



# ANNUAL REPORT

## 2016-17



Government of India  
Ministry of Environment, Forest and Climate Change



All Birds find shelter during a rain.  
But Eagle avoids rain by flying above the Clouds.  
Problems are common, but attitude makes the difference!!!

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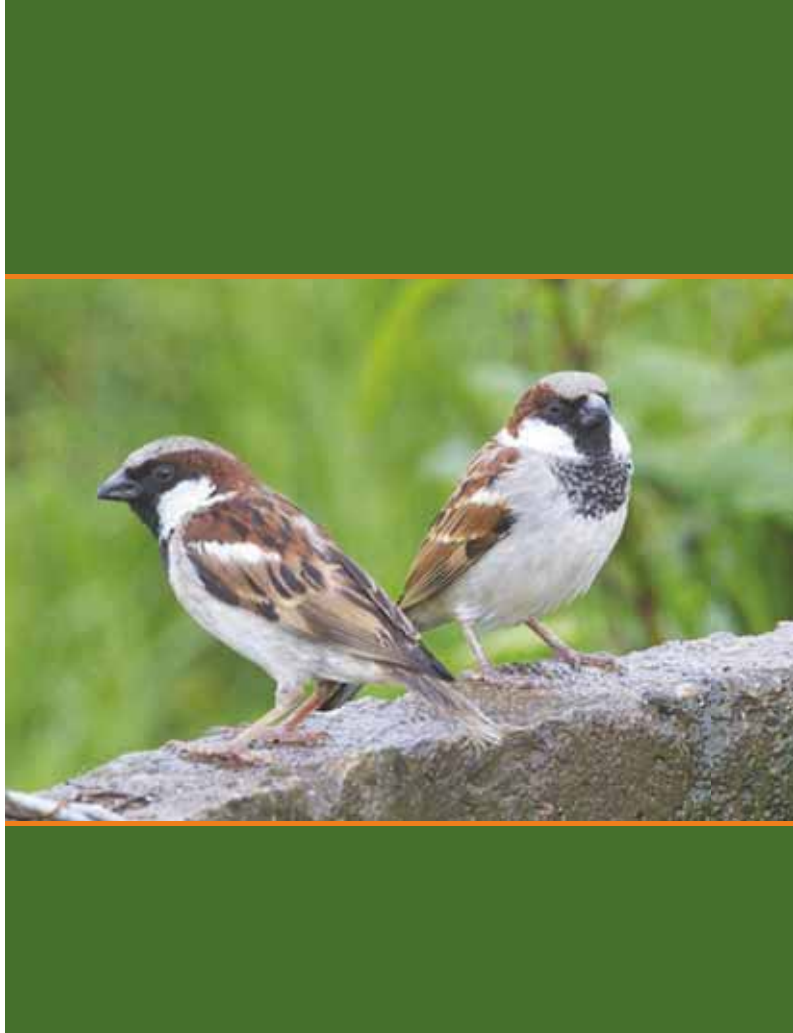
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# ANNUAL REPORT 2016-17



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



## CONTENTS

Sl. No.	Chapter	Page No.
	<b>Abbreviations</b>	<b>v</b>
	<b>Role and Mandate of the Ministry</b>	<b>vii</b>
	<b>Major Achievements</b>	<b>xi</b>
<b>1.</b>	<b>Natural Resources - Survey and Exploration</b>	<b>1</b>
1.1	Botanical Survey of India (BSI)	2
1.2	Zoological Survey of India (ZSI)	6
1.3	India Integrated Coastal Zone Management (ICZM)	9
1.4	Survey and Utilization (SU)	17
<b>2.</b>	<b>Conservation</b>	<b>29</b>
2.1	Biodiversity Conservation	30
2.2	Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP)	38
2.3	Mangroves & Coral Reefs	40
2.4	Biosphere Reserves	40
2.5	All India Coordinated Project on Capacity Building in Taxonomy (AICOPTAX)	42
2.6	Assistance to Botanical Gardens	43
2.7	Forest Conservation	46
2.8	Forest Establishment	46
2.9	Strengthening of Forest	47
2.10	Forest Policy	50
2.11	Forest Protection	52
2.12	Wildlife Conservation	52
2.13	Wildlife Crime Control Bureau	53
2.14	Central Zoo Authority	53
2.15	Project Elephant	55
2.16	National Tiger Conservation Authority (NTCA)	56
2.17	Animal Welfare	57
<b>3.</b>	<b>Environmental Impact Assessment</b>	<b>61</b>
<b>4.</b>	<b>Abatement of Pollution</b>	<b>65</b>
4.1	Control of Pollution	66
4.2	Central Pollution Control Board	69
4.3	Hazardous Substances Management	76



4.4	Fly Ash Utilization	83
4.5	Development & Promotion of Clean Technology	88
<b>5.</b>	<b>Conservation of Water Bodies</b>	<b>91</b>
5.1	National River Conservation Plan (NRCD)	92
5.2	Conservation of Lakes	95
<b>6.</b>	<b>Regeneration and Eco-development</b>	<b>99</b>
6.1	National Afforestation and Eco-development Board (NAEB)	100
6.2	National Green India Mission	102
<b>7.</b>	<b>Research</b>	<b>105</b>
7.1	Research in Environment	106
7.2	Ecologically Sensitive Areas	108
7.3	National Natural Resource Management System (NNRMS)	114
7.4	G.B. Pant Institute of Himalayan Environment and Development (GBPIHED)	117
7.5	Forestry Research	122
7.6	Wildlife Institute of India	137
<b>8.</b>	<b>Education and Awareness</b>	<b>143</b>
8.1	Environmental Education, Awareness and Training	144
<b>9.</b>	<b>Centres of Excellence</b>	<b>151</b>
9.1	Centre for Environment Education (CEE)	152
9.2	CPR Environment Education Centre (CPREEC)	153
9.3	Centre for Ecological Science (CES)	153
9.4	Salim Ali Centre for Ornithology and Natural History (SACON)	154
9.5	Centre for Environment Management of Degraded Ecosystem (CEMDE)	156
9.6	Madras School of Economics (MSE)	159
9.7	Foundation for Revitalization of Local Health Traditions (FRLHT),	160
<b>10.</b>	<b>Environmental Information</b>	<b>163</b>
10.1	Environmental Information System	164
10.2	Statistical Cell	167
10.3	Non-Governmental Organization (NGO) Cell	169
<b>11.</b>	<b>Legislation and Institutional Support</b>	<b>171</b>
11.1	Policy and Law	172
11.2	National Green Tribunal (NGT)	172
11.3	Economic Cell	173
11.4	Trade and Environment	173



<b>12. Climate Change</b>	<b>175</b>
12.1 Climate Change	176
12.2 Ozone Layer Protection	183
12.3 United Nations Convention to Combat Desertification	192
<b>13. International Cooperation and Sustainable Development</b>	<b>195</b>
13.1 International Cooperation	196
13.2 Sustainable Development	205
13.3 Externally Aided Projects/North-East Cell	207
<b>14. Administration and Civil Construction</b>	<b>209</b>
14.1 Administration	210
14.2 Indian Forest Service (IFS) Cadre Management	212
14.3 Vigilance	214
14.4 Parliament	215
14.5 Information Technology and e-Governance	218
14.6 Right to Information (RTI) Cell	219
14.7 General Administration	220
14.8 Public Grievance Cell	220
14.9 Implementation of Official Language Policy	220
1.10 Civil Construction Unit (CCU)	221
<b>15. Plan Coordination and Budget</b>	<b>223</b>
<b>16. Annexures</b>	<b>226</b>
Annexure-I – Significant Audit Paras as per Report No. 30 of 2016	226
Annexure-II – Organization Structure (Environment Sector)	227
Annexure-III – Organization Structure (Forestry & Wildlife Sector)	228
Annexure-IV – List of wetlands of International Importance from India under Ramsar Convention	229



## Abbreviations

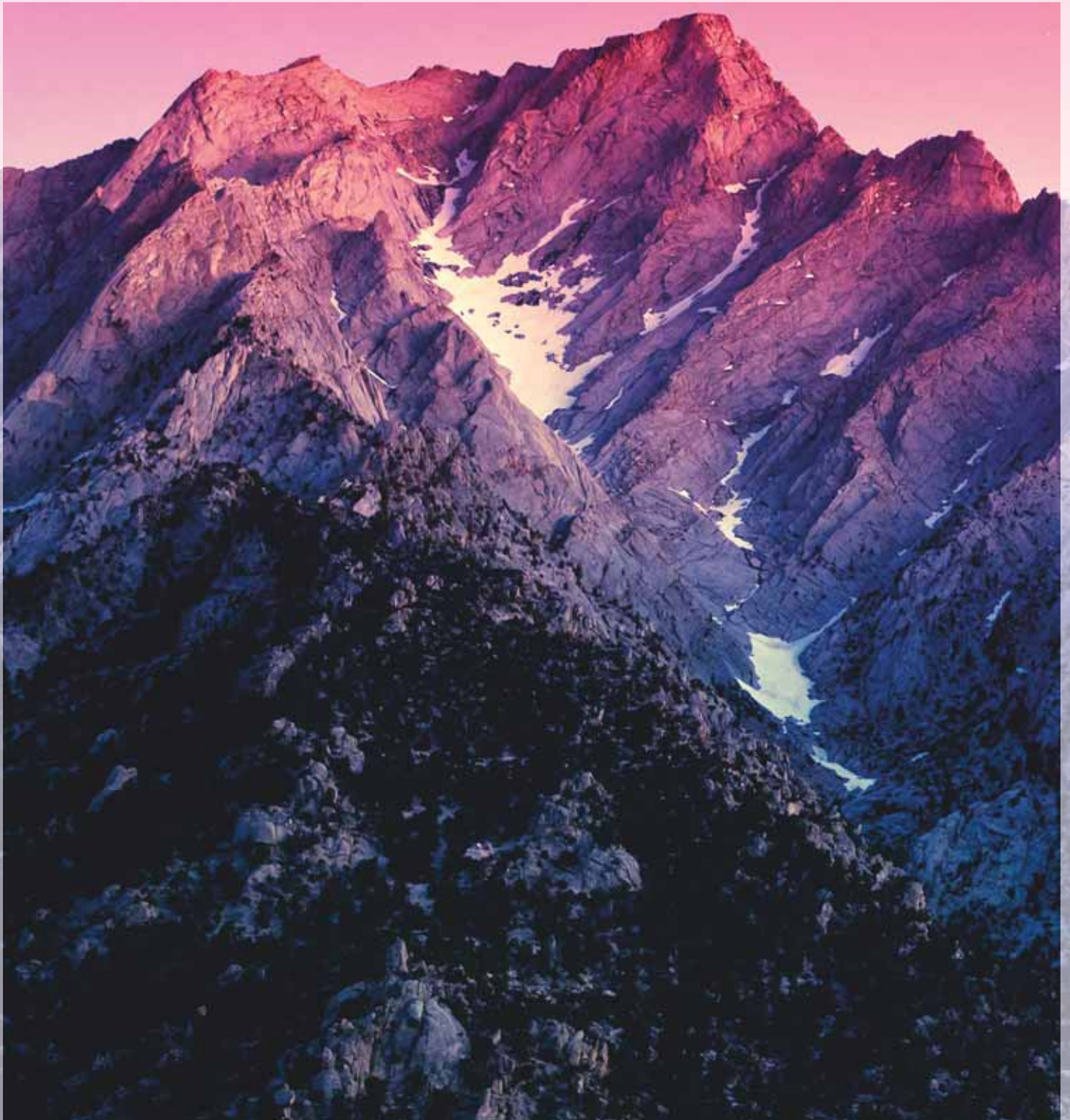
A.I.C.O.P.T.AX. :	All India Coordinated Project on Taxonomy	Capacity Building in	I.F.S. :	Indian Forest Service
A.W. :	Animal Welfare		I.G.P.P. :	Indira Gandhi Paryavaran Puraskar
B.C.S. :	Bio-Diversity Conservation Scheme		I.N.C.C.A. :	Indian Network for Climate Change
B.G. :	Botanical Garden		I.P.C.C. :	International Panel on Climate Change
B.G.I.R. :	Botanical Garden of the Indian Republic		I.T. :	Information Technology
B.S.I. :	Botanical Survey of India		I.U.C.N. :	International Union for Conservation of Nature
C.B.D. :	Convention on Biological Diversity		I.W.S.U. :	Internal Work Study Unit
C.B.P. :	Capacity Building Project		L.C. :	Legal Cell
C.C. :	Climate Change		M.B.P. :	Man and Biosphere Programme
C.C.U. :	Civil Construction Unit		M.G.C.E.&E. :	Mahatma Gandhi Chair on Environment & Ecology
C.D.M. :	Clean Development Mechanism		N.A.T.C.O.M. :	National Communication
C.E.S. :	Centre for Ecological Science		N.B.A. :	National Biodiversity Authority
C.M.W. :	Conservation and Management of Wetlands		N.B.A.P. :	National Biodiversity Action Plan
C.O.P. :	Conference of the Parties		N.C.Z.M.A. :	National Coastal Zone Management Authority
C.P.A. :	Control of Pollution Air		N.E.P.T.R.I. :	National Environmental Protection Training and Research Institute
C.P.W. :	Control of Pollution Water		N.E.S.P.F. :	National Environmental Science Fellows Programme
CPB :	Cartagena Protocol on Biosafety		N.F.A. :	National Fellowship Awards
C.P.C.B. :	Central Pollution Control Board		N.G.O. :	Non Governmental Organisation
CT :	Clean Technology		N.G.T. :	National Green Tribunal
C.R.Z. :	Coastal Regulation Zone		N.G.R.B.A. :	National Ganga River Basin Authority
C.S.D. :	Commission on Sustainable Development		N.I.A.W. :	National Institute of Animal Welfare
C.V.O. :	Chief Vigilance Officer		N.L.C.P. :	National Lake Conservation Plan
D.T.E.P.A. :	Dahanu Taluka Environment Protection Authority		N.M.C.G. :	National Mission on Clean Ganga
E.C. :	Economic Cell		N.M.N.H. :	National Museum for Natural History
E.E. :	Environment Education		N.N.R.M.S. :	National Natural Resources Management Systems
E.I. :	Environment Information		N.R.C.D. :	National River Conservation Directorate
E.I.V.R. :	Entities of Incomparable Value Regulations		N.R.C.P. :	National River Conservation Plan
E.N.V.I.S. :	Environmental Information System		I.N.C.C.A. :	Indian Network for Climate Change
E.P.T.R.I. :	Environment Protection Training & Research Institute		I.P.C.C. :	International Panel on Climate Change
E.S.A. :	Ecologically Sensitive Areas		I.T. :	Information Technology
F.E. :	Forest Establishment		I.U.C.N. :	International Union for Conservation of Nature
F.R.L.H.T. :	Foundation for Revitalization of Local Health Traditions		I.W.S.U. :	Internal Work Study Unit
G.A. :	General Administration		L.C. :	Legal Cell
G.B.P.I.H.E.D. :	G.B. Pant Institute of Himalayan Environment & Development		M.B.P. :	Man and Biosphere Programme
G.P.G. :	Global Public Goods		M.G.C.E.&E. :	Mahatma Gandhi Chair on Environment & Ecology
G.C. :	General Co-ordination		N.A.T.C.O.M. :	National Communication
G.E.A.C. :	Genetic Engineering Approval Committee		N.B.A. :	National Biodiversity Authority
G.E.F. :	Global Environment Facility		N.B.A.P. :	National Biodiversity Action Plan
G.I.M. :	Greening India Mission		N.C.Z.M.A. :	National Coastal Zone Management Authority
G.L.O.B.E. :	Global Learning & Observation to Benefit the Environment		N.E.P.T.R.I. :	National Environmental Protection Training and Research Institute
H.S.M.D. :	Hazardous Substances Management Division		N.E.S.P.F. :	National Environmental Science Fellows Programme
I.A. :	Impact Assessment		N.F.A. :	National Fellowship Awards
I.C. :	International Co-operation		N.G.O. :	Non Governmental Organisation
I.C.I.M.O.D. :	International Centre for Integrated Mountain Development		N.G.T. :	National Green Tribunal
I.F.C. :	Information Facilitation Counter		N.G.R.B.A. :	National Ganga River Basin Authority
I.F.D. :	Integrated Finance Division		N.I.A.W. :	National Institute of Animal Welfare
			N.L.C.P. :	National Lake Conservation Plan
			N.M.C.G. :	National Mission on Clean Ganga



N.M.N.H.	: National Museum for Natural History	N.G.R.B.A.	: National Ganga River Basin Authority
N.N.R.M.S.	: National Natural Resources Management Systems	N.I.A.W.	: National Institute of Animal Welfare
N.R.C.D.	: National River Conservation Directorate	N.L.C.P.	: National Lake Conservation Plan
N.R.C.P.	: National River Conservation Plan	N.M.C.G.	: National Mission on Clean Ganga
I.N.C.C.A.	: Indian Network for Climate Change	N.M.N.H.	: National Museum for Natural History
I.P.C.C.	: International Panel on Climate Change	N.N.R.M.S.	: National Natural Resources Management Systems
I.T.	: Information Technology	N.R.C.D.	: National River Conservation Directorate
I.U.C.N	: International Union for Conservation of Nature	N.R.C.P.	: National River Conservation Plan
I.W.S.U.	: Internal Work Study Unit	N.F.A.P.	: National Forestry Action Programme
L.C.	: Legal Cell	N.F.C.	: National Forest Commission
M.B.P.	: Man and Biosphere Programme	N.T.C.A.	: National Tiger Conservation Authority
M.G.C.E.&E.	: Mahatma Gandhi Chair on Environment & Ecology	N.Z.P.	: National Zoological Park
N.A.T.C.O.M.	: National Communication	P.E.	: Project Elephants
N.B.A.	: National Biodiversity Authority	P.T.	: Project Tigers
N.B.A.P.	: National Biodiversity Action Plan	ROHQ	: Regional Office Head Quarter
N.C.Z.M.A.	: National Coastal Zone Management Authority	R.Os	: Regional Offices
N.E.P.T.R.I.	: National Environmental Protection Training and Research Institute	R.T.	: Research & Training
N.E.S.P.F.	: National Environmental Science Fellows Programme	S.U.	: Survey & Utilization
N.F.A.	: National Fellowship Awards	S.F.A.	: Standard Financial Annex
N.G.O.	: Non Governmental Organisation	W.H.C.	: World Heritage Convention
N.G.T.	: National Green Tribunal	WCCB	: Wild Life Crime Control Bureau
		W.I.I.	: Wildlife Institute of India
		W.L.	: Wildlife



# ROLE AND MANDATE OF THE MINISTRY





## Role and Mandate of the Ministry

### Role of the Ministry

The Ministry of Environment, Forest and Climate Change (MoEF&CC) is the nodal agency in the Central Government for overseeing the implementation of India's environment and forest policies and programmes relating to conservation of the country's natural resources including lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals and prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development. The Ministry is also the nodal agency for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and the United Nations Conference on Environment and Development (UNCED). The Ministry also coordinates with multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and regional bodies such as Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Cooperation (SAARC) on matters pertaining to environment. The broad objectives of the Ministry are:

- Conservation and survey of flora, fauna, forests and wildlife
- Prevention and control of pollution

- Afforestation and regeneration of degraded areas
- Protection of environment, and
- Ensuring the welfare of animals

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

### The organizational structure of the Ministry is given in Annexure-II & III.

### Subjects under the Ministry of Environment, Forest and Climate Change

The following items of work have been allocated to the Ministry of Environment, Forest and Climate Change (Paryavaran, Van Aur Jalvaayu Parivartan Mantralaya):

- 1 Environment and Ecology, including environment in coastal waters, in mangroves and coral reefs but excluding marine environment on the high seas.
- 2 Environment Research and Development, education, training, information and awareness.
- 3 Environmental Health.
- 4 Environmental Impact Assessment.

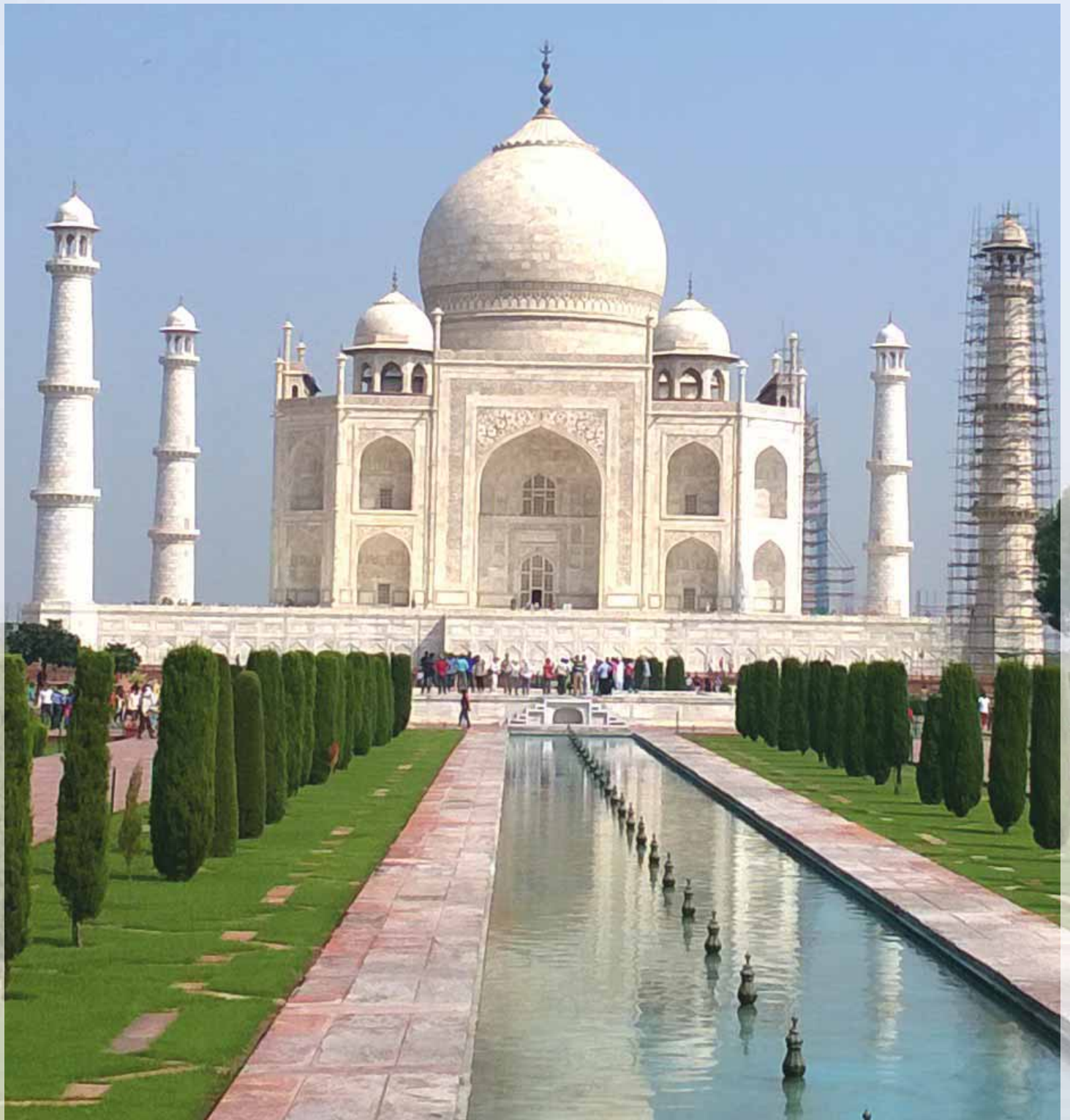


- 5 Forest Development Agency and Joint Forest Management Programme for conservation, management and afforestation.
- 6 Survey and Exploration of Natural Resources particularly of Forest, Flora, Fauna, Ecosystems etc.
- 7 Bio-diversity Conservation including that of lakes and Wetlands.
- 8 Conservation, development, management and abatement of pollution of rivers excluding the river Ganga and its tributaries.
- 8A. National River Conservation Directorate.
- 9 Wildlife conservation, preservation, protection planning, research, education, training and awareness including Project Tiger and Project Elephant.
- 10 International co-operation on Issues concerning Environment, Forestry and Wildlife.
- 11 Botanical Survey of India and Botanical Gardens.
- 12 Zoological Survey of India.
- 13 National Museum of Natural History.
- 14 Biosphere Reserve Programme.
- 15 National Forest Policy and Forestry Development in the country, including Social Forestry.
- 16 All matters relating to Forest and Forest Administration in the Union territories.
- 17 Indian Forest Service.
- 18 Wildlife Preservation and protection of wild birds and animals.
- 19 Fundamental and applied research and training including higher education in forestry.
- 20 Padmaja Naidu Himalayan Zoological Park.
- 21 National Assistance to Forestry Development Schemes.
- 22 Indian Plywood Industries Research and Training Institute, Bangalore.
- 23 Afforestation and Eco-Development which shall include National Afforestation and Eco-Development Board.
- 23A. Bio-fuel plantations in forest, wastelands and environmental issues concerning bio-fuels.
- 24 Desert and Desertification.
- 25 Forest Survey of India.
- 26 Indian Institute of Bio-diversity, Itanagar.
- 27 Central Pollution Control Board.
- 28 G.B.Pant Institute of Himalayan Environment & Development.
- 29 Wildlife Institute of India and Indian Board for Wildlife.
- 30 Indian Institute of Forest Management.
- 31 Central Zoo Authority including National Zoo Park.
- 32 Indian Council of Forestry Research & Education.



- 33 Andaman and Nicobar Islands Forest & Plantation Development Corporation Limited.
  - 34 Prevention of cruelty to animals.
  - 35 Matters relating to pounds and cattle trespass.
  - 36 Gaushalas and Gausadans.
  - 37 The Prevention of Cruelty to Animals Act, 1960 (59 of 1960).
  - 38 The Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974).
  - 39 The Water (Prevention and Control of Pollution) Cess Act, 1977 (36 of 1977).
  - 40 The Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981).
  - 41 The Indian Forest Act, 1927 (16 of 1927).
  - 42 The Wildlife (Protection) Act, 1972 (53 of 1972)
  - 43 The Forest (Conservation) Act, 1980 (69 of 1980).
  - 44 The Environment (Protection) Act, 1986 (29 of 1986).
  - 45 The Public Liability Insurance Act, 1991 (6 of 1991).
  - 46 The National Green Tribunal Act, 2010.
  - 47 The Compensatory Afforestation Fund Act, 2016.
- NOTE:-** The Ministry of Environment, Forest and Climate Change will be responsible for overall policy in relation to forests, except all matters, including legislation, relating to the rights of forest dwelling Schedule Tribes on forest lands.

# Major Achievements of the Ministry During 2016-17





## Major Achievements

**Botanical Survey of India (BSI):** Completed the taxonomic description of 2075 species of from the states, national and protected area.

**Zoological Survey of India:** 64 faunistic surveys have been completed in the Mountain Ecosystem, Estuarine ecosystem, Marine/Island ecosystem, Grassland ecosystem, Freshwater ecosystem, Desert Ecosystem, Biosphere Reserve/ Conservation areas, National Parks, Wildlife Sanctuaries, etc.

**Discoveries of New Taxa/ Species & New Record to India:** 1863 species were identified by the scientists of ZSI Headquarters and regional centers during the period under report. Out of which, 36 species new to science have been described and 55 species were added new record to India.

The National Zoological collections were further enriched by the addition of examples of 24833 specimens (unnamed) and 33277 identified specimens pertaining to 1863 species.

**Island Management Plan Preparation:** MoEF&CC through NCSCM has prepared the Integrated Island Management Plans for the ten islands of Lakshadweep and approved by Hon'ble Supreme Court. The same shall be considered as DPRs for implementation of the Phase-II of the ICZM Project.

**Forest Survey of India:** Forests Cover Mapping & Tree Cover during year 2016, 311 scenes of LISS III sensor of Indian Remote Sensing Satellite were procured from NRSC Hyderabad and classification work has been completed for 249 sheets till Nov 2016. The launched workshop for the 15th cycle was held on 12-13th May, 2016 in which all the technical staff from FSI headquarters and Zonal offices participated. A new sampling design for national forest inventory has been implemented by FSI from February, 2016.

**Biodiversity Conservation Beta version of ABS-E Filing software:** NBA released a Beta version of ABS-E Filing software on 7th November 2016 which allows the applicant to file their applications through online. This initiative is towards expedite the process of the applications. 127 ABS Agreements have been signed during the year. NBA has introduced Form-C for providing the intimation for depositing the Microorganisms by Indian researchers/scientist in other country repositories for claim of his novel species for publication in journals.

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

- Periyar and Satpuralandscape sites won conservation awards in April 2016.
- There has been good social mobilisation and institution building among landscape communities. About 40,000 households living in these landscapes have been brought under 300 village conservation committees (VCCs), including forest dependent communities such as salt-pan farmers, livestock keepers, farmers, fishermen, and other vulnerable households such as landless and SC and ST households.

**Forest Conservation:** During the year 2016-17 till end of January Central Government accorded approvals under the FC Act, 1980 for diversion of 6916.63 hectares of forest land for non-forest purposes with adequate mitigative measures.

**Forest Policy:** The Forest Policy Division of the Ministry organized a National Level Conference of all Additional Chief Secretaries (Forests)/PCCF(HoFF)/ Principal Secretaries (Forests) and Chief Wildlife Wardens (CWLWs) of all States/UTS on 21-22 October, 2016 at New



Delhi. The conference was inaugurated by Hon'ble Minister of State(IC) for Environment, Forest and Climate Change. A book titled "Golden Leaves- Celebrating 50 years of Indian Forest Services as an All India Service" was also released.

Ministry launched the Synthetic Aperture Radar (SAR) Technical Protocol for Forest Monitoring under Forest PLUS Programme on 21st November, 2016.

**Project Tiger / National Tiger Conservation Authority (NTCA):** The 3rd Asia Ministerial Conference on Tiger Conservation was held from April 12-14, 2016 at Vigyan Bhawan, New Delhi, which was inaugurated by the Hon'ble Prime Minister, Shri Narendra Modi. Inter alia, the Prime Minister stressed that tiger conservation is not a choice but an imperative while addressing delegates of 13 tiger range countries.

**Environmental Clearance to Developmental Projects:** Environmental Clearance (EC) has been accorded to 196 projects (between April 2016 to Dec, 2016).

**Constitution of State Environment Impact Assessment Authorities (SEIAA):** In 2016, SEIAA/ SEAC have been reconstituted in Chandigarh on 12.05.2016 and Jharkhand on 09.11.2016.

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

The environmental appraisal of development projects is undertaken as per the provisions of EIA Notification 2006 based on EIA/Environmental Management Plan (EMP) reports prepared by the project proponents

with the assistance of their consultants. Good quality EIA reports are pre-requisite for appropriate decision making. As of now, only consultants accredited with QCI/NABET are allowed to prepare EIA/EMP reports and present the cases before EACs/SEAC. As on 06.01.2017, there are 183 accredited EIA Consultant Organizations.

### **Ambient Air Quality**

- Operation and maintenance of 634 manual Ambient Air Quality Monitoring Stations (AAQMS)
- Operation and maintenance of 16 continuous ambient air quality monitoring stations (CAAQMS) of CPCB.
- Operation of 2500 Water Quality Monitoring Stations (WQMS) at various aquatic resources. Time series data of water quality was analyzed and identified the issue of sewage disposal in 302 river polluted stretches.
- 70 National Ambient Noise Monitoring Network (NANMN) stations have been installed spreading over 10 cities and data is being disseminated.

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

**National Afforestation and Eco-Development Board (NAEB).** 28 SFDA Projects have been operationalised in the country. An advance area of 2359 ha has been sanctioned for afforestation.



**Declaring Ecologically Sensitive Zones (ESZs) around Protected Areas in the country:** 31 Eco-Sensitive zones and 111 Draft ESZ notifications have been issued.

**Declaring Eco-Sensitive Areas in Western Ghats:** The Hon'ble Minister of State (Independent Charge), Environment, Forest and Climate Change, Shri Anil Madhav Dave held a meeting with the Members of the Parliament from the Western Ghats region on 11th August, 2016. During the deliberation in this meeting, it was emphasised that there should be balance between habitat, forests and society in the Western Ghats region. It was emphasised that the Draft Notification dated 4.09.2015, would be the basis for moving forward through a consultative process involving State Governments and other stakeholders to redress the concerns of people living in the Western Ghats region and for conservation of the Western Ghats.

**Climate Change:** During this year, many important bilateral and multilateral meetings and negotiations including Conference of Parties (CoP-22) on climate change were held in which Hon'ble Minister and senior Officials of the Ministry participated.

**National and State Action Plans on Climate Change:** The National Action Plan on Climate Change (NAPCC) coordinated by the Ministry is being implemented through the Nodal Ministries in specific sectors. All national missions were approved by the Prime Minister's Council on Climate Change (PMCCC) and are being implemented now. The Missions are under constant review by 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 with regular monitoring of the eight National missions along with other initiatives on Climate Change and coordinating with various agencies.

**Paris Agreement:** India has ratified the Paris Agreement to the UNFCCC on 2nd Oct, 2016. The Paris Agreement entered into force on 4 November 2016 and as on 5 Oct, 2016, 116 Parties have ratified the Paris Agreement.

**International Negotiations on Climate Change:** During the financial year 2016-17, many important bilateral and multilateral meetings and international negotiations on climate change were held in which Hon'ble Minister and senior officials of the Ministry participated. These meetings were crucial in the run up to the 22nd Conference of Parties. Hon'ble Minister and senior officials of Climate change division attended important meetings such as the UN Secretary-General's high-level ceremony for the signing of Paris Agreement on 22nd April, 2016 in New York, meeting of the Major Economies Forum during 22-23 September, 2016 in New York, Petersberg Climate Dialogue VII during 3rd-5th July 2016, Berlin. Delegates also participated in the 23rd BASIC Ministerial Meeting on Climate Change, held in 16-17 October, 2016 and Pre-COP Ministerial Meeting of the UNFCCC on 18-19 October, 2016 in Marrakech, Morocco.

MoEF&CC organized the 22nd BASIC Ministerial Meeting on Climate Change in New Delhi, India on 6th and 7th April 2016. The meeting was attended by H.E. Mr. Prakash Javadekar, Minister of State (Independent Charge) for Environment, Forest and Climate Change of India, H.E. Mr. Xie Zhenhua, Special Representative for Climate Change of China, H.E. Ambassador Antonio Marcondes, Under Secretary-General for the





Environment, Energy, Science and Technology, Ministry of Foreign Affairs of Brazil and Mr. Maesela Kekana, Chief Director, International Climate Change Relations and Negotiations of South Africa.

