Website : <a href="http://enviscecb.org/">http://enviscecb.org/</a>
21.	Assam	Mr. Jaideep Baruah Head I/C Environment Division Assam Science, Technology and Environment Council (ASTEC) G.S. Road, Guwahati- 781003 Assam Mob. No.: 9435102089 e-mail: <a href="mailto:astec@rediffmail.com">astec@rediffmail.com</a> ; <a href="mailto:jaideep82@hotmail.com">jaideep82@hotmail.com</a> , <a href="mailto:j.baruah@nic.in">j.baruah@nic.in</a> Website: <a href="http://www.astec.gov.in/">http://www.astec.gov.in/</a>
22.	Manipur	Dr. M. Gonchandra Sharma Principal Scientific Officer Manipur Pollution Control Board, Lamphelpat, Imphal West – 795004. Manipur Mob. No.: 9662593360 e-mail: <a href="mailto:mpollution2006@yahoo.co.in">mpollution2006@yahoo.co.in</a> , <a href="mailto:gonchandra@yahoo.com">gonchandra@yahoo.com</a> , <a href="mailto:gonchandra@gmail.com">gonchandra@gmail.com</a>
23.	Meghalaya	Mr. Sunil Kumar Additional PCCF Chief Conservator of Forests (HQ) Department of Forests & Environment Govt of Meghalaya Sylvan House, Lachumere Shillong – 793001. Meghalaya Mob. No.: 09436999140 Email: <a href="mailto:sunilkumar78@nic.in">sunilkumar78@nic.in</a> , <a href="mailto:snlkmr696@gmail.com">snlkmr696@gmail.com</a> Contact person: Shri Bahsuk, Supt. Wild Life Division Mob. No.: 09436105778



S. No.	State/Union	State Nodal Agency
24.	Mizoram	Mr. C. Laldhawma Mizoram Pollution Control Board, MG Road, Aizawl-796001. Mizoram Mob. No.: 09436142012 Email Id: duhawma15@yahoo.com
25.	Nagaland	Mr. Rusovil John Member Secretary Nagaland Pollution Control Board, Signal Point, Dimapur, Nagaland Mob. No.: 09436003731 Email: npc2@yahoo.com, ngc.nagaland@yahoo.com
26.	Sikkim	Mr. B.K. Tewari Chief Conservator of Forests, Landuse and Environment Section (LU & E) Dept. of Forests, Environment and Wildlife Management, Deorali, Gangtok- 737101. Sikkim Mob. No.: 09434723413 Email: sik@envis.nic.in
27.	Tripura	Shri Bishu Karmakar Sr. Lab. Asstt. NGP programme Tripura State Pollution Control Board, Tripura (W), Agartala - 799001, Tripura Kechowmujani Contact Person: Shri Amarendra Jamatia Mob. No.: 09436168371 e-mail: ajamatia@rediffmail.com
28.	Arunachal Pradesh	Shri N. Tam Member Secretary Nodal Officer & Member Secretary Arunachal Pradesh State Pollution Control Board, Department of Environment and Forests, PCCF's office, "Zero Point" Tiniali, Itanagar- 791111. Arunachal Pradesh Mob. No.: 09402278748 Email: arunachalspcb@gmail.com Website: <a href="http://www.apspcb.org.in/">http://www.apspcb.org.in/</a>
29.	Andaman & Nicobar Islands	Mrs. N. Kala Conservator of Forests, Department of Forests, Vansadan, Haddo, Port Blair, Andaman & Nicobar Islands Mob. No.: 9434284822 Email: vaishnavi_bharti@yahoo.com
30.	Lakshadweep Islands	Dr. Sayedis Mailkoia Dy. Conservator of forests, Department of Environment and Forests UT Administration of Lakshadweep, Kavaratti - 682555. Lakshadweep Islands Ph. No. 04896-26289, Fax No.: 04896-262598



S. No.	State/Union	State Nodal Agency
31.	Puducherry	Mr. V. Ramalingam Programme Coordinator Environment Education Directorate of School Education, State Training Centre, Puducherry Ph. No.: 0413-2200255, ext. 370 Fax No.:0413-2205419
32.	Andhra Pradesh	Mr. W.G . Prasanna Kumar, Director, National Green Corps, Andhra Pradesh 214-K Block, AP Secretariat, Hyderabad, Andhra Pradesh Mob. No.9849908831 Email: ngcap.vir@gmail.com
33.	Karnataka	Mr. R.M.N. Sahai Director General Environment Management & Policy Research Institute (EMPRI), 'Hasiru Bhavana' Doresanipalya Forest campus, J.P. Nagar 5th Phase Bangaluru 560078 Karnataka Mob. No.: 09480265641, 08026490747 Email:empri.ber@gmail.com
34.	Kerala	Dr. Kamalakshan Kokkal Scientific Officer, Kerala State Council For Science Technology & Environment (KSCSTE) Sasthra Bhawan, Pattom Thiruvananthapuram-04 Kerala Mob No.: 09447489587 Phone No. 0471-2543701-05 Email: drkhokkal@yahoo.com Website: <a href="http://www.kscste.kerala.gov.in/">http://www.kscste.kerala.gov.in/</a>
35.	Tamil Nadu	Mr. Thiru Vengadam Co-ordinator Department of Environment Ground Floor, Panagal Buildings 1, Jeenis Road Saidapet Chennai - 600 015 E-mail : tndoe@eth.net Tamil Nadu Mob. No.: 9444159948 Email: tndoe@eth.net



**List of Regional Resource Agencies (RRAs) under NEAC**

Sl.No	Name of the Organisations	Area under Jurisdiction
1.	<p>Sri Swarupa Nistha Ashrama Philosophical Welfare Society (SNAPS),</p> <p>Shri K. Narendra Nath Reddy, Chairman H.No.1-1189-99, 1st Floor,N.G.O. Colony, Kadiri-515591 Ananthapur Distt. Andhra Pradesh</p>	Andhra Pradesh (South)
2.	<p>Deccan Development Society</p> <p>Shri P.V. Subbarao, NEAC Convenor Flat No. 101, Kishan Residency House No. 1-11-242/1 Street No. 5, Begum Pet, Hyderabad-500016, Andhra Pradesh</p>	Andhra Pradesh (North)
3.	<p>Assam Science Society Jawahar Nagar, Khanapara, Guwahati781022, P.B.No.78,Assam</p> <p>Dr. B.K. Kar, General Secretary Ph. No.- 09864039200 Email- bimalkar@yahoo.com, Secy_ass@sify.com</p>	Assam
4.	<p>Rural Youth Coordination centre Sadhna Sadan , Pani Tanki More , Boaring –Patli putra Road, Po- Shashtri Nagar,Distt. : Patna, Bihar Pin- 800 013</p> <p>Shri Kameshwar Ojha, Genaral Secretary (M): K. Ojha- 09470034445 (M): S. Ojha- 09431645134 Email- rycc_pat@rediff.com</p>	Bihar
5.	<p>Jan Kalyan Parishad, Moh. Namana Kala ring Road, (Near Comel School), Ambikapur, Distt.- Surguja, Chattisgarh-497001</p> <p>Shri S.N. Singh, Director Ph. No.- 0774-223981 (M)- 09415881038, 09425584765 Email- snsingh.jkp@rediffmail.com</p>	Chattisgarh



Sl.No	Name of the Organisations	Area under Jurisdiction
6.	<p>Indian Environmental Society</p> <p>Dr. Desh Bandhu, President U- 112, Vidhata House, 3rd Floor Vikas Marg, Shakarpur, Delhi 110092 Ph.No.- 011-22046823, 22450749 Fax no. 011-22523311 Email- iesindia@gmail.com, iesenro@de12.vsnl.net.in iesenro@vsnl.com</p>	Delhi & Western U.P.
7.	<p>Vikram Sarabhai Centre for Development Interaction (VIKSAT) Nehru Foundation for Development, Taltej Tekra, Vastrapur Road, Ahmedabad- 380 054</p> <p>Mr. Dilip Surkar, Director, Taltej Tekra, Vastrapur Road Ahmedabad- 380 054 Ph. No.- 0179-26856220-26858002-2 (M)- 9879012367 (Dilip Surkar) (M)- 9825415319 (Vijay kaushal) Email- vijay.kaushal@viksat.org, viksat@gmail.com, dilipsurkar@viksat.org, vkaushal2000@yahoo.com Fax: 0179-26852360, 26853873</p>	Gujarat & Daman Diu
8.	<p>Haryana Nav Yuvak Kala Sangam (HNYKS) "Ishwar Sadan", Near Chaubisee ka Chabutra, MEHAM, District : Rohtak- 124 112, Haryana</p> <p>Ms. Rani Peter, General Secretary Ph. No.- 01262-272347 (M)- 09896250683 (M)- 09315595155 (Dr. Jasphool Singh) Email:- jasphool@rediff.com, hnyksrtk@rediffmail.com hnyksrtk@gmail.com</p>	Haryana
9.	<p>State Council for Science, Technology &amp; Environment H.P. 34, SDA Complex, Kasumpti, Shimla- 171009</p> <p>Shri Nagar Nanda, Member Secretary Ph. No.- 0177-2622490/2622489 Fax:- 0177-2620998 (M)- 9418084973 (Mr. Ravi) Email: ravism17@yahoo.co</p>	Himachal Pradesh



Sl.No	Name of the Organisations	Area under Jurisdiction
10.	<p>World Wide Fund for Nature-India Jammu &amp; Kashmir State Office C/O Centre for Environment Education &amp; Training, New University campus, Jammu- 180006</p> <p>Shri CM Seth, Chairperson Email: wwfjk@rediffmail.com Ph.No.:-0191-2439893 (M)- 09919011804</p>	Jammu
11.	<p>The NGOs Co-ordination Federation (J&amp;K) 34-Sahihandan, Lane-II, Umerabad, Zainakoote Srinagar- 190012 (J&amp;K)</p> <p>Shri. Imtiyaz Hussain, Chairman &amp; Chief Executive (M)- 09419051245, 09419019245 Email- ncfimtiyaz@yahoo.co.in</p>	Kashmir Including Ladakh
12.	<p>BAIF Institute for Rural Vocations and Advancement (BIRVA) Ranchi, Jharkhand. BAIF Institute for Rural Vocations and Advancement (BIRVA), Farmers Training Centre Campus , Near Sudha Dairy, HEC, Sector II , Jharkhand</p>	Jharkhand
13.	<p>Karnataka Rajya Vijnana Parishat, Vijnana Bhawan, No. 24/2&amp;24/3, 21st Main Road, Banashankari-II Stage, Bangalore- 560070 Karnataka</p> <p>Prof. K.S. Nataraj, CEO Ph. No.- 080-26718939 Tele Fax:- 080-26718959 (M)- 09880759734</p> <p>Sh. Ashok (M)- 09880917831 Email- ashok.krvp@yahoo.co.in, nagppa_mchandra@yahoo.co.in krvp_edu@dataone.in</p>	Karnataka
14.	<p>Center for Environment &amp;Development Thozhuvancode, Vattiyoorkavu P.O., Triuvananthapuram, Kerala- 695013</p> <p>Shri Babu Ambat, Executive Director Ph. No.- 0471-2369720, 2369721, 2369722 Fax- 0471-2369720 Email- ceddar@vsnl.com</p>	Kerala, Lakshwadeep & Minicoy Island



Sl.No	Name of the Organisations	Area under Jurisdiction
15.	<p>BAIF Development Research Foundation BAIF Bhawan, Dr. Manibhai Desai nagar National Highway No. 4, Wajre, Pune- 4110058</p> <p>Shri. G.G. Sohani, President Ph. No.- 91-20-25231661(M)- 09860835426, 09423784625(S.E.Pawar) Fax- 91-20-25231662 Email- jndaniel@baif.org.in, baif@vsnl.com Mr. Pawar - sepawar@baif.org.in</p>	Maharashtra, Goa & Dadar Nagar Haveli
16.	<p>Environment &amp; Ecology Wing Deptt. Of Environment And forests Government of Manipur Porompay, Near D.C. Officer, Imphal (East)- 795001</p> <p>Dr. T.H Jambhogen Singh, senior Scientific Officer Ph.No.09863151180 Email- thingujambhogen@yahoo.co.in</p>	Manipur
17.	<p>Environmental Planning &amp; Coordination Organisation (EPCO) Kachnar" Paryavaran Parisar, E- 5, Arera colony, Bhopal- 462016 Madhya Pradesh</p> <p>Shri Manohar Dubey, IAS - Executive Director Mr. Sarad Jain- 9425037042 Ph. No.- 0755-2466970, 2464318, 2460189 Fax No.- 0755-2462136 (M)- 09425300503 Email- epcobpl@sancharnet.in arif.mirza05@gmail.com</p>	Madhya Pradesh
18.	<p>Center for Environment Protection (CEP) B-27/ 1, Tuikual South, Aizwal- 796001, Mizoram</p> <p>Shri A.C. Zonunmawia, Coordinator &amp; Chairman Ph. No.- 0389-389-2319116 (M)- 09862374596, 09874749844 Email- cep_mizo@lycos.com</p>	Mizoram
19.	<p>Nagaland Pollution Control Board Signal Point, Dimapur, Nagaland- 797112</p> <p>Shri Rusovil John, Member Secretary Ph. No. 03862-245726, 245727 Email-npcb2@yahoo.com</p>	Nagaland



SI.No	Name of the Organisations	Area under Jurisdiction
20.	<p>Centre for Environment Studies Forests and Environment Department, Government of Orissa, N1/247,I.R.C.village, Bhubaneswar-751015</p> <p>Shri P.M. Dash, Nodal Officer- in-charge (M)- 09438186037 Ph. No.-0674-400920 Telefax- 0674-2551853 Email.- cesorissa@rediffmail.com</p>	South Orissa
21.	<p>Animal Welfare Society of Orissa Branch Office: at/ Po- Bhandaripokhari, Distt.- Bhadrak, Orissa, Head Office: Qr. No. 4R/2, Unit-8 Gopabandhu Square, Bhubaneswar- 751012 North Orissa</p> <p>Shri D.N. Rout, General Secretary (M)-93371-24995 Ph. No.- 0674-2556888/2565888/ 240860/395994 Fax no.- 06784-240860 Email-awso12@yahoo.co.in, jssbhadrak@yahoo.co.in</p>	North Orissa
22.	<p>Punjab State Council for Science &amp; Technology MG SIPA Building, Near Sacred Heart School, Sector -26, Chandigarh-160019</p> <p>Ms. Neelima Jayarath, Executive Director Ph,No.- 0172-2792325/2795001/2792787 (M)- 9417162322 Fax- 0172-2793143 Email info@pscst.com Contact Person : Shri Satnam Singh Ladhar Mobile – 09463200886 e-mail : ssladhar@yahoo.com</p>	Punjab & Chandigarh & Uttranchal
23.	<p>Consumer Unity &amp; trust Society(CUTS) D- 217, Bhaskar Marg, Bani Park, Jaipur- 302016, Rajasthan</p> <p>Shri Paradeep S. Mehta, Secretary General (M)- 91- 98292 85930/ 09414202868 Ph.No.- 91-141-4015395, 2282 823/ 2282 482/2282821 Fax- 0141-2282485 Email- cart@cuts.org</p>	Rajasthan



Sl.No	Name of the Organisations	Area under Jurisdiction
24.	<p>C.P. Ramaswamy Aiyar Foundation The grove, 1- Eldmas Road, Alwerpet, Chennai- 600018</p> <p>Dr. (Mrs.) Nanditha Krishna, Director (M)- 0944255832 Ph. No.- 91-44-24341778/24341778 Fax- 91-44-24351922 Email- cpraf@vsnl.com</p>	Tamilnadu (North) Andman Nicobar
25.	<p>C.P. Ramaswamy Environmental Education Centre No. 1-A, Eldams Road, Chennai- 600018</p> <p>Dr.(Mrs.) Nanditha Krishna, Director (M)-09444254831 ( P.Sudhakar) Ph. No.-044-4337023/4346526/4341778 Fax- 044-4320756 Pondicherry Email- cpreec@vsnl.com, cprenvaccounts@ gmail.com</p>	Pondicherry
26.	<p>PEACE Trust Near Police Colony, Trichy Road, Dindigul- 624005, Tamilnadu</p> <p>Shri J. Paul Bhaskar, Chairman Ph.No.-0451-2411281/2410021 (M)- 09443341082 Fax- 0451-2410372 Email- peacetrust@vsnl.com</p>	Tamilnadu (South)
27.	<p>Tripura State Pollution Control Board Parivesh Bhawan, Pandit Nehru Complex, Gorkhabasti, Agartala-799006</p> <p>Shri Mihir Deb Chairman Ph. No.- 0381-232 2462 (O) 0381-230 6233 (R) 09436122197 (M) Email- trippcb@sancharnet.in</p>	Tripura
28.	<p>State Environment Agency Forest Environment and Wild Management Department, Government of Sikkim, Gangtok- 737101</p> <p>Shri B.K.Tiwari, IFS (M)- 09434723413 Ph. No.- 03592-281261/ 281385 Fax- 03592-281778 Email- sik@envs.nic.in</p>	Sikkim



Sl.No	Name of the Organisations	Area under Jurisdiction
29.	<p>Shohratgarh Environment Society, Premkunj, 9, Adarsh Colony, Shohratgarh, Siddhartha Nagar Distt. 272205 (U.P.)</p> <p>Dr. B.C. Shrivastava, Secretary (M)- 09450553206, 9161624068 Ph.No.- 05544-263271 Fax- 05544-263166 Email- sesindia@sesindia.org, sesbcs@yahoo.co.in</p>	Uttar Pradesh (East)
30.	<p>School of Fundamental Research 29, Pratapaditya Road, Kolkata- 700026</p> <p>Prof. Gauri Ghatak, director- Convenor (M)- 9903030874 Ph.No.-033-2427367 Fax- 033-24664317/ 4630307 Email- biplab@gmail.com, Sfr1964.kolkata@gmail.com</p>	West Bengal Except Darjeeling Hilly Areas and Silliguri
31.	<p>Federation of Societies for environmental Protection (FOSEP) Darjeeling Hilly Areas &amp; Siliguri Dr. S.M. Das Road, Red Cross Building, Darjelling- 734101</p> <p>Dr. Bharat Prakash Rai, Secretary (M)- 09832031234 Ph.no.-0354-2258180 Fax- 0354-2253551 Email- fosep@hotmail.com, fosepdarjeeling@gmail.com</p>	Darjeeling Hilly Areas & Siliguri
32.	<p>Principle Chief Conservator of Forests &amp; Principal. Secry. Department of Environment &amp; Forests 'P'- sector, Government of Arunachal Pradesh, Itanagar- 791111</p> <p>Sh. M.S. Negi (M)- 09436898764 Email-pccf-arn@nic.in</p>	Arunachal Pradesh
33.	<p>Dept. of Forests and Environment, Govt. of Meghalaya Sylvan House, Lower Lachumiere, Meghalaya, Shillong- 793001</p> <p>Concern person: Mr. C.P. Marak (M)- 09436999260 Ph. No.-0364-2220414/ 2502184/ 2228334 Fax- 0364-2504068 Email- pccfmegh@gmail.com, cpmarak@hotmail.com</p>	Meghalaya



## Annexure-IX

## List of ENVIS Centres

S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
1.	Central Pollution Control Board (CPCB)	Dr. A. B. Akolkar, Member Secretary Shri G. Ganesh, ENVIS Coordinator Parivesh Bhawan, East Arjun Nagar, Delhi-110 032, Delhi Phone: 011-22301122, 22301932, 43102258 Fax: 011-22304948, 22301932, 43102258 (Coordinator M.: 9213828705) Email: cpcb-env@nic.in, ganesh.cpcb@nic.in URL: www.cpcbenvvis.nic.in	Control of Pollution (Water, Air and Noise)
2.	Indian Institute of Toxicology Research (IITR)	Dr. K.C. Gupta, Director Shri Shailendra Kumar Gupta, ENVIS Coordinator Post Box No.80, Mahatma Gandhi Marg, Lucknow-226 001, Uttar Pradesh Phone+91-522-2284591, +91-522-2627586, 2613786 (Ext. 308) Mobile: 0 9839533951 Fax: +91-522-2628227, 2611547 Email: itrc-env@nic.in, kcgupta9@gmail.com, kcgupta@iitr.res.in, director@iitrindia.org, shailendra15@gmail.com, skgupta@iitr.res.in URL: www.itrcenvvis.nic.in	Toxic Chemicals
3.	National Institute of Occupational Health (NIOH)	Dr. Sunil Kumar, Director (09426395738) Dr. R.R. Tiwari, ENVIS Coordinator Dr. Lokesh Sharma, ENVIS Co-Coordinator Meghani Nagar, Ahmedabad, Gujarat-380016 Phone: 079-22688842 Fax: 079-22686361,22686110 Coordinator: 09225224605, 09427958747, 079-22688838 Email: nioh@envvis.nic.in, sunilnioh@yahoo.com URL: www.niohenvvis.nic.in	Environmental and Occupational Health
4.	Centre for Ecological Sciences - Indian Institute of Science (IISc)	Prof. R. Sukumar, Chairman Dr. T.V. Ramachandran, ENVIS Coordinator Bengaluru, Karnataka-560 012, Bengaluru Phone: 91- 080-22933099/23600985/22932506 91-080-23601428/23600085/23600683 Email: envvis@ces.iisc.ernet.in, cestvr@ces.iisc.ernet.in URL: http://ces.iisc.ernet.in/biodiversity	Western Ghats Ecology and Biodiversity



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
5.	Centre for Advanced Study in Marine Biology (CASMB)	Prof. Dr. K. Kathiresan, Director and ENVIS Coordinator Annamalai University, Parangipettai-608 502, Tamil Nadu Phone: 04144-243223, 243533 Fax: 04144- 243555/243641 Email: stbcas@nic.in, stbcas@gmail.com, casmb-env@nic.in, caservis@gmail.com URL: casmbervis.nic.in	Mangroves, Estuaries, Lagoons, Coral Reefs
6.	Zoological Survey of India (ZSI)	Dr. K. Venkataraman, Director Dr. Bulganin Mitra ENVIS Coordinator Prani Vigyan Bhawan, M Block, New Alipore, Kolkata-700053, West Bengal Phone: 033-24002360 (Extn. 292) Fax: 033-24006893 Coordinator: 9330890774 Email: zsi@envis.nic.in, envis@zsi.nic.in URL: zsiervis.nic.in	Faunal Bio diversity
7.	Centre for Mining Environment (CME)	Prof. D. C. Panigrahi , Director Dr. Asim Kumar Pal, Prof & ENVIS Coordinator Indian School of Mines (ISM), Dhanbad-826004, Jharkhand Phone: 0326-2296624/25, Coordinator: 09939160256 Fax: 0326-2296624, 2296603 Email: ism@envis.nic.in, palasim2003@yahoo.co.in URL: http://ismervis.nic.in/	Environmental Problems of Mining
8.	National Environmental Engineering Research Institute (NEERI)	Dr. S. R. Wate, Director Shri Prakash Kumbhare, ENVIS Coordinator (9423063927, 0712-2249782) Nehru Marg, Nagpur-440020, Maharashtra Phone: 0712-2226026,2226071, 2249885 Fax: 0712-2225191, 2249782, 2249900 Email: neeri@envis.nic.in, ps_kumbhare@neeri.res.in URL: neeriervis.nic.in	Hazardous Waste
9.	G.B. Pant Institute of Himalayan Environment and Development (GBPIHED)	Dr. P.P. Dhyani, Director and ENVIS Coordinator Kosi – Katarmal, Almora-263643, Uttarakhand Phone: 05962-241041,241153 (Extn.54), 241015 Coordinator : 09412092189 Fax: 05962-241014/15, 241150, 241153 Email: gbpihed@envis.nic.in, himervis@gbpihed.nic.in URL: gbpihed.nic.in	Himalayan Ecology



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
10.	Botanical Survey of India (BSI)	Dr. Paramjit Singh, Director, BSI Dr.P.Lakshminarasimhan, Project In-Charge, ENVIS CENTRE ENVIS Centre on Floral Diversity CNH Building, 3rd Floor, AJC Bose Indian Botanic Garden,P.O. Botanic garden, Howrah-711103, West Bengal Phone: 033-26683235, 26680667 Fax: 033-26686226 (Coordinator M.: 9433396970) (IT Personal : Sh. Somnath Nandi (M.): 9432359198 Email: bsi@envis.nic.in, bsi_headquarter@rediffmail.com, envis@cal2.vsnl.net.in URL: bsienvis.nic.in	Floral Biodiversity
11.	Forest Research Institute (FRI)	Dr. S.S. Negi, IFS, Director Shri Shailendra Kaushik, ENVIS Coordinator National Forest Library & Information Centre, Indian Council of Forestry Research Education New forest - P.O., Dehradun-248006, Uttarakhand Phone: 0135-2756414 Fax: 0135-2756865 Email: fri@envis.nic.in, kaushikshail@yahoo.com, kaushiks@icfre.org URL: frienvis.nic.in	Forestry
12.	Wildlife Institute of India (WII)	Dr. V.B. Mathur, Director & ENVIS Coordinator PO Box NO. 18, Chandrabani, Dehradun-248001, Uttarakhand Phone: 0135-2640111-15 (Extn.202) Coordinator: 09412054648 Fax: 0135-2640117 Email: wii@envis.nic.in, envis@wii.gov.in URL: wiienvis.nic.in	Wildlife and Protected Area Management
13.	State Council of Science and Technology for Sikkim (SCSTS)	Shri S. K. Shilal, Secretary, Dept. of Science & Technology and Climate Change Shri Dorji Thinlay Bhutia, ENVIS Coordinator Deorali, Gangtok-737 102, Sikkim Phone: 03592-280025 Coordinator : 09434188242 Fax: 0359-2208764, 2228764 Email: scsts@envis.nic.in, dthinlay@hotmail.com, dthinlay@yahoo.co.in URL: scstsenvis.nic.in	Eco-Tourism