The 22nd Conference of Parties under UNFCCC was held in Marrakech, Morocco from 7 to 18 November, 2016. Shri Anil Madhav Dave, Hon'ble MoEF&CC led an inter-ministerial delegation that participated in the Marrakech Conference. India participated in the Conference with a positive approach and with the aim to protect India's long term interests and propagate a growth paradigm of sustainable development, poverty eradication & providing energy access to all. Marrakech COP followed the historic COP 21 that adopted the Paris Agreement. The Agreement aims to keep the global temperature rise below 2°C. It maintains differentiation in all operative sections of mitigation, adaptation, loss and damage, finance, technology development and transfer, capacity building and transparency of action and support.

**India-US Task Force on Hydrofluorocarbons (HFCs):** During the year, one meeting of the Task Force was held from 30th June, 2016 to 1st July, 2016. The meetings provided a unique opportunity for the industry, experts and the concerned officials, from the two countries to have in-depth discussions on various aspects related to HFCs and to develop better understanding on the issues of concern.

**Kigali Amendment to the Montreal Protocol for phase-down of HFCs:** In the Kigali Amendment, it has been agreed that the developing countries will have two set of baselines – one for the early movers in which case it will be 2020-2021-2022 and the other for those whose national circumstances were different and the

manufacturing of HFCs and consumption in whose case was still rising in the absence of clear alternative technologies. In case of such countries the agreed baseline years are 2024, 2025 and 2026.

**Desertification and Land degradation Atlas of India:** "Desertification and Land Degradation Atlas of India (Based on IRS AWiFS data of 2011-13 and 2003-05)" was prepared by the Space Application Centre, Department of Space, Government of India in collaboration with MoEF&CC and other State level institutions and was released on 17th June, 2016.

**International Cooperation and Sustainable Development:** The Ministry has entered into Agreements / Memorandum of Understanding (MoUs) with 21 countries like Norway, Sweden, France, Finland, Canada, Bangladesh, Egypt, Morocco, Brazil, Russia and others on various environmental issues of mutual benefits. Most of these MoUs/agreements are operated through the Joint Working Groups (JWGs) thus, providing an opportunity for dialogue and to work with the international community. A number of Joint Working Groups (with Germany, European Union, etc.) have also been constituted which flows from Agreements / MoUs / Joint Statements entered into by other Ministries.

Shri Anil Madhav Dave, Hon'ble Minister of Environment, Forest and Climate Change encouraged dialogue with the international community to invite investment, knowledge and cooperation to meet country's environment-related priorities and needs.

**BRICS (Brazil, Russia, India, China & South Africa) Environment Ministers meeting:** India being BRICS Chair for the year 2016, from environment perspective, the Ministry of Environment, Forest and Climate Change



(MoEFCC) hosted the second BRICS Environment Ministers meeting at Goa on 15 – 16 September 2016.

**BRICS Nations Join Hands to Save Environment:**

The BRICS Environment Ministers adopted a Goa Statement on Environment during the BRICS Environment Meeting and called upon the developed countries to honour their commitments related to means of implementation and facilitate its operationalisation with a clear road-map for the successful achievement of various global environmental agreements and sustainable development goals.

The BRICS countries resolved to develop a 'BRICS platform on Green Technology' for sharing environmentally sound technologies as a new international mechanism for public private partnership that can assist in addressing environmental challenges in our countries and promote innovations, knowledge management and capacity building including by means of a common website, a network of technical institutions and to undertake joint projects in areas of mutual interest.

**Indo-German Working Group:** The second meeting of Indo-German Working Groups (WGs) on Water; and Waste Management & Circular Economy was held in New Delhi from April 5 to 7, 2016. In the meeting it was agreed that Germany would like to invest €5 - 6 billion for developmental initiatives in India to build enabling systems and addressing capacity gaps effectively.

**Indo-Bangladesh Working Group:** The first meeting of India - Bangladesh Joint Working Group (JWG) on "Conservation of the Sundarbans" was held in New Delhi on July 21,

2016. The two sides noted the agreement related to joint study of biodiversity mapping of Sunderban, compilation of good practices, common approach towards monitoring of river pollution, management of marine ecosystem and the proposed study on indicators for assessment of the health of the ecosystem of Sunderban.

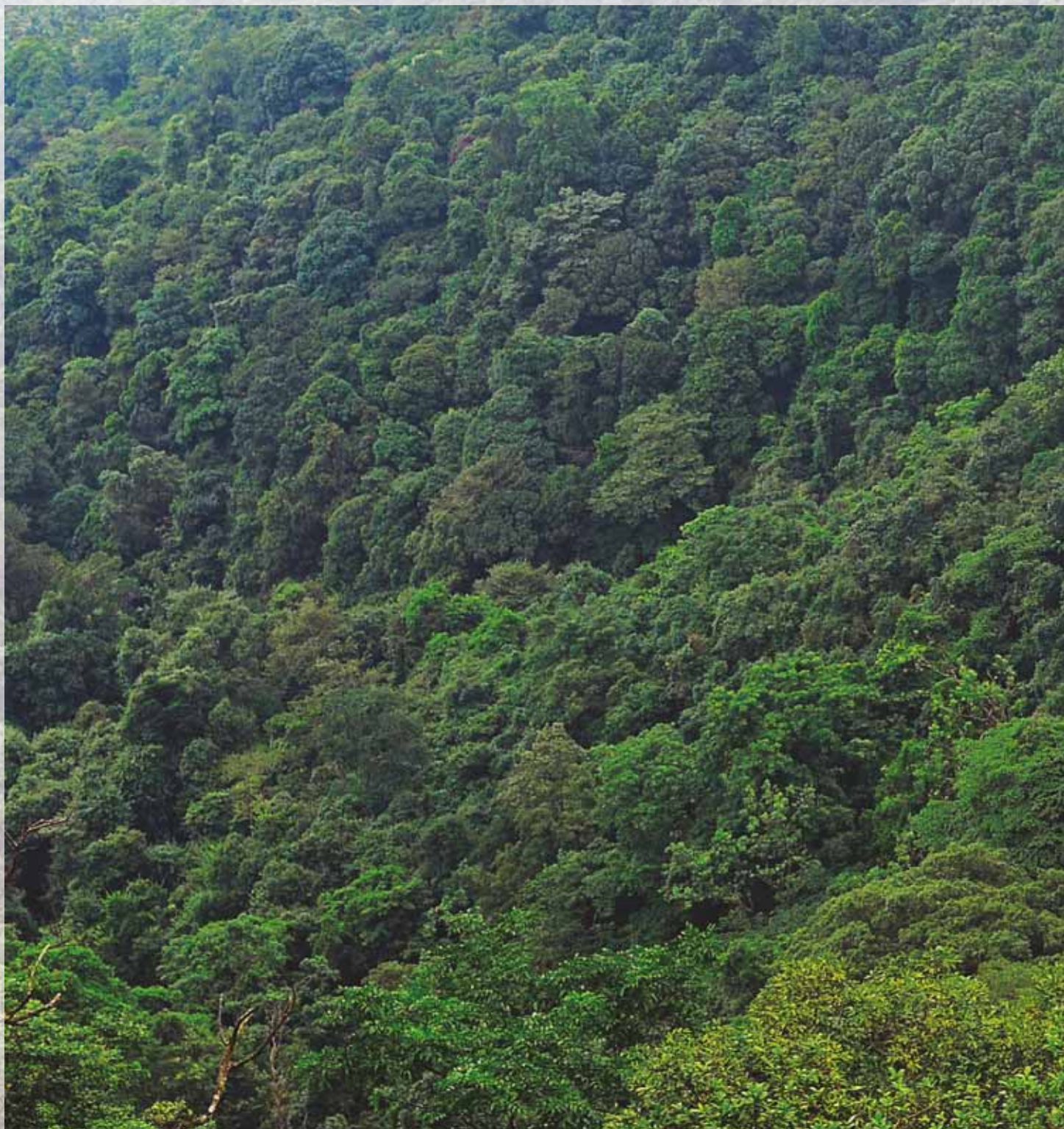
**United Nations Environment Programme (UNEP):** UNEA is the Governing body of UNEP.

The second session of United Nations Environment Assembly (UNEA) was held in Nairobi, Kenya from 23 to 27 May, 2016 focusing on 'Delivering on the Environmental Dimension of the Agenda 2030 for Sustainable Development'. A delegation from this Ministry actively participated in the 2nd Session of United Nations Environment Assembly alongwith concerned stake-holders. This Ministry also represented in the "Second Open-ended Meeting of the Committee of Permanent Representative (OECPR-2) held in Nairobi, Kenya from 15-19 February, 2016 to firm up the agenda of the UNEA-2.

Mr. Eric Solheim, newly appointed Executive Director, United Nations Environment Programme, Nairobi had visited India and had a meeting with Minister of State (Independent Charge) for Environment, Forest and Climate Change on 6th October, 2016 and had deliberations on enhancement of India-UNEP partnership.

**The World Bank (WB):** The Ministry-WB project portfolio comprises of four projects worth USD 322.56 m. Of these two projects are GEF projects managed by the Bank with a GEF grant of USD 32.78 m.

# Natural Resources- Survey and Exploration





## Botanical Survey of India (BSI)

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

### Primary Objectives

- Exploration, inventorying and documentation of phytodiversity in general

and protected areas, hotspots and fragile ecosystems in particular, publication of National, State and District Floras.

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

### 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.
- Environment Impact Assessment of areas assigned by MoEF&CC
- Develop and maintain Botanical Gardens, Museums and Herbaria.
- Preparation of Seed, Pollen and Spore Atlas of Indian Plants.

### Progress/Achievements

#### Botanical Exploration & Inventorisation of Phytodiversity

**Field tours and Herbarium consultation tours:**



Ninety Eight field tours were undertaken for floristic/ethnobotanical/ pharmacognostical studies on flowering and non-flowering plants, as well as live germplasm collection for introduction in the gardens, by different regional centres and units of BSI covering the following regions. These include 25 tours in 22 protected areas. Apart from that, 21 herbarium consultation tours and 16 ex-situ conservation tours were also conducted.

During these field tours, 33,743 specimens were collected and 28,791 specimens were identified into 14,408 taxa (species, subspecies and varieties). This resulted into the discovery of 17 new species and 22 new records for India. Two plant species have been rediscovered after 100 years.

## Documentation of Phytodiversity

### ➤ National Flora (Flora of India)

- Completed the taxonomic description of 75 species of family Bignoniaceae, 15 species subtribe Sporobolinae and 24 species of Genera Lepisorus and Adiantum.
- 186 species of following 7 projects have been completed by the Senior Research Fellows of BSI under Flora of India.
- Revision of the subtribe Eleusininae (Poaceae: Chloridoideae) in India, Revision of the Family Myrsinaceae in India, Taxonomic revision of subgenus Carex of Genus Carex L. (Cyperaceae) in India, Taxonomic revision of the family Fagaceae in India, Taxonomic Studies on lichenised non thelotremoid Indian Graphidaceae, Taxonomic Studies of genus Rubus L. in

India, Taxonomic revision of fern genus Pteris L. (Pteridaceae) in India.

### ➤ Regional/State Flora/District

- Completed the taxonomic description of 986 species for Flora of Uttarakhand, Flora of Gujarat, Grass Flora of Arunachal Pradesh, Flora of Anjaw District & West Siang District, Arunachal Pradesh, Polypodiaceae of NE India, Bryoflora (Hepaticae & Anthocerotae) of Mizoram, Flora of South Garo Hills, Meghalaya, Wild Mushrooms of North Sikkim, Pteridophytic Flora of North Sikkim, Flora of Chhattisgarh, Floral Diversity of Upper Ganga Ramsar Site, UP, Flora of Uttarakhand, Vol. III, Endemic & Threatened Pteridophytic Flora of NW Himalayas, Flora of Gujarat, Vol. III, Ferns of Maharashtra, Foliicolous Fungi of Maharashtra, Orchids of Maharashtra, Seaweed of Kerala Coast, Flora of N. Andaman Isls., Foliicolous lichens of Andaman, Alpine & Sub-Alpine Flora of Arunachal Pradesh, Flora of Bihar, Flora of Jharkhand, Liverworts & Hornworts of Sikkim, Wood Rotting Fungi of Koderma Wildlife Sanctuary and Algae of Jharkhand.

### ➤ Flora of Protected Areas

- Completed taxonomic description of 976 species from Buxa Wildlife Sanctuary, West Bengal; Gautama Buddha Wildlife Sanctuary, Bihar; Great Indian Bustard Wildlife Sanctuary, Maharashtra; Jaldapara Wildlife Sanctuary, West Bengal; Jamwa Ramgarh Wildlife Sanctuary, Rajasthan; Koderma Wildlife Sanctuary, Jharkhand; Malabar Wildlife Sanctuary, Kerala;



Nagarjunasagar Srisailem Wildlife Sanctuary, Andhra Pradesh; Pakhui Wildlife Sanctuary, Arunachal Pradesh; Palkot Wildlife Sanctuary, Jharkhand; Rani Jhansi Marine National Park, South Andamans; Seshachalam Biosphere Reserve, Andhra Pradesh; Shoolpaneshwar Wildlife Sanctuary, Narmada, Gujarat; Srivilliputhur Wildlife Sanctuary, Tamil Nadu; Sultanpur National Park, Haryana; Udhwa Lake Bird Sanctuary, Sahibganj, Jharkhand.

#### ➤ **Ex-Situ Conservation**

- 135 live plants under 49 species collected from WB, Meghalaya and Arunachal Pradesh have been introduced in the nursery of Acharya Jagadish Chandra Bose IBG, Howrah.
- 23 rare and endangered species have been introduced in other associated botanic gardens of different Regional Centres.

#### ➤ **Micro-Propagation of Threatened Species**

- Multiplication of *Cymbidium tigrinum*, *C. eburneum*, *Illex khasiana* (at ERC, Shillong) and *Eremostachys superba*, *Pittosporum eriocarpum* and *Indopiptadenia oudhensis* (at NRC, Dehradun) have been taken up through tissue culture.

#### ➤ **Documentation of Indigenous Knowledge of Plant Resources**

- Four ethnobotanical field tours were undertaken to Nayagarh, Malkangiri and Naupada districts of Odisha. Total 320 ethnobotanical interested plant species in duplicate voucher specimens were collected with the help of medicine man

from different tribal populated village at Dhenkanal. Among these 320 plants, 194 plants are used for medicine, 42 plants for food, 14 plants for small timber, 5 for agriculture implements, 8 for bio-fencing, 3 plants for insect repel, 3 as tooth brush, 3 for oil, 2 for liquor, 10 as fodder and 4 as rope/fibre.

- 282 ethnobotanical information from Lodha tribal group of WB have also been recorded.
- Manuscript of the ethnobotanical study of Dang district, Gujarat have been finalized.
- **Studies of Nutritional Values of Wild Edible Plants of Meghalaya**
  - Nutritive values, mineral estimation and antioxidant profile of 12 plant species have been carried out using parameters like proximate composition, mineral content and antioxidant activities. In addition, scientists of BSI published 235 research papers and communicated 68 research papers in various peer reviewed journals, both Indian and foreign.

### **Miscellaneous**

- **Maintenance and enrichment of Herbaria in BSI:** During the period, 12360 specimens mounted, 6,789 herbarium specimens remounted, 20,359 herbarium sheets dusted and fumigated, 14,268 herbarium sheets poisoned and 4,569 sheets have been incorporated in different herbaria.
- **Digitisation:** BSI started digitizing its herbarium specimens in its Data Centre at



CNH for creation of Digital Herbarium (DH) of high resolution images and Indian Virtual Herbarium (IVH) of low resolution images by deploying the manpower from its existing strength. Digitization of 5485 specimens completed by December 2017.

- **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 32,854 visitors, including scientists, students, teachers and VIPs, visited different botanic gardens, herbaria and museum of BSI. 146 queries on plant distribution and nomenclature were attended; 1886 specimens of angiosperms, pteridophytes, bryophytes and fungi, received from students/scientists outside BSI have been identified and about 285 plant materials, samples and seedlings have been supplied to scientists and students outside BSI.
- Status of Database preparation and Digitisation of specimens. 300 publications comprising of nearly one lakh pages and all 53 back volumes of BSI journal were digitized. Prepared database of around 22,000 records pertaining to Lichens and Fungi Checklist.
- Review of the work on 'Red listing of Orchids of Eastern Himalaya as per IUCN criteria' (Entire Sikkim, Darjeeling district of West Bengal and Arunachal Pradesh excl. Changlang and Tirap). 350 specimens of

Sikkim Himalayan Regional Centre, Gangtok were finalized in respect of their identity and geo-coordinates.

### Scientific Workshop/Training Programme

- Training on "Basics of Plant Identification and Nomenclature" was organized by Eastern Regional Centre, BSI, Shillong from 7<sup>th</sup> to 9<sup>th</sup> November 2016. More than 60 participants attended the training programme.
- A workshop on "Interactive talk and workshop on essentials in plant revisionary study and flora writing" was held by Naoroji Godrej Center for Plant Research in association with BSI, WRC on 1<sup>st</sup> to 3<sup>rd</sup> December 2016. More than 50 participants attended the workshop.
- ENVIS centre of BSI organized a training course on Basics of Plant Nomenclature during 14<sup>th</sup> -15<sup>th</sup> January, 2017 in the campus Central National Herbarium. More than 60 post graduate students, teachers and researchers attend the course.

**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 48ha at Sankie View has ca 400 species under cultivation.

**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.

**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 02ha in the campus has ca 570 species under cultivation.

**Northern Regional Centre, Dehradun:**

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 23ha at Dehradun, Pauri and Khirsu have ca 500 species under cultivation.

**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.

**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.

**Deccan Regional Centre, Hyderabad:**

Jurisdiction – Andhra Pradesh, Orissa. Established in 2005 at Hyderabad, the circle has ca 10,000 herbarium specimens.

**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

**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.

## Zoological Survey of India

The Zoological Survey of India (ZSI), a premier institution under the Ministry has completed 100 years of services to the Nation, undertaking survey, exploration and research leading to the advancement of our knowledge on the exceptionally rich faunal diversity of the country since its inception in 1916. Over the successive plan periods the functions of ZSI have also expanded gradually encompassing





areas like the Environmental Impact Assessment with regard to fauna; survey of Conservation Areas; Status Survey of Endangered Species; Computerization and Digitization of data on faunal resources; Environmental Information System (ENVIS) on faunal diversity; Identification and advisory services; National Designated Repository of type and voucher specimen; supporting enforcement of Wildlife (Protection) Act, 1972; establishment of marine aquaria and Museum for awareness on conservation etc. and acts as a custodian of the National Zoological Collections. Headquarters (Kolkata) and 16 Regional Centers located at different parts of the country, ZSI in recent years re-oriented its plan of work by grouping the survey and studies under the following six major programmes:

### Major Objectives

Exploration, survey and documentation of faunal resources of the country.

- Taxonomic studies of the material collected during Faunistic Survey.
- Inventorization of endangered species of fauna in the country.
- Maintenance and development of National Zoological Collections.
- Publication of "Fauna of India" and Departmental Journals.

### Activities undertaken

- Centenary Celebration was organised in ZSI Headquarter on the completion of 100 years of ZSI services which was inaugurated

by Shri Prakash Javadekar, Hon'ble Minister of Environment, Forests and Climate Change, New Delhi. In the inaugural ceremony, Shri. Soven Chatterjee, the hon'ble minister-in-charge of Environment, West Bengal Govt. participated as the Guest of Honour and graced the occasion. The other guests of honour, the respected Secretary, Shri. Hem Pandey, IAS, Consumer Affairs, Govt. of India, and the Additional Secretary, Dr. (Ms.) Amita Prasad, IAS, MoEF&CC, Govt. of India, also graced the occasion.

- Hon'ble Minister, Shri Prakash Javadekar, unveiled the Centenary Sculpture, launched the Digital ZSI, and released the Centenary Publications. In the function, the Minister also presented the prestigious Dr. E. K. Janaki Ammal National Award on Taxonomy for the year 2016 to the three awardees.
- On the occasion Centenary Celebration of Zoological Survey of India a three days "National Conference on Faunal Diversity in the Indian Land and Seascapes" was organised from 30th June – 2nd July, 2016 in which more than 30 delegates were presented their research papers. Dr. Amita Prasad, Additional Secretary, MoEF&CC, New Delhi, graced the occasion.
- An Internship Training Programme was organized Marine Biology Regional Centre, Chennai from 6<sup>th</sup> -16<sup>th</sup> June, 2016. The participants were briefed on faunal biodiversity and given hands on training on groups such as Marine fishes, Sea snakes,



Echinoderms, Mollusks, Crabs, Nematodes, and corals.

- Gangetic Plains Regional Centre (GPRC), ZSI, Patna, organized world habitat day/ Natures day on 3<sup>rd</sup> October, 2016 at ZSI, GPRC, Patna for awareness of wildlife faunal specimens preserved in Museum of Zoological Survey of India, GPRC, Patna.
- National Workshop on 'Status of Marine Faunal Diversity of India' organised jointly by the ZSI Headquarters and Estuarine Biological Regional Centre, Gopalapur-on-Sea from 26<sup>th</sup> to 27<sup>th</sup> October 2016.
- Western Ghats Regional Centre (WGRC) organized jointly by WGRC, ZSI, Calicut, Kerala Forests & Wildlife Department & Yuva Kala Sahithi at WGRC, ZSI, Calicut on 16<sup>th</sup> July, 2016.
- Northern Regional Centre (NRC) organized ZSI Centenary Lecture entitled "Amazing & Incredible Nematodes" by Prof M.S. Jairajpuri, Former Director, ZSI on 25<sup>th</sup> May, 2016.

**Faunal Surveys:** So far 64 faunistic surveys have been completed in the Mountain Ecosystem, Estuarine ecosystem, Marine/Island ecosystem, Grassland ecosystem, Freshwater ecosystem, Desert Ecosystem, Biosphere Reserve/ Conservation areas, National Parks, Wildlife Sanctuaries, States and Union territories. In addition to that 6 status Surveys were also undertaken during the period under report. During the surveys 58, 110 samples of various groups of animals were collected.

**Taxonomic Studies:** Altogether 1863 species

belonging to faunal groups Protozoa, Porifera, Platyhelminthes, Crustacea, Mollusca, Echinodermata, Ascidiacea, Coelentrata, Lepidoptera, Hymenoptera, Diptera, Hemiptera, Coleoptera, Collembola, Orthoptera, Acarine, Odonata, Isoptera, Amphibia, Pisces, Reptilia, Aves and Mammalia were indentified from different states, protected areas and important ecosystems.

**Discoveries of New Taxa/ Species & New Record to India:** Altogether 1863 species were identified by the scientists of ZSI Headquarters and regional centers during the period under report. Out of which, 36 species new to science have been described and 55 species were added new record to India.

**New species described from India in 2016 (36):** 36 species new to science have been described (one species of Trematoda, 15 species of Insects, eight species of Spiders, two species of Fish, four species of Platyhelminthes, six species of crabs)

**New records of species from India in 2016 (55):** 55 species were recorded for the first time from India (three new record of Protozoa, one new record of Sea anemone, two new record of Echinoderms, 23 new records of corals, four new records of Arachnida, one new record of Insects, five new records of Crabs, one new record of Shrimp, six new record of Molluscs, three new records of Ascidiacs, four new record of fishes, one new record of Cnidaria and one new record of Platyhelminthes)

**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. More than 20 confiscated material received for identification from various Central and state Government/Agencies.

**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 examples of 24833 specimens (unnamed) and 33277 identified specimens pertaining to 1863 species.

### **Publications/Book Released (2016-17)**

- Two vols. of Records of Zoological Survey of India, one Occasional Papers, one Memoirs of the ZSI, two Conservation Area Series, three Wetland Ecosystem Series, four Handbooks, one Catalogue of Marine Molluscs, one Genotypic Data of Indian Fauna Series, one Animal Discoveries, 2015 and one Animal Discoveries in 100 years (Centenary Publication) and one on Diversity (Centenary Publication).
- 13 books were released (Birds of Andaman & Nicobar Islands, Reef fishes of Andaman & Nicobar Islands, Animal Discoveries in 100 years by ZSI scientists, Bibliography of ZSI publications, Genotyping Data of Indian Fauna, Animal Discoveries 2015, Diversity,

Skinks of Eastern & North Eastern India, Type Catalogue of Odonata, Catalogue of Marine Mollusc, Antarctica-Mysterious Continent, Current Status of Marine faunal, Diversity in India and Faunal Diversity of River Subarnarekha in Jharkhand, West Bengal and Odisha)

### **Regulatory Acts/Rules governing the programme**

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 wildlife of the country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. In addition, ZSI providing (a) status survey of endangered species (b) identification and supporting protection of endangered Wildlife to 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.

### **India Integrated Coastal Zone Management (ICZM) Project in India.**

To conserve, protect and manage the coastal and marine environment, Ministry of Environment, Forest and Climate Change, (MoEF&CC) Government of India is implementing the ICZM Project with the World Bank assistance for the implementation of the above project MoEF&CC has established a Society of Integrated Coastal Management



(SICOM) as nodal Body under the Society Registration Act, in Delhi. Under the above World Bank assisted ICZM Project, the above issues have been given a huge thrust for implementation both at the regional and national levels.

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

### Objectives of the Project:

- “To develop the capacity and institutions to implement the Coastal Regulation Zone Notification, 1991 and achieve the objectives of integrated and sustainable coastal management as per the National Environmental Policy, 2006.
- To address the issues relating to climate change which have a major implication on the coastal areas and coastal communities especially with respect to sea level rise and increased frequency of cyclones and storm surges. Under the programme, an exercise of hazard mapping will be carried out to protect the coastal people and infrastructure located in the coastal regions.
- To develop an institution to carry out studies and research in the area of coastal and marine management.

- To conserve and protect the fragile coastal ecosystems such as the mangroves, brackish water wetlands, coral reefs, etc.
- To control pollution of coastal waters from land based sources.
- To demonstrate and pilot improved livelihood option of coastal communities threatened by coastal hazard and pollution.
- To develop Integrated Coastal Zone Management Plans for better Management of coastal areas.

**National component:** The following activities carried out under National component of the project

- Mapping delineation and demarcation of the hazard lines.
- Delineation of coastal sediment cells all along the mainland coast of India.
- Mapping, delineation and demarcation of Environmentally Sensitive Areas (ESAs).
- Capacity building of the MoEF&CC and the State Coastal Zone Management Authorities, and Nation-wide training program for coastal zone management.
- Setting up of a National Centre for Sustainable Coastal Management (NCSCM).

**State level component:** The following activities carried out under State level components of the project.

➤ **In Gujarat State:**

- Capacity building of the Gujarat state Government, including the State Pollution



Control Board, for effective management of the coastal areas.

- Pilot studies have undertaken on the ICZM approach for the stretch falling along Gulf of Kachchh.
- To conserve and protect the marine ecosystem of the Gulf of Kachchh, transplantation of corals.
- Continuous water monitoring and physico-chemical parameters of the waters are carried out.
- To reduce the sewage load in to Gulf of Kachchh, 70 MLD Sewage Treatment Plant for Jamnagar District has been undertaken.
- To conserve and protection of the marine ecosystem and improve the livelihood of the coastal communities, mangrove plantation carried out through Community Based Organizations and coral transplantation is carried out by Forest Department.
- To Mobilize the coastal community for improving their livelihood and increase awareness to conserve coastal environment.

➤ **In Odisha State:**

- The component includes, capacity building of the state level agencies and institutions.
- To prepare the ICZM plan for the stretches of Paradip-Dhamra and Gopalpur-Chilika.
- To generate data from regional coastal process study.
- To improve the coastal community and heritage sites along the selected stretches of the coast.

- To provide alternate source of livelihood to coastal fishers and involvement of coastal community to conserve coastal and marine environment.
- To promote eco tourism activities in and around Chilika Lake.
- To control coastal erosion through installation of a geo-tube embankment at Pentha, under Rajnagar block by Water Resources Department.
- Construction of Multi-purpose Cyclone Shelters to provide shelters to coastal community during natural disaster in the selected coastal stretch by OSDMA.

➤ **In West Bengal State:**

- To increase capacity building of the various agencies involved in coastal management and priority investments.
- To improve livelihood & marketing accesses in Sagar Island.
- Ecotourism development.
- Construction of sewage Treatment Plant and development of drainage system and phytoremediation.
- Beach cleaning, sanitation and solid waste management activities.
- To improve livelihood generation activities.
- Multipurpose cyclone shelters are constructed along the project area to reduce the cyclone impacts on coastal communities.
- 100% household electrification in Sagar Island.

## Progress /Achievements

Under National component, mapping and delineation of Ecologically Sensitive Areas along the mainland of the coast has completed and draft report circulated by NCSCM to all concerned States and UTs for suggestions/

inputs. Total of 27491 sq. km mapped including Marine Protected Areas. During ESA Mapping, total of 893 patches of ESAs were identified and detailed field study undertaken for conservation measures. Mapping and delineation of sediment cells along the mainland coast of India has been completed.



*Fig. 1 mangroves*



*Fig. 2 Corals*



*Fig. 3 Seagrass*



*Fig. 4 Salt marshes*



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

**GANDHI Project:** The GANDHI project is implementing in Dandi village inclusive of the surrounding five villages i.e. Sampore, Onjal, Matwad, Sultanpur & Aat has been designated as an Eco Sensitive Area (ESA) under the Environment (Protection) Act 1986, to be enhanced and developed as a Gandhi Memorial. This project is envisioned with the

aim to promote Gandhian thoughts for protection of natural resources and cultural heritage along with the socio-economic upliftment of the local communities. Under this project, conservation and protection based activities like mangrove plantation, shelterbelt plantation, beach cleaning, sanitation management, restructure and restoration of existing water ponds and community mobilization has been carried out. As per the ESA Notification, the consultancy for the Preparation and Implementation Support for the Integrated Development Plan for the Eco-sensitive Zone is awarded and work is under process.



*Fig. 5 Restoration of water body*

**Vedaranyam Project:** Vedaranyam is a coastal block of Nagapattinam district in Tamil Nadu State which inhabits the critical ecosystems like the wetland, swamp and small lagoon which harbours habitats like salt marsh, seaweeds and mangroves. Around 55 villages

come under this taluk whereas the community depends on fishing, agriculture, shrimp farming and salt production suggesting that the major ecosystem based livelihood seems to be of fishing and agriculture. In this sector, the ecosystem derived livelihood is the coastal

aquaculture activities which have also been plagued with environmental and social problems. To enhance national capacity and action to integrate ecological security of the coastal areas and livelihood security of the coastal community, the Vedaranyam is selected as project area under the ICZM Project. Under this project, the activities like community mobilization, exposure visits,

Participatory Rural Appraisal, establishing of Village Development Council (VDC) and restoration of water body in 12 villages have completed. The habitat restoration through Mangrove plantation in 35 ha and Non mangrove plantation in 30 ha has completed, restoration of salt marsh, establishment of genetic garden in 2 acre have been carried out.



*Fig. 6 Mangrove plantation*

### **National Centre for Sustainable Coastal Management (NCSCM):**

A specialized Centre namely National Centre for Sustainable Coastal Management (NCSCM) under the project has been set up within Anna University, Chennai to undertake research and development in the area of coastal zone management. The construction work of

NCSCM Building is under progress and will be completed shortly. However, NCSCM is carrying out activities from rented building in Anna University Campus, Chennai.

**Phase-II of the Project:** Based on the success of the project the remaining ten coastal States /Union Territories namely, Daman & Diu, Maharashtra, Goa, Kerala, Karnataka, Tamil





Nadu, Andhra Pradesh, Puducherry, Andaman & Nicobar Islands, and Lakshdweep Islands have requested Ministry of Environment, Forests and Climate Change to initiate the same project in their State as well. National Centre for Sustainable Coastal Management (NCSCM), Chennai has been assigned to coordinate with the remaining ten coastal States/Union territories for the purpose of preparing the Detailed Project Reports (DPRs) for the Phase-II of the ICZM Project. MoEF&CC has received Based Documents from Andhra Pradesh, Puducherry, Tamil Nadu, Kerala and Karnataka which are submitted to DEA.

**Island Management Plan Preparation:** MoEF&CC through NCSCM has prepared the Integrated Island Management Plans for the ten islands of Lakshadweep and approved by Hon'ble Supreme Court. The same shall be considered as DPRs for implementation of the Phase-II of the ICZM Project.

**National Coastal Mission:** SICOM has prepared a national coastal mission document in consultation with NCSCM and MoES and circulated to all coastal States and UTs for their comments/inputs.

**State wise status:** With regard to the State level components pilot ICZM Plan preparation alongwith certain intervention especially with regard to improvement of livelihood of local

communities is being undertaken under the project in the States of Gujarat, Odisha and West Bengal.

**Piloting ICZM approaches in Gujarat:** Under this comprised, capacity building of the Gujarat state Government, including the State Pollution Control Board, for effective management of the coastal areas. Pilot studies have undertaken on the ICZM approach for the stretch falling along Gulf of Kachchh. Further, to conserve and protect the marine ecosystem of the Gulf of Kachchh, transplantation of corals, continuous water monitoring and physico chemical parameters of the waters are carried out. To reduce the sewerage load in to Gulf of Kachchh, 70 MLD Sewage Treatment Plant for Jamnagar District has been undertaken. The work of establishment of STP is completed and plant is in operation. To conserve and protection of the marine ecosystem and improve the livelihood of the coastal communities, the Forest department has planted more than 15000 ha of mangroves through Community Based Organizations. 1000 sq mt. of coral transplantation is completed. 104 Community Based Organization [CBO] and 476 Self Help Groups [SHGs] have engaged for coastal ecosystem conservation and management. Under this project, more than 1000 toilets are prepared in the coastal villages in integrated manner.



*Fig. 7 Mangrove plantation and Coral transplantation activity carried out in Gulf of Kachchh under ICZM Project*

**Piloting ICZM approaches in Odisha:** includes pilot studies for Orissa coast. The component includes, capacity building of the state level agencies and institutions; preparation of an ICZM plan for the coastal sediment cells in the stretches of Paradip-Dhamra and Gopalpur-Chilika; regional coastal process study, and priority investments. The project is catering capacity building in the area of coastal management and wetland research. The priority investments in Orissa is concentrated in two stretches namely, (i) Gopalpur-Chilika and (ii) Paradip -Dhamra. In odisha to improve the coastal community and heritage sites along the coast the selected stretches of Odisha Coast. A study on Regional Coastal Process Study is carried out which are generating huge amount of data and are useful for the preparation of Integrated Coastal Zone Management Plan for the Odisha.

**Piloting ICZM approaches in West Bengal:** This component involves pilot ICZM studies for West Bengal. The project will support capacity building of the various agencies involved in

coastal management and priority investments. This component mainly addresses the coastal zone management issues in three sectors of West Bengal namely, Sundarban, Haldia and Digha-Shankarpur. Under the project, livelihood improvements & marketing accesses in Sagar Island, ecotourism development, construction of sewerage Treatment Plant, development of drainage system and phytoremediation, beach cleaning and sanitation, solid waste management, livelihood generation activities are carried out. Multipurpose cyclone shelters are constructed along the project area to reduce the cyclone impacts on coastal communities. 100% household electrification in Sagar Island has completed. Work regard to rehabilitation of vendors, beach beautification including 31 benches and decorative lights were installed and renovation of sanitary sewerage scheme is under progress. Total 100 garbage bins capacity of 240 ltr were placed in strategic locations at Digha beach.



*Fig. 8 Storm water drainage at Digha and Beach front development at Digha*

## Survey & Utilization Division

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

Plantation Development Corporation Limited, Forestry trade tariff and related issues for Bilateral/ Multilateral Trade Negotiations, National Forestry Information System, Sustainable Forest Management Cell and C&I for SFM at National Level, Forest Certification of Natural Forests, Plantation and NTFP, Wood Based Industries, Permission for Industrial Estates including North Eastern States and NE Cell.

## Forest Survey of India

Forest Survey of India (FSI), a national level organization under Ministry of Environment, Forest & Climate Change, 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 FAO and UNDP. The main objective of PISFR was to ascertain the availability of raw material for establishment of wood based industries in selected areas of the country. In its report in 1976, the National Commission on Agriculture (NCA) recommended the creation of a National Forest Survey Organization for collection of reliable data through countrywide comprehensive forest resources survey at regular intervals. Consequently, PISFR was reorganized into FSI in June 1981. After a critical review of activities, the mandate of FSI was refined in 1986 in order to make it more relevant to the rapidly changing needs and aspirations of the country. The main objectives of FSI are as follows:

### Objectives of FSI

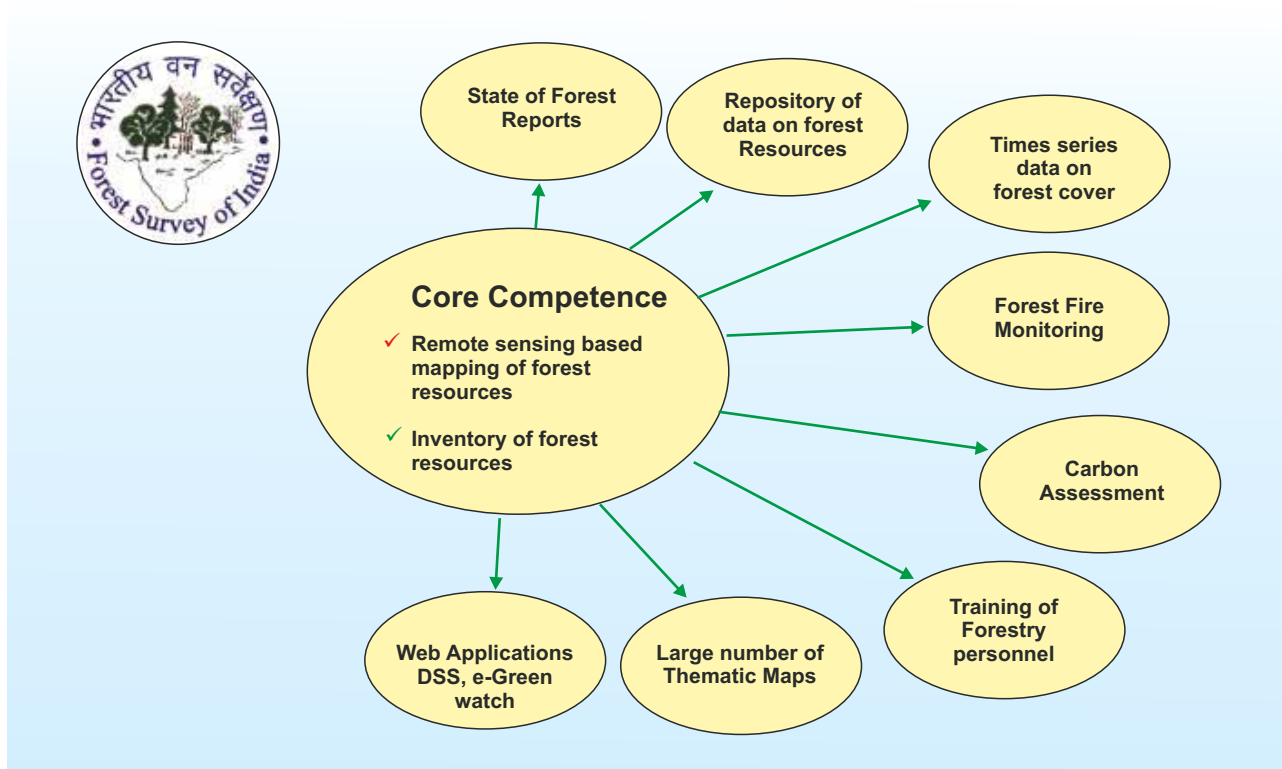
- To assess the forest cover of the country through Remote Sensing technology, analyse the changes and prepare State of Forest Report biennially.
- To conduct inventory in forests and non-

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, 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.

### The major activities of FSI are:

- Biennial Forest Cover Assessment using Remote Sensing technology.
- Inventory of Forest and Trees Outside Forests (Rural & Urban areas).
- Training and Extension.
- Projects and Consultancies



*Fig. 9 Major activities of FSI*

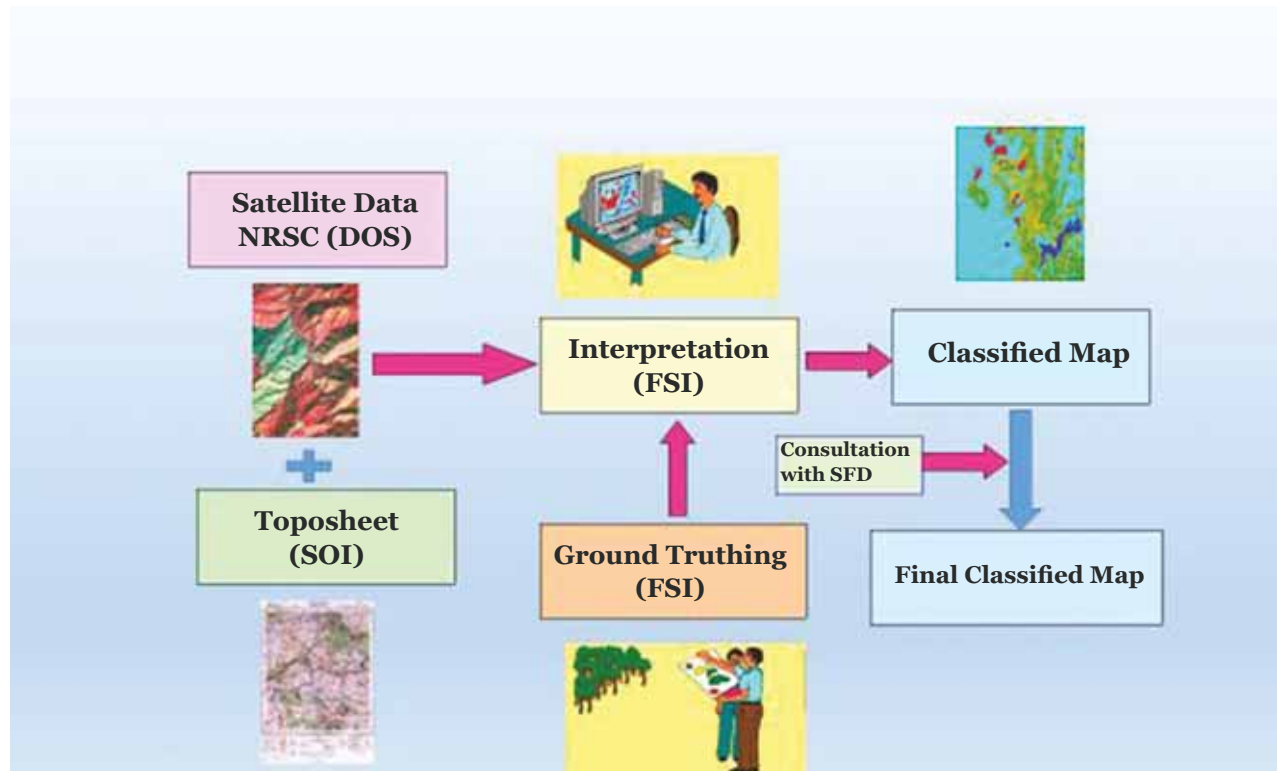
## Forests Cover Mapping & Tree Cover

Forest Survey of India (FSI) is involved in forest cover assessment of the country on biennial basis by interpretation of satellite data on a two-year cycle and presents the information in the form of 'India State of Forest Report'. So far 14 cycles of forest cover assessment have been completed since 1987 till year 2015. In addition to forest cover, assessment of tree cover of the country is also being carried out using the Trees Outside Forests (TOF) inventory data. There is an increase of 3,775 sq km in the forest cover and 1,306 sq km in tree cover of the country as compared to 2013 assessment.

During year 2016, 311 scenes of LISS III sensor of Indian Remote Sensing Satellite were

procured from NRSC Hyderabad and classification work has been completed for 249 sheets till Nov 2016. The launched workshop for the 15th cycle was held on 12-13<sup>th</sup> May, 2016 in which all the technical staff from FSI headquarters and Zonal offices participated.

The work for 15th cycle is in progress and the findings will be reported in the 'India State of Forests Report – 2017' to be published in the financial year 2017-18. Over the years with the advancement of technologies of image processing and data quality of remote sensing, the methodology of forest cover assessment has improved to provide more accurate data products for better operational management and planning.



**Fig. 10** Forest Cover Mapping

## Forests & TOF Inventory

Inventory of forests and Trees Out-side 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 and carbon stock estimation at national levels. In addition to inventory of forests, Trees Out-side Forests (TOF) resources are also

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

India State of Forest Report-2015 (ISFR-2015) was published in December 2015. In this report, chapters on 'Tree cover', 'Growing stock', and "Important Characteristics of India's Forest on different forest types groups", are based on the field inventory of forests. These chapters give information about tree cover,

species and diameter wise growing stock, carbon stock estimates and information on various important characteristics of India's forest on parameters such as soil depth classes, humus, soil organic carbon, soil erosion, forest vegetation, crop composition, important tree species in forest type groups, forest fires, injuries to crops, biotic influence etc.

There is an increase of 110.34 m. cum in total growing stock of the country as compared to last assessments as reported in ISFR-2013. Out of this, the increase inside forest is 21.69 m. cum. and that outside forest is 88.66 m. cum.

The data collection work for inventory of forest and TOF for ISFR 2017 is completed and data checking and data processing work is under progress.

### New National Forest Inventory Design:

A new sampling design for national forest inventory has been implemented by FSI from February, 2016.

The new sampling design is grid based instead of district based as used earlier. Under the new design nationwide grids of 5 x 5 km were created. Each year selected grids will be selected for forest and TOF inventory. The cycle for forest inventory is kept as 5 years and cycle for TOF has kept as 10 years. The new design is fully based on RS and GIS.

The main advantages of new design would be to reduce the revisit time of forest inventory from 20 years to 5 years, to generate state level estimates with better accuracy. In the new design, many new parameters such as NTFP, invasive species, availability of water near sample plot etc. has been added.

#### Addressing information need of:

- Niti Aayog
- Finance Commission
- UNFCCC
- REDD+
- State level estimates etc.



Reducing time of revisit from **20** years to **05** years



Fig. 11 New Forest Inventory Design



## Training of forestry personnel

Forest Survey of India (FSI) has been imparting training to forestry personnel of State Forest Departments since 1981 through short term courses (one/two weeks) on the modern Geomatic tools such as remote sensing, GIS, GPS, DGPS, carbon stock inventory and inventory techniques. Till 31<sup>st</sup> October 2016, about 4,400 forestry personnel have been trained in these fields in the various training programmes conducted at FSI. In addition, around 500 forestry personnel were also trained at various outreach training courses of FSI.

## Other major activities of FSI

### Revisiting of Forest Type Mapping (FTM):

Forest Type Mapping of India was carried out by FSI between year 2005 to 2011 on 1:50,000 scale using LISS-III data of year 2003. Now, after a decade it is necessary to Revisit the Forest Types of India to meet the following objectives:

- I. To improve and update the existing Forest Types as per the present scenario.
- II. To interpret the Forest Types as per their physiognomic distribution in the country.
- III. To facilitate use in DSS & E-Green watch applications.

In this regard the project launched workshop with state Forest Department representatives and other Central Government institutions was held on 5<sup>th</sup> August 2016,

**Forest Fires:** Forest fires are a recurrent phenomenon in India during fire season which is from February to June. The exercise on the

real time monitoring of forest fires was initiated in 2004 by FSI. The fire alerts received from high temporal MODIS (Moderate resolution imaging Spectro radiometer Sensor), are processed for pure forest fire signals using FSI forest cover layer, other ancillary ground information. The fire signals are also sent to the State Forests fire nodal officer as KML which is Google earth compatible file. FSI has reported a total of 24,817 forest fire points across the country using MODIS sensor during 2016.

## Pre- Warning Alert System for Forest Fires & Burnt Area Assessment

FSI has undertaken the exercise and developed an indigenous methodology from the perspective to provide the pre-warning alert system for forest fire on weekly basis using forest cover map, forest type map, RFA boundary, temperature and fire historical data and disseminates the same to state Forest Department.

FSI is currently using AWIFS image for the identification of burnt area and their severity assessment. Most of the objectives, including methodology of the project has been streamlined. However, the system is being made more robust by addition of different parameters.

**National Spatial Data Infrastructure (NSDI):** It 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 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. 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 and Forest Type of the entire country (state wise) and have been uploaded on NSDI portal. A one-day workshop on NSDI Data Content Standard Document on Forest was organized at FSI, Dehradun on 22<sup>nd</sup> Aug 2016.

**Decision Support System (DSS):** DSS is a web-GIS based application which has been developed to provide qualitative and quantitative information with respect to forest area. It uses different spatial layers for providing different information on different issues related to forest and wildlife areas. Geospatial data used in the DSS application includes state and district boundary layer protected area, tiger reserves, tiger corridors, forest type map, biological richness, landscape integrity, hydrological layer, forest cover map time series layer, recorded forest area, and recorded forest administrative boundary. All state PCCFs and MoEF&CC have been provided with the user ID and password to access and use the application [Website: [ww.fsigeoportal.gov.in/dss](http://ww.fsigeoportal.gov.in/dss)].

**e-Green Watch:** Compensatory Afforestation Fund Management and Planning Authority (CAMPA) is the National Advisory Council for

monitoring, technical assistance and evaluation of compensatory afforestation and other forestry activities funded by CAMPA fund. It is designed and developed as a web based workflow applications and integrated information system which shall enable automating of various functions and activities related to monitoring and transparency in the use of CAMPA funds and various works sanctioned in the Annual Plan of Operations (State CAMPA) approved by the State Authorities. State govt. uploads the polygons under following categories:

- I. Compensatory Afforestation Land (CA Land)
- II. Diverted Land (DL)
- III. Other Plantation Work (OPW)
- IV. Plantation Work (PW)
- V. Assets

Till now 28 states from India have uploaded 77,220 total no. of polygons. out of which 76,937 polygons have checked so far. 17,617 polygons have been rechecked between Jan to Nov 2016.

**Very High Resolution Data:** Now with the changing time and the upcoming challenges, FSI has decided to move in a new field to work on the various application using Very High Resolution Data. FSI has procured KOMPSAT-3 through NRSC, Hyderabad for the first time which provides 0.7m panchromatic and 2.8m multispectral imagery for the various purposes. At present FSI has procured Panchromatic, Multi Spectral and ortho-rectified images for the States of Maharashtra and Karnataka.



The Preliminary Objective in the development of visualizing application for monitoring of plantation and allied activities including ground truthing for Forest Cover Mapping, Forest Fire species identification etc.

The VHR lab with the requisite hardware and software has been established.

#### **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 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.

FSI has been estimating the carbon stock in the India's forest as per the methodology of 'Good Practices Guidance' (GPG) developed by Inter-governmental panel on Climate Change (IPCC). For estimation of emission factors for different strata, data of National Forest Inventory (NFI) has been used. Biomass equations/factors developed through a special study conducted by FSI. GIS techniques were used for synthesizing the data and to estimates carbon stock under different carbon pools.

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

#### **Inventory of TOF in Haryana, Uttarakhand and**

**Tamil Nadu:** Three projects on Inventory of Trees Out-side Forests (TOF) in Haryana, Uttarakhand and Tamil Nadu were undertaken by FSI. The field work in Haryana and Uttarakhand was carried out by state forest departments. The field work of Tamil Nadu state was done by FSI. The data processing and report writing was done by FSI and final report of all Uttarakhand and Tamil Nadu state has been published. The final report of Haryana state is under printing.

#### **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 state's 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 (LISS-III and LISS-IV 2011-12 multispectral data, ASTER DEM, SOI Topo sheets 1:25,000/1:50,000) were used for the



execution of this project. The District wise information's about the forest cover map showing the categories of forests by Density classes, forest type map, slope map, aspect map, drainage map, land use area map, DEM (District and state wise) and FC draped (District and state wise) completed and submitted to Nagaland forest department.

To assess the forest resources of Nagaland state, forest inventory work was carried out by FSI which has been completed. The Forest inventory results have been submitted to Nagaland forest department. Report writing work is in progress.

**Designing NFI for Sri Lanka with collaboration with FAO:** Forest survey of India has signed a LoA with FAO Sri Lanka for designing and developing a National Forest Inventory (NFI) system for Sri Lanka. Under this project, FSI is preparing a sampling design for carrying out inventory in Sri Lanka, designing of field forms, field manual, conducting field training, developing data entry and data processing module and conducting data processing training for staff of Sri Lanka Forest Department. The project started in April, 2016 and expected to be completed in the first half of the year 2017. The sampling design for the NFI of Sri Lanka has been prepared. In addition, field forms and field manual has also been prepared. Two field trainings for this purpose for the officials of Sri Lanka were conducted during August & October 2016.

**FAO-TCP Project:** A Technical Cooperation Programme (TCP) for Strengthening National Forest Inventory and Monitoring Protocols and Capacities in India has been initiated by FSI

under the ministry of MoEF & CC with the technical assistance of FAO. The FAO-TCP project would develop and set up a new integrated National Forest Monitoring System (NFMS), build national capacities on forest monitoring, and pilot test implementation in selected states. The MoEF & CC of Government of India is the nodal ministry for the project which will be implemented by FSI. The overall programme will be guided by a National Programme Steering Committee (PSC) under the chairmanship of Director General and SS, MoEF & CC. FSI has already conducted an inception workshop for formally launching the programme in August, 2016.

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

**Guidelines for Wood Based Industries:** The SU Division prepared the Guidelines for Wood Based Industries (Establishment and Regulation) Guidelines, 2016 in compliance of order of Hon'ble Supreme Court dated 05/10/2015 in W.P. (C) No. 202/1995 in the matter of T.N. Godavarman Vs. Union of India and Ors. After the order of Hon'ble Supreme



Court, the Ministry prepared a Committee under the Chairmanship of ADG (FC) to prepare the draft guidelines for wood Based Industry. The Committee prepared the draft guidelines and the guidelines were circulated to all States/UTs for comments.

After receipts of comments from State/UTs Forest Departments, the guidelines were modified accordingly. After approval, the guidelines i.e. Wood Based Industries (Establishment and Regulation, 2016 has been published in official gazette on 16th November, 2016. These guidelines are available on the website [www.ifs.nic.in](http://www.ifs.nic.in).

On the basis of these guidelines, the State Level Committee for Wood Based Industry will take decision on issue of new licenses/renewal of licenses for wood based industry.

### **Standard Operating Procedure for movement of surplus timber to other parts of the country.**

As per the order of Hon'ble Supreme Court dated 12.04.2016, SU Division prepared the Standard Operating Procedure for allotment of railway wagons for movement of surplus timber from North Eastern Region to the other parts of the country.

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

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

cooperation and consultation among countries producing and consuming tropical timber;

- promote the expansion and diversification of international trade in tropical timber and the improvement of structural conditions in the tropical timber market;
- promote and support research and development to improve forest management and wood utilization;
- encourage development of national policies for sustainable utilization and conservation of tropical forest and their genetic resource and for maintaining ecological balance in the regions concerned.
- The ITTA was adopted on 18th November 1983, and entered into force on 1<sup>st</sup> April 1985.
- The ITTA, 1983 established the International Tropical Timber Organization (ITTO), headquartered at Yokohama, Japan, which provides a framework of tropical timber producer and consumer countries to discuss, exchange information and develop policies on issues relating to international trade in, and utilization of, tropical timber and the sustainable management of its resources base.
- The ITTA, 1994 was renegotiated under the auspices of UNCTAD, Geneva, Switzerland to formulate a new Agreement, ITTA, 2006 which entered into force definitively or provisionally on or after 1<sup>st</sup> February, 2008 or any date within six months thereafter.



India as a signatory to ITTA 1994 has ratified and deposited the instrument of ratification with the UN Secretary General in New York on 25<sup>th</sup> July, 2008.

- The ITTO also administers assistance for related projects.
- At Present, the ITTO has 73 members divided into two category: Producer Countries (35 members) and Consumer Countries (38 members). India is a founder member (producer Country Category) of ITTO which aims for conserving tropical forest and assisting countries to develop economically in the field of forestry.
- The highest authority of the ITTO is the International Tropical Timber Council (ITTC), which governs the performance of all functions necessary to carry out the provisions of the ITTA, 2006.
- The Council is supported by four committees open to all member countries, which provide advice and assistance to the council on policy and project issues.
- Three of the committees deal with key areas of policy and project work. They are (i) Committee on Economic Information and Market Intelligence; (ii) Committee on Reforestation and Forest Management; and (iii) Committee on Forest Industry.
- These committees are supported by the Expert Panel for the Technical Appraisal of projects and Pre-Projects, which reviews project proposals for technical merit and relevance to ITTO objectives.
- The fourth committee, on Finance and

Administration, advises the Council on matters related to the budget and other funding and administrative issues concerning the management of the Organization.

- As a member of ITTO, India has to pay annual contribution to ITTO which is made every year. In the current year 2016-17, the Government of India sanctioned the annual contribution of US \$ 98,760 to ITTO for the calendar year 2016.

#### **International Network of Bamboo and Rattan**

**(INBAR):-** The International Network for Bamboo and Rattan (INBAR) is an intergovernmental organization established in 1997. INBAR is dedicated to improving the social, economic, and environmental benefits of bamboo and rattan. INBAR plays a unique role in finding and demonstrating innovative ways of using bamboo and rattan to protect the environment and biodiversity, alleviate poverty, and facilitates fairer pro-poor trade. INBAR connects a global network of partners from the government, private, and non-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. As a member of INBAR, India has to pay annual contribution to INBAR which is made every year. During the year 2016-17, Government of India sanctioned annual contribution of US \$ 12,000 for the calendar year 2016 to INBAR.

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

Andaman & Nicobar Islands Forest &

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

since 2001. The obligatory expenses of the Corporation, like the payment of salaries, wages etc. were possible only due to the sanction of interest bearing loans every year from the Govt. of India since 2003-04. The total interest bearing loan upto 31.03.2016 is Rs. 162.83 crore and interest is Rs. 152.58 crore. From the year 2014-15, the loan is being provided by Ministry of Home Affairs. This sick corporation has been identified by NITI Aayog for closure.



*Fig. 12 Andaman Island*

# CONSERVATION





## Biodiversity Conservation

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 February 1994, several steps were initiated to meet the commitments under the Convention, and to realize the opportunities offered by the Convention. These efforts were aimed at bringing the legislative, administrative and policy regimes in tune with the three-fold objectives of the CBD. India enacted the Biological Diversity (BD) Act in 2002 to give effect to the provision of this Convention. India has also prepared a National Biodiversity Action Plan (NBAP) in 2008, and an Addendum to NBAP in 2014 with 20 national targets on biodiversity.

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

national level inter alia through the Biological Diversity Act.

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

The Nagoya Protocol on access and benefit sharing (ABS) adopted under the aegis of Convention on Biological Diversity (CBD) and related matters:

- During the period, India participated in the following important international meetings relating to biodiversity:
  - Seminar on Traditional Knowledge associated with Biological Resources in Bhutan from 29-30 March 2016
  - Subsidiary Body on Scientific, Technical and technological Advice held in Montreal from 27-30<sup>th</sup> April, 2016
  - First meeting of Subsidiary Body on Implementation in Montreal from 3-6 May 2016
  - CoP Bureau and Informal consultation in Mexico from 4-7 October 2016.
  - ASEAN heritage park & Bilateral meeting held in Myanmar from 24-25 October 2016
  - High Level Segment, thirteenth Conference of the Parties (CoP-13) to the Convention on Biological Diversity (CBD), eighth meeting of the Parties to



the CBD serving as meeting of the Parties (CoP-MoP 8) to the Cartagena Protocol on Biosafety (CPB), and second CoP-MoP to Nagoya Protocol on Access and Benefit Sharing (ABS) to be held from 2-17 December, 2016 in Cancun, Mexico.

- For participating in the meetings of the CBD, country positions were prepared through a consultative process, which were put forth at these negotiation meetings.
- During the period, work related to the implementation of decisions of the CoP to the CBD was continued, including through making submissions to the CBD Secretariat. India also continued to contribute to the IPBES work programme and deliverables including through participation of Indian experts in the meetings.
- In accordance with the requirements under the Nagoya Protocol on ABS, India published information relating to an ABS agreement entered into by NBA, on the ABS Clearing House of the CBD Secretariat on 1<sup>st</sup> October 2015, thus constituting the first Internationally Recognised Certificate of Compliance.
- A long-drawn exercise of augmenting the list of normally traded commodities to be exempted from the purview of the BD Act through a notification to be issued under Section 40 was completed following consultations with stakeholders over the last three years. The Notification issued on 7 April 2016 under Section 40 of the Biological Diversity Act for exempting 385 species normally traded as commodities (NTACs) from the purview of the Act.



*Fig. 13 Biodiversity Connect Media Workshop*



- Activities to strengthen the institutional capacity of NBA, SBBs and constitution of BMCs, as well as preparation of Peoples Biodiversity Registers (PBRs) were continued during the year, including by providing special grant to NBA for SBBs and PBRs, and by developing project proposals.
- Two projects on biodiversity have been developed seeking grants from biodiversity portfolio of sixth cycle of the Global Environment Facility (GEF). The project on 'Securing livelihoods, Conservation, Sustainable Use and Restoration of high range Himalayan Ecosystems (SECURE-Himalayas)' has been approved by the GEF Council in 2015. The project on "Mainstreaming Biodiversity into production sectors and development and finance planning" has been submitted for consideration of approval.
- A project proposal was developed on 'Capacity Development of Statutory Institutions for Effective Implementation of the Access and Benefit Sharing (ABS) Mechanism in India' under Indo-German Biodiversity Programme for Euro 3 million, which was approved in the 2015 Indo-German negotiations on development cooperation. The project will be implemented at the national level with NBA and in three pilot states of Maharashtra, Tamil Nadu and Uttarakhand with the respective State Biodiversity Boards.
- International Day for Biological Diversity (IDB) was celebrated all over the country on 22<sup>nd</sup> May, 2015. The theme for year 2015-16

was 'Mainstreaming Biodiversity: Sustaining People and their Livelihood'. The national level celebrations of the Day are held in Mumbai, Maharashtra. The event is organised by the Ministry of Environment, Forest & Climate Change, Government of India, through the National Biodiversity Authority with support from Maharashtra State Biodiversity Board, in partnership with United Nations Development Programme and others. The Honourable Governor of Maharashtra is the Chief Guest and Mr Prakash Javadekar, Hon'ble Minister of State (Independent Charge), Ministry of Environment, Forest & Climate Change presides over the function. The United Nations Resident Coordinator and UNDP Resident Representative also attend the event.

- The main activities during the event include a talk by biodiversity expert; presentation of the third round of UNDP supported India Biodiversity Awards 2016, and release of a publication on winners of these Awards, as well as some other communication material relating to linkage of SDGs with National Biodiversity Targets.

### **Biological Diversity Act and National Biodiversity Authority**

- The Authority met three times – 38<sup>th</sup> Authority meeting held on 4<sup>th</sup> July, 2016, 39<sup>th</sup> Authority meeting held on 14<sup>th</sup> October, 2016 and 40<sup>th</sup> Authority meeting held on 21<sup>st</sup> December, 2016.
- NBA has received a sum of about Rs 2.02



crores as benefit sharing component during 2016 - 17 (so far) including from the auction of Red Sanders wood.

- International Day for Biological Diversity (IDB) was celebrated by 27 SBBs all over the country on 22<sup>nd</sup> May, 2016. The theme for year 2016-17 was “Mainstreaming Biodiversity: Sustaining People and Livelihood”. The national level programme was celebrated in Mumbai, Maharashtra in presence of Shri Prakash Javadekar, Minister for Environment, Forest & Climate Change and Shri C. V. Rao, Governor of Maharashtra. India biodiversity awards 2016 were distributed among the recipients in this occasion.
- So far as 22 SBBs have notified State Specific Rules as per the provisions of the Act and 7 SBBs are finalizing it currently. Across India, 2889 PBR have been prepared and 41180 BMCs constituted as on 31<sup>st</sup> March, 2016.
- Three regional meeting of smaller group SBBs were held in Chennai, Delhi and Kolkata on 10<sup>th</sup> May, 8<sup>th</sup> June and 22<sup>nd</sup> August, 2016 respectively.
- The Eleventh National Meeting of the State Biodiversity Boards was held at Chennai during 30<sup>th</sup> September-1<sup>st</sup> October 2016 and attended by the Chairman and Member Secretaries of 23 states along with 5 authority members. The meeting reviewed the progress made on processing of ABS applications by SBBs, modalities for utilizing the State Biodiversity Fund, sharing of the details with NBA regarding grant approval by SBBs, amendments in the State Rules, litigation matters, notification of threatened species and its rehabilitation, digitalization of PBR, linking of BMC with Panchayati Raj Institutions, develop / update State Biodiversity Action Plan and the action taken on Resolutions passed in the Ministers’ Conference in 2015.
- The Compendium of the Biodiversity Rules of States compiled by NBA and a Brochure on achievements of the NBA during the year 2015-16 were released on 1<sup>st</sup> October 2016, during the occasion of 13<sup>th</sup> Foundation Day celebration at Chennai. A Manual on PBR prepared by the Maharashtra State Biodiversity Board and Watershed Organization Trust, Pune was also released during this occasion.
- Benefit sharing agreements were executed by 127 applicants with NBA, which is construed as an approval for undertaking various activities enshrined in Sections 3,4,6 and 20 of the BD Act.
- An interactive media workshop was organized by the Centre for Environmental Communication at New Delhi on 14<sup>th</sup> June 2016 with the support of NBA for engaging the media on National biodiversity targets and Biological Diversity Act. (Photo no.: 1 enclosed)
- A Joint workshop on seeds development organized by the Protection of Plant Varieties and Farmers’ Rights Authority (PPVFRA) under Indo-German Bilateral Co-operation was held on 23<sup>rd</sup> to 24<sup>th</sup> May, 2016, wherein

stakeholders meet was also organized to clarify the issues such as ABS, seed movement and required formalities, IPR.

- NBA celebrated its 13<sup>th</sup> Foundation Day in the afternoon on 01<sup>st</sup> October, 2016 at the premises of the NBA, Chennai. During this occasion, the Compendium of the Biodiversity Rules of States, the Manual on PBR prepared by the Maharashtra State Biodiversity Board and Watershed Organization Trust, Pune and the Brochure on achievements of the NBA during the year 2015- 16 were released.
- A Brainstorming on Harmonization of Regulations on Access to Biological Resources and Seed movement under the Biological Diversity Act, 2002 was organized by the CABI South Asia, India with the Support of M/s Crop Life Asia and ABLE-ag on 22<sup>nd</sup> September, 2016 at NBA Office premises, Chennai for understanding the provisions of the BD Act.

- So far NBA has initiated action against 11 patent applications filed in European patent office, State Intellectual Property Office China, Canadian Intellectual Property Office and WIPO as per Section 18(4) of BD Act. Of this opposition measures in 9 cases were initiated during the period 2016-17.

### **NBA is currently operationalizing three projects under it's belt:**

**UNEP-GEF-MoEF&CC ABS Project** on “Strengthening the Implementation of the Biological Diversity Act and Rules with Focus on its Access and Benefit Sharing Provisions”:

- It's purpose is to increase the institutional, individual and systemic capacities of stakeholders to effectively implement the Biological Diversity Act, 2002 and the Rules 2004 in order to achieve biodiversity conservation through implementing Access and Benefit Sharing Agreements in India.



*Fig. 14 Dr. Amita Prasad, Additional Secretary, MoEF&CC representing India at Cancun on COP-13, CBD related meeting in December, 2016*



- The project is currently being implemented in ten provincial states of India in partnership with state biodiversity boards in Andhra Pradesh, Karnataka, Gujarat, Goa, Himachal Pradesh, Odisha, Sikkim, Telangana, Tripura and West Bengal, some of the key technical partners such as BSI, ZSI, UNEP-DELCO, UNU-IAS, UNDP and GEF help in providing relevant technical inputs.
- The Project Steering Committee of the UNEP-GEF project met on 21<sup>st</sup> December, 2016 in the Ministry to review the progress made under the project

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

- National Biodiversity Authority (NBA) has proposed to start a Centre for Biodiversity Policy and Law (CEBPOL) to deal with emerging and current biodiversity governance and policy related issues. The Government of Norway and India decided to collaborate and a letter of intent for technical and institutional cooperation was signed on 19<sup>th</sup> November, 2010:
- The Annual Meeting for the contract between MFA and NEA regarding Institutional and Technical Assistance to National Biodiversity Authority (NBA) was held in the premises of the Norwegian Embassy in New Delhi on January 30 with participants from NBA, MFA and NEA.
- A Nature Index workshop was organized in Bhubaneswar, Odisha 28-29 January. Stein Are Sæther and Signe Nybø attended from NINA, Norway.

- CEBPOL organised a two day workshop on Synergies among Biodiversity related Multilateral Environmental Agreements (MEAs) at Heritage Resort, Manesar, Haryana on 3-4 October 2016.
- CEBPOL, National Biodiversity Authority, in association with the National Law School of India University, Bangalore, organised a two day Consultative Conference for State Biodiversity Boards to address the challenges and prospects of biodiversity governance in India during 25-26 October 2016 in Bangalore.
- CEBPOL has organised a Policy Dialogue on Mainstreaming Biodiversity into the Fisheries Sector on 25<sup>th</sup> November, 2016 at the National Biodiversity Authority (NBA) conference hall, Chennai, around 30 fishery experts from various organisations participated in the deliberation.
- NBA in association with CEBPOL has organized a Consultative Conference on Biodiversity Governance for State Biodiversity boards at National Law School, Bangalore from 25-26 Oct 2016. SBBs actively participated in the programme.