<b>S. No</b>	<b>Name</b>	<b>Communication Linkage (Head of Organisation/Coordinator/Address)</b>	<b>Subject Area</b>
14.	Central Arid Zone Research Institute (CAZRI)	Dr. M.M. Roy, Director Shri Tirth Das, ENVIS Coordinator Dr. Raheja Library, Jodhpur-342 003, Rajasthan Tel.: 0291- 2786931, (Director: 2786584) Coordinator: 09829586846 Fax: 291-2788706 Email: cazri@envis.nic.in, tdas@cazri.res.in URL: cazrienvis.nic.in	Desertification
15.	Department of Zoology - University of Madras	Col. Dr. G. Thiruvassagam (Vice-Chancellor) Prof. N. Munuswamy, Hon. Director and ENVIS Coordinator Life Science Building, Guindy Campus, Chennai-600 025, Tamil Nadu Phone: 044-22300899 Mobile: 09884171947 Fax: 044-22300899 Email: dzum@envis.nic.in, enviscoordinator@gmail.com, munuswamym@yahoo.com URL: dzumenvis.nic.in	Microorganisms and environmental management
16.	Institute for Ocean Management (IOM)	Prof. R. Ramesh, Director Prof. S. Srinivasalu, ENVIS Coordinator Koodal Building, Anna University, Chennai-600 025, Tamil Nadu Phone: 044-22330108, 22200159, 22203408 Mobile: 9840966299 Fax: 044-22200158 Ms. Judith D.Silva, Programme Officer – M. 09566735393 Email: iom@envis.nic.in, rramesh_au@yahoo.com, ramesh@annauniv.edu URL: iomenvis.nic.in	Coastal Regulation Zone Management and Coastal Shelter Belts
17.	Indian Institute of Tropical Meteorology (IITM)	Prof. B.N. Goswami, Director Dr. Gufran Beig, Scientist F & ENVIS Coordinator Dr. Homi Bhabha Road, Pashan, Pune-411 008, Maharashtra Phone: 020-25904200, 25893825 (Extn. 261, 212) Mobile: 09423018580 Fax: 020-25893825 Email: iitm@envis.nic.in, goswami@tropmet.res.in, beig@tropmet.res.in URL: iitmenvis.nic.in, envis.tropmet.res.in	Acid Rain and Atmospheric Pollution



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
18.	Indian Institute of Chemical Technology (IICT)	Dr. J.S. Yadav, Director Dr. U.Suryanarayana Murthy, ENVIS Coordinator Habsiguda, Uppal Road, Hyderabad-500 007, Andhra Pradesh Phone: 040-27193134 Fax: 040-27193227 Coordinator: +91-9440802794 Email: iict@envis.nic.in, usnmurthy@iict.res.in URL: iictenvis.nic.in	Bioinformatics - Vector Control
19.	Central Building Research Institute (CBRI)	Prof. S.K. Bhattacharya, Director Dr. L.P. Singh, ENVIS Coordinator Roorkee-247 667, Uttarakhand Phone: 01332-283442, 272391, 2722432 Mobile: Coordinator : 09837031050 Fax: 01332-272272, 272543 Email: cbri@envis.nic.in, lpsingh.cbri@nic.in, lpsingh@cbri.in, cbri_environment@cbri.res.in URL: cbrienviis.nic.in	Fly Ash
20.	National Botanical Research Institute (NBRI)	Dr. C.S. Nautiyal - Director Dr. Nandita Singh, ENVIS Coordinator Rana Pratap Marg, Lucknow-226 001, Uttar Pradesh Phone: 0522-2205847, 2205839, 2297931 Coordinator : 09415110314 Fax: 0522-2205847 Email: nbri@envis.nic.in, n.singh@nbri.res.in, nanditasingh8@yahoo.com URL: nbrienviis.nic.in	Indicators of Plant Pollution
21.	Gujarat Cleaner Production Centre (GCPC)	Shri Bharat P. Jain , Member Secretary Ms. Chinkal Patel, ENVIS Coordinator Block No.4, 3rd Floor, Udyog Bhawan, Sector-11, Gandhi Nagar-382 017, Gujarat Phone: 079- 23244147 Fax: 079-23244306 Mobile: 09898876827 Email: gcpc@envis.nic.in, gcpc11@yahoo.com URL: gcpcgujarat.org/envis	Cleaner Production & Technology
22.	Department of Environmental Sciences (DES), Kalyani University	Professor (Dr.) Rattan Lal Hangloo, Vice Chancellor Prof. S.C. Santra, ENVIS Coordinator University of Kalyani, Kalyani Distt. Nadia West Bengal - 741235 Phone: 033-25808749 Fax: 033-25828282 Coordinator: 09433215100 scsantra@yahoo.com, desku@envis.nic.in url: deskuenvis.nic.in	Environmental Biotechnology



<b>S. No</b>	<b>Name</b>	<b>Communication Linkage (Head of Organisation/Coordinator/Address)</b>	<b>Subject Area</b>
23.	School of Planning and Architecture (SPA)	Prof. A. K. Sharma, Director Prof. Meenakshi Dhote, ENVIS Coordinator 4 B, Block, Indraprastha Estate, New Delhi-110002 Phone: 011-23702393 Coordinator: 09313508547 Fax: 011-23702383 Email: spa-env@nic.in, spa@envis.nic.in, m.dhote@spa.ac.in URL: spaenvis.nic.in	Human Settlement
24.	School of Environmental Sciences Jawaharlal Nehru University (JNU)	Shri Sandeep Chatterjee, Registrar Prof. I.S. Thakur, ENVIS Coordinator (9868558865) Dr. Sudesh Yadav (ENVIS In-charge, 9968077736) School of Environmental Sciences, New Delhi-110 067, India Phone: 011-26704315 Fax: 26741502 Email: envis@mail.jnu.ac.in, attriak@gmail.com URL: jnuenvis.nic.in	Biogeochemistry
25.	Environment Protection Training and Research Institute (EPTRI)	Shri A.K. Parida, IAS, Director General Mr. P. Prasada Rao, ENVIS Coordinator 91/4, Gachibowli, Hyderabad-500 032, Andhra Pradesh Phone: 040-23180103, 23180110, 23180114 Fax: 040-23180135 (Coordinator M: 9866077472 Email: eptri@envis.nic.in, prasad@eptri.com, ap-env@nic.in URL: eptrienvis.nic.in	Ecology of Eastern Ghats
26.	International Institute for Population Sciences (IIPS)	Dr. F. Ram, Director Dr. Aparajita Chattopadhyay, ENVIS Coordinator Dr. Dhananjay Bansod, ENVIS Co-Coordinator Govandi Station Road, Deonar, Mumbai-400 088, Maharashtra Phone: 022-423472417, 42372412, 42372473 (Dr. Aparajita (M.): 09930909174) (Dr. Bhagat (M.): 09869947264) Fax: 022-25563257 Email: iip@envis.nic.in, popenvis123@rediffmail.com, director@iips.net, apachat@rediffmail.com, aparajita@iips.net, dbansod@gmail.com URL: iipsenvis.nic.in	Population, Human Settlement and Environment



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
27.	Institute of Forest Genetics and Tree Breeding (IFGTB)	Dr. N. Krishna Kumar, Director Dr. Kannan C.S.Warrier, Scientist 'E', Coordinator Institute of Forest Genetics and Tree Breeding Coimbatore- 641 002 Phone: 0422-2484100 Mobile (Coordinator): 09443889937 Email: kannan@icfre.org, dir_ifgtb@icfre.org	Forest Genetics and Tree Breeding
<b>ENVIS NGO Centres (Subject Specific)</b>			
28.	The Energy Resources Institute (TERI)	Dr. R.K. Pachauri, Director General Shri P.K. Bhattacharya, ENVIS Coordinator Darbari Seth Block, Habitat Centre, Lodi Road, New Delhi-110 003 Phone: 011-24682100, 24682111, 41504900 Coordinator: 9811873580 Fax: 011-246821 44/45 Email: teri@envis.nic.in, pkbhatta@teri.res.in URL: terienvis.nic.in	Renewable Energy and Environment
29.	World Wide Fund for Nature – India (WWF)	Shri Ravi Singh, Secretary General and CEO Shri G. Areendran, ENVIS Coordinator Indira Gandhi Conservation Monitoring Centre (IGCMC), 172-B, Lodhi Estate, New Delhi-110 003 Phone: 011-41504791, 41504793 Coordinator: 9968061056 Fax: 011-41504779, 24691226 Email: wwfindia@envis.nic.in, gareendran@wwfindia.net, ravisingh@wwfindia.net, rkumar@wwfindia.net URL: wwfindia.nic.in	NGOs and Parliament
30.	Centre for Environment Education (CEE)	Shri Kartikeya V. Sarabhai, Director Ms Sarita Thakore, ENVIS Coordinator Nehru Foundation for Development, Taltej Tekra, Ahmedabad-380 054, Gujarat Phone: 079-26844795, 26858002-05, 26858011 Coordinator: 09879209214 Fax: 079-26858010 Email: cee@envis.nic.in, cee.envis@ceeindia.org, sarita.thakore@ceeindia.org, rajeswari.namagiri@ceeindia.org URL: greenteacher.org	Environmental Education & Sustainable Development



<b>S. No</b>	<b>Name</b>	<b>Communication Linkage (Head of Organisation/Coordinator/Address)</b>	<b>Subject Area</b>
31.	Centre for Media Studies (CMS)	Dr. N. Baskara Rao , Chairman Mr Anand A. Jha, ENVIS Coordinator Research House, B-34, Community Centre, Saket, New Delhi-110 017, Delhi Phone: 011-26851660, 26522255, 26522244 26856429 Fax: 011-26968282 M.: 9582254615 (Mr. Anand Jha) Email: cms@envis.nic.in,cmsenvis@cmsindia.org URL: cmsenvis.nic.in	Communication and Electronic Media
32.	Bombay Natural History Society (BNHS)	Dr. Asad R. Rahmani, Director & ENVIS Coordinator Hornbill House, Dr. Salim Ali Chowk, Saheed Bhagat Singh Road, Mumbai-400 001, Maharashtra Phone: 022-22818967 Coordinator: 022-22821811 Fax: 022-22837615 Email: bnhs@envis.nic.in, envis@bnhs.org URL: bnhsenvis.nic.in	Avian Ecology
33.	Consumer Education and Research Centre (CERC)	Ms. Pritee Shah, Chief General Manager Dr. (Mrs.) Ashoka Ghosh, ENVIS Coordinator Suraksha Sankool, Thaltej, Sarkhej-Gandhinagar Highway, Ahmedabad-380 054, Gujarat Phone: 079-27489945-46, 27438752/53/54, (Coordinator: 9825019607) Fax: 079-27489947 Email: cerc@envis.nic.in, cerc@cercindia.org URL: cercenvis.nic.in, enviscerc.org	Eco-Labeling and Eco-Friendly Products
34.	CPR Environmental Education Centre (CPREEC)	Dr.(Mrs.) Nanditha C. Krishna , Hon. Director Shri P.Sudhakar, ENVIS Coordinator 1, Eldams Road, Alwarpet, Chennai-600 018, Tamil Nadu Phone: 044-24346526, 24337023, 24341778 Coordinator: 094442 54831 Fax: 044-24320756 Email: cpreec@envis.nic.in, cpreec@vsnl.com , cpreec@gmail.com, nankrishna18@gmail.com URL: cpreecenvis.nic.in	Conservation of Ecological Heritage and Sacred Sites in India