**Biodiversity Finance Initiative (BIOFIN):** The Ministry joined UNDP managed global initiative on Biodiversity Finance Initiative (BIOFIN) in 2015. The initiative is hosted by NBA, and technical assistance is being provided by the Wildlife Institute of India and National Institute of Public Finance and Policy in implementation of BIOFIN.

- A Global BIOFIN Project Mission Team visited India from 25-27 July, 2016 and



interacted with the Officials from MoEF&CC, NBA, NIPFP and other project partners to review the progress of the BIOFIN project in India

## Performance/Achievements

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

Nagoya Protocol on ABS requires Parties to issue a permit or its equivalent at the time of access as evidence that access to genetic resources was based on prior informed consent and that mutually agreed terms were established. The Protocol further requires that Parties make information on the permit or its equivalent available to the ABS Clearing House for it to constitute an Internationally Recognised Certificate of Compliance (IRCC). The IRCC of compliance is a major innovation of the Nagoya Protocol, and one of the cornerstones of the ABS system. As a major step forward towards operationalisation of the Nagoya Protocol and the global Aichi biodiversity target 16, India became the first and so far the only country to publish information relating to an ABS agreement on the ABS Clearing House of the CBD Secretariat on 1<sup>st</sup> October 2015, thus constituting the first IRCC under the Nagoya Protocol. So far there are only three countries that have hosted the IRCCs in their CH platform, including India. Out of total 48 IRCCs published so far, 46 are from India. The other two countries viz., Republic of South Africa and Republic of Guatemala, hosted one IRCC each, as of now.

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

**Beta version of ABS-E Filing software:** NBA released a Beta version of ABS-E Filing software on 7<sup>th</sup> November 2016 which allows the applicant to file their applications through online. This initiative is towards expedite the process of the applications.

**Record number of agreements signed by NBA:** During the reporting period, the NBA has received 409 applications from different stakeholders seeking approval, of which 210 (includes applications received during previous year) are found complete in all respects and taken up for processing. 139 applications have been cleared by the Authority and model agreement sent to them for execution. 127 ABS Agreements have been signed during the year.

NBA has introduced Form-C for providing the intimation for depositing the Microorganisms by Indian researchers/scientist in other country repositories for claim of his novel species for publication in journals.

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

Section 40 of the BD Act provides for the Central Government to exempt through issuing a notification biological resources normally traded as commodities. The first notification thus issued on 26 October 2009 contains 190 species. After extensive consultations over a

period of more than three years, including through an Expert Committee of NBA with all stakeholders viz., Ministries/Departments, State Biodiversity Boards, industry, experts and public, the list of 190 species notified earlier has been augmented to 385 species to be exempted from the purview of the Act, when traded as commodities, through a Notification issued vide S.O. 1352(E) dated 7<sup>th</sup> April, 2016 in supersession of the earlier notification. The Notification further provides that products derived from listed items that are traded as a matter of common practice are to be treated as NTACs (examples: ketchup from tomato, chips from potato, oil from ground nut, yarn/fabric from cotton). This list has been made more comprehensive in terms of crop plants with information like trade/common name; part used, and sources procurement as cultivated or mixed (cultivated plus wild). A self-declaration form appended to the notification provides for the exporter to declare the source of procurement to keep the implementation of the notification under careful watch and scrutiny.

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

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

- The Annual Meeting for the contract between MFA and NEA regarding Institutional and Technical Assistance to National Biodiversity Authority (NBA) was held in the premises of the Norwegian Embassy in New Delhi on January 30 with participants from NBA, MFA and NEA.
- A Nature Index workshop was organized in Bhubaneswar, Odisha 28-29 January. Stein Are Sæther and Signe Nybø attended from NINA, Norway.



**Fig. 15** Dr. Amita Prasad, Additional Secretary, MoEF&CC attending meeting on consultation with UT about BD Act in Chennai



- CEBPOL organised a two day workshop on Synergies among Biodiversity related Multilateral Environmental Agreements (MEAs) at Heritage Resort, Manesar, Haryana on 3-4 October 2016.
- CEBPOL, National Biodiversity Authority, in association with the National Law School of India University, Bangalore, organised a two day Consultative Conference for State Biodiversity Boards to address the challenges and prospects of biodiversity governance in India during 25-26 October 2016 in Bangalore.
- CEBPOL has organised a Policy Dialogue on Mainstreaming Biodiversity into the Fisheries Sector on 25<sup>th</sup> November, 2016 at the National Biodiversity Authority (NBA) conference hall, Chennai, around 30 fishery experts from various organisations participated in the deliberation.
- NBA in association with CEBPOL has organized a Consultative Conference on Biodiversity Governance for State Biodiversity boards at National Law School, Bangalore from 25-26 Oct 2016. SBBs actively participated in the programme.

### Performance/Achievements

- India is actively involved in the implementation of the Nagoya Protocol. Towards operationalisation of the Protocol, India became the first and so far the only country to have submitted Internationally Recognized Certificate of Compliance.
- 38<sup>th</sup> Authority meeting held on 4<sup>th</sup> July, 2016.

- 39<sup>th</sup> Authority meeting held on 14<sup>th</sup> October, 2016.
- 40<sup>th</sup> Authority meeting held on 21<sup>st</sup> December, 2016.
- So far 41,667 BMCs have been constituted and 2,889 PBR prepared as on 31<sup>st</sup> December 2016.
- 127 ABS Agreements were signed

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

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

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

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

The externally aided project entitled, 'Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP)' is being implemented as a centrally sponsored scheme. The project has four landscape located at





Askot, Uttarakhand; Little Rann of Kachchh, Gujarat, Satpura, Madhya Pradesh and Maharashtra and Agasthyamalai, Tamil Nadu and Kerala; and three field learning centre at Gir, Gujarat; KalakadMundanthurai Tiger Reserve, Tamil Nadu and Periyar Tiger Reserve, Kerala. A capacity building centre for the project is at Wildlife Institute of India, Dehradun.

The BCRLIP is a blended GEF and IDA activity using a Specific Investment Loan instrument aimed at strengthening biodiversity conservation and improving rural livelihoods at landscape sites. The Project was launched in July 2011 for a duration of six years.

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

The project has four components: (i) Demonstration of Landscapes Conservation Approaches in two Pilot Sites, i.e., landscapes mentioned above; (ii) Strengthening knowledge Management and National Capacity for replication of successful models of

Conservation in Additional Landscapes Sites; (iii) Scaling up and Replication of Successful Models of Conservation in Additional Landscapes Sites; and (iv) National Coordination for Landscape Conservation.

### Progress/achievements

- The Eighth Implementation Support Mission was carried out by the World Bank from September 12 – 30, 2016. The World Bank assessed the progress made by the project in achieving the project outcome through six envisaged monitorable indicators. The World Bank adjudged that three of the six indicators have been fully achieved and the remaining three that are rated as partially achieved have progressed well and are more than 2/3 achieved. The World Bank has identified low budgetary allocation and changes in fund-flow to implementing agencies as constraints in realizing the project outcomes fully.
- About 3,35,000 ha in the four landscapes have been brought under improved management through interventions on human-wildlife conflict mitigation, crop fencing, organic farming, as well as, convergence with other line departments.
- Periyar and Satpura landscape sites won conservation awards in April 2016.
- There has been good social mobilisation and institution building among landscape communities. About 40,000 households living in these landscapes have been brought under 300 village conservation committees (VCCs), including forest



dependent communities such as saltpan farmers, livestock keepers, farmers, fishers, and other vulnerable households such as landless and SC and ST households.

- Over 400 village microplans have been prepared; another 50 microplans are in advanced stages of finalization.
- Livelihood benefits and sustainable resource use through improved livestock management, organic fertilizer use, water storage/ harvesting, sustainable forestry, medicinal herbs cultivation, skill training and jobs placement to youth has been undertaken at a commendable scale.
- More than 30,000 stakeholders including front-line staff, teachers and general public have been trained on biodiversity and landscape conservation strategies by the Field Learning Centres in Gir, KMTR and Periyar and at WII;
- Biodiversity and socioeconomic mapping conducted in 2 landscapes;
- Several new training modules and publications prepared, including the first Landscape Atlas, on strategies/approaches and tools/methods for landscape conservation.

**Implementing organizations:** The project has four landscape located at (i). Askot, Uttarakhand, (ii). Little Rann of Kachchh, Gujarat (iii). Satpura, Madhya Pradesh and Maharashtra and (iv) Agasthyamalai, Tamil Nadu and Kerala; and three field learning centre at (i). Gir, Gujarat, (ii). Kalakad Mundanthurai Tiger Reserve, Tamil Nadu and

(iii). Periyar Tiger Reserve, Kerala. A capacity building centre for the project is at Wildlife Institute of India, Dehradun.

## Conservation and Management of Mangroves & Coral Reefs

The Government has identified 38 mangrove and 4 coral reef sites throughout the Country for intensive conservation and management of mangroves and coral reefs. List of identified sites is at Annexure-I. During the F.Y. 2016-17, the Ministry of Environment, Forest and Climate Change is providing central assistance in the ratio 60:40 to the Forest Departments of the Coastal States/UTs, whosoever requests, for Conservation and Management of Mangroves and Coral Reefs. Besides this, the Ministry also supports R&D activities with emphasis on targeted research on mangrove and coral reef biodiversity and its management.

Some major achievements during 2016-17 are as under:

- i. According to the Forest Survey of India (FSI) Report titled 'India State of Forest Report (2015)', the mangrove cover in the Country is 4740 km<sup>2</sup> which is nearly 3% of the world's mangrove vegetation. There is a net increase of 112 km<sup>2</sup> mangrove cover in 2015 as compared to 2013 assessment.

## Biosphere Reserves

The idea of 'Biosphere Reserves' was initiated by UNESCO in 1973-74 under its Man and Biosphere (MAB) Programme. The MAB, launched in 1970 by UNESCO, is a broad based



ecological programme aimed to develop within the natural and social sciences a basis for the rational use and conservation of the resources of the biosphere and for the improvement of the relationship between man and the environment, to predict the consequences of today's actions on tomorrow's world and thereby to increase man's ability to manage efficiently the natural resources of the biosphere.

The Indian National Man and Biosphere (MAB) Committee identifies and recommends potential sites for designation as Biosphere Reserves, following the UNESCO's guidelines and criteria. There are 18 designated Biosphere Reserves (BRs). Out of 18 Biosphere Reserves, 10 Biosphere Reserves have been included in the World Network of Biosphere Reserves of UNESCO.

### Progress/Achievements

- Agasthyamala Biosphere Reserve included in the World Network of Biosphere Reserves of UNESCO MAB Program
- 10 number of Management Action Plan (MAP) submitted by the State Governments been scrutinized and the funds have been released against them.
- Proposal for inclusion of Khangchendzonga Biosphere Reserve, Sikkim in the World Network of Biosphere Reserves of UNESCO MAB Program has been submitted.

**Implementing organizations along with details of responsibilities:** Implementing organization are the concerned states/ UT Government, Environment and Forest

Departments/ line departments. Lead Institutes identified for the Biosphere Reserves conducts research activities on the sanctioned research projects and periodic review and progress reports are evaluated by experts and the evaluation of the completed report is done by the designated committee.

### Biodiversity Conservation Scheme relating to Biosafety

The scheme on Biodiversity Conservation was initiated during 1991-92 during the 8th Plan period, to ensure coordination among various agencies dealing with the issues relating to conservation of biodiversity, and to review, monitor and evolve adequate policy instruments for the same. The SFC for the scheme which was approved on 03.02.1992 was revised while appraising its continuation during 10th Plan by adding new thrust areas. The main objective is to implementation of Cartagena Protocol on Biosafety, UNEP-GEF Supported Capacity building Project on Biosafety (Phase-II) Project and Strengthening of Biosafety management System.

### Progress/Achievements

CS-III (Biosafety) Division has conducted 3 GEAC during 2016-17. Thirteen workshops are being organized in various part of the country for awareness among the people about Biosafety. The Division has also defended Govt. interest before High Court/ Supreme Court. The division is implementing UNEP-GEF Supported Capacity Building Project on Biosafety-(Phase-II) Project. CS-III (Biosafety) Division has also conducted various workshops during 2016-17:



S. No.	Workshops	Dates	Place
1	Training workshop on Strengthening Capacities for Transboundary movement of LMOs for Seed Inspection Officials	May 27-28, 2016	Hyderabad
2	Training workshop on Strengthening Capacities for Transboundary movement of LMOs for Food Safety Officials	May 20-21, 2016	Indian Institute of Research (IISER) and Science Education and PBTI, Mohali
3	Training workshop on Strengthening Capacities for transboundary movement of LMOs for State Biodiversity Boards	May 9, 2016	Chennai
4	Regional Workshop on Risk Communication	April 4-5, 2016	Pragati Resorts, Hyderabad
5	Workshop on Dossier Preparation for GE plants	February 25, 2016	MoEF&CC, New Delhi
6	Training Workshop on Environmental Risk Assessment of Genetically Engineered Plants	February 22-23, 2016	NASC Complex, New Delhi
7	Capacity Building Workshop on Risk Communication	November 2-4, 2016	MoEF&CC, New Delhi
8	Training Workshop on Strengthening Capacities for Enforcement agency (Plant Quarantine Officers) for transboundary movement of LMOs	January 20-22, 2016	National Bureau of Plant Genetic Resources (NBPGR), New Delhi.
9	Hands on training of eight scientist engaged in detection of LMOs at Sweden	January 17-23, 2016	Stockholm, Sweden

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

The AICOPTAX Project was launched in 1999 and a Steering Committee was constituted for overseeing the activities under the Project. The prime objectives includes Survey, collection,

and maintenance of collections of taxonomic groups including microbes for which no information is available and of unexplored and under-explored areas ; Taxonomic analysis of collections made; Biosystematics research for the groups which require modern tools for refinement of taxonomy especially of economically important groups. The Steering



*Fig. 16 Seedling stages of I. oudhensis (Brand.) Brenan under ex-situ conditions in the Botanic Garden*

Committee was originally constituted on July 2, 1999. The Steering Committee was reconstituted on June 13, 2013 and served as a 'think-tank' on Viral, Microbial, Plant & Animal Taxonomy and would identify new thematic areas and corresponding institutions who can undertake research in such thematic areas. Out of total 30 thematic areas selected for Taxonomic research till date 13 thematic areas have been studied. A Project Monitoring Unit (PMU) have also been constituted for day-to-day monitoring of the Scheme. MoU has been framed and implemented for smooth functioning of the project between Coordinators and collaborative centres. EK Janaki Ammal National Award for Taxonomy is awarded annually for excellent research work in the field of Plant, animal and Microbial Taxonomy.

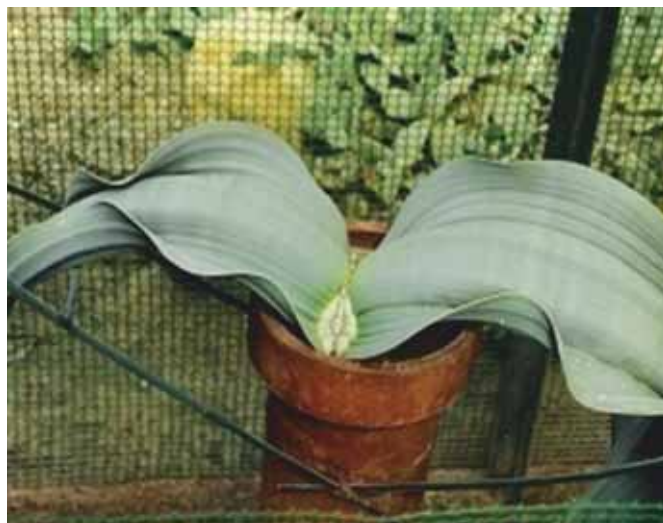
**Implementing organizations along with details of responsibilities:** As per the recommendation of the Evaluation Finance Committee, the Botanical Survey of India will be the implementing agency for the scheme.

### Assistance to Botanic Garden

The scheme on Assistance to Botanic Gardens was initiated in 1992 to augment facilities for ex-situ conservation of rare, endangered threatened and endemic plants. The objectives of the scheme include Ex-situ conservation of indigenous; particularly RET species and their multiplication; Establishment of seed banks, arboreta and mist propagation facilities; Promotion of education and public awareness in respect of above said plants; and Reintroduction and rehabilitation of said plants in natural habitats in collaboration with State Forest Department on project basis. An Expert Group Committee has been re-constituted in 4<sup>th</sup> October, 2016 for overseeing the activities under the ABG Scheme.

### Progress/Achievements

In current financial year funds have been released to 5 Lead Botanic Garden and two Small Garden thereby ensuring the ex situ conservation of nearly 234 RET plant species. Till date 18 Lead Botanic Gardens have been established all over the country. Some of the important RET plant species conserved are given below:



**Fig. 17** Views of *Welwitschia mirabilis* in Cactus House



**Fig. 18** *Erythrina resupinata* & *Frerea indica* in flowering



**Fig. 19** *Alectra chitrakutensis* (Rau) Prasad & Dixit (Orobanchaceae) growing with host *Vitex negundo*; in flowering & fruiting under ex-situ conditions in CSIR-NBRI Botanic Garden



**Fig. 20** *Sapindus emarginatus* Vahl (Sapindaceae)



**Fig. 21** *Armodorum senapatianum* - a new species of orchid



**Fig. 22** *Chlorophytum malabaricum* a RET Orchid



**Fig. 23** *Diospyros elbrica* a RET Plant species

As per the recommendation of Evaluation Committee, now the Botanical Survey of India

will be the implementing agency for the scheme



**Fig. 24** Fern House, inaugurated by Shri Ajay Narayan Jha, Secretary, MoEF&CC



## Forest Conservation

The mandate of the Forest Conservation Division is to regulate the diversion of forest land for non-forestry purposes through effective implementation of the Forest (Conservation) Act, 1980. The proposals seeking prior approval of the Central Government for diversion of forest land for non-forestry purposes are examined at different levels as per procedure defined under the Forest (Conservation) Rules, 2003 including the Forest Advisory Committee (FAC) or the State Advisory Committee (SAC). The Ministry keeping in view recommendations of the FAC/SAC makes decision on diversion of forest land for non-forestry purposes, stipulating appropriate mitigative measures. The considerations of the Forest (Conservation) Act, 1980 pertains to the floral and faunal significance of the forest land proposed to be diverted, feasible alternatives, number and nature of beneficiaries and nature and extent of the benefits likely to accrue from the proposed diversion.

## New Initiatives for Grant of Forest Clearances

- The Compensatory Afforestation Fund Act, 2016 No. 38 of 2016 enacted by Parliament with effect from 3rd August, 2016 to ensure expeditious and transparent utilization of compensatory levies realised in lieu of forest land diverted for non-forest purpose.
- Issued guidelines to exempt transmission

lines of all capacities from providing non-forest land for compensatory afforestation.

## Achievements

Implementation of the FC Act has successfully reduced the average annual rate of diversion of forest land for non-forest purposes from 1.65 lakh hectares per annum during the 25 years period from 1951-52 to 1975-76 prior to enactment of the Act during which 4.135 million hectares of forest land was diverted for non-forest purposes without any mitigative measures. During the year 2016-17 till end of January Central Government accorded approvals under the FC Act, 1980 for diversion of 6916.63 hectares of forest land for non-forest purposes with adequate mitigative measures.

## Forest Establishment

The Forest Establishment Division is handling the establishment matters relating to the Indian Council of Forestry Research and Education (ICFRE), an autonomous organisation under the Ministry of Environment, Forests, and Climate Change and its Institutes/Centers Forest Survey of India (FSI) and its Regional Centers; National Zoological Park (NZP); Wildlife Crime Control Bureau (WCCB) and its Regional Offices, Indira Gandhi National Forest Academy (IGNFA); Directorate of Forest Education (DFE), Central Academies (3) and Ranger College. The matter relating to seeking approval of Department of Personal Training (DoPT)/Appointments





Committee of the Cabinet (ACC) and court cases, RTI applications Parliament Matters etc. concerning the above organizations are also handled in this Division.

### Activities undertaken

#### Proposal for ACC to grant

- Ex post Facto approval of DG ICFRE as additional Charge.
- Appointment of new DG ICFRE.
- Constitution of Search Cum Selection Committee and subsequent appointment for posts of DDG (Education), DDG (Extension), DG ICFRE.
- Constituent of Search Cum Selection Committee for the post of Director (IC) in ICFRE.

#### Strengthening of Forests Division

The Government of India had set up five Regional Offices of the MoEF&CC 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 MoEF&CC at New Delhi to facilitate more frequent inspections and in-depth scrutiny and appraisal of the proposals.

#### Environmental Management and Pollution Control functions:

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



- To collect and furnish information relating to environmental impact assessment of projects, Pollution control measures, methodology and status, legal and enforcement measures, environmental protection for special conservation areas like wetlands, mangroves and biosphere reserves;
- To maintain liaison and provide linkage with the concerned State Government, with Central Government Agencies (including Regional Offices of BSI, FSI & ZSI) with project authorities, with the Regional Offices of the Central Pollution Control Board; with State Pollution Control Boards and with non-Government Organisation involved in implementation of programmes relating to environment;
- To organize workshops for State Pollution Control Board and State Environment Department to acquaint with the application of Hazardous Management Rules and Public Liability Act;
- Uploading on their website the Six Monthly Progress reports of compliance and site visit reports.

### **Miscellaneous functions:**

- To service the Standing Site Inspection

Committee in the matter of ascertaining the position of the forest or non-forest land.

- Rendering assistance in preparation of the National Forestry Action Plan.
- Regional level technical and scientific consultation on biological diversity
- To assist the State/ Union Territories in streamlining collection, collation, storage and retrieval of data/ covering all forestry activities and to transmit such data to the Central Government/ Central Data Processing Centre.
- Verification of nominees for Indira Gandhi Paryavaran Puruskar and other Awards of the Ministry;
- Attending to Court Cases pertaining to the Ministry of Environment, Forests and Climate Change.
- Attend to RTI Applications, general complaints pertaining to environment and forest issues
- Such other work as assigned from time to time.

A statement showing Regional Office wise physical achievements for monitoring of approved project under FCA, 1980 and EPA, 1986 for the for the period 01.04.2016 to 31.12.2016.



(Physical in No.)

	FCA 1980	EPA 1986
Regional Office	Achievement	Achievement
Bhopal	67	70
Bangalore	106	73
Bhubaneswar	66	65
Chennai	51	266
Chandigarh	62	99
Dehradun	57	79
Lucknow	105	127
Nagpur	22	75
Ranchi	23	36
Shillong	56	89
<b>Total</b>	<b>615</b>	<b>979</b>

Stage-I and Stage-II Forest Clearance under the Forest (Conservation) Act, 1980 accorded by ten Regional Offices for the period from 01.04.2016 to 31.12.2016: The details are as given below:-

Regional Office	Stage-I	Area diverted (in ha.)	Stage-II	Area diverted (in ha.)
RO Bhopal	36	758.58	24	423.31
RO Bangalore	12	79.08	21	198.95
RO Bhubaneswar	12	668.69	11	127.57
RO Chennai	21	219.27	13	140.15
RO Chandigarh	213	476.23	170	275.57
RO Dehradun	114	582.37	72	195.25
RO Lucknow	63	1216.88	33	162.93
RO Nagpur	30	589.19	16	353.85
RO Ranchi	21	69.50	19	245.88
RO Shiillong	18	743.69	17	245.67
<b>Total</b>	<b>540</b>	<b>5403.48</b>	<b>396</b>	<b>2369.13</b>

**Other activities undertaken:** The details of some of the important activities undertaken by Regional Offices during 2016-17 are given below:-

- Regional Office (Eastern Zone), Bhubaneswar has developed a fragrance garden within its Office-cum-residential complex which has been awarded 2<sup>nd</sup> prize



in a State Level Competition held on 14<sup>th</sup> January, 2017 organized by Plant Lovers' Association at Bhubaneswar.

- Regional Office (Northern Zone), Chandigarh has taken an initiative to address environmental issues on pollution in Harike Lake in Punjab and water quality issues in drain 2,6 and 8 of Kundli Industrial Zone, GT Road, Sonapat, Haryana.
- To facilitate informed, objective and predictable decisions on forest clearance proposals, a GIS based Decision Support System (DSS) has been made operational in all ten Regional Offices of this Ministry.

## Forest Policy

Forest Policy Division of Ministry of Environment, Forest and Climate Change (MoEF&CC) 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 issues under various conventions such as UNFCCC, UNCCD & UNCBD, etc. The Division is the National Focal Division for the International Cooperation on United Nations Forum on Forestry (UNFF), Asia Pacific Forestry Commission (APFC), Asia Pacific Forest Invasive Species Network (APFISN), Committee on Forestry of FAO (COFO), UN-REDD and Centre for International Forestry Research (CIFOR).

## Progress/Achievement

In view of the above a need to review the Policy was felt and accordingly the Ministry had

initiated the review of the National Forest Policy, 1988. Indian Institute of Forest Management (IIFM), Bhopal under the MoEF&CC was asked to prepare a draft National Forest Policy document. IIFM has submitted the draft policy document. A committee of senior officers in the Ministry has been constituted for examining the Draft National Forest Policy, 2016 document and it is under consideration.

1. The Ministry submitted a proposal for entry of subject Bamboo in the mandate of MoEF&CC under Government of India (Allocation of Business) Rules, 1961 to the Cabinet Secretariat for consideration and approval for holistic development of bamboo sector in the country. Further, a Committee has been constituted in the Ministry to prepare a draft on composition and nature of developing/establishing a "National Body for Bamboo Development".
2. Ministry finalized the Guidelines for Conservation, Management and Sustainable Use of Community Forest Resources on 26.09.2016.
3. Guidelines on Liberalizing Felling and Transit Regime for Tree Species Grown on Non-Forest/Private land were issued to the Chief Secretaries of all States/UTs and the Division is actively pursuing the matter with State/UT Governments. The Guidelines are also available at the MoEF&CC website at <http://envfor.nic.in>.
4. Comments of the Ministry were communicated to the Ministry of Home Affairs on the matters related to the



- amendment of Rajasthan Land Pooling Scheme.
5. Based on consultation with Ministry of Railway and State Forest Department, a Draft agreement for plantation on railway land between the State Forest Department and Railway administration has been finalized and circulated to all State Forest Department for action as appropriate with concerned Railway Board. State of Haryana and Punjab has already signed the agreement with Railway Board for carrying out plantation on railway land.
  6. A Workshop on Fire and Invasive Species Management under Forest PLUS Programme was organized at New Delhi.
  7. The Division organized a one week Central Secretariat Programme for Indian Forest Service Probationers of 2015-17 Batch to provide exposure on the working of the Central Government organizations from 19-23 September, 2016.
  8. The Forest Policy Division of the Ministry organized a National Level Conference of all Additional Chief Secretaries (Forests)/PCCF(HoFF)/ Principal Secretaries (Forests) and Chief Wildlife Wardens (CWLWs) of all States/UTS on 21-22 October, 2016 at New Delhi. The conference was inaugurated by Hon'ble Minister of State(IC) for Environment, Forest and Climate Change. A book titled "Golden Leaves- Celebrating 50 years of Indian Forest Services as an All India Service" was also released followed by a screening of a short Film on evaluation and contribution of IFS to the nation. The conference highlighted the various issue related to forests and wild life such as draft rules for implementing of Compensatory Afforestation Fund Act, 2016, management and utilization of bamboo, recruitment and training of frontline staff, rules in respect of tree species grown under Agroforestry, initiatives in WL sub-sector and human-wildlife conflict etc.
  9. Indian delegation participated in the 1<sup>st</sup> and 2<sup>nd</sup> Meeting of Ad Hoc Expert Group (AHEG) of United Nations Forum on Forests (UNFF) held in USA and 2<sup>nd</sup> Meeting of United Nations Forum on Forests' ad hoc expert group (AHEG) meeting held in USA and Thailand and submitted the country's views on the Option and building blocks for the 2017-2030 Strategic Plan of the International Arrangements on Forests, and the quadrennial programme of work for the period 2017-2020.
  10. Indian delegation participated in the 23rd Session of Committee on Forestry (COFO) from 18-22 July, 2016. The session reviewed the state of the world's forests focusing on the forests and trees and 2030 Agenda for sustainable development.
  11. A team of delegations participated in the study tour on "Forestry Training under Forest PLUS Technical Exchange Programme held in USA from 17<sup>th</sup> September to 2nd October, 2016.
  12. Ministry launched the SAR Technical Protocol for Forest Monitoring under Forest PLUS Programme on 21<sup>st</sup> November,



2016. The use of Synthetic Aperture Radar technique for forestry application is gaining acceptance worldwide because of its several advantages over optical data such as (i) penetration through the clouds and atmosphere and (ii) penetration through the canopy at longer wavelengths enabling 3 Dimensional structural modeling of forest lands. This protocol will help in institutionalizing the use of SAR techniques for forest carbon assessment, proper training and capacity building for primary stakeholders across the country.

13. The Division organized two days Workshop on 15-16 December, 2016 on United Nations Forest Instrument (UNFI) with support of UNFF to create awareness and capacity building of State Forest Departments on the FI.

## Forest Protection Division

### Implementing the Centrally Sponsored Scheme (IFMS)

The “Intensification of Forest Management Scheme” (IFMS) aims at strengthening forest protection machinery of the State/UT Governments and provides support for area-specific forest management interventions.

**Implementing organizations along with details of responsibilities:** Under the scheme of IFMS the responsibility of MoEF&CC is to receive proposals from the States / UTs and disburse funds as per allocation. To ensure effective allocation & utilization of the funds

MoEF&CC scrutinizes the proposals through a Screening Committee, ensures progress reports and scrutinizes the utilization certificates. To ensure greater transparency this division also ensures that the photographs and Geo-referenced information such as GPS data and remote sensing images are submitted alongwith progress report and also those are uploaded in the website of the respective States / UTs. Ministry also utilizes the services of Forest Survey of India, Dehradun (an Autonomous organization under MoEF&CC) for satellite based monitoring of the field activities under the scheme from time to time.

However, it is the forest departments of the States / UTs, which are directly responsible for implementation of the sanctioned activity in the field and proper utilization funds disbursed. States / UTs also conduct regular field level monitoring of the activities under the scheme through a review and monitoring committee headed by Principal Chief Conservation of Forest (PCCF) of the States / UTs with the Conservators of Forests (CFs) as its members.

## Wildlife Conservation

**Integrated Development of Wildlife Habitats:** The Protected Area network in India comprises of 733 Protected Areas (103 National Parks, 537 Wildlife Sanctuaries, 67 Conservation Reserves and 26 Community Reserves). Apart from providing support to Protected Areas (National Parks, Wildlife Sanctuaries,



Conservation Reserves and Community Reserves) the Scheme has also the following components – ‘Protection of wildlife outside the Protected Areas’ and ‘Recovery programmes for saving critically endangered species and habitats’.

**Wildlife Crime Control Bureau (WCCB):**

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

wildlife crimes; and advise the Government of India on issues relating to wildlife crimes having national and international ramifications, relevant policy and laws. The Wildlife Crime Control Bureau has been constituted on 6th June 2007 through an amendment to the Wildlife (Protection) Act, 1972 in 2006. The powers and functions of the Bureau have been defined u/s 38z of the Act. They broadly deal with:

- Intelligence gathering and dissemination for coordinated efforts for inter state wildlife crime control;
- Fulfill international obligations and to assist/co-ordinate with national /international agencies for wildlife crime control;
- Build capacity-both physical infrastructure and skills, knowledge towards fulfilling (a) and (b) above.

**Central Zoo Authority:** The Central Zoo Authority with its headquarter 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.

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



## Activities undertaken

- Union Cabinet approved the proposal of the Ministry of Environment, Forest and Climate Change to sign Memoranda of Understanding (MOU) on Conservation of Migratory Birds of Prey in Africa and Eurasia, also called the 'Raptor MOU' with the Convention on Conservation of Migratory Species (CMS). With signing of this MOU, India will become the 54th signatory to the MOU.
- The Union Cabinet approved the proposal of the Ministry of Environment, Forest and Climate Change to sign Memoranda of Understanding (MOU) with the United States of America to enhance co-operation on Wildlife Conservation and Combating Wildlife Trafficking. The MOU was signed by the Indian Ambassador to the United States of America on 2<sup>nd</sup> June 2016 at Washington D.C.
- Secure-Himalaya:-The Ministry of Environment, Forest and Climate Change and the United Nations Development Programme in consultation with the State Governments of Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Sikkim, are developing a full-size project proposal titled SECURE Himalaya (Securing livelihoods, conservation, sustainable use and restoration of high range Himalayan Ecosystems) to be submitted to the Global Environment Facility. The project will be implemented over a period of six years (2017- 2023) with a total GEF grant of USD 11.54 million. This project aims to promote sustainable land and forest management in the alpine pastures and forests in the high ranges of Indian Himalayan ecosystem, inter alia securing sustainable livelihoods, community resilience and also ensuring conservation of globally significant biodiversity.
- Indo-German Technical Cooperation (TC) project on "Human-Wildlife Conflict Mitigation in India"- The Ministry of Environment, Forest and Climate Change (MoEF&CC) is in process for formulating a new project 'Human Wildlife Conflict Mitigation in India' with technical cooperation from GIZ. The project was successfully negotiated for EUR 4 million (funding from GIZ) for a period of four years, at the recently concluded 'Indo-German Negotiations on Development Cooperation' held between the 'Government of India' and the 'Government of the Federal Republic of Germany' in October 2016. The project will be implemented at the national level through the selected states and Wildlife Institute of India (WII) to address distinct, representative and conceptually complementary HWC scenarios in India with wide-ranging species at the landscape-level (West Bengal, Odisha, Jharkhand, Chhattisgarh, Bihar), remote rural areas facing severe livelihood issues (e.g. Uttarakhand), and areas where innovative preventive measure are being used (e.g. Karnataka). The project will focus, under different output areas and activities, involving species such as





Elephants, Leopards, Wild Boar and Blue bull as well as monkey (for behavioural and population management research).

**Human-Wildlife Conflict Management (HWC):-**The management of the human wildlife conflict essentially is a part of wildlife management, which is with the State Governments. Ministry provides central assistance in the Centrally Sponsored Schemes like Project Tiger (PT), Integrated Development of Wildlife Habitats (IDWH), Project Elephant (PE) etc, to the States for effective management of the issues. Ministry also holds periodic consultation with various stakeholders and Chief Wildlife Wardens to address the issue of human wildlife conflict.

In continuation of advisory in the context of Human Wildlife Conflict issued during December, 2014, Ministry issued another advisory dated 1<sup>st</sup> June, 2015 to the States regarding priority actions for management of human wildlife conflict. Keeping in view the need of managing human wildlife conflict beyond the limits of Sanctuaries and National Parks, the Ministry has started providing funds to the States for this purpose covering any area having human wildlife conflict issues. Separate plan for management of the HWC are considered and funds are released based on the availability as per norms.

Under the Central component of Compensatory Afforestation Fund Management and Planning Authority (CAMPA) funds, Ministry started a programme since the year 2015 for augmenting the fodder and water resources within the forest, so that sufficient

supply is available to the wildlife within the forest itself.

For the effective management of wild animals and to mitigate the damage to crop by wild animals, the Central Government may, by notification, declare any wild animal other than those specified in Schedule I and Part II of Schedule II to be vermin for any area and for such period specified as may be and such wild animal shall be deemed to be included in Schedule V (Section 62 of the Wildlife (Protection), 1972). The proposals of State Government of Uttarakhand for declaring Wild boar; Himachal Pradesh for declaring Monkeys and Bihar for declaring Nilgai and Wild boar, as vermin are accordingly considered by the Ministry.

Gazette notifications declaring Nilgai and Wild pig as vermin in the State of Bihar, Wild pig as vermin in the State of Uttarakhand and Rhesus Macaque monkeys as vermin in the State of Himachal Pradesh has been notified vide S.O. 3318(E) dated 01.12.2015, S.O. 374(E) dated 03.02.2016 S.O. 1922(E) dated 24th May, 2016, and S.O. 1140(E), 14<sup>th</sup> March, 2016 respectively.

### **Project Elephant**

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

- To protect elephants, their habitat and corridors
- To address issues of man-elephant conflict
- Welfare of domesticated elephants



## Important Initiatives Taken

Data of elephant mortality in 10 MIKE Sites or Elephant Reserves (ERs) namely Chirang Ripu and Dihing Patkai ER in Assam, Eastern Doors ER in West Bengal, Deomali ER in Arunachal Pradesh, Garo hills ER in Meghalaya, Mayurbhanj ER in Odisha, Mysore ER in Karnataka and Nilgiri ER in Tamil Nadu has been revived after its discontinuation in 2006. The data for the year 2014 and 2015 has been submitted to IUCN vide our email dated 26.08.2016.

The process of All India Synchronized Elephant Census, 2017 has been started. In this process four regional workshops have been conducted;

- a. For North Eastern Region at Guwahati on 29.9.2016,
- b. For Eastern Region at Bhubaneswar on 26.10.2016,
- c. For Southern Region at Bangalore on 2.11.2016 and
- d. For Northern Region at Dehradun on 19.11.2016.
- e. 2<sup>nd</sup> Regional Workshop for the North Eastern Region is scheduled to be held at Guwahati on 10.2.2017.
- f. 2<sup>nd</sup> Regional Workshop for the Northern Region is scheduled to be held at Bhubneshwar on 11.3.2017.

MoEF&CC has directed all Chief Wildlife Wardens to get the cattle in and around Protected Areas & Forests under Cattle Insurance of the Ministry of Agriculture to minimize retaliatory killing of wild animals.

Reporting by India to IUCN under MIKE (Monitoring of Illegal Killing of Elephnats) programme resumed in 2016-17 since its discontinuation in 2006.

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

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

- All tiger reserves shall file their Annual Plan of Operations for the financial year 2017-18 online on a portal jointly developed by the National Tiger Conservation Authority (NTCA) and National Informatics Centre (NIC).
- Validation of the framework prepared to carry out Security Audit of Tiger Reserves was carried out at the Kanha and Satkosia Tiger Reserves in Madhya Pradesh and Odisha respectively.
- The Conservation Assured Tiger Standards (CATS) protocol was successfully implemented in territorial divisions of Uttarakhand, wherein the Lansdowne Division was successfully registered and Haldwani and Ramnagar Divisions are in process.
- Economic valuation of 10 tiger reserves namely Melghat, Palamau, Nagarjunasagar



Srisailem, Anamalai, Panna, Dudhwa, Pakke, Bandipur, Valmiki and Similipal has been initiated, wherein a Dissemination workshop was held to finalize parameters for the valuation process.

- Performance audit of Special Tiger Protection Force was carried out by the NTCA.
- Guidelines on establishing Tiger Safaris were issued and circulated by this Authority to all tiger range States.
- No objection from the Ministry of Defence, Ministry of Home Affairs and Directorate General of Civil Aviation in context of the NTCA-WII project titled “E-Bird Technology for Tiger Conservation: Development and Integration of Unmanned Aerial Vehicles as a Surveillance and Monitoring Tool for Protection of Tiger and Capacity Building of Staff” was obtained, and the said project shall commence shortly.
- A Standard Operating Procedure for Interstate Co-ordination amongst tiger reserves that share boundary was issued by the NTCA.
- The 3rd Asia Ministerial Conference on Tiger Conservation was held from April 12-14, 2016 at Vigyan Bhawan, New Delhi, which was inaugurated by the Hon’ble Prime Minister, Shri Narendra Modi. Inter alia, the Prime Minister stressed that tiger conservation is not a choice but an imperative while addressing delegates of 13 tiger range countries namely Bangladesh, Bhutan, China, Cambodia, India, Indonesia, Lao PDR, Malaysia,

Myanmar, Nepal, Russia, Thailand and Vietnam.

- The Conference culminated with all countries taking a pledge for tiger conservation besides adopting the New Delhi Resolution on Tiger Conservation.
- ‘Orang Tiger Reserve’ in Assam and ‘Kamlang Tiger Reserve’ in Arunachal Pradesh were notified 49th and 50th tiger reserves in the country, taking coverage of Project Tiger to 2.2% of the country’s area.
- Bilateral meetings with Nepal, Bhutan, Bangladesh and Russia were held on 14-15 March, 2016; 14-15 February, 2016; 27-29 January, 2016 and September, 2016 respectively to strengthen cross border co-operation besides sharing of important learnings in tiger conservation.
- “Tiger Cell” as part of NTCA was established at Wildlife Institute of India, Dehradun to manage data generated during the All India Tiger Estimation through National Repository of Camera Trap Photographs of Tigers (NRCTPT) besides fostering research that shall aid tiger conservation.

## Animal Welfare

**Animal Welfare Board of India (AWBI):** General Animal Welfare covers the welfare of individual animals, mainly domesticated animals, as also wild animals in captivity, through Animal Welfare Board of India (AWBI), Chennai, Tamil Nadu. AWBI is a statutory body established under Section 4 of the Prevention of Cruelty to Animals Act, 1960, with head



quarters at Chennai. Its basic mandate is to advise the Government on animal welfare issues, and create awareness in animal welfare and to implement the regular schemes of AWBI and also the Central Sector Schemes for the welfare of animals.

**National Institute of Animal Welfare (NIAW):** The National Institute of Animal Welfare (NIAW) has been set up as a subordinate office of the MoEF&CC. The objective of NIAW is to impart training and education in Animal Welfare on a diversified basis comprising, among other things, animal management, their behavior and ethics. The aim is to create an enabling environment for fulfillment of the statutory requirements as laid down in the Prevention of Cruelty to Animals act, 1960. The mandate of NIAW covers the need to improve animal welfare through education, research and public outreach. The institute has been operational since January, 2006.

**Free Mobile Animal Clinic:** The Board is providing free, on the spot veterinary treatment to sick and injured animals belonging to poor people through its Mobile Animal Clinic (MAC) programme operating from the Headquarters at Chennai. The Veterinary Surgeon of the Board visits the pre-determined localities in the city where the animal population is concentrated to treat the animals free of charge during forenoons as per a fixed schedule. During the year 2016-17, ~ 282 (up to December 2016) animals were treated / rescued by AWBI Mobile Clinic in Chennai.

The Board conducted the following humane

education training programmes in collaboration with National Institute of Animal Welfare as per the details given below:-

**Humane Education:** One of the main functions of the Board is propagation of Humane Education. The Animal Welfare Fortnight (from 14th to 30th January) and World Animal Day (4th October) are celebrated by all Animal Welfare Organisations, SPCAs, Animal Welfare Trainers, Animal Welfare Officers, Govt. Animal Husbandry Departments, Zoological Parks and Voluntary Organisations throughout the country with great interest, zeal and enthusiasm.

**Awareness Rallies Conducted During World Animal Day Week:** The Animal Welfare Board of India has organized rallies to create kindness and compassion with the co-ordination of the 11 Schools in Chennai & Vellore and Karuna International, Chennai under Humane Education programme during the World Animal Day in 2016-17 from 4<sup>th</sup> – 14<sup>th</sup> October, 2016. The purpose of this rally is to create awareness On Peace, Karuna, Non Violence, Stopping Hinsa to all forms of life and also create an awareness on “Swachh Bharath” So that diseases like chickenqunia, dengue and malaria spread by mosquitoes could be eradicated. Various cultural programs like dance, drama, speech were also conducted to inculcate the value of Karuna.

a. The Board is implementing the Humane education programme through Karuna International, Chennai and C.P.R. Environmental Education Centre (CPREEC), Chennai throughout the Country.



b. The Board will be conducting the Animal Welfare Laws Senitization training programme in the Judicial Academies of the States/UTs in the year 2016-17. Accordingly, a workshop was organized on 8<sup>th</sup> & 9<sup>th</sup> December, 2016 at Dehradun, Uttarakhand for sensitization of the Judges and Prosecution Officers on Animal Protection Laws and Animal Welfare Laws.

**Registration of performing animals:** Under Rule 3 of the Performing Animals (Registration) Rules, 2001, the Board is the prescribed authority to issue registration certificates. During the year viz. 2016-17 (upto 15.12.16) 890 Films/Ad films were granted registration certificates and 989 have been granted pre-

shoot permission for using animals in their films.

**Issue of HAWO ID Card:** A total of 319 Hony. Animal Welfare Officers (HAWOs) were nominated to carry out animal welfare activities and awareness on animal welfare.

**Publications of AWBI:** The Board brings out publications like Animal Citizen (English), Jeev Sarathi (Hindi) and AWBI monthly Newsletter (English/Hindi) and other booklets/Rules pertaining to Animal Welfare. During the year 2016-17, the Board has published one combined issue Animal Citizen (English & Hindi) and 3 issues of AWBI Monthly Newsletter.

a. The Board has brought out a ABC Module



Fig. 25 Birds

and the same was placed before the Hon'ble Supreme Court of India in the stray dog matter and it was also circulated to all the States/UTs.

b. The Board has also brought out a book on "The Art and Practice of Humane Dog Handling".



*Fig. 26 Elephant*

# Environmental Impact Assessment





## Environmental Impact Assessment

EIA is a planning tool to integrate environmental concerns into the developmental process from the initial stage of planning. It was first used in India as early as 1978 with river valley projects, and was subsequently extended to large public sector projects requiring Public Investment Board (PIB) clearance. These practices were formally codified for the first time in the EIA Notification, 1994, which came into effect from 27<sup>th</sup> January 1994. The above notification made the requirement of environmental clearance mandatory for 37 categories of projects/processes, listed therein. The criterion of investment was the basis for the projects requiring environmental clearance in different sectors. Ministry has issued the Coastal Regulation Zone (CRZ) Notification, 2011 in supersession of CRZ Notification, 1991 after a series of consultations with the various stakeholders including the fishermen community. The objective of the 2011 Notification is to ensure livelihood security to fishing and other local communities living in coastal areas, to conserve/ protect coastal stretches and to promote development based on sustainable scientific principles.

EIA Notification, 2006 and CRZ Notification, 2011 have been amended from time to time to further streamline the clearance process. The amendments have also been done to address emerging concerns stemming from the need to integrate environmental concerns into the developmental process for achieving the goal of sustainable development. While according

EC to development project(s), necessary conditions, environmental safeguard and measures are stipulated for their effective implementation during the construction and operation of the project. The safeguard measures are intended to minimize adverse impacts, inter alia, on (i) air quality, (ii) water quality, (iii) land degradation, (iv) bio-diversity, and (v) wildlife habitat. In addition, measures like rainwater harvesting, water conservation, greenbelt and plantation; wildlife conservation plan, etc. are also required to be implemented in the project.

**Environmental Clearance to Developmental Projects:** As per the provisions of the EIA Notification 2006, several meetings of various sectoral Expert Appraisal Committees were convened during the year for appraisal of category “A” projects from sectors of Industry, Thermal, River valley and Hydroelectric Projects, Coal Mining, Non-Coal Mining, Infrastructure, Construction & CRZ and Nuclear, Defence & related Projects. As part of appraisal process, wherever required, the Expert Appraisal Committees also visited project sites for obtaining first hand information about the ground level realities and response of people living in the vicinity. Environmental Clearance (EC) has been accorded to 196 projects (between April 2016 to Dec, 2016).

**Constitution of State Environment Impact Assessment Authorities (SEIAA):** The Ministry has so far constituted thirty two (32) State/UT level Environment Impact Assessment Authorities (SEIAA) under sub section (3) of





section 3 of the Environment (Protection) Act 1986 for approval of EC of category B projects and activities which have been appraised by State Expert Appraisal Committees (SEAC). In 2016, SEIAA/ SEAC have been reconstituted in Chandigarh on 12.05.2016 and Jharkhand on 09.11.2016. The Constitution of SEIAA Manipur is under process.

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

**The objectives**

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

Monitoring of projects with respect to

conditions stipulated in the environmental clearance issued under Environmental Impact Assessment (EIA) Notification, 2006 and Coastal Regulation Zone (CRZ), 2011 is carried out through the ten Regional offices.

The monitoring report is scrutinized in the Ministry and on that basis appropriate action is contemplated under the Environment (Protection) Act, 1986 for non-compliance of environmental clearance conditions.

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

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

The environmental appraisal of development projects is undertaken as per the provisions of EIA Notification 2006 based on EIA/Environmental Management Plan (EMP) reports prepared by the project proponents with the assistance of their consultants. Good quality EIA reports are pre-requisite for



appropriate decision making. As of now, only consultants accredited with QCI/NABET are allowed to prepare EIA/EMP reports and present the cases before EACs/SEAC. As on 06.01.2017, there are 183 accredited EIA Consultant Organizations.

### Achievements

- An amendment to EIA Notification 2006 vide Notification S.O.No. 2269(E) dated 01.07.2016 was issued for mining of minor minerals of Category 'B1' in case of cluster of mining lease area.
- An amendment to EIA Notification 2006 vide Notification S.O.No. 3518(E) dated 23.11.2016 was issued regarding change in product mix of existing projects.
- An amendment to EIA Notification 2006 vide Notification S.O.No. 3999(E) dated

09.12.2016 was issued regarding Integration of Environmental Conditions in Building and Construction Sector.

- An amendment to EIA Notification 2006 Vide Notification S.O.No. 4162(E) dated 23.12.2016 was issued regarding Construction of Memorial in the honour of Bharat Ratna Dr. Babasaheb Ambedkar in Mumbai on Indu 6 Mills land.

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

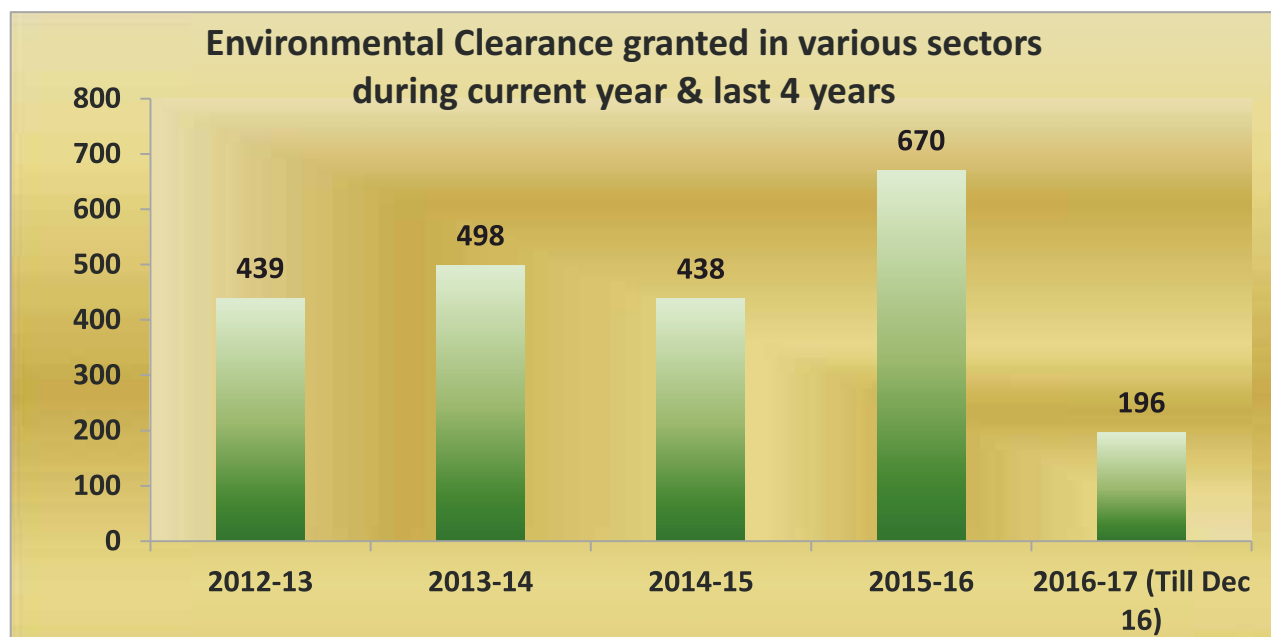


Fig. 27 Environmental Clearance granted in various sectors during current year and last 4 years

# Control of Pollution





## Assistance for Abatement of Pollution

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/PCCs for enforcing statutory provisions for pollution abatement. The scheme is 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) including North Eastern Region Grants-in-aid-General and North Eastern Region Grants for creation of Capital Assets.

Under this Scheme the Grants are provided to the State Pollution Control Boards/UT Pollution Control Committees, Environment Departments of States/UTs, 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.

## Scheme of Common Effluent Treatment Plants (CETPs)

- 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. The CSS of CETPs has been revised by the Ministry since 2012.

The salient features of the revised scheme are as follows:

- a. The Central subsidy has been enhanced from 25% to 50% of the project cost.
- b. 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.
- c. The management of the CETP is to be entrusted to a Special Purpose Vehicle registered under an appropriate statute.
- d. Performance guarantee at full design load is to be ensured upfront.

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

Under the provisions of Section 12 of Environment (Protection) Act, 1986, the Central Government recognizes Environmental Laboratories to carry out the functions entrusted to an environmental laboratory and under Section 13 of E (P) Act, 1986 the Central Government appoints Government Analyst(s) for carrying-out analysis of samples under E(P)Act, 1986. The Ministry has been recognizing of Environmental Laboratories and Government Analyst(s) under E (P) Act, 1986



with the aim of increasing facilities for analysis of environmental samples.

Twenty seven (27) Private Laboratories and three (03) Government laboratories have been recommended for recognition under E (P) Act, 1986 during the year.

**Environmental Health:** Ministry has been implementing a programme on environmental health. An Apex Committee and Working Group have been re-constituted for screening /evaluation of project proposals on environmental health. Three (3) projects have been extended for financial assistance to carry out studies of impact of pollution on human health.

**National Ambient Air Quality Monitoring Programme (NAMP):** Central Pollution Control Board (CPCB) is executing a nation-wide programme of ambient air quality monitoring known as NAMP with the objective to determine status and trends of ambient air quality; to ascertain whether the prescribed ambient air quality standards are violated; to Identify Non-attainment Cities; to obtain the knowledge and understanding necessary for developing preventive and corrective measures.

**National Air Quality Index (AQI):** Inform the public about the air quality of cities and facilitate public participation for maintaining ambient air quality.

**National Ambient Noise Monitoring Network:** To regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise

## Activities undertaken

- Strengthening of ambient air and Noise quality monitoring network;
- Network expanded with 638 operating stations in 271 cities/towns in 29 States and 5 Union Territories (184 districts);
- Parameters monitored i) SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub> at all locations; ii) Monitoring of CO, O<sub>3</sub>, PM<sub>2.5</sub>, NH<sub>3</sub>, Pb, B(a)P, C<sub>6</sub>H<sub>6</sub>, in six cities.
- Air Quality Index (AQI) of 54 Continuous Ambient Air Quality Monitoring Stations covering 33 cities in 12 states is released daily.
- Expansion of continuous ambient air quality monitoring network to cover million plus cities and state capitals.
- CPCB and State Pollution Control Boards (SPCBs) are continuously working to setup Continuous Ambient Air Quality Monitoring Stations (CAAQMS) on 50:50 sharing basis in the 46 identified million-plus cities phase-I. Subsequently setting up of stations would be taken up in the 21 State Capitals and UTs (except Delhi). The parameters monitored at most of the locations are SO<sub>2</sub>, NO<sub>2</sub>, NH<sub>3</sub>, O<sub>3</sub>, CO, Benzene, PM<sub>10</sub> & PM<sub>2.5</sub> besides meteorological parameters. The AQI (Air Quality Index) of all these stations are calculated on daily basis and uploaded on CPCB website for dissemination and awareness to public in general.
- CPCB in association with SPCBs has laid down National Ambient Noise Monitoring Network covering 07 metropolitan cities



i.e. in Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad and installed 70 Noise Monitoring System(10 stations in each city).

- Installation of real time emission monitoring systems in polluting industries to ensure that emissions are meeting the prescribed norms.
- Directions issued to States and UT for control of vehicle emissions; re-suspension of dust and other fugitive emission; emissions from biomass/ crop residue/ garbage/ municipal solid waste burning; industrial emission; air pollution from construction and demolition activities and other Steps to control air pollution.
- States of Punjab, Haryana, UP and Rajasthan were requested to use the information from the satellite to take preventive action against stubble burning.
- Apart from regular co-ordination meetings to control air pollution in the country, emergency meetings and meeting of the Centralised Monitoring Committee held.
- Graded response action plan to different levels of pollution in NCR was proposed

### **Progress /Achievements**

- Operation and maintenance of 634 manual Ambient Air Quality Monitoring Stations (AAQMS)
- Operation and maintenance of 16 continuous ambient air quality monitoring stations (CAAQMS) of CPCB.
- Proposal for strengthening the air quality

monitoring network with 280 stations in 92 districts with parameters to be monitored SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub> & PM<sub>2.5</sub> and plan for setting up of CAQMS and AQI for all 46 million plus cities and 21 State Capitals, UTs (Total 67 Cities).

- 70 National Ambient Noise Monitoring Network (NANMN) stations have been installed spreading over 10 cities and data is being disseminated.
- Noise Monitoring is being carried in 07 Metropolitan Cities covered out of 46 Metropolitan Cities and proposed that remaining 39 metropolitan cities with 04 stations may be covered by 2017.
- Univerlisation of BS-IV emission norms for vehicles is in progress.

### **Implementing organizations along with details of responsibilities:**

Central Pollution Control Board performs functions as laid down under The Water (Prevention & Control of Pollution) Act, 1974, and The Air (Prevention and Control of Pollution) Act, 1981. 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, formulating national policies and programmes, training and promoting awareness.

State Pollution Control Boards / Pollution Control Committee and State Governments of States and UTs responsible for implementation of the pollution control programme.



## Central Pollution Control Board

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.

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, formulating national policies and programmes, training and promoting awareness.

**National Water Quality Monitoring Programme:** Central Pollution Control Board in association with State Pollution Control Boards has established a water quality monitoring network. The network presently comprises of 2500 stations in 29 states and 6 union territories. 1687 locations are monitored monthly, 807 locations on half yearly and 6 locations on yearly basis.

**Interstate River Boundary Monitoring:** Water Quality Monitoring of Rivers at the Interstate Borders is carried out at 85 locations spread over 42 rivers.

**Real Time Water Quality Monitoring System (RTWQMS) On River Ganga And Yamuna:** 08 Real Time Water Quality Monitoring Stations (RTWQMS) have been established on river Ganga and 02 on river Yamuna viz. Wazirabad and Okhla in Delhi to assess water quality of river Ganga/Yamuna.

## CPCB's Activities on Ganga

### Rejuvenation:

Activities executed under NGRBA Project are summarized as follows:

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

**National Ambient Air Quality Monitoring Programme:** CPCB is executing a nation-wide National Air Quality Monitoring Programme (NAMP). The ambient air quality monitoring network has 614 operating stations covering 254 cities/towns in 29 States and 5 Union Territories.

CPCB has developed a network of real time data from CAAQM stations being operated by CPCB, SPCBs and PCCs. This data is provided to all stake holders and being published in public domain for taking corrective measures in time. In the beginning of the year 2015, CPCB network connected to 27 stations in 10 cities spread in 06 states, has been expanded to cover total 40 stations located in 22 cities of 11 states.



**National Air Quality Index:** The National Air Quality Index (AQI) was launched by Hon'ble Prime Minister on 6<sup>th</sup> April, 2015 covering 10 cities.

Presently AQI of 43 Continuous Ambient Air Quality Monitoring Stations covering 24 cities in 10 states is released and AQI Bulletin is published every day at 4:00 pm for dissemination.

**National Ambient Noise Monitoring Network:** CPCB in association with State Pollution Control Boards has established National Ambient Noise Monitoring Network covering 07 metropolitan cities i.e. in Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad and installed 70 Noise Monitoring System (10 stations in each city).

**Real-Time Emission & Effluent Monitoring Systems:** CPCB made it mandatory to all 17 Categories of Industries and GPIs to install real-time emission and effluent monitoring systems.

Out of 3377 industries to 17 category of industries to which directions were issued to 2035 industries have already installed online monitoring system and 415 industries are under process of installation. 1169 units have been issued Closure directions, for non-compliance.

### Activities Undertaken

- Strengthening of ambient air and water quality monitoring network.
- Establishing real time water quality

monitoring stations on river Ganga and other major rivers to assess the water quality on real time basis.

- Expansion of continuous ambient air quality monitoring network to cover million plus cities and state capitals.
- Installation of real time effluent and emission monitoring systems in polluting industries to ensure that emissions/effluent are meeting the prescribed norms. strengthening of the compliance mechanism, so that no untreated industrial effluent is discharged into the environment
- Improving the performance of existing sewage treatment plants (STPs) and adopting non-conventional technologies that is in synergy with the conventional methods for improving the water quality of river Ganga and its tributaries.
- Emphasis on Waste Management.
- Operation and maintenance of Laboratory and its management.

### Progress/Achievements of Various Activities:

#### Assessment of Pollution

- Operation and maintenance of 634 manual Ambient Air Quality Monitoring Stations (AAQMS)
- Operation and maintenance of 16 continuous ambient air quality monitoring stations (CAAQMS) of CPCB.
- Operation of 2500 Water Quality





Monitoring Stations (WQMS) at various aquatic resources. Time series data of water quality was analyzed and identified the issue of sewage disposal in 302 river polluted stretches.

- 70 National Ambient Noise Monitoring Network (NANMN) stations have been installed spreading over 10 cities and data is being disseminated.

### Industrial Pollution Control

#### Development of Environmental Standards:

The MoEF&CC formulates and notifies standards for emission or discharge of environmental pollutants viz. Air pollutants, water pollutants and noise limits, from industries, operations or processes with an aim to protect and improve the quality of the environment and abate environmental pollution. The standards are framed in consultation with the concerned stakeholders. The process is based on the best practices and techno-economic viability. The notification of standards also involves formulation of load based standards i.e. emission/ discharge limits of pollutants per unit of product obtained/ processes performed to encourage resource utilization efficiency and conservation aspects.

The standards for any industrial process / operation recommended by Central Pollution Control Board (CPCB) are subjected to stakeholder consultation including general public. The comments are compiled and technically examined by CPCB and change, if any, incorporated. The modified standards are placed before the 'Expert Committee (EC)' of MoEF&CC for approval. The EC of MoEF&CC

comprises of representatives from industry associations, subject experts, and concerned ministries of the industrial sectors, besides the officials of MoEF&CC and CPCB. The EC recommended standards for approval and legal vetting are published in Gazette of India. During the year, Standards in respect of following category of Industries have been notified:

**Thermal Power Plants (TPPs), Gazette Notification S.O. 3305(E) dated 7/12/2015:** To bring the environmental norms at par with those prevailed in other countries, the MoEF&CC revised the environmental standards for TPPs on 07/12/2015 after extensive consultations with concerned stakeholders. The emission limits of NO<sub>x</sub>, SO<sub>2</sub> and Mercury are included in the environmental standards for TPPs considering their adverse impact of on the environment and human health. The standards in respect of Particulate Matter (PM), SO<sub>x</sub> and NO<sub>x</sub> are notified to be implemented in phase wise manner:

For PM, the older plants commissioned prior to 31/12/2003 are required to meet limit of 100 mg/Nm<sup>3</sup> whereas TPPs commissioned during 01/01/2004 to 31/12/2016 are required to meet the norms of 50 mg/Nm<sup>3</sup>. New plants to be commissioned after 01/01/2017 should meet the norms 30 mg/Nm<sup>3</sup> as against the earlier norms of 150 mg/Nm<sup>3</sup>.

For NO<sub>x</sub>, the plants commissioned prior to 31/12/2003 are required to meet limit of 600 mg/Nm<sup>3</sup> whereas TPPs commissioned between 01/01/2004 to 31/12/2016 are



required to meet the limit of 300 mg/Nm<sup>3</sup>. New plants to be commissioned after 01/01/2017 should meet 100 mg/Nm<sup>3</sup> whereas no standards for NO<sub>x</sub> emission were prescribed earlier.

For SO<sub>x</sub>, the TPPs having capacity less than 500 MW and commissioned up to 31/12/2016 are required to meet the limit of 600 mg/Nm<sup>3</sup> whereas TPPs having capacity more than 500 MW and commissioned up to 31/12/2016 shall meet the limit of 200 mg/Nm<sup>3</sup>. New plants to be commissioned from 01/01/2017 shall meet the norm of 100 mg/Nm<sup>3</sup> whereas no standards for SO<sub>x</sub> were prescribed.

For Mercury, the limit of 0.03 mg/NM<sup>3</sup> is proposed irrespective of date of commissioning of TPP.

**Effluent Standards for Slaughter house, G.S.R. 1016(E), dated 28/10/2016:** In the notified Standard, the permitted pH range of treated effluent is 6.5-8.5 in harmonization with other industrial categories. The various categories of slaughter house or meat processing units are merged into a single category as these were categorized separately in previous notification. The BOD norms are rationalized to 30 mg/l for all units, so that the treated water quality is fit for discharge into surface waters. The limit for suspended solids has been reduced to 50 from 100 mg/l for surface water discharge and oil and grease limits to remain the same. The COD parameter included in the present norms for the treated effluent as 250 mg/l was not present in earlier notification. The COD and pH parameters serve as an indicator to check the

treatment aspect of cleaning and sanitizing chemical used in Slaughter House and Meat Processing units.

**Effluent Standards for Textile Industry, G.S.R. 978(E), dated 10/10/2016:** The scope of the said Standards covers all Integrated Cotton/Woolen/carpets/Polyesters textile units. The pH range and colour for treated effluent are limited as 6.5-8.5 and 150 Platinum Cobalt Units (PCU). While the norms for BOD, COD and Oil and grease are retained as 30, 250 and 10 mg/l for discharge in surface water. For accounting toxicological issues of effluent, limit of Ammonical Nitrogen (NH<sub>3</sub>-N) has been included as 50 mg/l in place of Bioassay test. The Total Dissolved Solids (TDS) and Sodium Absorption Ratio are 2100 mg/l and 26 respectively except for in case of marine disposal through proper marine outfall. The treated effluent shall be discharged in the ambient environment only after exhausting options for reuse in industrial process/irrigation in order to minimize freshwater usage. The standalone Micro, Small, and Medium Enterprises (MSMEs) as per MSME Development Act 2006 should meet the values specified above. The standalone large scale units should meet the values specified above, however, CPCB, SPCB/PCCs may mandate Zero Liquid Discharge in environmentally sensitive/critical areas.

**Effluent Standards for Common Effluent Treatment Plants, S.O. 4(E), dated 01/01/2016:** For the Common Effluent Treatment Plant (CETP), the State Board will prescribe Inlet Quality Standards for General



Parameters, Ammonical Nitrogen and heavy Metals as per design of the CETP and local needs and conditions. For treated effluent the pH limit specified is 6-9 while for BOD, COD, TDS the limits are 30, 250 and 100 mg/l for discharge of surface water. The BOD for discharge on land for irrigation and into sea is 100 mg/l. The temperature limit is reduced to 50C and limits for heavy metals introduced. The Oil & grease and Ammonical Nitrogen are retained as 10 and 50 mg/l respectively. The discharge of effluent into sea in permitted provided, it is through proper marine outfall. In cases, where the marine outfall provides a minimum initial dilution of 150 times at the point of discharge and a minimum dilution of 1500 times at a point 100 m away from discharge point, then, the State Board may relax the COD limit, provided, the relaxed COD limit does not exceed 500 mg/l of limit.

**Effluent Standards for Sugar Industry, G.S.R. 35(E), dated 14/01/2016:** In the notified standard, the permitted pH range of treated effluent is 5.5-8.5 so as to be in harmony with other Industrial Categories. The Total Suspended Solid (TSS) in the treated effluent for disposal on surface water is limited to 30 mg/l and 100 mg/l for disposal on land as already in practice by the Industries. The Oil and grease limit is 10 mg/l and the permitted BOD for disposal in surface water is 30 and on land is 100 mg/l. The TDS limit proposed is 2100 mg/l. The final wastewater discharge is 200 litres per tonne of cane crushed and the final treated effluent discharge restricted to 100 litres per tonne of cane crushed. The waste

water from spray pond overflow or cooling tower blow down is restricted to 100 litre per tonne of cane crushed and only single outlet point from unit is allowed. The particulate emissions from stack should be less than 150 mg/NM3.

**Emission Standards for Cement Plants with Co-Processing, G.S.R. 497(E), dated 10/05/2016:** The emission standard for Rotary Kiln with co-processing of wastes in respect of particulate matter (PM) is 30 mg/NM3 for all plants specified, whereas, the Sulphur dioxide (SO<sub>2</sub>) limit is 100, 700 and 1000 mg/NM3 when pyritic Sulphur is less than 0.25%, 0.25-0.5% and more than 0.5 respectively. The Nitrogen Oxides (NO<sub>x</sub>) limit stipulated is 600 mg/NM3 for plants commissioned after 25/08/2014 and 800 mg/NM3 for Plants commissioned before 25/08/2016 having rotary kiln with Lime Calciner besides the prescribed norms for HCl, HF Dioxins and heavy metals. Industry should make all efforts for zero discharge and in case Industry prefers to discharge the service water, the pH limit specified is 5.5-9 and Suspended Solids limit as 100 mg/l. In addition, the temperature should not exceed 50C and Oil and grease to be as 10 mg/l.