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
35.	Foundation for Revitalization of Local Health Traditions (FRLHT)	Dr. Padma Venkat, Director Ms. Suma TS, ENVIS Coordinator 74/2, Jarakbande Kaval, Yelahanka, via Attu PO, Bengaluru-560 064, Karnataka Phone: 080-28565847, 28568007, 28565873,28568000 Coordinator: 09448937066 Fax: 080-28565895, 28567926 Email: frlht@envis.nic.in, envis@frlht.org, suma.tagadur@frlht.org URL: frlhtenvis.nic.in	Conservation of Medicinal Plants
36.	International Institute of Health and Hygiene (IIHH)	Dr. Namita Mathur, Head & ENVIS Coordinator Sulabh Bhawan, Mahavir Enclave, New Delhi-110 045, Delhi Phone: 011-45700118 Coordinator: 9810055105 Prog. Officer: 9711905143 (Gaurav Solanki) Fax: 011-25034014 Email: sulabh@envis.nic.in URL: sulabhenvis.nic.in	Hygiene, Sanitation, Sewage Treatment Systems and Technology
37.	Indian Centre for Plastic in the Environment (ICPE)	Shri K.G. Ramanathan , President Shri T.K. Bandopadhyay, ENVIS Coordinator OLYMPUS House, 2nd Floor, 25, Raghunath Dadaji Street (Near Fort House - Formerly Handloom House), Fort, Mumbai – 400 001 Phone: 022-22617137, 22617165, 40022491 Fax: 022-22617168, 09323296499 Email: icpe@envis.nic.in, icpe@vsnl.net URL: icpeenvis.nic.inCMS AKIKO	Management of Plastic, Polymers and Biopolymers
38.	Salim Ali Centre for Ornithology and Natural History (SACON)	Dr. P.A. Azeez, Director Dr. Goldin Quadros, ENVIS Coordinator Anaikatty P.O., Coimbatore-641 108, Tamil Nadu Phone: (Reception)- 0422-2203100 /2203109 (Director SACON: 0422-2203101) (Coordinator ENVIS Centre - 0422-2203128, 09869183412) SACON ENVIS Centre - 0422 - 2203130. Email: sacon@envis.nic.in, salimalicentre@gmail.com, goldinq@yahoo.com URL: saconenvis.nic.in	Wetland Ecosystem (including inland wetlands)



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
39.	Indian Environmental Society (IES)	Dr. Desh Bandhu, President and ENVIS Coordinator Vidhata House, Vikas Marg, Shakarpur, Delhi-110092 Phone: 011-22046823,22450749 Coordinator: 9810180133 Fax: 011-22523311 Email: iesenro@vsnl.com, iesindia@gmail.com URL: iesenvis.nic.in	Role of Panchayats in Environment
40.	Nagaland Institute of Health, Environment and Social Welfare (NIHESW)	Dr. Inakhe Sumi, Honorary Director and ENVIS Coordinator Opposite to Commissioner's Office, Old Secretariat Complex, Kohima-797 001, Nagaland Phone: 0370-2292086 Fax: 0370-2240626, 2245615, 2240180 Mob: +91-8974519317/+91-9402992786 Email: nag@envis.nic.in, nihesw@yahoo.com URL: nagenvis.nic.in	Status of Environment and Related Issues
41.	National Solid Waste Association of India (NSWAI)	Dr. Amiya Kumar Sahu, President and ENVIS Coordinator B-703, Customs Colony A, Marol Military Road, Andheri (E), Mumbai – 400 059 Tel:- 022-24375363, 29207577 Fax:- 022-29202951, 29202951 Email:- nswai@envis.nic.in, econpcpl@gmail.com, sahu_amiya@rediffmail.com, nswaindia@gmail.com Url:- www.nswaienvis.nic.in	Municipal Solid Waste Management
<b>ENVIS Government Centres (State Government)</b>			
42.	Environment Protection Training and Research Institute (EPTRI)	Shri A.K. Parida, IAS, Director General Mr. G.Suryanarayana,(I/c) ENVIS Coordinator 91/4, Gachibowli, Hyderabad-500 032, Andhra Pradesh Phone: 040-23180103, 23180114, Coordinator: 9848475506 Fax: 040-23180135 Email: dg@eptri.com, ap@envis.nic.in, soeapri.eg@gmail.com, surya@eptri.com URL: apenvis.nic.in	Status of Environment and Related Issues



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
43.	Assam Science, Technology and Environmental Council	Dr. Satyendra Kumar Choudhury, Director Shri Jaideep Baruah, ENVIS Coordinator Bigyan Bhawan, G.S. Road, Guwahati-781005, Assam Phone: 0361-2464621/2464619 Mobile: 09435032706, 09435102089 Telefax: 0361-2464617 Email: asm@envis.nic.in, astec-asm@nic.in, nverma2000@gmail.com, j.baruah@nic.in URL: asmenvis.nic.in	Status of Environment and Related Issues
44.	Bihar State Pollution Control Board	Prof. Subhash Chandra Singh, Chairman (9771433445) Shri Rakesh Kumar, IFS, Member Secretary & ENVIS Coordinator Mr Anil Kumar, Sr Prog. Officer (09430511414, 0612-2284330) Beltron Bhawan, 2nd Floor, Lal Bhadur Shastri Nagar, Patna-800 023, Bihar Phone: 0612-2281250, 2291709, 2281050 Fax: 0612-2291709, 2281050 Coordinator: 09771423957 Email: bh@envis.nic.in URL: bhenvis.nic.in	Status of Environment and Related Issues
45.	Chhattisgarh Environment Conservation Board	Shri P.V. Narsingh Rao, Member Secretary Shri A.P. Savant, ENVIS Coordinator (9685095435) Shri Hunkar Singh, Programme Officer (8656070712) Commercial Complex, Chhattisgarh Housing Board Colony, Kabir Nagar, Raipur-492 001, Chhattisgarh Phone: 0771-2443923, 24; 2425523 Fax: 0771-2443924, 2425585 Email: cht@envis.nic.in, hocecb@gmail.com URL: enviscecb.org/links.htm	Status of Environment and Related Issues
46.	Goa State Council of Science & Technology	Mr. Lewinson Martin, Member Secretary and Director GSCST Mob.: 08390908284, 0832-2438528 Shri Joseph D'Souza, Chief Scientist & ENVIS Coordinator (09623255354) Saligao Plateau, Saligao, Bardez-403 511, Goa Telefax: 0832-2407012 Accounts Officer: 9881773451 (Sh. Aatma Ram) Email:josephste@rediffmail.com URL: goaenvis.nic.in	Status of Environment and Related Issues



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
47.	Gujarat Ecology Commission (GEC)	Shri A. K. Verma, Member Secretary, Shri Nischal Joshi, Sr. Project Manager/Coordinator Block No.18/1, Udyog Bhavan, Sector-11, Gandhinagar-382017, Gujarat Phone: 079-23257658, 23257659, (Coordinator: (09825021373) Fax: 079-23257656 Email: guj@envis.nic.in, gec_icef@rediffmail.com, nischal.joshi2@gmail.com URL: gujenvfor.gswan.gov.in	Status of Environment and Related Issues
48.	State Council for Science, Technology and Environment (SCSTE)	Dr. Hemant Gupta, IFS, Jt. Member Secretary ENVIS Coordinator B-34, SDA Complex, Kasumpti, Shimla-171 009, Himachal Pradesh Phone: 0177-2621992,2620998, 2622923, 2633923 Coordinator: 094180-20469(M), 0177-2620998 Fax: 0177-2620998 Email: hp@envis.nic.in URL: hpervis.nic.in	Status of Environment and Related Issues
49.	Department of Ecology, Environment and Remote Sensing, State Government of J&K	Shri Suresh Chugh, (IFS), Director Ms. Priyanka Sareen, SFS, ENVIS Coordinator (M.09419125176) (May-Oct.) SDA Complex, Bemina, Srinagar-190003 (May-Oct) Telefax: 0194-2490823, 2454847 Paryavaran Bhawan, Gladni, Transport Nagar, Narwal, Jammu-180012  (Nov –April) Telefax: 0191-2474553 Email: jk-env@nic.in, dirjkers@gmail.com URL: jkenvis.nic.in	Status of Environment and Related Issues
50.	Forests & Environment Department, Govt. of Jharkhand	Shri A. K. Singhi IFS, Principal Chief Conservator of Forests, Shri Dinesh Kumar, IFS - Conservator of Forests and ENVIS Coordinator (09431364084) Forests & Environment Department Doranda, Ranchi-834 002, Jharkhand Phone: 0651- 2482294 Fax: 0651-2480655 Email: jhar@envis.nic.in, akm_1954@yahoo.co.in URL: jharenvic.nic.in	Status of Environment and Related Issues



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
51.	Environment Management & Policy Research Institute (EMPRI)	Ms Ritu Kakkar, IFS, APCCF, Director General Shri K. H. Vinaya Kumar, IFS, ENVIS Coordinator (9611135140) Department of Forests, Environment and Ecology, Govt. of Karnataka, Hasiru Bhawan, Doresanipalya, Forest Campus, Vinayaka Nagar Circle, J.P. Nagar, 5th Phase, Bengaluru-560078, Karnataka Phone: 080-26490746/47 Fax: 080-26490745 Email: empri@envis.nic.in, empri.envis@gmail.com URL: parisaramahiti.kar.nic.in, karenvis.nic.in	Status of Environment and Related Issues
52.	Kerala State Council for Science, Technology and Environment (KSCSTE)	Prof. V N Rajasekharan Pillai, Ex. Vice President, (KSCSTE), Dr. Kamalakshan Kokkal, Principal Scientific Officer & ENVIS Coordinator Sasthra Bhawan, Pattom P.O., Thiruvananthapuram-695 004, Kerala Phone: 0471-2548210/99, 2543701/05 Coordinator: 09447489587, 0471-2548213 Fax: 0471-2543558, 2540085 Email: ker@envis.nic.in, kscste@gmail.com, mailto@kscste.org drkokkal@yahoo.com, envkerala@gmail.com URL: kerenvis.nic.in	Status of Environment and Related Issues
53.	Disaster Management Institute (DMI)	Shri Gulshan Bamra, Executive Director Dr. Rakesh Dubey, ENVIS Coordinator and Director DMI Housing and Environment Department, Paryavaran Parisar, E-5, Arera Colony, P.B.No.563, Bhopal-462 016, Madhya Pradesh Phone: 0755-2466715, 2461538, 2461348, 5293592 Fax: 0755-2466653 Coordinator- 09893250923 Email: mp@envis.nic.in, dmibpl@sancharnet.in, rakeshddubey@hotmail.com URL: mpenvis.nic.in	Status of Environment and Related Issues



<b>S. No</b>	<b>Name</b>	<b>Communication Linkage (Head of Organisation/Coordinator/Address)</b>	<b>Subject Area</b>
54.	State Environment Department, Maharashtra	Mrs. Valsa R. Nair Singh (IAS), Secretary (Environment Department), Government of Maharashtra Dr. B. N. Patil, ENVIS Coordinator (9869942395) Mr Sujit Gawde, Web Admin (M. 9821879068, 9869607717) New Administrative Building, 15th Floor, Madam Cama Marg, Mantralaya, Mumbai-400 032, Maharashtra Phone: 022-22854707, 22855082 Fax: 022-22025946, 22813947 Email: mah@envis.nic.in, envis.maharashtra@gmail.com URL: mahenvis.nic.in	Status of Environment and Related Issues
55.	Directorate of Environment, Dept. of Forests and Environment, Govt. of Manipur	Dr. M. Homeshwor Singh, Director Dr. Y. Nabachandra Singh, Jt. Director & ENVIS Coordinator Porompat (Near DC Imphal-East), Imphal (East)-795 010, Manipur Phone: 0385-2227625 Coordinator: 09436038970, Braja Kumar(RO): 09436035880 Fax: 0385-2227625, 2446670 Email: man@envis.nic.in, homeshwormai@gmail.com brajakumar_t@yahoo.com URL: manenvis.nic.in	Status of Environment and Related Issues
56.	Mizoram Pollution Control Board	RC. Thanga (IFS Rtd), Chairman, Mizoram Pollution Control Board C. Lalduhawma, Member Secretary & ENVIS Coordinator (0 919436142012) K Vanlalfamkima, Sr PO (M. 09774217908, 9862809075) Ms. Elizabeth, Web Asstt. (09436192247) Silver House, Tuikhuahtlang, Aizwal-796 001, Mizoram Phone: 0389-2316591, 2326173, 231184, 09436142012 Fax: 0389-2316591, 2316590 Email: miz@envis.nic.in, mpcb_azl@yahoo.com URL: mizenvis.nic.in	Status of Environment and Related Issues