**Emission Standards for Cement Plants, G.S.R. 498(E), dated 09/05/2016:** The emission standards specified for Cement Plants having Rotary Kiln without co-processing in respect of Sulphur dioxide (SO<sub>2</sub>) is 100, 700 and 1000 mg/NM3 respectively when pyritic Sulphur is less than 0.25%, 0.25-0.5% and more than 0.5 5 respectively compared to the earlier informed Standard of 100 mg/NM3 for all type of Sulphur



irrespective location and commissioning of the Plant. The PM Standard proposed is 30 mg/NM3 irrespective of place and date of commissioning of the Plant. The Nitrogen Oxides (NOx) limit is 600 mg/NM3 for plants commissioned after 25/08/2014 and 800 mg/NM3 for Plants commissioned before 25/08/2016 having rotary kiln with Lime Calciner technology. However, NOx limit is 1000 mg/nm3 for the rotary kiln using mixed stream of ILC, Separate Line Calciner (SLC) and suspension pre-heater technology or SLC technology alone or without Calciner.

**Dedicated LPG/CNG Gensets (upto 800 kW), Gazette Notification G.S.R. 281 (E), dated 07/03/2016:** The emission limits are notified in respect of Oxides of Nitrogen (NOx), Carbon Monoxide (CO), Non-Methane Hydrocarbon (NMHC) and Reactive Hydrocarbon (RHC). For Gensets Upto 19 kW capacity the NOx + NMHC or NOx + RHC limit specified is < 7.5, for gensets with power rating more than 19 kW upto 75 kW the NOx + NMHC or NOx + RHC limit is < 4.7; and for gensets and power rating more than 75 kW and upto 800 kW the NOx + NMHC or NOx + RHC limit is < 4.0. The CO emission limit for all Gensets is <3.5. The norms are effective from 1st July 2016. The maximum permissible noise limit is 75 dB (A) at 1 metre from the enclosure surface and norms are effective from 1st January, 2017.

**Petrol and LPG/CNG Gensets (upto 19 kW), Gazette Notification G.S.R. 281 (E), dated 07/03/2016:** The emission limits are notified in respect of Oxides of Nitrogen (NOx), Carbon Monoxide (CO), Total Hydrocarbon (THC), Non-

Methane Hydrocarbon (NMHC) and Reactive Hydrocarbon (RHC). The emission limits for NOx +THC / NOx + NMHC / NOx + RHC for engine displacement upto 99 cc is <12 g/kWh, for engine displacement g/kWh >99 upto 225 cc is <10 g/kWh and for engine displacement > 225 upto 400 cc is <8. The CO limit is <250 g/kWh for all Engine Displacements. The norms are effective from 1st August 2016. The maximum permissible noise limit is 86 dB (A) at 1 metre from the enclosure surface and norms are effective from 1st September, 2016.

**Diesel and LPG/CNG Gensets (upto 800 kW), Gazette Notification G.S.R. 281 (E), dated 07/03/2016:** The emission limits are notified in respect of Oxides of Nitrogen (NOx), Carbon Monoxide (CO), Non-Methane Hydrocarbon (NMHC) and Reactive Hydrocarbon (RHC). For Gensets of power rating upto 19 kW the NOx + THC or NOx + NMHC/RHC limit is <7.5, for power more than 19 kW upto 75 kW the NOx + THC or NOx + NMHC/RHC limit is <4.7; and for power rating more than 75 kW and upto 800 kW the NOx + THC or NOx + NMHC/RHC limit is <4.0. The CO emission limit for all Gensets is <3.5. The PM limit is <0.3 for gensets with power rating upto 19kW and more than 19kW upto 75 kW while the PM limit is <0.2 for power more than 75kW upto 800 kW. The smoke limit for all is <0.7m-1. The norms are effective from 1st July 2016. The maximum permissible noise limit is 75 dB (A) at 1 metre from the enclosure surface and norms are effective from 1<sup>st</sup> January, 2017.

The Standards in respect of 13 other categories of industries such as manmade Fibre Industry; Pulp and Paper Industry; Paint Industry;

Sewage Treatment Plants; Bathing Water Quality Standards for Rivers; Brick Kiln Industry; Fertilizer Industry; Automobile Service Station, Bus Depot and Workshop; Fermentation Industry; Coffee Processing Industry; Iron and Steel Industry; Tannery Industry; and Airport Noise Standards are under finalization.

### Revised Concept of Comprehensive Environmental Pollution Index [CEPI]:

Comprehensive Environmental Pollution Index (CEPI) developed in 2010 has been revised based on detailed in-house discussions followed by consultation with SPCBs/PCCs and other Stake Holders. The revised CEPI eliminates the subjective issues and while emphasizing on field-based monitoring which includes air, water and land / sub-surface water. Field-based measurements are based on critical pollutants / parameters applicable to

the given area. Action Plans With Progress Reports Of Critically Polluted Areas: Action Plans along with their implementation station in the 42 critically polluted areas have been prepared and compiled and placed on CPCB website. Moratorium has been lifted from all the entirely polluted Area except for the four areas in Delhi, Jodhpur, Pali & Vellore.

### Categorization of Industrial Sectors Under Red, Orange, Green And White:

CPCB has finalized the criteria for classifying industries into Red, Orange, Green and White category. The classification is based on pollution potential will help bring uniformity for its adoption by SPCBs. Classification of industries may be linked with the siting criteria, consent mechanism and determining periodicity for inspections. Red, Orange, Green and White Categories of Industries

Sl No.	Original Categorization	Initial Nos.	Addition by Splitting into further classes	Deletion / Shifting to foot-note due to vague term/ Merger / other reasons	Re-categorization to Red	Re-categorization to Orange	Re-categorization to Green	Re-categorization to White	Check
		1	2	3	4	5	6	7	(1+2)=(3 to 7)
1	Red	85	11	7	60	26	3	Nil	96=96
2	Orange	73	2	3	Nil	51	19	2	75=75
3	Green	86	Nil	5	Nil	6	41	34	86=86
Final Categorization		244	13	15	60 (Red )	83 (Orange)	63 (Green)	36 (White)	257 =257 (Total categories including in footnote)



**Control of pollution in Ganga:** CPCB has prepared segmental action plan for restoration of water quality of River Ganga which is based on dividing the entire River Ganga into 4 segments and for each segment, action points have been evolved for implementation. The main concern is pollution due to disposal of sewage and control of industrial pollution. CPCB has issued directions to all towns (118) which are along the Ganga for getting the action plans prepared for implementation for management of sewage and municipal solid waste.

Inventory of grossly polluting industries have been prepared and Compliance verification to the existing standards for all the industries including MSMEs being undertaken as well as continuing with the action plan for ZLD and water conservation being implemented for 5 sectors (Sugar, Textiles, Distilleries, Pulp & Paper and Tanneries).

### **Hazardous Substance Management (HSM)**

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

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

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

**Chemical Safety:** In order to ensure chemical safety, the Ministry of Environment, Forest and Climate Change has notified two sets of Rules under the Environment (Protection) Act, 1986 viz. (i) The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (MSIHC); and (ii) The Chemical Accidents (Emergency, Planning, Preparedness, and Response) Rules (EPPR), 1996. The main objectives of the MSIHC rules are to: (a) prevent major accidents arising from industrial activities; and (b) limit the effects of such accidents. The rules endeavour to achieve these objectives by having a quantity-based approach. The MSIHC rules require the occupier to disclose the necessary information to the public in the neighborhood that is likely to be affected by a major accident at the site. During the process of implementation of MSIHC Rules, 1989, it was felt that a Chemical Crisis Management System has to be established in the country to ensure proper coordination of the activities of the



various authorities and to render help to the District Collector who is responsible for the preparation, maintenance and execution of an Off-Site Emergency Plan. An informal system of the Crisis Management System requires a Centre with State Level Crisis Groups was in place from 1987. However, after a thorough study it was felt essential that the Crisis Management System requires a statutory backing and two areas namely: dissemination of information to the public regarding possible chemicals accidents and coordination leading to preparedness needs to be addressed. Therefore, a set of rules entitled “Chemicals Accidents (Emergency Planning, Preparedness and Response) Rules, 1996” was notified with the aim at providing administrative structure at different levels such as national, state, district and local levels for effective planning, preparedness and responses to chemicals accidents and also ensuring availability of information to public likely to be affected by an accident. The Chemical Accidents (EPPR) Rules, 1996 envisage a four-tier Crisis Management System in the country at the Central, State, District and Local levels. The Central Crisis Group is headed by the Secretary, Environment & Forests, the State Crisis Group by the Chief Secretary, the District and Local Crisis Groups by the District Collector and Sub-Divisional Magistrate respectively.

**Hazardous Waste Management:** To address the issue of ensure environmentally sound management of hazardous waste for safety of health and environment during handling of such waste, Hazardous Wastes (Management, Handling & Transboundary Movement) Rules,

2008 were notified under Environment (Protection) Act, 1986. The Rules lay down procedure towards this process by providing provisions for authorization of hazardous waste generating and units using hazardous waste. It also provides for establishment of Treatment Storage and Disposal Facility (TSDF) for disposal of hazardous wastes. The rules have an important provision on regulation of import /export of hazardous waste in pursuance to our obligation under the Basel convention on Control of Transboundary Movement of Hazardous waste and it’s Disposal. India is party to the Convention.

However, after some time it was Experience garnered during felt to review of this Rules. Accordingly, after all the consultation new rules, Hazardous and other Wastes (Management, Handling and Trans-boundary Movement) were notified on 4th April 2016. The major salient features of Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016 include the following: -

- I The ambit of the Rules has been expanded by including ‘Other Waste’.
- II Authorization and Registration requirement is replaced with one permission i.e. authorization under the rules for all stakeholders handling the hazardous and other waste.
- III The basic necessity of infrastructure to safeguard the health and environment from waste processing industry has been prescribed as Standard Operating Procedure (SOPs) specific to waste type



which has to be complied by the stakeholders and ensured by SPCB/PCC while granting such authorisation.

- IV Waste Management hierarchy in the sequence of priority as prevention, minimization, reuse, recycling, recovery, co-processing; and safe disposal being incorporated.
- V The provision on co-processing as preferential mechanism over disposal for use of waste as supplementary resource or for recovery of energy is being enumerated with simplification of process for approval of such activity
- VI Responsibilities of State Government for environmentally sound management of hazardous and other wastes has been introduced as follows:
  - To set up/ allot industrial space or sheds for recycling, pre-processing and other utilisation of hazardous or other waste
  - To register the workers involved in recycling, pre-processing and other utilisation activities;
  - To form groups of workers to facilitate setting up such facilities;
  - To undertake industrial skill development activities and ensure safety and health of workers.
- VII Schedule I giving “List of processes generating hazardous wastes” has been reviewed taking into account technological evolution in the industries.
- VIII Schedule II giving ‘List of Waste Constituents with Concentration Limits’

has been revised as per United Nation Environment Protection Act (USEPA), Canadian Standards and drinking water standard.

- IX The process of import/export of waste under the rules has been streamlined by simplifying the procedure and by revising the list of waste regulated for import/export under Schedule III.
- X Separate Schedule has been introduced which comprises of waste such as metal scrap, Paper waste and various categories of electrical and electronic equipments for re-use purpose exempted from the need of obtaining Ministry’s permission. Document based approach for such import/export shall ensured by the Custom Authority.
- XI The list of waste prohibited for import has been revised by inclusion of following items
  - a. Waste edible fats and oil of animals or vegetable origin.
  - b. Household waste
  - c. Critical Care Medical equipment.
  - d. Tyres for direct re-use purpose
  - e. Solid Plastic wastes
  - f. Waste electrical and electronic assemblies scrap.
  - g. Other chemical wastes especially in solvent form

**E-Waste Management:** The e-waste (Management and Handling) Rules, 2011, notified by the Ministry of Environment, forest and Climate Change came 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 introduced 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.

In supersession of the e-waste (Management and Handling) Rules, 2011, the Ministry of Environment, Forest and Climate Change notified the e-Waste (Management) Rules, 2016 vide GSR No. No. 338(E), dated 23<sup>rd</sup> March, 2016. The government has widened the scope of EPR in the amended e-waste (Management) Rules, 2016. As per these rules, EPR means responsibility of any producer of electrical or electronic equipment, for

channelization of e-waste to ensure environmentally sound management of such waste. Under the EPR, target based collection of e-Waste has been mandated. The producers have been made solely responsible for collection of e-waste and are authorised to set up collection centre or point including arrangement to buy back for such collection. Under EPR, a producer may manage his responsibility through a Producer Responsibility Organisation (PRO). The producers also have the options of e-waste exchange and e-retailer for channelization of e-waste. The amendment to the rules have been notified on 10<sup>th</sup> June 2015 and draft e-waste (Management) Rules, 2015 is under finalization. Salient features of Draft e-waste (Management) Rules, 2015 are as given below:

- Stakeholders to be covered under the rules is being expanded to manufacturer, dealer, refurbisher and Producer Responsibility Organization (PRO) and e-waste exchange to address leakage of e-waste to informal sector at any stage of the chain;
- Applicability of the Rules is now being extended to components, consumables and spare parts of EEE which makes the product operational;
- Compact Fluorescent Lamp (CFL) are proposed to be covered under the Rules by inclusion in Schedule I;
- Exemption to Micro and Small industry sector as defined in MSME Developmental Act, 2006 is being removed;
- Enabling provision is being made for setting up of Producer Responsibility



organization,(PRO) by producers and e-waste exchange by private sector or on PPP mode to ensure efficient channelization of e-waste;

- Setting up of collection centers shall now be Producers responsibility and stand-alone collection centres are not permitted;
- Bulk Consumer is being redefined in terms of turnover and the number of employees and they need to file annual returns now;
- Authorization from SPCBs for EPR by Producers is being replaced with Authorization by CPCB.
- Simplification in registration/ authorization for collection, dismantling and recycling wherein Registration and Authorization is being combined as one document of Authorization for recyclers and dismantlers.

### **Solid Waste Management:**

**Solid Waste Management Rules, 2016:** The Ministry has revised the rules for management of solid waste in the municipal areas after 16 years. The new rules are now applicable beyond Municipal areas and extend to urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, airbase, Port and harbour, defense establishments, special economic zones, State and Central government organizations, places of pilgrims, religious & historical importance. The segregation of waste at source has been mandated. Responsibilities of Generators have been fixed for segregation of waste in to three streams,

Wet (Biodegradable), Dry (Plastic, Paper, metal, wood, etc.) and domestic hazardous wastes (diapers, napkins, empty containers of cleaning agents, mosquito repellents, etc.). The Rules provide ways for integration of Waste pickers/ Rag pickers. The Rules mandate local bodies to frame their bye-laws to impose 'User Fee', to be paid by the generator to waste collector and for 'Spot Fine' for Littering and Non-segregation. The concept of partnership as envisaged under Swachh Bharat has been introduced viz. Bulk and Institutional Generators, Market Associations, event organizers and Hotels and restaurants have been directly made responsible for waste segregation and management in partnership with Local Bodies. All Resident Welfare and Market Associations, Gated communities and institution with an area >5,000 sq. m, new townships and Group Housing Societies have been made responsible to develop in-house waste handling, and processing arrangements for biodegradable waste. The developers of Special Economic Zone, Industrial Estate, Industrial park have been mandated to earmark at least 5% of the total area of the plot or minimum 5 plots/ sheds for recovery and recycling facility. All industrial units using fuel and located within 100 km from a solid waste based RDF plant are required make arrangements to replace at least 5 % of their fuel requirement by RDF so produced. Non-recyclable waste having calorific value of 1500 K/cal/kg or more shall not be disposed of on landfills and shall only be utilized for generating energy either or through refuse derived fuel or by giving away as feed stock for preparing



refuse derived fuel. The Rules provide timeline for putting in place the requisite infrastructure for waste management by local bodies. The implementation said provisions of the rules will definitely facilitate sustainable waste management in the country.

**Plastic Waste Management Rules, 2016:** It is known fact that plastic has multiple uses and the physical and chemical properties lead to their commercial success but inevitably their indiscriminate disposal has become a major threat to the environment. In particular, the plastic carry bags are the biggest contributors of the littered waste and every year, millions of plastic bags end up in to the environment vis-a vis soil, water bodies, water courses, etc and it takes an average of one thousand years to decompose completely. Therefore, to the address the issue of scientific plastic waste management, new regulations namely, the Plastic Waste (Management and Handling) Rules, 2011 were notified in 2011 which included plastic waste management. However, the implementation of these rules was not so effective because the ambit of these rules was limited to notified municipal areas whereas today, the plastic has reached to our rural areas also. There were no provisions for waste generators. The rules did not address the promotion of conversion of waste in to useful resources. Though, it provided for Extended Producers Responsibility for the establishment of waste management system, pricing of carry bags etc. those were not exercised by the local authorities as it was simply left at the discretion of municipal authorities.

To address these issues and with an objective

to set up self-sustainable waste management system, the Ministry notified the Plastic Waste Management Rules, 2016. The applicability of new Rules has been expanded beyond municipal area to cover rural area as the plastic has reached to our rural areas also. The Rules provide for:

- I increase in minimum thickness of plastic carry bags from 40 to 50 microns,
- II first time cover and stipulate minimum thickness of 50 microns for plastic sheets being used for packaging and wrapping commodities to facilitate collection and recycle of plastic waste,
- III clarify the role of producers and brand owners in respect of take back system of plastic waste under Extended Producers Responsibility;
- IV revamped pricing mechanisms for plastic carry bags by introducing plastic waste management fee to be paid by retailers/ street vendors willing to provide carry bags as pre-registration charge,
- V ways and means to promote gainful utilization plastic waste such as energy recovery, in road construction, etc.,
- VI introducing user charge and spot fines by local authority, and
- VII mandate for institutional generator and event organizers to collect and channelize their waste generated to authorized waste processing units.

**Construction & Demolition Waste Management, 2016:** The Ministry first time notified the separate set of rules for



management of Construction and Demolition Waste in the Country as Construction and Demolition Management Rules, 2016. Prior to notification of these Rules, the management of construction and demolition waste was regulated under the Municipal Solid Waste Management rules, 2000 and it was left at the discretion of the urban local bodies. The new rules regulate waste generated from construction, re-modeling, repair and demolition of any civil structure and make a way forward to reuse, recycle such waste in gainful manner. The new rules will apply to everyone who generates construction and demolition waste-building materials, debris, and rubble waste from construction, re-modeling, repair and demolition of any civil structure of individual or organisation or authority. Under the Rules every waste generator has been made responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated separately, deposit at collection centre so made by the local body or handover it to the authorised processing facilities, ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains. Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month are mandated to submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work. They are also required to segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks

and mortar, keep the concerned authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis. Waste generators are also required to pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities. The service providers are required to prepare a comprehensive waste management plan covering segregation, storage, collection, reuse, recycling, transportation and disposal of construction and demolition waste generated within their jurisdiction. They are also responsible for removal of all construction and demolition waste. Local Authority has been responsible for proper management of construction and demolition waste within its jurisdiction including placing appropriate containers for collection of waste, removal at regular intervals, transportation to appropriate sites for processing and disposal. The Secretary in-charge of development in the State Government or Union territory administration has been mandated to prepare policy for management of construction and demolition of waste within one year from date of final notification of these rules. The Local authorities are also required to put in place necessary infrastructure in place for management of C&D waste in their jurisdiction within the timeline specified under the Rules. Procurement of materials made from construction and demolition waste is to be used in certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control. The implementation of



these rules will facilitate preventing indiscriminate disposal of C& D Waste and reuse, recycle such waste in gainful manner.

**Fly ash utilization:** The fast-increasing demand of power coupled with its dependence on coal for about 2/3<sup>rd</sup> of its energy requirement is leading to generation of large volume of fly ash. The management of Fly ash has been a matter of concern in view of requirement of large area of land for its disposal. To address the environmental problems of fly ash disposal, the Ministry of Environment, Forest and Climate Change issued notification on fly ash utilization in 1999 prescribing the targets for the fly ash utilization for Coal/Lignite power based Thermal Power Stations with an aim to achieve 100% utilization in phased manner. The Notification has been amended in 2003, 2009 and recently in 2016. The utilization of fly ash has increased from 6.64 million ton in 1996-97 to a level of 107.77 million-ton in 2015-16. The percentage of fly ash utilization during 2015-16 has been 60.97%. Fly ash earlier considered to be “hazardous industrial waste” material, is now considered to be useful and saleable commodity. The objectives of this notification are to protect environment, conserve the top soil, prevent dumping of fly ash from Thermal Power Stations on land and to promote utilization of ash in the manufacture of building materials and construction activity. The implementation of this Notification has resulted in steady increase in the utilization of fly ash. However, the utilization has not reached to 100% and certain additional measures are required to be taken to promote and facilitate its use. In the recently amended

notification dated 25.01.2016 the scope of the notification is broaden to enhance the utilization of the fly ash for various gainful activities and to promote and facilitate utilisation of ash based products in construction activities and using ash as soil conditioner. This shall result in reduction of pollution and requirement of land for ash disposal. The following are the specific amendments and their implication-

- I The mandatory jurisdiction of the area of application of the notification is increased from 100 km to 300 km. According to the amendment, every construction agency engaged in the construction of buildings within a radius of 300 km from a coal or lignite based thermal power plant (TPP) shall use only fly ash based products for construction. This will encourage more stakeholders to utilise the fly ash.
- II TPPs shall bear the cost of transportation of ash for manufacturing of ash based products, road construction projects and for use as soil conditioner in agriculture activity up to 100 km distance. Beyond the distance of 100 km and up to 300 km, the transportation cost shall be shared equally between the user and the TPPs. This will bring down the cost of manufacturing of fly ash based products thereby increasing the affordability of ash based products by the consumers as well as increase the utilisation of ash.
- III The amendment mandates use of fly ash based products in road construction projects under Pradhan



MantriGraminSadakYojna and asset creation programmes of the Government involving construction of buildings, road, dams and embankments and the entire cost of transportation of ash to these project sites shall be borne by the TPPs.

- IV The amendment provides for the use of fly ash as soil conditioner which will enhance utilisation / demand of fly ash.
- V Amendment also mandates use of ash based bricks or products in construction under all Government Scheme or programmes e.g. Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MNREGA), Swachh Bharat Abiyan, Urban and Rural Housing Scheme where built up area is more than 1000 square feet and in infrastructure construction including buildings in designated Industrial Estates or Parks or Special Economic Zone.
- VI The mandatory provision of providing 20% of dry fly ash free of cost to the brick manufacturers shall not be applicable to such Thermal Power Plants which are able to utilise / dispose of 100 % fly ash in the prescribed manner.
- VII TPPs, within three months from the date of notification, shall upload on their website the details of stock of ash available and thereafter update the stock position at least once every month. By this, the users would be able to look for the sources where ash is available and can approach such TPPs for obtaining fly ash.
- VIII The amendment mandates the TPPs to

provide dedicated dry ash silos and separate access roads. This shall ease the delivery of fly ash.

- IX Coal or lignite based thermal power plants located in coastal districts shall support, assist or directly engage into construction of shore line protection and other measures. This would further increase the ash utilisation.
- X Mandating setting up of fly ash based product manufacturing industries by TPPs within their premises or in the vicinity or near the cities will reduce the transportation of ash and encourage utilisation of fly ash products.
- XI State Authorities shall amend Building Bye Laws of the cities having population One million or more so as to ensure the mandatory use of ash based bricks.
- XII Payments to the contractors for road making or any other infrastructure projects within the mandated distance shall be linked to submission of certificate of fly ash supply from the TPP/s.
- XIII The Ministry of Agriculture shall promote Fly Ash utilization in Agriculture as soil conditioner.
- XIV The time period to comply with the above provisions by all concerned authorities is 31.12.2017. The coal or lignite based thermal power plants shall comply with the above provision in addition to 100 % utilization of fly ash generated by them before 31.12.2017.

**Externally Aided Project:** The Ministry is



executing the World Bank aided “Capacity Building for Industrial Pollution Management Project” under the sub-head “Environmental Protection and Monitoring” as Pollution Abatement (Externally Aided Programme) Scheme. The project which commenced on 13.10.2010 was originally for the duration of five years with closing date as on 30<sup>th</sup> September 2015. The project has now been restructured with a project cost of USD 51.25 million (Rs.333.29 crores) with 85% as financial assistance from the World Bank and 15% contribution by the MoEF&CC, Govt. of Andhra Pradesh, Telangana & West Bengal. The project closing date has now been extended upto 15<sup>th</sup> September 2017. The objective of the Project is to establish a National Programme for the Rehabilitation of Polluted sites (NPRPS) as policy for remediation of contaminated sites and to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites.

**Activities undertaken so far:**

- I The three NPRPS consultancies viz. Inventory and Mapping of Probably Contaminated Sites in India (M/s COWI, Netherland), Development of Methodologies for National Programme for Rehabilitation of Polluted Sites (M/s Grontmij, Denmark), and Development of NPRPS (M/s PWC, India) were awarded and the works under all three consultancies has been completed. The final reports are yet to be accepted. Draft Policy formulation as guidelines and legislation is expected to be completed by 31<sup>st</sup> March 2017.
- II Remediation plans of Noor Mohammed Kunta Lake, the hazardous waste (HW) site in Telangana, Closure and Containment Plan of Kadapa Municipal Solid Waste (MSW) Site in Andhra Pradesh and Closure and Containment Plan for Dhapa MSW site in West Bengal were finalized and approved. Bid documents were prepared and bids invited. The contract for closure and containment of Kadapa MSW in Andhra Pradesh and Dhapa MSW site in West Bengal were awarded. The contracts for NMK lake could not be awarded as the bids were found to be non-responsive. The bid was reinvited and as a result the bid is likely to be awarded shortly.
- III Due to slow progress, Hooghly hazardous waste site in West Bengal has been dropped from the project.
- IV Following new activities have been introduced as part of restructuring from the saving that are available due to dropping of other activities:
  - a. National Action Plan on Industrial Chemicals
  - b. Engaging technical/academic institutions to build their specialized capacity on remediation which in turn will serve as Center of Excellence on remediation for the future training and capacity building of SPCBs and other Stakeholders.
  - c. Development of Standards for soil and ground water
  - d. National Waste Management Information System – Phase II



- e. Capacity Building of North Eastern States in terms of infrastructure
- f. Training and Capacity Building including infrastructure development of Other States with higher number of contaminated sites
- g. Strengthening of Hazardous Substance Management Division in the Ministry in terms of manpower and infrastructure.

#### **Progress/Achievements made during 2016-17:**

- I The reports upto Task 6 for all the three consultancies have been received except final.
- II Restructuring of the Project has been finalized.
- III Mid Term Review of the project undertaken to evaluate the status of various activities under the project.
- IV The remediation action plan of Hooghly hazardous waste sited in West Bengal was dropped in restructuring. The re-invitation of bids for NMK lakes site was done and bid is expected to be awarded shortly.

### **International Conventions**

**Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal:** The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22nd March, 1989 by the Conference of Plenipotentiaries in Basel, Switzerland. The Convention entered into force on 5 May 1992. The overarching objective of the Basel Convention is to protect human health and the environment against the

adverse effects of hazardous wastes. Its scope of application covers a wide range of wastes defined as “hazardous wastes” based on their origin and/or composition and their characteristics (Article 1 and Annexes I, III, VIII and IX), as well as two types of wastes defined as “other wastes” (household waste and incinerator ash; Article 1 and Annex II). India deposited its instrument of ratification on June, 1992. As on date there are 180 Parties to the Convention.

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

The Rotterdam Convention on the prior informed consent procedure for certain Hazardous Chemicals and Pesticides in International Trade entered into force on 24<sup>th</sup> February 2004. India acceded to the convention 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 are in Ministry of Chemicals and Fertilizers, Ministry of Agriculture and Cooperation. The Official Contact Points (OCPs) are designated in Ministry of Environment, Forests and Climate Change. There are 47 chemicals listed in Annex III to this Convention, which include 33 pesticides and 14 industrial chemicals that have been banned or severely restricted for





health or environmental reasons by two or more Parties and which the Conference of the Parties (COPs) has decided to subject to the Prior Informed consent (PIC) procedure.

**Stockholm Convention on Persistent Organic Pollutants:** The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from POPs. The Convention sought initially 12 chemicals, for restriction or elimination of the production and release. Now, the Convention covers 23 chemicals. The Convention was adopted in May, 2001 and came into force on 17<sup>th</sup> May, 2004. India ratified the Convention on 13<sup>th</sup> January, 2006 which came into force on 12<sup>th</sup> April, 2006. As per Article 7 of the Convention, Parties to the Convention were required to develop a National Implementation Plan (NIP) to demonstrate how their obligations to the Convention would be implemented and NIP has been developed through Global Environment Facility (GEF) funding. Ministry of Environment, Forests and Climate Change serves as the focal point for GEF and Stockholm Convention in the country. Designated national authorities are in Ministry of Agriculture and Cooperation and Ministry of Chemicals and Petrochemicals. India has ratified 12 initially listed chemicals.

**Minamata Convention on Mercury:** In February 2009, the Governing Council of UNEP adopted Decision 25/5 on the development of a global legally binding instrument on mercury. At the Conference of Plenipotentiaries held from 9<sup>th</sup>-11<sup>th</sup> October 2013 in Minamata and

Kumamoto, Japan, the “Minamata Convention on Mercury”, a global treaty to protect human health and the environment from the adverse effects of mercury, was formally adopted and opened for signature by States and regional economic integration organizations. The Convention has till now received nine ratification and 128 signatures. India has signed the Convention on 30<sup>th</sup> September 2014.

**Strategic Approach to International Chemicals Management:** In February 2006, over 190 countries including India acceded to the Strategic Approach to International Chemicals Management (SAICM), an international policy framework to foster sound management of chemicals. Initial activities under SAICM included development or updating of national chemicals profiles, strengthening of institutions, and mainstreaming sound management of chemicals in national strategies. Towards this end, India initiated the preparation of the National Chemicals Management Profile to assess India’s infrastructure and capacity for management of chemicals. Other actions taken by the Ministry were: (i) initiated studies of inventorisation of lead, cadmium, mercury and arsenic in paints, distemper and pigments in the country, (ii) initiated discussions with leading national laboratories, (iii) notified the E-Waste (Management and Handling) Rules, 2012 for the management of electronic waste, and (iv) finalized the draft Dangerous Goods (Classification, Packaging and Labelling) Rules, 2013 in the line of Globally Harmonized System.



## Development and Promotion of Clean Technology and Waste Minimization Strategies.

Under the above-mentioned Scheme Clean Technologies, are distinct from “end-of-pipe” abatement technologies, minimizing 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.

### Progress/Achievements

Under the grant-in-aid Scheme on Development and Promotion of Clean technology and Waste Minimization strategies during year 2016-2017 three Workshops for dissemination of outcomes of the completed projects for the use of different stakeholders which are as follows:

- Performance Evaluation of Pilot Plant based on Sequencing Batch Reactor for the Biodegradation of Absorbable Organic Halides (AOX) from Pulp and Paper Mill Wastewater Aligarh Muslim University, Aligarh, Uttar Pradesh.
- Development and demonstration of photo Catalytic Oxidation Technology for VoC Control at source - IIT, Kanpur, Kanpur, Uttar Pradesh.

- Synthesis of Polymer Hydro gel and Development of Hybrid Waste Water Treatment System using Cavitations Technique and Hydro gel – NIT Warangal, Telangana.

The Ministry has invited project proposals under this scheme through advertisement on MoEF&CC website during 2016-17 and received 108 project proposals, which are under Consideration.

Performance evaluation of Pilot Plant based on Sequencing Batch Reactor for the Biodegradation of Adsorbable Halides (AOx) from Pulp and Paper Mill Wastewater by Aligarh Muslim University, Aligarh, Uttar Pradesh.

The research project on Performance Evaluation of Pilot Plant based on Sequencing Batch Reactor for the Biodegradation of Adsorbable Halides (AOx) from Pulp and Paper Mill Wastewater was carried out by Aligarh Muslim University, Aligarh, Uttar Pradesh. The Pilot Plant was set up at M/s Naini Tissues Ltd., Kashipur, Uttarakhand. The project was initiated in September 2009 and completed in October 2016.

The objectives of the project was to assess the performance of Pilot Plant based on column type sequencing batch reactor for the biodegradation of Absorbable Organic Halides (AOx) present in Pulp and Paper Mill waste water. In addition, in order to meet out the stringent norms of pollution board, the COD removal was also assessed.

The important findings of the project are as follows:

- Successful removal of AOx upto 55% is achieved, whereas the COD removal upto 80% was achieved in Laboratory studies. In the Reactor operated for 760 days, total 75% of AOX and 80% of COD was successfully removed from the waste water.
- The process of development of granules was observed in the pilot plant due to the agglomeration of microorganisms after the operation period of 100 days. The granules were in size range of 2-4 mm after 220 days of operation. These granules were observed to be effective in biodegradation of toxic compounds like AOx, etc.

The quality of treated effluent was found to be good as there was complete absence of toxic intermediate compounds that may form during the conventional biodegradation processes. Therefore, the results of the study in turn suggest that the process may be useful for large scale applications for the treatment of waste water from Pulp and Paper Mill.

### **Synthesis of Polymer Nano Hydro Gel and Development of Hybrid Waste water Treatment System using Cavitation Technique and Hydro gel- by National Institute of Technology Warangal, Telengana.**

The research project on Synthesis of Polymer Nano Hydro Gel and Development of Hybrid Waste water Treatment System using Cavitation Technique and Hydro gel was carried out by National Institute of Technology Warangal, Telengana State. The Pilot Plant was

set up at M/s K. Patel Chemopharma Pvt. Ltd., Ankleshwar, Gujrat. The project was initiated in December 2013 and completed in July 2016.

The objectives of the project were: Synthesis Polymer Hydro Gel and incorporation of Nanoparticles into the Polymer Matrix; Comparative study of Cavitation effect and gel adsorption onto model pollutants; and Development of simplified process for removal of these textile dye compounds, and testing the effectiveness of developed system for Industrial waste treatment.

The important findings of the project are as follows:

- Two types of Polymer Nano Hydro Gel namely Poly(acrylic acid)-bentonite-FeCo Hydro Gel and Poly (acrylic acid)-Kaolin Hydro Gel Nanocomposites were successfully synthesized. Significant removal of Crystal Violet dye was achieved using Poly(acrylic acid)-bentonite-FeCo Hydro Gel Nanocomposites i.e. above 75% in the pH range of 9 to 11 which further increased upto 87% at 35oC. Hydro Gel was found to remove 87% of Crystal Violet in 15h through adsorption, and in combination of ultrasound 97% of CV removal was achieved in only 5h.
- The Poly (acrylic acid)-Kaolin Hydro Gel Nanocomposites were found to absorb the maximum brilliant green dye at pH 7, which was upto 88.3% for ultrasonic method. The 2g of ultrasonically synthesized Hydro Gel was able to remove 100% of dye. In case of Hydrodynamic Cavitation + Hydro Gel, the extent of decolourization and



mineralization of Crystal Violet dye was achieved up to 75% and 67% respectively compare to the 49% decolourization and 18% mineralization of Crystal Violet dye with Hydrodynamic Cavitation alone.