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
57.	Centre for Environmental Studies (CES)	Dr. Ms Sailabala Padhi, Director, Shri Pravat Mohan Dash, ENVIS Coordinator Forest & Environment Department, Government of Odisha, N-1/247, IRC Village, Nayapalli, Bhubaneswar-751 015, Odisha Phone: 0674-2551853, 2551853 Coordinator: 0 9438186037 Fax: 0674-2553182 Email: ori@envis.nic.in, cesorissa@rediffmail.com, pravatmohandash@gmail.com URL: orienvis.nic.in	Status of Environment and Related Issues
58.	Punjab State Council for Science and Technology (PSCST)	Ms. Neelima Jerath , Executive Director Shri Gurharminder Singh, ENVIS Coordinator MGSIPA Complex, Second Floor, Adj. Sacred Heart School, Sector-26, Chandigarh-160 019, Punjab Phone: 0172-2792325,2795001, 2793300, Ext. 140 Fax: 0172-2793143 Coordinator: 09815655801 Email: pun@envis.nic.in, harminder1978@gmail.com, neelimajerath@pscst.com, ravleenmarwah@gmail.com URL: punenvis.nic.in	Status of Environment and Related Issues  discrepancies
59.	Rajasthan State Pollution Control Board	Dr. V. S. Singh, Chairman Shri Ashok Puri, Sr. Environmental Engineer and ENVIS Coordinator (M. 9413340882, 9667575991) 4, Institutional Area, J halana Doongari, Jaipur-302 004, Rajasthan Phone: 0141-2705731, 2707285,2711263 Fax: 0141-2709980 Email: raj@envis.nic.in, member-secretary@rpcb.nic.in dnpandey@gmail.com, singhalvijai@gmail.com URL: rajenvis.nic.in	Status of Environment and Related Issues



<b>S. No</b>	<b>Name</b>	<b>Communication Linkage (Head of Organisation/Coordinator/Address)</b>	<b>Subject Area</b>
60.	Forests, Environment & Wildlife Management Department, Sikkim	Shri. Arvind Kumar, IFS PCCF-cum-Addl Chief Secretary Shri. B. K. Tewari, IFS Conservator of Forests (Environment) and ENVIS Coordinator ENVIS Centre Sikkim, Forest Secretariat Annex-II, Ground Floor, Room No.1101/1102, Deorali, Gangtok-737 102, Sikkim (East) Mobile Coordinator: 0 9434109635 Phone: 03592-280381 Fax: 03592-281778 Email: sik@envis.nic.in URL: sikenvis.nic.in	Status of Environment and Related Issues
61.	Department of Environment, Tamil Nadu	Dr. H. Malleshappa, I.F.S., Director of Environment Shri J.D. Marcus Knight, Coord. #1, Jeenis Road, 4th Floor Down, Panagal Building, Saidapet, Chennai-600 015, Tamil Nadu Phone: 044-24331243, 24336421 Coordinator: 09884338406 Prog. Astt: 09841545503 (T. Indiradevi) Fax: 044-24336594 Email: tn@envis.nic.in, tndoe@tn.nic.in URL: tnenvis.nic.in	Status of Environment and Related Issues
62.	Tripura State Pollution Control Board	Prof. Mihir Deb, Chairman Shri Manas Mukherjee, ENVIS Coordinator Parivesh Bhawan, Pandit Nehru Complex, Gorkhabasti, P.O. Kunjaban, Agartala-799 006, Tripura Phone: 0381-2322462, 2306233, Coordinator: 09436122197 Fax: 0381-2322455 Email: mukherjee_manas@rediffmail.com, trippcb@sancharnet.in, trp@envis.nic.in, tripuraenvis@rediffmail.com URL: trpenvis.nic.in	Status of Environment and Related Issues



S. No	Name	Communication Linkage (Head of Organisation/Coordinator/Address)	Subject Area
63.	Directorate of Environment - Uttar Pradesh	Shri O.P. Verma, Director(I/C) Shri R.K. Sardana, Jt. Director-cum-Chief Appraisal and ENVIS Coordinator Vinit Khand-1, Gomti Nagar, Lucknow-226 020, Uttar Pradesh Phone: 0522-2300541 Coordinator: 09450777908 Fax: 0522-2300543 Email: up@envis.nic.in, doeuplko@yahoo.com, vikascagrawal@yahoo.com (Sr.Prog.Officer 09415549690) URL: upenvis.nic.in	Status of Environment and Related Issues
64.	Uttarakhand Environment Protection & Pollution Control Board (UEPPCB)	Shri Vinod Singhal, IFS, Member Secretary Shri Amarjeet Singh Oberai, ENVIS Coordinator E-115, Nehru Colony, Hardwar Road, Dehradun-248 011, Uttarakhand Phone: 0135-2668922 Coordinator: 09412085568 Fax: 0135-2668092 Email: ms.ueppcb@gmail.com, utr@envis.nic.in, asoberai@yahoo.com URL: utrenvis.nic.in	Status of Environment and Related Issues
65.	Department of Environment and Forest - Andaman and Nicobar	Shri D. V. Negi, PCCF Shri S.H.K Murti, DCF (Planning & Monitoring) & ENVIS Coordinator (03192-244664, WLL No. 03192-200995, Van Sadan, Haddo P.O., Port Blair-744 102, Andaman and Nicobar Phone: 03192-233233, 234430, Fax: 03192-230113, 244664 Email: an@envis.nic.in, pccfani@gmail.com, apccfpd2010@gmail.com, murtigis@hotmail.com) URL: as.and.nic.in/envis	Status of Environment and Related Issues
66.	Forest Department (Wildlife Division), Union Territories of Dadra & Nagar Haveli and Daman & Diu	Shri Richard D'Souza, Chairman Dr. N. Palanikanth (07567676668, vetpalani@gmail.com) Deputy Conservator of Forests (WL) / ENVIS Van Bhavan, Opp. Gujarat Industrial Bank, Silvassa, Union Territory of Dadra and Nagar Haveli, Pin – 396 230 Phone: 0260 – 2643048, 02638-2230963, 2230524, 9825515965 Fax: 02638-2230804 Email: dd@envis.nic.in, envisddd@gmail.com, vetpalani@gmail.com	Status of Environment and Related Issues



<b>S. No</b>	<b>Name</b>	<b>Communication Linkage (Head of Organisation/Coordinator/Address)</b>	<b>Subject Area</b>
67.	Department of Environment – Chandigarh	Shri. Ishwar Singh , Director, Shri P.J.S. Dadhwal , ENVIS Coordinator Chandigarh Administration, Addl.Town Hall Building 2nd Floor, Sector 17-C, Chandigarh-160 001, Punjab Phone: 0172-2700065, 0172- 2700311, Fax: 0172- 2700149 Email: ch@envis.nic.in, dadhwalpjsd@gmail.com URL: chenvis.nic.in	Status of Environment and Related Issues
68.	Puducherry Pollution Control Committee	M. Dwarakanath, Director, Department of Science, Technology & Environment Dr. N. Ramesh, ENVIS Coordinator IIIrd Floor, Pondicherry Housing Board Building, Anna Nagar, Puducherry-605 005, Puducherry Phone: 0413-2201256 Mobile: 0 9443329141 Fax: 0413-2203494 Email: pon@envis.nic.in, envis.pon@nic.in, dste.pon@nic.in URL: dstepuducherry.gov.in/envis1.htm	Status of Environment and Related Issues



**R F D**  
**Results Framework Document**  
**For**  
**MINISTRY OF ENVIRONMENT AND FORESTS**  
**(2014-2015)**



## SECTION 1: Vision, Mission, Objectives and Functions

### Vision:

Conservation of environment and natural resources for the present and future generations in a manner consistent with the aspirations of the country for sustainable growth and development

### Mission:

To plan, promote, coordinate and oversee the implementation of environmental legislation and forestry programmes in order to protect the environment and maintain a balance between conservation and development activities

### Objectives:

1. Improve forest & tree cover to 33% of the geographical area of the country through programmatic interventions.
2. To control environmental pollution by better Environmental Governance, Pollution and Waste management and Restoration of Degraded System.
3. In situ and Ex-Situ conservation of floral & faunal diversity of the country and identification of new species.
4. Conservation of Rivers, lakes and wetlands.
5. To conserve and sustainably use biodiversity resources.
6. Coordination implementation Action Plan on Climate Change (NAPCC) & preparation of State Action Plan on Climate Change by State Government.
7. Joint Responsibility for power generation.
8. To support Research in multi-disciplinary aspects of Environment in identified thrust areas.
9. Better Ambient Water and Air Quality.
10. Prevention of cruelty to animals.

### Functions:

The major functions of the Ministry include:

1. Formulation of national policies on management of environment, forests and wildlife;
2. Implementation of provisions of related legislations on forests, environment and wildlife, control of pollution of air and water, etc.; and
3. Survey and exploration of natural resources particularly of forests, flora, fauna, ecosystems, etc.
4. Bio-diversity conservation including that of lakes and wetlands;
5. Conservation, development, management and abatement of pollution of rivers which includes National River Conservation Directorate;



6. Environmental research and development, education, training, information and awareness;
7. Regulation of diversion of forest land for non forestry purposes;
8. Environmental Impact Assessment;
9. Wildlife conservation, preservation, protection planning, research, education, training and awareness;
10. Afforestation and eco-development;
11. Prevention of cruelty to animals;
12. Administration and Management of subordinate and autonomous institutions of the Ministry; and
13. Monitoring of implementation of central sector and centrally sponsored schemes funded by the Ministry.



## Results-Framework Document (RFD) for Ministry of Environment and Forests (2014-2015)

Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6					
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Target /Criteria Value					
							Excellent	Very Good	Good	Fair	Poor	
1	2	3	4	5	6	7	8	9	10	11	12	
			<b>Green India Mission (3%)</b> (a) Eco restoration/ enhancing tree cover in urban and peri-urban areas/ Agro-forestry and social forestry/ restoration of wet lands including preparatory activities and advance action for plantation. (b) Promoting alternative fuel energy (c) Livelihood Improvement activities	(i) Approval of proposals (% of proposals disposed of within 45 days of receipt) (ii) No. of landscape covered (iii) Extent of Area covered under GIM	Number  Number Ha	0.25  0.75 0.75	21 42 0.096 Lakh ha	19 37 0.086 Lakh ha	17 33 0.077 Lakh ha	15 29 0.067 Lakh ha	13 25 0.057 Lakh ha	
				Number of households adopting Energy Saving Devices.	Number of households	0.50	25,000 Household	23,000 Household	21,000 Household	19,000 Household	17,000 Household	
				Number of Households Covered under GIM	Number of households	0.75	25,000 Household	23,000 Household	21,000 Household	19,000 Household	17,000 Household	

## Results-Framework Document (RFD) for Ministry of Environment and Forests (2014-2015)

Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6				
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Excellent	Very Good	Good	Fair	Poor
1	2	3	4	5	6	7	8	9	10	11	12
			<b>Protection of Forests (8%)</b>								
			Strengthening of forest protection and management in States/ UTs by providing financial assistance	(i) Percentage of proposal approved within 60 days of receipt	%	1.00	90%	80%	70%	60%	50%
				(ii) Utilisation of budget allocation	%	2.00	>90%	>80%	>70%	>60%	Upto 60%
				(iii) Sanction of Creation and Maintenance of Firelines	%	0.75	>90%	>80%	>70%	>60%	Upto 60%
				(iv) Sanction of Engagement of Fire Watchers	%	0.75	>90%	>80%	>70%	>60%	Upto 60%
				(v) Sanction of Construction of Forest Boundary pillars	%	0.75	>90%	>80%	>70%	>60%	Upto 60%
				(vi) Sanction of Construction of field Office/Residence Building.	%	0.75	>90%	>80%	>70%	>60%	Upto 60%
			Technology Based Monitoring of Forest Cover	Publication of Report "India State Forest Report 2013" by the end of 2014-15.	date	1.00	31.01.2015	15.02.2015	28.2.2015	15.3.2015	31.3.2015
2	<b>To control Environmental Pollution by better Environmental Governance, Pollution and Waste management and Restoration of Degraded System</b>	16%	<b>To Increase Awareness among the People about Environmental Issues for their Participation in the Protection of Environment (7%)</b>								
			(a) Support to eco clubs in schools under the National Green Crops programme	Number of eco-clubs functionally assisted	Number	3.0	1,00,000	90,000	80,000	70,000	60,000
			(b) Support to NGOs educational and others institutions under the National Environment Awareness Campaign	Number of local level NGOs, educational and other institutions financially assisted	Number	2	14,000	12,600	11,200	9,800	8,400

## Results-Framework Document (RFD) for Ministry of Environment and Forests (2014-2015)

Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6				
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Excellent	Very Good	Good	Fair	Poor
1	2	3	4	5	6	7	8	9	10	11	12
			(c) Advertising & Publicity for awareness generation through Science Express	Number of visitors to the Science Express: Biodiversity Special	Number	2	6,00,000	5,00,000	4,00,000	3,00,000	2,00,000
			<b>To Improve Management of Hazardous Substances (8%)</b>								
			(a) Setting up of one Treatment, Storage and Disposal Facilities (TSDFs) for Hazardous Wastes/ Bio- Medical Wastes Treatment and Disposal Facilities (CBMWTFs)/ Integrated E-Waste Recycling, Treatment and Disposal Facilities	(i) Inviting proposals from states/UTs	Date	1.0	31/07/2014	31/08/2014	30/09/2014	31/10/2014	30/11/2014
				(ii) Receipt of proposal by the Ministry and evaluation of proposals and field visit by independent empanelled agency	Date	1.0	31/12/2014	15/01/2015	31/01/2015	15/02/2015	28/02/2015
				(iii) Release of financial assistance	Date	1.0	05/03/2015	10/03/2015	15/03/2015	20/03/2015	25/03/2015
			(b) Physical Monitoring of hazard analysis and off-site emergency plans	Review of draft reports	Number	2.0	10	8	6	4	2
			(c) Creating public awareness	Organizing workshops/seminars on chemical accidents management and wastes management	Number	2.0	10	9	8	7	6