Therefore, it is concluded that the as synthesized Hydro Gel Nanocomposites were highly effective in removal of undesirable dye compounds from the waste water during treatment process. In addition, the Hydrodynamic Cavitation combined with packed bed Hydro Gel process has been successfully developed that may find potential applications for the treatment of bulk quantity of wastewater.

**Development and Demonstration of Nano-sized TiO<sub>2</sub> based Photo-catalytic oxidation for controlling VOCs at Source and in situ Ambient Airy by IIT Kanpur, Kanpur, Uttar Pradesh:**

The research project on Development and Demonstration of Nano-sized TiO<sub>2</sub> based Photo-catalytic oxidation for controlling VOCs was carried out by Centre for Environmental Science and Engineering, Indian Institute of Technology (IIT) Kanpur. The Pilot Plant was set up at Aarti Industries Limited, Vapi The project was initiated in March, 2012 and completed in November, 2016.

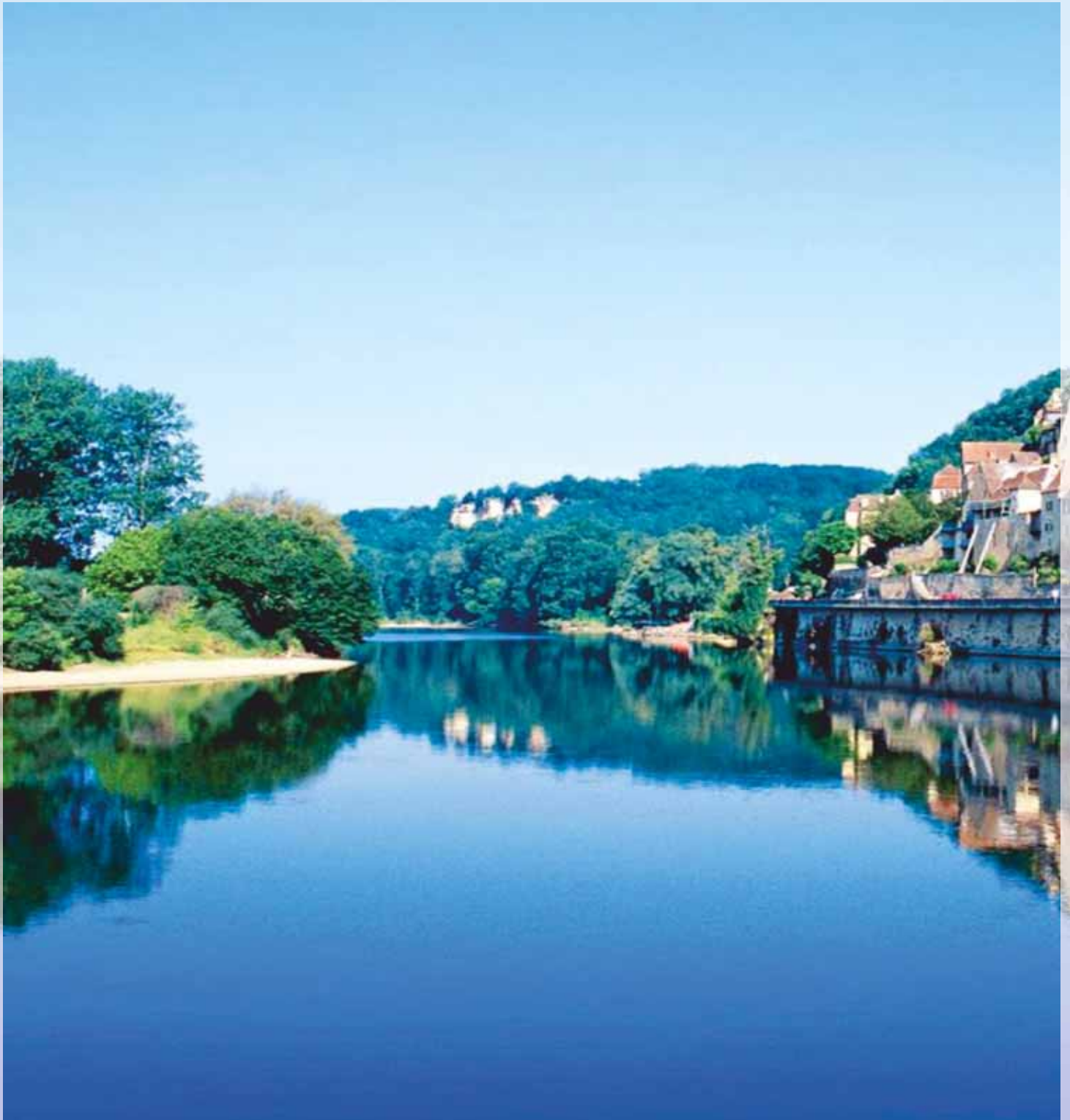
The objectives of the project were: Laboratory study for improving Photo Catalytic Oxidation (PCO) Technology using Nano-sized TiO<sub>2</sub>; Field applications of technology; and Characterization of the risk of exposure to

intermediate and suggesting degradation pathways of Benzene, Toluene, Ethylbenzene, and Xylene (BTEX).

The important findings of the project are as follows:

- Standardized TiO<sub>2</sub> Sol gel coating method was established for controlling particle size in 10.2+1.43 nm range. The highest degradation rate for all VOCs was obtained for 16 W lamps due to higher opportunity to optimize the process based on increased wattage versus increased efficiency of PCO system at increased cost.
- It is concluded that the heating of the reactor is the fastest and most efficient regeneration technique and should be followed. The regenerated catalyst can be used for a reasonable time depending upon catalyst performance for degradation of VOCs and its mechanical strength for long term uses.
- The Study demonstrated its effectiveness for different VOCs and estimated degradation rate constant for co-existing multiple VOCs was 1.06 min<sup>-1</sup>m<sup>-2</sup>. The controlled efficiency of device was over 99% for Benzene and 88% for multiple VOCs and 71% for Chloro-benzenes. The intermediates of degradation of BTEX were quantified and human health risk of exposure of these intermediates was accessed and found to be within acceptable level.

# National River Conservation Plan





## National River Conservation Plan

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

The pollution abatement works taken up under the NRCP include:

- Interception and diversion works/ laying of sewerage system to capture raw sewage flowing into the rivers through open drains and diverting them for treatment;

- Setting up of Sewage Treatment Plants (STPs) for treating the diverted sewage;
- Construction of Low Cost Sanitation Toilets to prevent open defecation on river banks;
- Construction of Electric Crematoria and Improved Wood Crematoria to conserve the use of wood;
- River Front Development works, such as improvement of bathing ghats;
- Public participation & awareness and capacity building, etc.

Presently NRCP (excluding Ganga and its tributaries) has covered polluted stretches of 31 rivers in 75 towns spread over 14 States and a treatment capacity of 2445 million litres per day (mld) has been created so far under NRCP (excluding Ganga and its tributaries). The 31 rivers covered under the programme are given in Table.

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

As per amendment to the Government of India (Allocation of Business) Rules, 1961 notified vide Gazette Notification SO No. 1986(E) dated 31<sup>st</sup> July, 2014, the work relating to Ganga and

its tributaries had been allotted to Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD&GR). Accordingly the rivers namely Ganga, Yamuna, Gomti,



Damodar, Mahananda, Chambal, Beehar, Khan, Kshipra, Betwa, Ramganga and Mandakini have been shifted to MoWR, RD & GR along with the National Mission for Clean Ganga(NMCG).

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

- **Pollution Abatement of River Satluj & Beas :** In 11 towns of Punjab for pollution abatement of rivers Satluj and Beas are under implementation with envisaged STP capacity of 187 mld . At present physical progress under these projects is around 88% & STP capacity of 187 mld has already been created.
- **Pollution Abatement of River Ghaggar:** 4 projects for the towns of Lehragaga, Khanauri, Moonak and Patran in Punjab, under which STPs having total treatment capacity of 15 mld will be created. The projects are under implementation & at present the physical progress is around 68%.
- **Sabarmati River Conservation Project Phase-II at Ahmedabad:** Sabarmati River Conservation Project Phase-II at Ahmedabad, Gujarat. Laying of new sewers, strengthening/ rehabilitation of the existing sewerage system, construction of sewage pumping stations and 4 nos. STPs having a total treatment capacity of 210.5 mld is envisaged under the project. The project is under implementation & and physical progress of about 16 % has been achieved so far.
- **Pollution Abatement of River Mindhola at Surat, Gujarat :** Under the project proposal

for 'Conservation of river Mindhola at Surat' works relating to sewerage networks, sewage pumping stations along with creation of sewage treatment capacity of 53 mld was envisaged. At present physical progress under these projects is around 83% & STP capacity of 53 mld has already been created.

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

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

The project of "Pollution abatement of River Mula- Mutha at Pune under NRCP", has been sanctioned in January, 2016. Loan assistance of 19.064 billion yen is being provided by Japan International Cooperation Agency (JICA) for the project. The project cost will be shared between Govt. of India and State Government/Pune Municipal Corporation (PMC), the implementing agency for the project, in 85:15 ratio respectively. The project is scheduled for completion by January, 2022. Acquisition of balance land requirement for STP, is ongoing & is in the final stages of completion.



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

### **National River Conservation Plan (North Eastern States)**

- Under NRCP, 7 projects were sanctioned for conservation and pollution abatement of river Rani Chu in Sikkim in 3 towns of Gangtok, Ranipool and Singtam. The works sanctioned under the projects pertain to interception & diversion of sewage, sewage treatment plants, rehabilitation of sewer mains, low-cost sanitation, river front development and improved wood

crematoria. Sewage treatment capacity of 20.06 mld is envisaged to be created in these towns. Works on 4 projects have been completed and 8 mld STP capacity has been created so far.

- For pollution abatement of rivers Diphu and Dhansiri at Dimapur, Nagaland, works have been sanctioned under NRCP. The works envisaged under the project pertain to construction of sewage treatment plants (25.43 mld), allied sewerage works, low-cost sanitation, afforestation, etc.

**New Initiative:** The project proposal for pollution abatement of river Nag at Nagpur costing Rs. 1252.32 crore has been posed to DEA, Ministry of Finance for seeking loan assistance for the project from Japan International Cooperation Agency (JICA).

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

**National Plan for Conservation of Aquatic Eco-Systems (NPCA):** For conservation of lakes and wetlands, Ministry of Environment, Forest and Climate Change was earlier implementing two separate Centrally Sponsored Schemes, namely the 'National Wetlands Conservation Programme' (NWCP) and the 'National Lake Conservation Plan' (NLCP).





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

### Conservation of Lakes

So far under NLCP/NPCA, a total of 46 projects for conservation of 63 lakes have been sanctioned in 14 States for undertaking works like providing sewerage system and sewage treatment plants, interception and diversion of sewage, desilting, catchment area treatment, storm water management etc. Conservation works for 34 lakes have been completed.

Major projects presently under implementation include Dal lake in Jammu & Kashmir, Shivpuri & Sindh Sagar Lakes in Madhya Pradesh, twin lakes at Mokokchung in Nagaland (NE region), Annasagar, Pushkar and Pichola lakes in Rajasthan, Ramgarh Tal & Laxmital in Uttar Pradesh.

**Conservation of Wetlands:** Wetlands are lifelines for a very large number of people and an important source of fresh water to mankind.

They provide a host of ecosystem services to humanity, in addition to being host to rich biodiversity. However, due to anthropogenic activities, wetlands are getting degraded. Major pressures on wetlands include fragmentation of hydrological regimes, siltation from degraded catchments, pollution, spread of invasive, species and over-harvesting of resources.

To control degradation and conserve wetlands, the National Wetland Conservation Programme (NWCP) was initiated in 1987 and financial assistance is being provided to the State Governments for implementing action plans for conservation and management of identified wetlands. So far, 22 States and one UT for conservation and management of the 82 identified wetlands, out of the total of 115 identified wetlands. During the year 2016-17, Management Action Plans of 4 wetlands were approved and financial assistance of Rs. 2.49 crore was provided to the concerned State Governments (till 31/01/2017).

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

**The Wetlands (Conservation and Management) Rules 2010:** To implement the objectives of the convention, a regulatory mechanism was put in place through Wetlands (Conservation and Management) Rules in December, 2010 vide GSR-951(E).



Central Wetland Regulatory Authority (CWRA) has been constituted under the Wetlands Rules, 2010. Four meetings of CWRA have been organized under the chairmanship of Secretary, Ministry of Environment, Forest and Climate Change during 2016-17, i.e. 4th meeting on 23<sup>rd</sup> August, 2016 and 5th meeting on 21<sup>st</sup> December, 2016, respectively. CWRA Cell is also being created for implementation of the Wetlands Rules in the Ministry.

As a follow up of meetings of CWRA, all States/UTs have been advised that

1. Untreated/ partially treated sewage or, industrial effluent should not be disposed of in any wetland or lake by panchayat, urban local body or industry. For the purpose of treatment, the norms/ standards prescribed by the concerned State Pollution Control Board / Pollution Control Committee for UTs shall be the criteria.
2. Immersion of idols should not be permitted in any wetland or lake in contravention to the 'Guidelines for Idol Immersion' brought out by the Central Pollution Control Board (CPCB) & (PROBES/136/2010-June, 2010).
3. A Nodal Agency to deal with the issue of wetlands and lakes vis-à-vis implementation of the Wetlands (Conservation and Management) Rules, 2010 may be identified in each State /UT. In case the State Wetland Authority has already been established, it should be the designated nodal agency. In case the State Wetland Authority is yet to be set up, the same may be constituted on priority.

4. An Expert Committee may be constituted or, appropriate Department/Centre in university, research institute, Centre of Excellence for prioritizing and identification of wetlands and preparation of 'Brief Documents' complete in all respects as per the Wetland Rules, 2010 may be identified.
5. First priority may be given to wetlands having area equal to or greater than 500 ha. In case, State / UT does not have wetlands having area more than 500 ha, 5-10 wetlands may be prioritised for notification considering various aspects.

25 wetlands spread over 14 states have already been notified under the Wetlands Rules, 2010. All States/UTs were requested by the Ministry for submission of 'Brief Documents' for wetlands to be considered for Notification. Proposals/Brief Documents for notification of wetlands have already been received from some states and are being examined.

'Guidelines for preparing Brief Documents on Wetlands' have been drafted in house in the Ministry and circulated among States/UTs apart from select experts for comment and inputs. Another 'Guidelines for Identification, Conservation and Management of Wetlands' have been drafted and are under discussion through an Expert Committee before finalization to facilitate the implementation of conservation programme in wetlands.

The Government has initiated the process of revisiting the existing wetland rules for more effective conservation & management of wetlands in the country and to enable a greater



role and ownership by State Governments in management of wetlands, particularly as water and land are State subjects. The State Wetland Authorities are envisaged to be entrusted the role of management and regulation of wetlands within their jurisdiction. A draft notification on the Wetlands (Conservation and Management) Rules, 2016 with a proposal to supersede the existing Wetlands (Conservation and Management) Rules, 2010, were published in the Gazette for seeking public objection/suggestions within 60 days. The comments received are being examined.

**World Wetland Day:** Each year, World Wetland

Day is celebrated on 2nd February for increasing awareness and spreading need for conservation and wise-use of wetlands all over the world. The World Wetland Day – 2017 with the theme ‘Wetlands for Disaster Risk Reduction’ was celebrated in collaboration with the Government of Madhya Pradesh at Bhoj Wetlands, Bhopal, one of the 26 Ramsar sites that India has designated under the Ramsar Convention.

**Progress during the year:** Sewage Treatment Capacity of 75 mld was targeted to be created under NRCP during the year 2016-17 against which, 19.30 mld has been created so far



*Fig. 28 Chilika Lake in Odisha (A Ramsar Site)*

during the year. Against the target of completion of 2 lakes, rejuvenation/

conservation works have been so far completed in 1 lake during 2016-17.

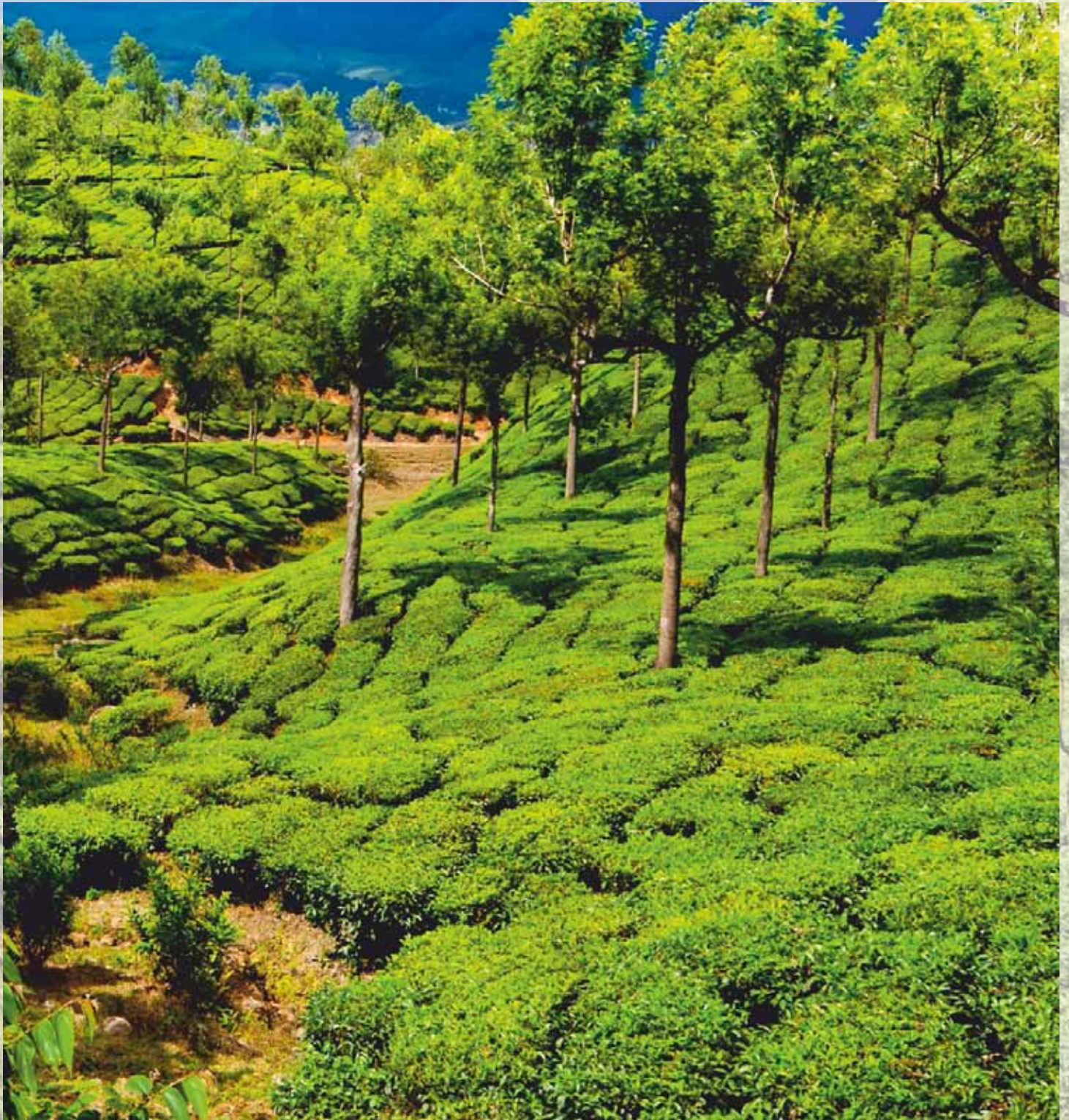


**Fig. 29** 5<sup>th</sup> Meeting of Central Wetlands Regulatory Authority in progress on (21.12.2016)



**Fig. 30** Tulip Flowers

# National Afforestation and Eco-Development Board (NAEB)





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

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.

The detailed objectives of the NAEB are to:–

- Evolve mechanisms for ecological restoration of degraded forest areas and adjoining lands through systematic planning and implementation;
- Restore, through natural regeneration or appropriate intervention, the forest cover in the country for ecological security and to meet the fuelwood, fodder and other needs of the rural communities;
- Augment availability of fuelwood, fodder, timber and other forest produce on the degraded forest and adjoining lands in order to meet the demands for these items;
- Sponsor research and extension of findings to disseminate new and proper technologies for the regeneration and development of degraded forest areas and adjoining lands;
- Create general awareness and help foster a people's movement for promoting

afforestation and eco-development with the assistance of voluntary agencies, Non-Governmental Organizations, Panchayati Raj institutions and others and promote participatory and sustainable management of degraded forest areas and adjoining lands;

- Coordinate and monitor the Action Plans for tree planting, ecological restoration and eco-development; and
- Undertake all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco-development activities in the country.

### Name of the Programme, Scheme, Project:

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

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

National Afforestation Programme (NAP) is a major Afforestation scheme of the NAEB in the Government of India. Launched in 2000-02, the scheme has acquired a Pan India ambit over the last nine years of its implementation and was being implemented by 28 states of the country



through a twin institutional set up of Forest Development Agencies (FDAs) at the forest division level and Joint Forest Management Committees (JFMCs) at the village level. From the year 2010-11, State Forest Development Agency (SFDA) has been constituted at the State level to smoothen the fund flow to the FDAs. The programme is now implemented through a three tier system of State Forests Development Agency (SFDA) at the state level, Forest Development Agency (FDAs) at the district/forest division level and Joint Forest Management Committees (JFMCs) at the village level. Under Entry Point Activities, community assets are created with a 'care and share' concept. The objectives of the scheme are as follows:

- Protection and conservation of natural resources through active involvement of the people.
- Checking land degradation, deforestation and loss of biodiversity
- Ecological restoration and environmental conservation and eco-development
- Evolving village level people's organization which can manage the natural resources in and around villages in a sustainable manner
- Fulfillment of the broader objectives of productivity, equity, and sustainability for the general good of the people
- Improve quality of life and self-sustenance aspect of people living in and around forest areas
- Capability endowment and skill enhancement for improving employability of the rural people.

## Progress and Achievements

- 28 SFDA Projects have been operationalised in the country. An advance area of 2359 ha has been sanctioned for afforestation.

## Progress/Achievements

The financial assistance provided to States under National Afforestation Programme during financial year 2016-17.

- New Initiatives under the Scheme: A number of initiatives have been taken by the Ministry to expedite the implementation of the scheme as well as to improve the qualitative aspects of implementation. These include:
  - Comprehensive amendment in Guidelines of NAP scheme has been made to promote further decentralization by delegating more responsibilities to State Forest Departments with respect to processing of the FDA project proposals, greater organic linkage of JFMCs with Gram Panchayats, increased security of the elected members of JFMCs through longer tenure of JFMC presidency, capacity building in particular of frontline staff of Forest Department and JFMC members especially with regard to local management and administrative responsibilities.
  - In general, women are the largest beneficiary group of all interventions by the NAEB. In addition to being users of the resource, and their participation in the labor force, the empowerment of women is being also ensured by requesting the States to increase their representation to 50% in



FDA. Similarly, the revised guidelines of NAP scheme also require 50% women in the JFMCs. It is proposed to monitor the benefit of the NAP scheme to women members in quantifiable terms. Accordingly, the formats for progress reports of FDA projects under NAP scheme have been modified.

- While formulating proposals under National Afforestation Programme, States have been advised to give adequate representation to SC/ST in FDA and JFMC at village level. Information received from FDAs reveal a larger participation of SCs/STs, in afforestation programme, and there has been corresponding increase in generation of employment in the project areas.
- A website of NAEB has been launched and the relevant information on the approvals is being provided on the website. SFDA/FDA is required to discuss the approved works in the General Body of the JFMCs.

### **(b) 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, Forest and Climate Change while the inputs like sapling, fencing, etc. and also the professional and managerial guidance is provided by the State Forest Departments. In ETF battalions, the Ministry of Defence deploys its ex-servicemen, preferably from within the area of operation, whereas the nuclear core of the force is constituted of regular servicemen. Some of the ETF Battalions have undertaken successful eco-restoration of highly degraded sites, for example the limestone mining areas in the Mussoorie Hills.

Six ETF battalions are being supported under the EDF Scheme in the States of Uttarakhand, Rajasthan, Jammu & Kashmir and Assam. Budget Estimate for the scheme during 2016-17 is Rs. 20.00 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.

### **(c) National Mission for a Green India (GIM)**

The National Mission for a Green India (GIM), one of the eight missions under the National Action Plan on Climate Change aims at protecting and enhancing India's diminishing





forest cover to counter the perils of climate change. It envisages a holistic view of greening and focuses on multiple ecosystem services along with carbon sequestration and emission reduction as co-benefit.

The Mission embarks on meeting the challenge of climate change adaptation and mitigation through five Sub-Missions and a cross-cutting intervention:

- a) enhancing quality of forest cover and improving eco-system services
- b) Eco-system restoration and increase in forest cover
- c) Enhancing tree cover in urban and peri-urban areas,
- d) Agroforestry and social forestry
- e) Restoration of wetlands and
- f) Promoting alternative fuel energy

### State-wise status and Progress/Achievements made under GIM

The State-wise details of funds released, physical targets set and achieved are given in the table below:

(Phy: area in hectares)

S. No.	States	Physical			
		Target		Achievement	
		Advance Work	Creation	Advance Work	Creation
1	Andhra Pradesh	881	-	150	-
2	Chhattisgarh	-	20716	-	17322
3	Karnataka	-	760	-	760
4	Kerala	4978	-	-	-
5	Manipur#	-	8798	-	8789
6	Mizoram	19643	-	19643	
7	Odisha	-	2094	-	2094
8	Punjab	3000	-	1107	1107
9	Uttarakhand	7483	-	-	-
<b>Total</b>		<b>35985</b>	<b>32368</b>	<b>20900</b>	<b>30072</b>

# Manipur has reported that in anticipation of sanction and release of the grants-in-aid during the year 2016-17, plantations on the sites

where advance work was undertaken from funds released during the year 2015-16 have already been created during the year 2016-17.

Bar chart above shows the progress and achievements made during 2016-17. Out of the set target of 35985 ha of advance work, 58% of target has been achieved so far i.e. 20900 ha of

advance works have been accomplished while the plantation activities have been carried out in 30072 ha against the creation target of 32368 ha which is around 92% of the set target.



**Fig. 31**



**Fig. 32 Fish**

# Research in Environment





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

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 the Environmental Research.
- 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.

### **Environment 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 a total of 80 new proposals were received under the EnvRP programme, progress of 30 ongoing projects were reviewed and monitored and 12 projects have been sanctioned during the period.



## Ecosystems Research Programme (EcRP)

- Ecosystem Research Programme is an interdisciplinary programme of research which emphasizes ecological approach for studying the relationship between man and environment. The Ecosystem Research Programme (EcRP) deals with “green issues” relating to ecology, conservation of natural resources, Eastern and Western Ghats, aquatic and terrestrial ecosystems, mountain ecosystems, tropical rainforests, wetlands, mangroves and coral reefs, biosphere reserves, biodiversity and the study of inter-relationships between humans and environment and seeks to generate scientific knowledge needed to manage natural resources wisely.
- 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 upto 30th November, 2016, 02 meetings of the Ecosystem Research Programme (EcRP) committee were held where progress of 32 ongoing projects was reviewed and mid-term corrections were suggested on case to case basis. During the year 2016-2017, the Committee also appraised 76 new/revised/peer reviewers proposals received under Ecosystem Research Programme (EcRP), out of this, 08 new projects were sanctioned and 05 projects were completed.

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

- This programme supports research on environmental and ecological economics, socio-economic issues arising out of extant as well as new contemplated legislation(s), tribal, rural, urban issues vis-à-vis legislation, role of gram panchayats and civil society in the implementation of environmental legislation etc.
- During the year, one meetings of the Programme Advisory Committee (PAC) were held and a total of 40 proposals were



appraised. Progress of 01 ongoing projects were reviewed and monitored. One project has been approved during the period.

## Progress/Achievements

- An online Project Monitoring and Information System (PMIS) has been introduced and made operational since March, 2015 to streamline the Research Programme that are received in the Ministry throughout the year. Since then only proposals received online are being considered. This online PMIS has been made fully operational for all these 3 Flagship Research Programs of the Ministry by the end of the year.
- Proposal for Building up of a data base for 'Roster of Experts' to facilitate timely coordination and review of Research Programmes.
- Encouragement of commissioned projects by identifying thematic areas which would have a direct relevance and implications on the Ministry's policies and programs by way of organizing workshops and consultative meetings is in the anvil.
- Executive Summary of the ongoing Projects and Project outcomes on submission of FTR is being uploaded on the Ministry's web-site for wider publicity.

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

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

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

The status of draft and final ESZ notifications issued by the Ministry as on 31.12.2016 is given below:

**Draft ESZ Notifications Issued as on 31.12.2016**

Sl.N.	States/UTs	Name of Draft Notification	Date of notification
1.	Andhra Pradesh	Nelapattu WLS	15.01.2016
2.		Kambalakonda WLS	07.01.2016
3.		Rajiv Gandhi NP	10.02.2016
4.	Telangana	Kinnersani WLS	05.08.2016



Sl.N.	States/UTs	Name of Draft Notification	Date of notification
5.	Arunachal Pradesh	Eagle Nest WLS	05.08.2016
6.		Rube Supse WLS	19.02.2016
7.		Mouling NP	23.02.2016
8.	Assam	Borail WLS	08.04.2016
9.		Amchang WLS	21.03.2016
10.		Panidehing WLS	19.04.2016
11.		Sonai Rupai WLS	19.09.2016
12.		Dibru Saikhowa NP	08.04.2016
13.	Bihar	Valmiki NP & Tiger Reserve	19.05.2016
14.		Bhimbandh WLS	11.03.2016
15.		Nagi Bird Sanctuary	24.06.2016
16.		Nakti Bird Sanctuary	24.06.2016
17.		Kusheshwar Asthan Bird Sanctuary	19.05.2016
18.		Gautam Buddha WLS	08.04.2016
19.	Chhattisgarh	Tamor Pingla WLS	07.01.2016
20.		Bhoramdev WLS	08.04.2016
21.		Pamed WLS	27.01.2016
22.		Barnawapara WLS	27.01.2016
23.		Gomarda WLS	24.02.2016
24.		Semarsot WLS	21.03.2016
25.		Badalkhol WLS	29.03.2016
26.	Delhi	Asola Bhattie WLS	22.06.2016
27.	Gujarat	Velavadar Black Buck NP	08.01.2016
28.		Gir NP	03.11.2016
29.	Himachal Pradesh	Kibber WLS	28.04.2016
30.		Kais WLS	19.04.2016
31.		Manali Bird Sanctuary	24.02.2016
32.		Kanawar WLS	19.04.2016
33.		Nargu WLS	26.02.2016
34.		Shikari Devi WLS	26.02.2016



Sl.N.	States/UTs	Name of Draft Notification	Date of notification
35.		Pin Valley NP	11.03.2016
36.		Renukaji WLS	21.07.2016
37.		Khokhan WLS	24.02.2016
38.		Great Himalayan NP	05.08.2016
39.		Sangla Valley Rakchham Chitkul WLS	03.06.2016
40.		Churdhar WLS	03.06.2016
41.		Kalatop Khajjar WLS	03.06.2016
42.		Inderkila NP	21.07.2016
43.		Chandertal WLS	03.06.2016
44.		Tundah WLS	03.06.2016
45.		Kugti WLS	19.05.2016
46.		Gamgul Siyabehi WLS	03.06.2016
47.		Talra WLS	03.06.2016
48.		Sech Tuan Nala WLS	01.07.2016
49.	Jammu & Kashmir	Ramnagar WLS	21.03.2016
50.		Nandini WLS	28.04.2016
51.	Karnataka	Gudavi WLS	08.01.2016
52.		Gudekote Sloth Bear WLS	15.01.2016
53.		Someshwara WLS	15.01.2016
54.		Ranebennur Blackbuck WLS	07.01.2016
55.		Ranganathittu WLS	03.06.2016
56.		Talacauvery WLS	13.01.2016
57.		Malai Mahadeshwara WLS	31.03.2016
58.		Rangayyanadurga 4-horned Antelope WLS	07.01.2016
59.		Cauvery WLS	04.03.2016
60.		Bhimgad WLS	08.01.2016
61.		Kudremukh NP	08.01.2016
62.		Melukote WLS	31.03.2016
63.		Pushpagiri WLS	15.01.2016
64.		Banerghatta NP	15.06.2016





Sl.N.	States/UTs	Name of Draft Notification	Date of notification
65.		Nugu WLS	05.08.2016
66.		Chinchioli WLS	05.08.2016
67.		Ramadevarabetla Vulture Sanctuary	03.06.2016
68.		Bhadra Tiger Reserve	05.08.2016
69.		Biligiriranganaswamy Tiger Reserve	05.08.2016
70.		Dandeli Anshi Tiger Reserve	03.11.2016
71.	Kerala	Silent Valley NP	06.01.2016
72.		Thattekad WLS	27.01.2016
73.		Mathikettan WLS	29.03.2016
74.		Peechi WLS	03.03.2016
75.		Idduki WLS	05.08.2016
76.		Aralam WLS	29.03.2016
77.		Chimmony WLS	05.08.2016
78.		Shendurney WLS	07.01.2016
79.		Malabar WLS	08.01.2016
80.		Kottiyoor WLS	09.09.2016
81.		Neyyar and Peppara WLS	05.08.2016
82.		Periyar Tiger Reserve	31.03.2016
83.		Parambikulam Tiger Reserve	05.08.2016
84.		Madhya Pradesh	Madhav NP
85.	Nauradehi WLS		03.06.2016
86.	Karera WLS		19.05.2016
87.	Bagdara WLS		31.03.2016
88.	Ghuga Fossil NP		31.03.2016
89.	Sailana WLS		29.03.2016
90.	Ken Gharial WLS		31.03.2016
91.	Satpura Tiger Reserve		02.03.2016
92.	Sanjay Dubri & Sanjay NP		31.03.2016
93.	Dinosaur NP		02.03.2016
94.	Ratapani & Singhori WLS		21.12.2016

Sl.N.	States/UTs	Name of Draft Notification	Date of notification
95.	Maharashtra	Tipeshwar WLS	07.01.2016
96.		Jaikawadi WLS	14.01.2016
97.		Pench NP	17.03.2016
98.		Mayureshwar WLS	05.08.2016
99.	Manipur	Jiri Makru WLS	11.03.2016
100.	Odisha	Kuldiha WLS	19.02.2016
101.	Rajasthan	Kesarbagh WLS	13.01.2016
102.	Uttar Pradesh	Nawabganj Bird Sanctuary	27.01.2016
103.		Sandi Bird Sanctuary	20.01.2016
104.		Samaspur WLS	18.01.2016
105.		Parwati Arga WLS	03.06.2016
106.		Saman Bird Sanctuary	03.06.2016
107.		Sohagi Barwa WLS	22.06.2016
108.		Ranipur WLS	03.06.2016
109.	West Bengal	Jaldapara NP	29.03.2016
110.		Neora Valley NP	02.11.2016
111.	Uttarakhand	Nandhar WLS	08.01.2016



**Fig. 33 Crane**



Final Esz Notifications Issued as on 31.12.2016

Sl. N.	State	Name of Final Notification	Date of notification
1.	Andaman & Nicobar Islands	Protected Areas of A&N Islands	30.09.2016
2.	Telangana	Pakhal WLS	30.11.2016
3.	Bihar	Baraila Lake Salim Ali Jubba Sahni WLS	23.11.2016
4.	Gujarat	Shoolpaneshwar WLS	05.05.2016
5.	Haryana	Bir Shikargarh WLS	23.11.2016
6.		Khol Hi Raitan WLS	26.10.2016
7.		Kalesar and Kalesar WLS	22.04.2016
8.		Bhindawas WLS	30.09.2016
9.	Madhya Pradesh	Son Gharial WLS	14.12.2016
10.		Ghatigoan Hurna WLS	14.12.2016
11.		Gandhi Sagar WLS	14.12.2016
12.		Bandhavgarh Tiger Reserve	14.12.2016
13.	Maharashtra	Nagzira , New Nagzira , Koka , Navegaon and Navegaon WLS	25.02.2016
14.		Melghat Tiger Reserve	28.12.2016
15.		Gautala Autramghat WLS	09.12.2016
16.		Sanjay Gandhi NP	15.12.2016
17.		Painganga WLS	30.11.2016
18.	Manipur	Bunning WLS	14.12.2016
19.		Kailam WLS	26.10.2016
20.		Zeilad WLS	26.10.2016
21.		Yangoupokpi Lakch WLS	26.10.2016
22.	Odisha	Chandaka Dampara WLS	09.09.2016
23.	Punjab	Bir Motibagh WLS	11.03.2016
24.		Bir Bhadason WLS	21.07.2016
25.		Bir Gurdialpur WLS	01.07.2016
26.		Bir Bhunerheri WLS	01.07.2016
27.		Kathlaur Kushalia WLS	28.12.2016
28.		Bir Aishwan WLS	26.10.2016
29.		Abohar WLS	05.08.2016
30.		Bir Dosanjh WLS	21.07.2016
31.		Tekhni Rehmpur WLS	30.11.2016



### **Declaring Eco-Sensitive Areas in Western**

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

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

To proceed further in this direction, the Hon'ble Minister of State (Independent Charge), Environment, Forest and Climate Change, Shri Anil Madhav Dave held a meeting with the Members of the Parliament from the Western Ghats region on 11<sup>th</sup> August, 2016. During the deliberation in this meeting, it was emphasised that there should be balance between habitat, forests and society in the

Western Ghats region. It was emphasised that the Draft Notification dated 4.09.2015, would be the basis for moving forward through a consultative process involving State Governments and other stakeholders to redress the concerns of people living in the Western Ghats region and for conservation of the Western Ghats.