## Results-Framework Document (RFD) for Ministry of Environment and Forests (2014-2015)

Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6				
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Excellent	Very Good	Good	Fair	Poor
							100%	90%	80%	70%	60%
1	2	3	4	5	6	7	8	9	10	11	12
			(d) Continuing the implementation of the on-going Capacity Building on Industrial Pollution Management Project (CBIPMP)	(i) Selection of contractor, awarding of contract, in the case of two (2) pilot projects on remediation of hazardous waste and Municipal Solid Waste at NMK and Kadapa sites, respectively in Andhra Pradesh  (ii) Selection of contract, awarding of contract in the case of pilot projects on remediation of municipal solid waste at Dhapa in West Bengal  (iii) Selection of contract, awarding of contract in the case of pilot projects on remediation of hazardous waste site at Hooghly in West Bengal	date  Date  Date	0.5  0.25  0.25	31.10.2014  31.10.2014  31.12.2014	30.11.2014  30.11.2014  31.01.2015	31.12.2014  31.12.2014  28.02.2015	31.01.2015  31.01.2015  15.03.2015	28.02.2015  28.02.2015  31.03.2015
			(e) Initiation of preparation of Detailed Project Report (DPRs) under National Clean Energy Fund (NCEF) for remediation of 10 contaminated sites in six (6) identified States.	(i) Report reconnaissance, preliminary assessment and preliminary investigations of the contaminated sites  (ii) Report on identification of remediation goals/ objectives and preparation of remediation plans	Date  Date	0.5  0.5	31.07.2014  30.11.2014	31.08.14  31.12.2014	30.09.2014  31.01.2015	31.10.2014  28.02.2015	30.11.2014  31.03.2015
3	In situ and Ex-Situ conservation of floral & faunal diversity of the country and identification of new species(12%)	12%	In situ Conservation: Strengthening of infrastructure in protected areas including tiger reserves and elephant reserves	Number of protected areas including tiger reserves and elephant reserves provided financial assistance	Number	7.00	406	370	334	298	262

## Results-Framework Document (RFD) for Ministry of Environment and Forests (2014-2015)

Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6				
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Excellent	Very Good	Good	Fair	Poor
1	2	3	4	5	6	7	8	9	10	11	12
			<b>Ex-situ Conservation of Rare Endangered, Threatened (RET) and Endemic Plants and their multiplication (5%)</b>								
			(a) To provide financial assistance to 14 existing botanic gardens.	Financial assistance provided to existing botanic gardens.	Number	2.5	14	12	10	8	6
			(b) To ensure ex-situ conservation atleast 100 RET and endemic species	Ex-situ Conservation of 100RET and endemic species	Number	2.5	100	80	60	50	40
4	<b>Conservation of Rivers, lakes and wetlands</b>	10%	<b>Conservation of Rivers and Lakes (10%)</b>								
			(a) Treatment of municipal sewage falling into the rivers	Creation of sewage treatment capacity	mld	7	200	180	160	140	120
			(b) Pollution abatement works / rejuvenation of lakes	Number of lakes where works to be completed	Number	2	4	3	2	1	1
			(c) Conservation and management activities in identified wetlands	Conservation and improvement of biodiversity in identified wetlands	Number	1	20	18	16	14	12
5	<b>To conserve and sustainably use biodiversity resources</b>	6%	<b>Survey, Identification and Documentation of Wild Plant Diversity of the Country and identification of new species (3%)</b>								
			(a) Survey of forest ecosystems, protected areas and fragile ecosystems	Number of Field surveys conducted	Number	2.7	60	54	48	42	36
			(b) Digitization of herbarium specimens	Number of Specimens digitized	Number	0.3	5000	4500	4000	3500	3000

Results-Framework Document (RFD) for Ministry of Environment and Forests (2014-2015)

Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6					
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Excellent	Very Good	Good	Fair	Poor	
							100%	90%	80%	70%	60%	
1	2	3	4	5	6	7	8	9	10	11	12	
			<p><b>Survey Identification and Documentation of Wild Faunal Diversity of the Country and identification of new species (3%)</b></p> <p>(a) Survey of forest ecosystems, protected areas and fragile ecosystems</p> <p>(b) Digitization of national zoological collections</p>	<p>Extent of coverage of region/ state/ district/ecosystem/ protected areas</p> <p>Digital Images and Metadata</p>	<p>Number of field surveys conducted</p> <p>Number of specimens digitized</p>	<p>2.7</p> <p>0.3</p>	100	90	80	70	60	
6	<p><b>Coordination of implementation of National Action Plan on Climate Change (NAPCC) &amp; preparation of State Action</b></p>	3%	<p>(a) Coordinate implementation of National Action Plan on climate change.</p> <p>(b) Review and Consideration of State Action Plan on Climate Change and National Steering Committee on Climate Change.</p>	<p>Meetings of the Executive Committee on Climate Change</p> <p>Final approval of State Action Plans on Climate Change</p>	<p>Number</p> <p>Number</p>	1	1	1	1	-	-	
7	<p><b>Joint ** Responsibility for power generation</b></p>	5%	<p>Give necessary support and clearance</p>	<p>Additional Capacity installed</p> <p>Total power generated</p>	<p>MW</p> <p>BU</p>	3	18500	18000	17000	16500	-	-
8	<p><b>To support Research in multi-disciplinary aspects of Environment in identified thrust areas</b></p>	4%	<p>Support of research proposals in identified thrust areas during year 2013-2014</p>	<p>Processing of Research Proposals received until 31th Oct, 2014 for decision-making</p>	<p>Time</p>	4.00	15.01.2015	31.01.2015	15.2.2015	15.3.2015	31.03.2015	
9	<p><b>Better Ambient Water and Air Quality</b></p>	7%	<p>(a) Enhancement of common effluent treatment capacity</p> <p>(b) Notification of standards for additional categories of industries</p>	<p>Additional effluent treatment capacity to be created (MLD)</p> <p>Industrial processes categories to be covered</p>	<p>Mld</p> <p>Number</p>	3.50	45	40.5	36	31.5	24.60	
						3.50	4	3	2	1	0	

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Sl. No	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6				
	Objective	Weight	Actions	Success Indicator	Unit	Weight	Excellent	Very Good	Good	Fair	Poor
1	2	3	4	5	6	7	8	9	10	11	12
10	Prevention of cruelty to animals	1%	Release of funds to the Animal Welfare Board of India	Release of 100% fund meant for AWBI by 31.03.2015	Date	1	28.02.2015	31.03.2015			

**\* Monitoring of the preparation and implementation of National Missions and other Initiatives under NAPCC**

For effective and timely monitoring of the NAPCC and its missions, the Prime Minister's Council has now set up an Executive Committee on Climate Change under the Chairmanship of Advisor to PM. The Executive Committee will be responsible for regular monitoring of the implementation of 8 National mission and other initiatives on Climate Change. PMO also entrusted the responsibility of convening and servicing the Council as well as the Executive Committee to the Ministry of Environment and Forests. Meetings of the PM's Council and the Executive Committee will be convened soon.

\*\* Joint Responsibility has been included as an objective as suggested by ATF in the review meeting although such a responsibility is not appropriate for a Regulatory Ministry such as Ministry of Environment and Forests. However, this objective may be excluded from the RFD for the Ministry of Environment and Forests for the year 2013-14 and this weightage of 5% be equally distributed amongst the other five objectives.

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**MANDATORY SUCCESS INDICATORS**

Sl. No	Objective	Weight	Actions	Success Indicators	Unit	Weight	Target /Criteria Value				
							Excellent	Very Good	Good	Fair	Poor
1	2	3	4	5	6	7	8	9	10	11	12
11	Efficient Functioning of the RFD System	3%	(a) Timely submission of draft RFD 2013-14 for approval (b) Timely submission of results	On-time submission	date	2.00	March 5, 2014	March 6, 2014	March 7, 2014	March 8, 2014	March 11, 2014
12	Improving Internal Efficiency of/ Responsiveness/ Transparency/ Service Delivery of the Ministry/ Department	6%	Update departmental strategy to align with 12th Plan priorities Independent Audit of implementation of Citizen's Charter Independent Audit of implementation of Public Grievance Redressal System	On-time submission Timely updation of the Strategy % of implementation % of implementation	date Date %	1.00 2.00 2.00	May 1, 2014 Sep 10, 2014 100	May 2, 2014 Sep 17, 2014 95	May 3, 2014 Sep 24, 2014 90	May 6, 2014 Oct 1, 2014 85	May 7, 2014 Oct 8, 2014 80
13	Administrative Reforms	6%	(a) Implement mitigating strategies for reducing potential risk of corruption (b) Implement ISO 9001 as per the approved action plan (c) Implement Innovation Action Plan (IAP)	% of implementation % of implementation % of agreed milestones achieved	% % %	1.00 2.00 2.00	100 100 100	95 95 95	90 90 90	85 85 85	80 80 80
			(d) Identification of core and non-core activities of the Ministry/ Departments as per 2nd ARC recommendations	Timely Submission	Date	1.00	Oct 1, 2014	Oct 15, 2014	Oct 30, 2014	Nov 10, 2014	Nov 20, 2014
Total Weight = 15%											



### SECTION 3: Trend values of the success indicators

Sl. No.	Objective	Action	Success Indicator	Unit	Actual value for FY 12/13	Actual Value for FY 13/14 (Anticipated)	Target Value for FY 14/15	Projected Value for FY 15/16	Projected Value for FY 16/17
1	Improve forest and tree cover to 33% of the geographical area of the country through programmatic interventions	Afforestation and Regeneration of Degraded Forests  (a) Approval of State Forest Development Agency proposals for regeneration of degraded forests	(i) Approval of State Forest Development Agency proposals within 45 days of receipt  (ii) Extent of treatment area for which NAP projects approved	Number  Ha	27  0.56 lakh	27  0.81 lakh	27  0.50 lakh Ha	27  0.50 lakh	27  0.50 lakh
		(b) Mainstreaming livelihood issues with afforestation programmes	Employment generation – number of man-days generated	No. (mandays)	17.70 Million	17.26 Million	16 Million	16 Million	16 Million
		<b>Green India Mission</b>	(i) Approval of state project proposals within 45 days of receipt  (ii) No. of landscape covered  (iii) Extent of Area covered under GIM	Number  Number  Ha	0  0  0	0*  0*  0*	21  42  0.096 lakh ha.	28  352  1.113 lakh ha.	28  397  1.196lakh ha
		(b) Promoting alternative fuel energy	No. of household adopting Energy Saving Devices.	Number	0	0*	25000 household	50,000 household	75,000 household
		(c) Livelihood improvement activities	No. of Households covered under GIM	Number	0	0*	25000 household	50,000 household	75,000 household



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Sl. No.	Objective	Action	Success Indicator	Unit	Actual Value for FY 12/13	Actual Value for FY 13/14 (Anticipated)	Target Value for FY 14/15	Projected Value for FY 15/16	Projected Value for FY 16/17
		<b>Protection of Forests</b>	Major physical indicators in the proposals approved are-	%	>90%	>90%	>90%	>90%	>90%
		(a) Strengthening of forest protection and management in States/ UTs by providing financial assistance	(i) Percentage of proposal approved within 60 days of receipt	%	94.81%	>90%	>90%	>90%	>90%
			(ii) Utilisation of budget allocation	%	>90%	>90%	>90%	>90%	>90%
			(iii) Sanction of Creation and Maintenance of Firelines	%	>90%	>90%	>90%	>90%	>90%
			(iv) Sanction of Engagement of Fire Watchers	%	>90%	>90%	>90%	>90%	>90%
			(v) Sanction of Construction of Forest Boundary pillars	%	>90%	>90%	>90%	>90%	>90%
			(vi) Sanction of construction field Office/Residence building	%	>90%	>90%	>90%	>90%	>90%
		(b) Technology based Monitoring of Forest Cover	Publication Report "India State of Forest Report 2013" by the end of 2013-14.	Date	Feb. 2012 (Report of 2011)	July, 2014	Dec. 2015	No Report	Dec. 2017
2	<b>To control Environmental Pollution by better Environmental Governance, Pollution and Waste management and Restoration of Degraded System</b>	<b>To Increase Awareness among the People about Environmental Issues for their Participation in the Protection of Environment</b>	Number of eco-clubs functioning in NGC schools financially assisted	Number	95,350	86,387	1,00,000	1,00,000	1,00,000
		(a) Support to eco-clubs in schools under the National Green Corps Programme	Number of local level NGOs, educational and other institutions financially assisted	Number	13,457	13,911	14,000	14,000	14,000
		(b) Support of NGOs, educational and other institution under the National Environment Awareness Campaign	Number of visitors to the Science Express: Biodiversity Special	Number	24,00,000	22,00,000	6,00,000	-	-
		(c) Advertising & Publicity for awareness generation through Science Express	Release of financial assistance for ongoing or new facilities	Number	1	2*	1	1	1
		<b>To Improve Management of Hazardous Substances</b>							
		(a) Setting up of one Treatment, Storage and Disposal Facilities (TSDFs) for Hazardous Wastes/ Bio- Medical Wastes Treatment and Disposal Facilities (CBMWTFs)/ Integrated E-Waste Recycling, Treatment and Disposal Facilities							

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Sl. No.	Objective	Action	Success Indicator	Unit	Actual value for FY 12/13	Actual Value for FY 13/14 (Anticipated)	Target Value for FY 14/15	Projected Value for FY 15/16	Projected Value for FY 16/17
		(b) Implementation of GIS based inventorisation system for hazardous wastes	To have GPS for 5000 industries in different States	Number	5000	4000	-	-	-
		(c) Physical Monitoring of hazard analysis and off-site emergency plans	Review of draft reports	Number	0	0	10	10	10
		(d) Creating public awareness	Organizing workshops/seminars on chemical accidents management and wastes management	Number	10	4*	10	10	10
3	<b>In situ and Ex-Situ conservation of floral &amp; faunal diversity of the country and identification of new species</b>	<b>In situ Conservation:</b> Strengthening of infrastructure in protected areas including tiger reserves and elephant reserves	Number of protected areas including tiger reserves and elephant reserves provided financial assistance	Number	400	402	406	406	407
		<b>Ex-situ Conservation of Rare Endangered, Threatened (RET) and Endemic Plants and their multiplication</b>							
		(a) To provide financial assistance to 14 existing botanical gardens	Financial assistance provided to existing botanical gardens and lead botanical gardens	Number	12	12	14	14	14
		(b) To ensure ex-situ conservation of atleast 100 RET and endemic species	Ex-situ conservation of RET and endemic species	Number	100	100	100	100	100
4	<b>Conservation of Rivers, lakes and wetlands</b>	(a) Treatment of municipal sewage falling into the rivers	Creation of sewage treatment capacity	mld	119	188	200	175	250
		(b) Pollution abatement works / rejuvenation of lakes	Number of lakes where rejuvenation works to be completed	Number	1	4	4	2	2
		(c) Conservation and management activities in identified wetlands	Conservation and improvement of biodiversity in identified wetlands			18			
5	<b>To conserve and sustainably use biodiversity resources</b>	<b>Survey, Identification and Documentation of Wild Plant Diversity of the Country and identification of new species</b>							
		(a) Survey of forest ecosystems, protected areas and fragile ecosystems	Extent of coverage of region/state/district/ecosystem/protected areas	Number of field surveys conducted	72	90	60	60	60
		(b) Digitization of herbarium/botanical specimens	Digital Images and Metadata	Number of specimens digitized	4200	8316	5,000	5,000	5,000

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Sl. No.	Objective	Action	Success Indicator	Unit	Actual value for FY 12/13	Actual Value for FY 13/14 (Anticipated)	Target Value for FY 14/15	Projected Value for FY 15/16	Projected Value for FY 16/17
		<b>Survey Identification and Documentation of Wild Faunal Diversity of the Country and identification of new species</b> (a) Survey of forest ecosystems, protected areas and fragile ecosystems (b) Digitization of national zoological collections	Extent of coverage of region/state/district/ ecosystem/protected areas  Digital images and Metadata	Number of field surveys conducted  Number of specimens digitized	148  10000	115  10,124	100  10,000	100  10,000	100  10,000
6	<b>Coordination of implementation of National Action Plan on Climate Change (NAPCC) &amp; preparation of State Action</b>	a) Monitoring of the preparation and implementation of National Missions under NAPCC  b) Review and Consideration of State Action Plan on Climate Change by Expert Committee on Climate Change and National Steering Committee on Climate Change	Meeting of the Executive Committee on Climate Change  Final approval of State Action Plans on Climate Change	Number  Number	1  9	1  9	1  9	1  10	1  10
7	<b>Joint ** responsibility for power generation</b>	Give necessary support and clearance	Additional Capacity installed  Total power generated	MW  BU			18,000  1,000		
8	<b>To support Research in multi-disciplinary aspects of Environment in identified thrust areas</b>	Support of research proposals in identified thrust areas during year 2013-2014	Processing of Research Proposals received until 31st Oct, 2014 for decision-making	Time	-	15.01.2014	15.1.2015	15.01.2016	15.1.2017
9	<b>Better Ambient Water and Air Quality</b>	(a) Enhancement of common effluent treatment capacity  (b) Notification of standards for additional categories of industries	MLD value created  Industrial processes categories to be covered	Mld  Number	43  4	24  4	30  4	30  4	35  4
10	<b>Prevention of cruelty to animals</b>	Release of funds to the Animal Welfare Board of India	Release of 100% fund meant for AWBI by 31.03.2015	Date					

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Sl. No.	Objective	Action	Success Indicator	Unit	Actual value for FY 12/13	Actual Value for FY 13/14 (Anticipated)	Target Value for FY 14/15	Projected Value for FY 15/16	Projected Value for FY 16/17
11	Efficient Functioning of the RFD System	(a) Timely submission of draft RFD 2013-14 for approval (b) Timely submission of results	On-time submission On-time submission	Date Date			05.03.2014 01.05.2014		
12	Improving Efficiency of Internal of/ Responsiveness/Service Delivery of the Ministry	Update departmental strategy to align with 12th Plan priorities Independent Audit of implementation of Citizen's Charter Independent Audit of implementation of Public Grievance Redressal System	Timely updation of the Strategy % of implementation % of implementation	Date % %					
13	Administrative Reforms	Implement mitigating strategies for reducing potential risk of corruption Implement ISO 9001 as per the approved action plan Implement Innovation Action Plan (IAP) Identification of core and non-core activities of the Ministry/ Departments as per 2nd ARC recommendations	% of implementation % of implementation % of agreed milestones achieved Timely Submission	% % % Date					

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**Section 4:  
Acronym**

SI. No	Acronym	Description
1	BSI	Botanical Survey of India
2	FDA	Forests Development Agencies
3	JFMCs	Joint Forest Management Committee
4	MoEF	Ministry of Environment & Forests
5	NAP	National Afforestation Programme
6	NAPCC	National Action Plan on Climate Change
7	RET	Rare Endangered Threatened
8	ZSI	Zoological Survey of India
9	NGC	National Green Crops programme



## SECTION 4:

### Description and Definition of Success Indicators and Proposed Measurement Methodology

Apart from formulation of policies related to environment and forest conservation and implementation of the provisions of various related legislations, the Ministry releases funds to the State Governments, NGOs and private institutions under the various central sector and centrally sponsored schemes being implemented by the Ministry. The success of utilization of funds earmarked for various schemes and completion of physical targets depends on the actions completed by the agencies concerned as per the time lines fixed by the Ministry. Many times because of non-receipt of utilization certificates and physical progress reports in time for the funds released previously, the Ministry is not able to release further installments and achieve the targets in full.

As far as environment is concerned, the ambient quality of air and water depends upon the actions of all the diverse players in the society. The pace of development, industrial growth and urbanization, together with the changing lifestyles of the people, make it impossible for any agency to set quantifiable targets for a short time frame of a year. The description of some of the success indicators is given below:

S. No.	Success Indicator	Description	Definition	Measurement	General Comments
1.	Approval of State FDA proposals within 45 days of receipt	Till 2009-2010, the Ministry has been inviting proposals from each of the Forest Development Agencies (a conglomeration of the Joint Forest Management Committees (JFMC) at Forest Division level) and processing the same for release of financial assistance as per the guidelines approved by the Ministry. From 2010-11 onwards, the MoEF revised the guidelines for constituting State FDAs by the State Governments which will analyze each of the FDA proposal and recommend to the Ministry for release of financial assistance. Hence, the Ministry would approve only one proposal for the whole state.	Proposals received from Forest Development Agencies (FDA) for release of financial assistance for afforestation activities.	Number of proposals approved.	
2.	Extent of treatment area for which NAP projects approved	Under the National Afforestation Programme, the forest areas are managed (as per the treatment action plan)/ treated by the JFMCs. A number of activities are taken up in the area to be treated (soil and moisture conservation, raising of nursery stock and plantation, protection including fire protection, etc.)	Forest Areas managed/treated by JFMCs under the National Afforestation Programme (NAP)	Area treated in Hectares.	
3.	Employment generation – number of man-days generated	The work is executed by the members of the JFMCs and they are paid wages, apart from sharing of benefits available from the forest area, as per the guidelines issued and the wage rates fixed by the State Government.	Employment generated by execution of work by the members of JFMCs under NAP.	Number of man-days generated	

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S. No.	Success Indicator	Description	Definition	Measurement	General Comments
4.	Number of proposals approved within 60 days of receipt	State/UTs submit Annual Work Plan Proposals under Centrally Sponsored Scheme: Intensification of Forest Management which is placed before the screening committee for scrutiny and recommendations. Sometimes more than one proposal is received from States/UTs. For timely execution it is important that funds are released to States/UTs without delay. This indicator will measure the promptness of processing the proposals received from States/UTs	Number of days is calculated from the date of receipt of complete proposals from States/UTs and date of sanction of Screening Committee.	Measured in number of days. If more than one proposal is received from a State/UT, weighted average of the number of days is taken to clear the proposal will be considered.	Complete proposals will be required from States/UTs before any action is initiated in the Ministry. Counting of days will begin from the receipt of such complete proposals.
5.	Utilization of budget in percentage terms	This success indicator is percentage of budget allotted for implementation of Centrally Sponsored Scheme IFMS released to States/UTs. Indicates financial achievement by the Forest Protection Division on a gross level.	Percentage of net amount released after adjusting unspent balance or revaluated amount.	Measured as Percentage of amount released to Budget Estimates/ Revised Estimates	
6.	Creation and maintenance of firelines (with respect to BE)	Creation and maintenance of firelines is one of the important activities through which state/UT Forest Departments execute fire protection works well in time before the fire season starts. It is an indicator of preparedness for fire prevention and control.	New Firelines created or old firelines maintained by removal of vegetation or debris.	Number of kilometers of work done.	
7.	Engagement of Firewatchers	Human Resource is one of the key inputs for fire prevention and control in case there is a break-out of fire. Manpower is required for regular patrolling of forest, intelligence gathering, managing communication, equipments and firewatch towers and preparations of teams to quickly respond whenever there is a fire in the forest.	Persons engaged for forest fire activities like fire watchers, wireless operators, fire fighting and fire prevention teams etc.	Number of man-days of employment created in financial year.	
8.	Construction of Forest Boundary pillars (With respect to BE)	Boundary Pillar is one of the important methods by which boundary of forest land is demarcated in the ground according to authorized forest maps. They are extremely important for consolidating forest boundary and identification so as to prevent any ingress by any person.	Boundary pillars constructed as per the norms and guidelines of the State/UT Forest Departments as approved by the concerned working plans.	% of physical quantity sanctioned with respect to the BE.	
9.	Construction of field Officer/ Residence Buildings (With respect to BE)	Forests are generally present in remote and inaccessible areas may of which do not have proper living facilities nearby. Officers and residential buildings are necessary so that staff is able to function from the vicinity of these forests so that they have better supervisions and they are able to respond quickly. In addition, staying in their jurisdiction increases contact of forest staff with local people which is extremely necessary for better protection and management of forests. It will also aid in improving the quality of execution of development works.	Buildings constructed for the purpose of offices, residences, nakas, checkposts, protection camps, labour camps, barracks, etc. as per the guidelines of the scheme.	% of physical quantity sanctioned with respect to the BE.	
10.	Publication of Report "India State of Forest Report 2013" by the end of 2013-14	Forest Survey of India does biennial survey of the forest cover of the country and publishes India State of Forest Report. The 13th Report is due in the current year 2013-14. The last report was published in 2011.	The report India State of Forest Report is the outcome of survey and inventorisation of the forests of the country. The report also gives among other data, details of the change of forest and tree cover State/ UT wise, status of bamboo in forests and forest carbon stock in the country.	Publication of the report.	
11.	Creation of sewage treatment capacity	The Ministry provides financial assistance to the State Governments for creation of sewage treatment plants under the National River Conservation Plan.	Treatment of municipal sewage falling into the river (creation of additional capacity)	Mld (million liter daily)	

S. No.	Success Indicator	Description	Definition	Measurement	General Comments
12.	Lakes where works to be completed	The Ministry provides financial assistance to the State Governments for conservation of lakes which include activities like catchment area treatment, protection, creation of capacity for sewage treatment under the National Lakes Conservation Plan and the achievement is assessed based on the financial assistance released and activities completed by the State Governments.	Works relating to conservation of Lakes such as catchment area treatment, protection, creation of capacity for sewage treatment.	Number	
13.	Number of Protected Areas including Tiger Reserves and Elephant Reserves provided financial assistance	For in situ conservation of wildlife, the Ministry provides financial assistance to the State Governments under three Centrally Sponsored Schemes, viz., Project Tiger, Project Elephant and Integrated Development of Wildlife Habitats. The activities are executed by the State Governments and progress is monitored through receipt of physical progress reports as well as inspections by the officials.	Financial assistance to the State Governments under three Centrally Sponsored Schemes, viz., Project Tiger, Project Elephant and Integrated Development of Wildlife Habitats (in the natural habitats)	Number	
14.	Financial assistance provided to existing Botanic Gardens and Lead Botanic Gardens	For ex situ conservation of RET species of plants, under the 'Assistance to Botanic Gardens Scheme', financial and technical assistance is provided for maintenance of the existing botanic gardens in the public and private sector.	Financial and technical assistance for maintenance of the existing botanic gardens in the public and private sector.	Number	
15.	Eco Clubs in NGC schools across the country financially assisted	Through Eco club of NGC programme, inculcation of environment friendly attitude and behavioural pattern among the students is the main target. Each district can have maximum 250 eco clubs. In this programme each eco club get a financial assistance @ Rs. 2500	Every recognized school, with classes up to the Xlith standard, is eligible to start and Eco-club. Eco-clubs set up in schools registered as members of NGC.	Number	The phenomenal response that NGC has received has made the network of more than 1,00,000 Eco club. Numbers of Eco clubs are increasing with the passing years.
16.	Local level NGOs, educational and other institutions financially assisted	NGO's educational and other institutions are the main agencies who apply in the NEAC programme. Agencies whose proposals gets recommended gets financial assistance to conduct seminar, workshops, rallies padyatras etc. to spread environmental awareness	Participating agencies are the Non-governmental organizations, schools, colleges, women and youth organization, government department etc. who participate in conducting themes based action and awareness component to spread environment awareness.	Number	Number of participating agencies is increasing with the passing years.
17.	Extent of coverage of Region/State/District/ Ecosystem/Protected Areas	The Botanical Survey of India and Zoological Survey of India undertake field survey visits in protected areas/ different eco-systems for exploration, collection, identification and documentation of flora and fauna. The achievement is assessed by the number of survey visits undertaken, specimens collected and identified, new species to the science and new records for the country discovered and documentation prepared.	Field survey undertaken in protected areas/ different eco-systems for exploration, collection, identification and documentation of flora and fauna	Number of field surveys conducted	

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S. No.	Success Indicator	Description	Definition	Measurement	General Comments
18.	Digital Images and Metadata	Under the e-Governance Programme of the Ministry, it has been decided to digitize the plant and animal specimens available with the BSI and ZSI for detailed scientific studies by the scientists located in different parts of the country and putting the same on the website for use by the interested students and others.	Digitization of the plant and animal specimens available with the BSI and ZSI.	Number of Specimens digitized	
19.	Additional effluent treatment capacity to be created (MILD)	For improving the quality of water, assistance is provided for creation of effluent treatment capacity. The achievement can be assessed based on the percentage of physical work completed by the implementing agencies in the state governments.	Additional effluent treatment capacity created by financial assistance	Mld	
20.	New industrial categories to be covered	Under the Environment (Protection) Act, the Ministry notifies standards for various categories of industries.	Standards notified for various new industrial categories	Number	
21.	Inviting proposal from States for improving management of hazardous substances	Proposals are invited from the States/UTs, evaluated in the Ministry and financial assistance is released. The Ministry will write to States/UTs about the scheme under which financial assistances is being provided for setting up facilities for treatment, storage and disposal of the waste. The proposals are considered on first come first basis and as per the criteria laid down in the Scheme. Preference is given to States/UTs, which do not have such facilities.	Proposals received from states government for setting up of treatment, storage and disposal facilities for hazardous and bio-medical wastes and awarding studies on hazard analysis, rapid safety audit and off-shore emergency plan.	Date	
22.	To enhance coverage to new States	The Ministry provides financial assistance for implementation of GIS based inventorisation of hazardous wastes.	Financial assistance for implementation of GIS based inventorisation of hazardous wastes in different states.	Date	
23.	Programs workshops/seminars on Chemical Accidents and Wastes Management	For creating awareness among the public on chemical accidents and wastes management, the Ministry provides financial assistance for organising workshops/seminars.	Financial assistance for organising workshops/seminars for creating awareness among the public on chemical accidents and waste management.	Number	
24.	Meeting of Executive Committee for Climate Change	Prime Minister's Council on Climate Change has set up a Executive Committee for coordinating and review of implementation of eight-national missions under National Action Plan on Climate Change (NAPCC).	Meeting of the Executive Committee for implementation of eight-national missions on NAPCC.	Number	

## SECTION 5: Specific Performance Requirement from other Departments

S. No.	Location Type	State	Organization Type	Organization Name	Relevant Success Indicator	What is your requirement from this organization	Justification for this requirement	Please quantify your requirement from this Organization	What happens if your requirement is not met
1	State Government	All States	Society	State Forest Development Agency	Percentage of proposals approved within 60 days of receipt.	Timely submission of proposal for release of financial assistance for taking up afforestation activities through joint Forest Management Committees (JMCS)	Without timely received of proposals from the SFDAs the National Afforestation Programme cannot be implemented.	Number of Proposals	The implementation of the programme get delayed
2	State Government	All States	Departments	State Departments	Creation and Maintenance of Firelines (With respect of BE)	State Forest Departments are implementing agencies for the intensification of Forest Management Schemes and actual outcomes of the scheme will depend on the implementation of the States.	Centre provides funds under the schemes after approving their plan. Execution, supervision and monitoring are done by the States.	1. Timely submission of Complete Annual Work Plans. 2. Prompt implementation of the activities approved for the purpose sanctioned and of good and acceptable quality. 3. timely reporting of progress of implementation.	1. The funds released by the Division will not be utilized by the States and results in balance. 2. The outcomes intended to aid to help in forest protection will not be met. Therefore, it will have negative impact on the same.
3	State Government	All States	Departments	State Departments	Engagement of Fire Watchers (With respect of BE)	State Forest Department are the implementing agencies for the Intensification of Forest Management Scheme and actual outcomes of the scheme will depend on the implementation of the states.	Centre provides funds under the scheme after approving their plan. Execution, supervision and monitoring are done by states.	1. Timely submission of Complete Annual Work Plans. 2. Prompt implementation of the activities approved for the purpose sanctioned and of good and acceptable quality. 3. timely reporting of progress of implementation	1. The funds released by the Division will not be utilized by the States and results in balance. 2. The outcomes intended to aid to help in forest protection will not be met. Therefore, it will have negative impact on the same.

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S. No.	Location Type	State	Organization Type	Organization Name	Relevant Success Indicator	What is your requirement from this organization	Justification for this requirement	Please quantify your requirement from this Organization	What happens if your requirement is not met
4	State Government	Assam and other States/UTs	Departments	State Departments	Construction of Forest Boundary pillars	State Forest Department are the implementing agencies for the Intensification of Forest Management Scheme and actual outcomes of the scheme will depend on the implementation of the states.	Centre provides funds under the scheme after approving their plan. Execution, supervision and monitoring are done by states.	1. Timely submission of Complete Annual Work Plans. 2. Prompt implementation of the activities approved for the purpose sanctioned and of good and acceptable quality. 3. timely reporting of progress of implementation	1. The funds released by the Division will not be utilized by the States and results in balance. 2. The outcomes intended to aid to help in forest protection will not be met. Therefore, it will have negative impact on the same.
5	State Government	Assam and other States/UTs	Departments	State Departments	Construction of field Officer/Residence Building	State Forest Department are the implementing agencies for the Intensification of Forest Management Scheme and actual outcomes of the scheme will depend on the implementation of the states.	Centre provides funds under the scheme after approving their plan. Execution, supervision and monitoring are done by states.	1. Timely submission of Complete Annual Work Plans. 2. Prompt implementation of the activities approved for the purpose sanctioned and of good and acceptable quality. 3. timely reporting of progress of implementation	1. The funds released by the Division will not be utilized by the States and results in balance. 2. The outcomes intended to aid to help in forest protection will not be met. Therefore, it will have negative impact on the same.
6	State Government	Assam and other States/UTs	Departments	State Departments	Setting up of treatment, storage and disposal facilities (TSDFs) for hazardous Wastes / Bio- Medical Wastes Treatment and disposal facilities (CBMWTFs) / Integrated E-Waste Recycling, Treatment and Disposal Facilities	Proposals from State Govt./ UTs	These proposals are only received from State Govt.	Number of Proposals	The implementation of the programme get delayed

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S. No.	Location Type	State	Organization Type	Organization Name	Relevant Success Indicator	What is your requirement from this organization	Justification for this requirement	Please quantify your requirement from this Organization	What happens if your requirement is not met
7	State Government	Assam and other States/UTs	Departments	State Departments	Release of financial assistance for Setting up of treatment, storage and disposal facilities (TSDFs)	Release of matching contribution from state/UTs	Proposal considered and release of grant is subject to matching contribution	Release of matching contribution	Get delayed
8	Central Government	-	Ministry	Ministry of New & Renewable Energy	Monitoring of the preparation and implementation of National Missions and other Initiatives under NAPCC	Proper coordination, cooperation and timely action in completing formulation of the mission documents and implementation of the activities under them by the nodal ministries identified for each mission.	Without their support this programme can not be successful	Implementation of activities under the nodal ministry identify the each mission	Without their support this programme can not be successful
9	Central Government		Ministry	Ministry of Earth Sciences	Monitoring of the preparation and implementation of National Missions and other Initiatives under NAPCC	Proper coordination, cooperation and timely action in completing formulation of the mission documents and implementation of the activities under them by the nodal ministries identified for each mission.	Without their support this programme can not be successful	Implementation of activities under the nodal ministry identify the each mission	Without their support this programme can not be successful
10	Central Government		Ministry	Ministry of power	Monitoring of the preparation and implementation of National Missions and other Initiatives under NAPCC	Proper coordination, cooperation and timely action in completing formulation of the mission documents and implementation of the activities under them by the nodal ministries identified for each mission.	Without their support this programme can not be successful	Implementation of activities under the nodal ministry identify the each mission	Without their support this programme can not be successful

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S. No.	Location Type	State	Organization Type	Organization Name	Relevant Success Indicator	What is your requirement from this organization	Justification for this requirement	Please quantify your requirement from this Organization	What happens if your requirement is not met
11	Central Government		Ministry	Ministry of Water Resources	Monitoring of the preparation and implementation of National Missions and other Initiatives under NAPCC	Proper coordination, cooperation and timely action in completing formulation of the mission documents and implementation of the activities under them by the nodal ministries identified for each mission.	Without their support this programme can not be successful	Implementation of activities under the nodal ministry identify the each mission	Without their support this programme can not be successful

## Section 6: Outcome/ Impact of activities of department ministry

S. No.	Outcome/impact	Jointly responsible for influencing this outcome/impact with the following organisation(s)/departments/ ministry(ies)	Success Indicator(s)	Unit	2012-13	2013-14	2014-15	2015-16	2016-17
1	Improved forest and tree cover in the country	Ministry of Rural Development, Ministry of Tribal Affairs, Ministry of Agriculture, Ministry of New Renewable Energy, State Governments, Local Bodies							
2	Conserve and Sustainably use biodiversity resources	State Governments/ UTs, Ministry of Agriculture, Health & Family Welfare, Biotechnology, Rural Development, Science and Technology, Tribal Affairs etc.	Increase in population of important species like tiger						
3	Improved quality of water in identified water bodies	Ministry of Water Resources, Ministry of Agriculture and State Governments	TBD						
4	Control environmental pollution	State Pollution Control Boards	TBD						
5*	Enhancing the provision of water in major streams	State Governments/UTs, Ministry of Water Resources, Central Water Commission							
6*	Increase in ground water level	State Governments/UTs, Ministry of Water Resources, Ministry of Drinking Water, Central Water Commission							

\* These outcomes pertain primarily to other Ministries. The Ministry of Environment and Forests only plays a supportive role in the achievement of these objectives. Therefore the success indicators for these outcomes may be developed by the Ministry which is chiefly concerned with these objectives i.e. the Ministry of Water Resources.