### **National Natural Resources Management System (NNRMS):**

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

The prime objective of PC-NNRMS is utilization of Remote Sensing Technology for inventorization, assessment and monitoring of country's natural resources.

To accomplish 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 (EF&CC) with Members from concerned line Ministries / Departments. About 130 projects addressing the 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, about 100 projects have been completed.

Some of the mega projects undertaken and completed/ under this programme include the following:

1. Forest Type Mapping on 1:50,000 scale of Entire Country Coordinated by FSI.
2. Mapping of Wildlife Sanctuaries and National Parks on 1:25,000 scale Coordinated by Wildlife Institute of India
3. Coastal Studies (Land use, Mangroves, Coral Reefs, etc.) for entire Indian Coast (1:25,000 scale)
4. Snow & Glaciers mapping of entire Himalayas (1:250,000/50,000 scale) Coordinated by SAC (ISRO)
5. National Wetland Inventory and Assessment (1:50,000 scale) Coordinated by SAC (ISRO)

## Achievements

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

- a. Desertification Status Mapping of India": under the guidance of Dr. A.S. Rajawat, Project Director & Head, Geo-Science Division, Department of Space, Space Application Centre, Ambawadi Vistar P.O. Ahmedabad.
- b. Natural Resources Assessment of selected Eco-Tourism sites of Gujarat and its associated environments using remote sensing and GIS, Dr. R. D. Shah, Head,

Geology Department, M.G. Science Institute, Dadasaheb Mavalanker Campus, Navrangpura, Ahmedabad, Gujarat.

- c. An ecosystem approach for management of Bhindawas and Khaparwas Wetlands, Haryana using geospatial techniques, Dr. J.K. Garg Professor, Environment Management & Director, Centre for Disaster Management, University School of Environment Management, Guru Govind Singh Indraprastha University, A-Block, Sector-16C, Dwarka, New Delhi.
- d. Biodiversity Assessment of Central Gujarat using Geospatial and Conventional Approach with Emphasis on Conservation of important Threatened Taxa.
- e. Assessing & Monitoring Climate Change Effects on Tree Line species in Garhwal Himalaya" by Dr. Sabyasachi Dasgupta, HNB Garhwal University, Srinagar (Garhwal) Uttarakhand.
- f. Monitoring of Arsenic in Ground Water of Ballia District, Uttar Pradesh Using Remote Sensing and GIS Techniques.
- g. Application of RS & GIS for Integrated Management of Hasdeo River Watershed (A Tributary of Mahanadi River) in Chhattisgarh.
- h. Application of Remote Sensing for Integral Land use, Water and Energy Management in Rural Areas: Exploring Energy Plantation Opportunities.
- i. Study of SI-fluxes and Nutrient inputs across the Vellar River Basin in the East



Coast of Indian and Assessment of their impacts on Coastal Resources-A Geo-Biotechnical Approach.

- j. Forest Encroachment in Karnataka-A two Decadal analysis using RS and GIS under the guidance of Dr. R.K.Somashekar, Professor, Deptt. of Environmental Sciences, Bangalore University, Bangalore, Karnataka.
- k. Soil and water quality appraisal in the salt affected land Forms of Nagapattinam District, Tamil Nadu using Remote Sensing and GIS Technics” under the Guidance of Dr. D. Jayanthi, Assistant Professor Water Technology Centre, Tamil Nadu Agricultural University, Coimbatore.

In order to streamline the process, Technical & Financial Sub-Committee was 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 about 30 on-going 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, Forest and Climate Change (MoEF&CC) itself including the various organizations under its administrative control like FSI, ZSI, BSI etc.

### Recent Activities:

- This year on June 17, 2016, an Atlas “Desertification and Land Degradation Atlas of India” was released jointly at AFRI, Jodhpur. This Atlas has been appreciated by UNCCD Headquarters, also.
- Space Application Centre (SAC), Ahmedabad has published a Book on “Monitoring Snow and Glaciers of Himalayan Region” on November 17, 2016, based on the work carried out under a project entitled “Monitoring Snow and Glaciers of Himalayan Region-Phase II”, funded jointly by MoEF & CC and ISRO/DOS.
- National Wetland Information System and National Coastal Zone Information System in GIS Platform have been developed and are being extensively used in the implementation of wetland and CRZ notification.

### Summary of achievements/goal under NNRMS Scheme

The NNRMS Scheme has provided valuable inputs for assessment as well as monitoring of land, water, vegetation, forest and other natural resources in the country. It provides valuable inputs to defend India’s position in International Protocols/Convention. The Scheme with the use of scientific tools and methodology helped in formulating policy decisions and taking appropriate course corrections for the conservation and management of natural resources in the



country. Considering the identified thrust areas and diverse nature and size of the country, financial resources for this scheme may be continued well beyond the 12th plan.

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

G.B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD) was established in August 1988 by the (MoEF&CC), as an autonomous Institute, with a mandate of achieving sustainable development and environmental conservation in the Indian Himalayan Region (IHR). The Institute attempts to execute its mandate through the Headquarters located at Kosi-Katarmal, Almora (Uttarakhand), and five regional Units located at Mohal - Kullu (Himachal Pradesh), Srinagar-Garhwal (Uttarakhand), Pangthang (Sikkim), Itanagar (Arunachal Pradesh) and Mountain division (housed at MoEF&CC, New Delhi). The Institute designs and implements R&D activities on priority environmental problems; develops and demonstrates best practices and delivers technology packages for improved livelihood options for the people of IHR. The identified thematic categories for Institute R&D activities include: (1) Watershed Processes and Management (WPM), (2) Environment Assessment and Management (EAM), (3) Environmental Governance and Policy (EGP), (4) Biodiversity Conservation and Management (BCM), (5) Ecosystem Services

(ES), (6) Climate Change (CC), (7) Socio-economic Development (SED), (8) Biotechnological Applications (BTA), (9) Environmental Physiology (EP), (10) Knowledge Products and Capacity Building (KCB). Research, demonstration and dissemination are essential underlying elements of all project activities geared towards development of environment-friendly technology packages. In addition GBPNIHESD also provides inputs for guidelines to the ministry with policy implications.

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**

#### **Research and Development Achievements**

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

- Towards promoting ecotourism for biodiversity conservation and sustainable livelihood in the Indian Himalayan Region,



an ecotourism model was developed at Apatani Plateau in Arunachal Pradesh and strengthened by adding various cultural items. As many as 305 respondents were assessed in 12 villages in Apatani Plateau, while 100 hosts were assessed in 14 villages of West Kameng District. Similarly, in Sikkim an assessment of tourist flow in Fambonglho wildlife sanctuary revealed gentle increase. In Uttarakhand, information on tourist inflow status was updated and survey of 400 tourists, 108 business owners at Kausani revealed a clear cut impact of tourism on income of local people. In Himachal Pradesh, an assessment of tourist arrival at Great Himalayan National Park (GHNP) and their positive and negative impacts on park and surrounding areas was studied through consultations with 90 respondents.

- As an effort to strengthen the initiative of 'Nanda Van Development', one thousand saplings of 21 multipurpose tree species have been planted. To fulfil the water demand rain water harvesting structures were prepared and demonstrated in the site.

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

- Towards assessing and addressing the issues of water demand, household survey for assessment of water demand for

different land-uses in 150 villages of 6 demands sites, e.g., Someshwar, Lamgara, Almora, Khairna, Betalghat, and Ramnagar in Kumaun Himalaya and 302 households of 12 villages in Mohal Khad (HP) watershed was carried out. The results of the overall demand revealed that the highest water use rate was recorded for Ramnagar (of  $4.82 \times 10^9$  l/yr) and the lowest for Lamgara ( $6.80 \times 10^7$  l/yr). In Himachal Pradesh, a 45% decrease in water availability was recorded.

- Under the environment assessment and management, vulnerability assessment of Satluj basin into three zones (approx. 10 km) was carried out. It was revealing that area under the influence of landslides has significantly increased from 1.35 km<sup>2</sup> in 1990 to 15.7 km<sup>2</sup> in 2015. Further, 37 km<sup>2</sup> area is vulnerable to landslides. About 3.44 km<sup>2</sup> area under agriculture and settlements was damaged by the landslides during 1989-2015. Out of 118 km length of NH-5 (34 km<sup>2</sup>), 28% was affected by these landslides.

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

- In order to understand the patterns and processes of climate change and its impact on biodiversity, studies in KWLS (HP) identified 19 survey sites and 12 forest tree communities based on Importance Value Index and relative density. GLORIA long-





term monitoring site has been established in Byans valley, Uttarakhand, in which a total of 63 plant taxa (51 genera and 25 families) have been recorded from 4 summit areas. Resource use pattern in Hat Kalika watershed revealed that *Pinus roxburghii* was utilized maximum followed by *Quercus leucotrichophora*, *Myrica esculenta* and *Lyonia ovalifolia*. In Sikkim, a strong relationship between woody species richness and altitude was observed, which means that increasing altitude support the woody species diversity. Surveys conducted in pine groove forest in Ziro valley in Arunachal Pradesh collected information on utilization pattern of plant diversity and use of 20 different species in various diseases.

- In order to understand the impact of climate change on phenology of forest trees, timing and extent of leafing in the different target forest species (dominant canopy and sub canopy) across the altitudinal gradient (600-2200 masl) was found highly dependent on ambient temperature across the north and south aspects.

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

- Towards promoting conservation and sustainable utilization of Himalayan plants and reduce the pressure on wild populations, a process for synthetic seed development in in vitro grown callus

cultures of *Nardostachys jatamansi* has been optimized.

- Studies on the nutritional, anti-nutritional and anti-mutagenic activities of the fresh and boiled *Paeonia emodi* leaves revealed its potential for vitamin A (64.19 mg/100g), C (160.50 mg/100g) and E (1.25 µg/g), protein (329.63 mg/100g) carbohydrate (0.353 and 0.353 mg/g), methionine (47.75 mg/g) and proline (1.23 µM/g), however, the content varied among the process used. Anti-nutritional attributes showed that they are within the permissible limit. A comparative amount of antioxidant activities as compared to other medicinal plants were recorded. Similar studies have been conducted in *Aconitum ferox* from the Sikkim Himalaya.

#### **Application of R & D Outputs in Demonstration and Dissemination:**

- In order to strengthen and manage the ENVIS Centre on Himalayan Ecology at the Institute, quantitative and qualitative databases on various aspects of Himalayan Ecology has been collected and updated. These include ENVIS Newsletters; ENVIS Bulletin; State at a Glance: Series of Indian Himalayan States. The coverage and indexing of ENVIS publications have found place in various scientific agencies/libraries/etc.
- Central laboratory facility in the Institute has been strengthened for the analysis of physico-chemical, biological, heavy metal of drinking, raw, waste water and



quantification of volatile compounds of soil and plant samples. The Institute has extended these services for other organizations (NGO's and other Government organizations) on payment basis.

- In order to strengthen the central library at Institute, a total of 70 periodicals (36 Foreign and 41 Indian) were subscribed. Also, 16614 new book titles have been added to the Library. In addition, 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 have been provided.

### **c) National Initiatives**

- The Institute facilitated funding to various projects through National Mission for Sustaining Himalayan Ecosystem, as a nodal organization for implementing Task Force 3: Forest resources and plant diversity and also a network partner for Task Force 5: Traditional Knowledge System. The Institute also provided inputs in (i) technical committee of National Water Mission, (ii) National Forest Policy, and (iii) preparing State Specific Action Plan for Water Resources (SSAP) for Uttarakhand.
- Under National Mission on Himalayan Studies (NMHS), launched by MoEF&CC, New Delhi, a Project Management Unit

(PMU) has been setup at GBPNIHESD, Kosi-Katarmal, Almora. Under this, a total of 27 projects (7 Large, 6 medium and 13 small grants) have been made functional.

### **d) Transboundary Initiatives**

- As coordinating Institute for three transboundary initiatives, Institute continued to contribute for Regional cooperation through scientific researches. For Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) Institute was able to establish strong convergence with line departments to follow research advises while implementing programme. Besides, knowledge sharing mechanisms have been strengthened.

### **e) New Initiatives on Awareness**

- The Institute organized and celebrated the following in order to raise awareness towards conservation and promotion of bio-cultural diversity an environmental issues of the Indian Himalayan Region at different occasion:
  - A three days workshop on 'Diversity - Our Identity Our Heritage' at Gangolihat, Pithoragarh (December 28-30, 2016)
  - Impact of climate change on the Himalayan Ecosystem at CoP 22, Marrakech, Morocco (November 7-18, 2016).
  - Himalayan Biodiversity & Climate Change at CoP 13, Cancun, Mexico (December 4-17, 2016).



- A workshop on "Mountain Cultures: Celebrating Diversity and Strengthening Identity" at the Institute HQs, Kosi-Katarmal (December 11, 2016).
- A National Workshop on Forest Resources and Plant Biodiversity (NMSHE-Task Force-3) at the Institute HQs, Kosi-Katarmal (November 16-18, 2016).
- Himalayan peoples' representatives 3rd meet for policy advocacy on sustainable development of the Indian Himalayan Region at MoEF&CC, New Delhi (August 10, 2016).
- Participation in the mass plantation drive in coordination with 130 Eco Task Force Kumaon along with Civil Administration and Forest Department, Uttarakhand at Bhanswara Farm, Almora, Uttarakhand (July 10, 2016)
- Himalayan Students' nature awareness campaign for facilitating development of a culture of creative nature based learning at G.I.C. Pangu, Dharchula, Pithoragarh (May 20-21, 2016).
- Various consultative meetings, workshops and 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 11), etc.

**National Mission on Himalayan Studies (NMHS):** The Himalaya, a highly complex and diversified mountain system both in terms of biological and physical attributes, is considered a life-support system for millions of people in

uplands and much more in lowland areas of India. It acts as climate regulator for much of Asia and globally recognized for its sacred, spiritual and philosophical values. The vulnerability of this mountain chain towards human-induced disturbances is now well established. Therefore, being special and change sensitive system, and more importantly due to its life-support values, the Himalaya deserves a special attention.

The National Mission on Himalayan Studies (NMHS), a Central Sector Grant-in-aid Scheme, therefore, targets to provide much needed focus, through holistic understanding of systems components and their linkages, in addressing the key issues relating to conservation and sustainable management of natural resources in Indian Himalayan Region (IHR). The jurisdiction of NMHS includes all IHR states with a broad Vision to support the sustenance and enhancement of the ecological, natural, cultural, and socio-economic capital assets and values of the IHR. The mission is to launch and support innovative studies and related knowledge interventions. Mission strategy is to focus on enhancing livelihoods of local communities, in line with the National Environment Policy, 2006 of the Government.

The NMHS has identified a list of 25 indicative thematic areas under 6 broad thematic thrusts: (i) Sustainable management of land and water resources; (ii) Environmental assessment and management; (iii) Conservation and sustainable use of biodiversity; (iv) Sustainable infrastructure and energy security; (v)



Supplementary livelihood options; and (vi) Awareness and capacity building. While targeting the above-mentioned goals and thematic thrusts, the Mission specifically focuses on achieving the objectives of: (a) building a body of scientific and traditional knowledge on the aforesaid indicative thematic areas; (b) building a network of practitioners engaged in working solutions to problems in the thematic areas; (c) demonstrating workable/ implementable/ replicable solutions to the problems in the thematic areas. The core philosophy is to enhance the focus and funding to support demand-driven research and technological innovations by way of supporting Studies, Pilots and Interventions along with institutional strengthening and capacity building.

### Forestry Research

Indian Council Forestry Research and Education (ICFRE), Dehradun: Indian Council of Forestry Research and Education (ICFRE), an apex body in the national forestry research system, has been undertaking the holistic development of forestry research, education and extension covering all aspects of forestry. The Council deals with solution based forestry research in tune with the emerging issues in the sector, including global concerns such as climate change, conservation of biological diversity, combating desertification and sustainable management and development of resources.

### Progress/Achievements

- ICFRE, Dehradun organized a workshop on

National Reducing Emissions from Deforestation and Forest Degradation (REDD)+ Strategy and Action Plan for India: Issues and Challenges on 30 August 2016 under the project entitled REDD+ Himalayas; Developing & Using Experience in implementing REDD+ in the Himalayas. 40 participants from various government departments and NGOs participated in the workshop.

- Representative of ICFRE, Dehradun participated in meeting at MoEF&CC, New Delhi on 20 October 2016 regarding finalization of National REDD-Plus Policy, Strategy/ Action Plan.
- ICFRE, Dehradun participated in a regional workshop on 'Measurement, reporting and verification in the context of REDD+ in Himalayan countries at Naypitaw, Myanmar from 24 to 27 October 2016.
- ICFRE, Dehradun participated in meeting at MoEF&CC, New Delhi on 25 October 2016 regarding organization of side events at COP-22 at Marrakech, Morocco.
- ICFRE, Dehradun participated in 22<sup>nd</sup> meeting of the Eco-sensitive Zone Expert Committee at MoEF&CC, New Delhi on 5 October 2016.
- An interactive meeting with Scientists for GBPIHED, Almora, and Officers of State Forest Department on the 'Scoping study for REDD plus in Kailash Sacred Landscape' and Meeting with Forest staff of Pithoragarh Forest Division and stakeholders meeting with Van Panchayat

members of Nakina, Chandak (Pithoragarh) was organized from 3 to 6 May 2016.

- ICFRE, Dehradun attended meeting of Apex Committee constituted for facilitation and monitoring of implementation of scheme of Star Rating of mines/ mining lease holders held on 25 July 2016 at New Delhi.
- ICFRE participated in the technical cooperation programme of FAO for 'Strengthening National Forestry inventory and Monitoring protocols and Capacities in India' at FSI, Dehradun on 29 August 2016 and delivered a presentation on "Forestry for mitigation and adaptation to climate change in India with special focus on REDD+: Current scenario and future possibilities"
- To put in place a firm instrument for collaborative research, education and extension on medicinal plants of the Trans-Himalayan Cold Deserts of the region and other related subjects, a Memorandum of Understanding (MoU) was signed in between ICFRE and CCRAS and Department of AYUSH, Ministry of Health, Govt. of India on 5 June 2016.
- ICFRE, Dehradun attended presentation meeting of CEIA study on Hydropower project in Yamuna Tons & tributaries in Uttarakhand before CEIA Appraisal Committee of Govt. of Uttarakhand at State Level Environment Impact Assessment Authority, Dehradun on 28 July 2016.
- Also attended 3<sup>rd</sup> FAC meeting of MoEF&CC and review meeting of CEIA Sutlej at

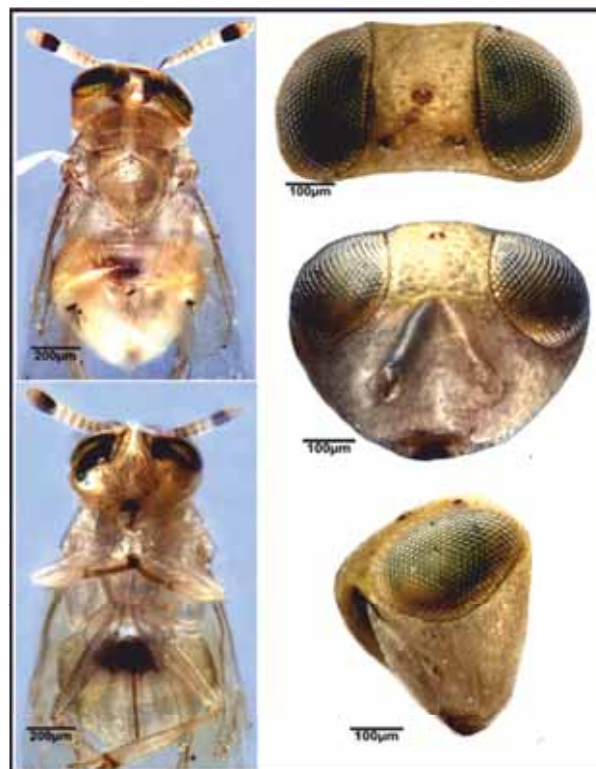


Fig. 34 Female of *Paraphaenodiscus udayveeri* Singh

MoEF&CC New Delhi on 03.05.2016. Meeting of UN-REDD plus programme at New Delhi from 16 to 17 May 2016.

- ICFRE participated in Indian Science Congress Exhibition held at Mysore University, Mysuru from 3 to 7 January 2016. The ICFRE activities were showcased by IWST, Bengaluru.
- ICFRE entered into the following MoUs/ MoAs:
  - Institute of Wood Science and Technology (IWST) with VE Commercial Vehicle Ltd. (VECV) for the Tree Transplantation and Tree Management project.
  - IWST and Madhya Pradesh State Bamboo



- Mission (MPSBM) for the project Development of bamboo lumber from locally available bamboo resources for their improved utilization in building and construction sector.
- IWST and M/s Pointec Pens and Energy Private Limited, Bengaluru to develop and commercialize thermally modified bamboo and its application for mass production and industrial needs for developing bamboo-based products.
  - IWST and University of Agricultural Science-Bengaluru (UASB) and partner institutes for a project entitled "Spatio – Temporal Landuse Patterns At Rural-Urban Interface and the Relationship between Green Areas and Biophysical Features" of budget outlay 38.90 lakhs under Indo-German Consortium research project "The Rural Urban interface of Bengaluru: A Space of Transitions in Agriculture, Economics, and Society partnering with German FOR2432" funded by DBT as per the MoU signed by DBT and DFG (Germany) has been signed.
  - AFRI and National Medicinal Plant Board (NMPB), Ministry of AYUSH, Govt. of India Govt. of India for following two projects:-
    - Development of Seed Production Areas and Haploid Plants of *Commiphora wightii* (Arnott) a Rare and Threatened Medicinal Plant.
    - Clonal Propagation, Characterization and Biochemical analysis of *Leptadenia reticulata* – A threatened medicinal plant.

- ICFRE published the proceedings of the inception workshop of project on "REDD-plus Himalayas: Development and Using Experience in Implementing REDD-plus in the Himalayas". Also published a book "Poplar: Samridhi ka Vriksh" in Hindi under a project entitled "Samudai Adharit Samanvit Van Prabandhan Evam Sanrakshan Yojana in Bihar State".

### Forest Research Institute (FRI), Dehradun

#### Research

- Previously unknown structure of the wax obtained from *Pinus roxburghii* needles was established by comprehensive NMR (1H, 13C, 1H-1H (COSY), HSQC, HMBC, NOESY and TOCSY) spectral analysis at FRI, Dehradun.
- The institute standardized DNA extraction protocol of *Kafal* (*Myrica esculanta*) for its population genetic studies.
- Two new species of parasitoids of biological control importance such as *Psyllaephagus arjuna* Singh, 2016 and *Paraphaenodiscus udayveeri* Singh, 2016 were described as new species to the science. *Psyllaephagus arjuna* Singh, 2016 is an important primary parasitoid of *Trioza fletcheri* minor Crawf. Which causes leaf pit galls on *Terminalia arjuna*.
- *Paraphaenodiscus udayveeri* Singh, 2016 is a primary parasitoid of scale insect (*Coccus* sp.) on leaves of *Pterygota alata* commonly called Buddha Coconut. Red weaver ant, *Oecophylla smaragdina* usually make their nest around infested leaf.

- The institute determined 1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging capacity of the *Dalbergia sissoo*'s saw dust and *Populus deltoides* knot extracts and it was found comparable with that of the Butylated Hydroxy Toluene (BHT), the known antioxidant.

### Extension

- A 5 days Training-cum-workshop on "Essential Oils, Perfumery & Aromatherapy" was organized in collaboration with Fragrance and Flavour Development Centre (FFDC), Kannauj at FRI, Dehradun for 30 participants.
- A customized training course on Nursery management for 26 field personnel of Indian Farm Forestry Development Cooperative Ltd. (IFFDC), Gurgaon, Haryana working in the states of Uttar Pradesh, Madhya Pradesh and Rajasthan.
- An exposure visit of 21 ICIMOD delegation of Forest Service officers from Nepal to adopted Demo Village, Shyampur, Dehradun to showcase extension activities being carried out by the institute.
- A training on "Agroforestry and land

management" for farmers and SHGs of Uttarakhand & Uttar Pradesh that was attended by 26 farmers.

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

#### Research

A new insect pest problem on *Swietenia macrophylla* (Mahogany) in a farmer plantation at Anakatty, Coimbatore, Tamil Nadu has been investigated. The investigation revealed the attack of a species of Bostrychid beetle. The beetles measuring about 1.5 cm were dark brown (Fig.1) and were observed to move faster over the bark and bore into the main stem. Maximum 8 to 10 bore holes were seen on surface of the stem starting from bottom to top of a tree. Oozing of gum from the entry holes (Fig.2) and heaps of wood dust poured out of the holes lying at the bottom of the tree on the ground (Fig.3) are the indicators of the attack of the pest. As it was noticed that the severely affected trees were broken at the point of attack due to wind (Fig.4), this pest draws a greater attention of the Mahogany growers. The transverse section of the stem showed the deep tunnels made by the insect throughout the stem.



Fig. 1



2 Fig.



3 Fig.



Fig. 4

**Fig. 35** Investigation of Bostrychid beetle problem on *Swietenia macrophylla* by IFGTB, Coimbatore



## Extension

- IFGTB has developed 25 fast growing clones of Casuarina and Eucalyptus capable of increased pulpwood production in a short rotation of 3 to 5 years. License has been granted to a progressive farmer, Shri T. Umama heshwar Rao for commercial propagation of three clones of Casuarina (CJ9, CH 1 and CH 2) developed by the institute. The Farmer has paid a one-time license fee for the non-exclusive license to propagate these clones for a period of ten years.
- IFGTB has initiated the digitization of the herbarium specimens in a phased manner recently. The first phase of digitization has been completed and the digital herbarium has been web hosted during a function organized on 12 April 2016. The web address to visit the site is [www.frcherbarium.org](http://www.frcherbarium.org).
- A two days training programme on “Bio-prospecting–Role of the State Forest Departments” for Indian Forest Officers sponsored by MoEF&CC, GOI, New Delhi was organised in IFGTB, Coimbatore for 15 IFS officers in the rank of DCF to CCF.
- One day Workshop on “Administrative and Legal Issues in Cultivation and Marketing of Valuable tree Species” for about 124 farmers from various districts of Tamil Nadu participated in the Workshop.

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

### Research

- IWST, Bengaluru has developed a new process of chemical modification of wood

using iso-propenyl acetate (IPA). The modified wood exhibited increased hydrophobicity, fungal resistance, UV stability and improved dimensional stability of wood.

- The Institute has also identified *Cryptolaemus montrouzieri* and *Chilocorus nigrita* as potential predatory coccinellids on sandalwood scales and mealybugs infesting sandalwood. Their potential in controlling the scales and mealy bugs has been demonstrated in field condition.
- IWST, Bengaluru under the project "Microwave assisted chemical modification of wood" observed that acetylation of wood with acetic anhydride in presence of N-Bromosuccinimide (NBS) as catalyst show good hydrophobicity and dimensional stability. NBS was found to be an efficient catalyst of esterification of wood by acetic anhydrides. Use of NBS as catalyst had no significant adverse effect on mechanical properties of modified wood. Based on collected growth data from nineteen plantations of different age group, eighteen natural populations and four regeneration plots under a project in IWST, Bengaluru, in Thangli Sandal Reserve (47 ha area) under Kadur Forest Range (Chikamagalur division), excellent growth of sandalwood (about 1300 plants/ha) has been observed. The growth rate was 52.65 % to 416.33 % in sandalwood plantations.

### Extension

- A training-cum-demonstration programme on forestry related technologies at Chintamani in Karnataka in collaboration with KVK, Chintamani for 77 farmers.





- A training programme at Davanagere on "Sandalwood cultivation and other forestry related aspects" for 110 farmers.
- A training programme on Sandalwood Cultivation and other forestry aspects at Hirehally, Tumkur in collaboration with KVK, Hirehally, Tumkur for 125 farmers and staffs of KVK.

### Tropical Forest Research Institute (TFRI), Jabalpur

#### Research

- Exploration of forest through pit fall trap resulted in finding of an unique spider family viz. Palpimanidae or the groups of "Pulp-footed spider". The spider belongs to genus Palpimanus.
- Under a non-plan research activity, the "Avian Diversity" of the TFRI campus reached up to 153 species of birds. Two new species have been added to the list i.e. Bande Bay Cuckoo (*Cacomantis sonnerati*) and White Bellied Cuckoo (*C. passerines*).
- A new spider identified upto genus level : *Bomis* sp. under Family : Thomisidae

#### Extension

- One day training programme on "Application of Biofertilizers in Forest Nurseries funded by MP State forest department in Malwa Demo Nursery of Research and Extension Circle at Indore.
- Three days training programme on "पौध उत्पादन एवं रोपणी प्रबंधन" for SHG members associated with Iora Ecological Solution, Delhi.
- Three days training programme on "Statistical Application in Entomological and other Biological Experiments".

- Two days training programme on "Candidate plus Tree Selection" for the frontline staffs of Maharashtra State Forest Department at Nagpur.

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

#### Research

- Observation from trial on vegetative propagation with circular soil beds of three bamboo species (*Bambusa cacharensis*, *Bambusa cacharensis* and *Bambusa polymorpha*) were recorded. Rootex and water were injected inside the internodes as treatments. Findings based on 45 days of treatment indicates that:
- Circular soil bed method allows to accommodate 20% more no. of culm cuttings besides providing easiness in management.
- Cuttings with rootex showed lower mortality rate by 40 to 50% in *B. cacharensis* and *B. polymorpha*.
- Cuttings with water are performing better in *B. polymorpha* only.
- An intercropping trial on Turmeric and Noni (Source: Kerala) was laid out at Panchakarma Research Centre, Gandhigram, Agartala by CFLE, Agartala.



**Fig. 36** Intercropping trial on Turmeric and Noni by CFLE, Agartala



## Extension

- A one week training cum workshop on "Capacity Building and Skill Development of Bamboo Handicrafts" at Kasturba Gram Seva Kendra, Parijat, Bokota, Sivasagar for the local people of Bokota, Sivasagar of Assam.
- A training programme on skill development on Nursery Management at Garupaban JFMC, Geleki, Sivasagar Forest Division, Sivasagar (Assam) under the Assam Project on Forest and Biodiversity Conservation.
- A five days training programme on 'Cultivation of wild mushrooms' sponsored by North-East Centre for Technology Application and Reach (NECTAR).

## Arid Forest Research Institute (AFRI), Jodhpur

### Research

- Growth parameters viz., shoot length, root length, collar diameter of Neem and Khejri seedlings were recorded in one of the experiment inoculated with *Piriformospora indica*, *Azotobacter* and their mixture by AFRI, Jodhpur and found that the combination of (*Azotobacter* + *Azospirillum* + *Trichoderma*) of biofertilizers was found best in enhancing the growth of Neem seedlings.
- Quantification of neem leaves in Basna and Sehway villages of Sojat city in Pali district of Rajasthan under a project revealed that green fodder yield per tree (for each D.B.H. class interval) per year are 22.5 kg (45-60

cm DBH), 110.5 kg (60-75 cm DBH), 121.05 kg, (75-90 cm DBH), 145.78 kg (90-120 cm DBH), 239.84 kg (120-150 cm DBH), 258.75 kg (150-200 cm DBH) and 331.25 kg (201 cm DBH & above).

- The institute has tested the efficacy of *Trichoderma* sp. as biological control against the fungal pathogens isolated from *Neem* such as *Fusarium* sp., *Collectotrichum* sp. and *Macrophomina* sp. and has found 42-77% inhibition of test fungus by *Trichoderma* in in-vivo conditions.
- Under the project 'Identification of extent of forest land in forest fringe villages', data collected from forest fringe villages of Dholpur district Rajasthan indicates that the fringe village mixed forest tree species showed a wide variation in their growth variables like height, diameter at breast height and basal area. *Mangifera indica* attained the highest average height as well as diameter growth among the tree species. It was followed by *Ficus religiosa*, *Bombax ceiba*, *Salvadora oleoides*, *Syzygium cumini*, *Boswellia serrata*, *Acacia catechu*, *Holoptelea integrifolia* and *Zizyphus mauritiana*. The highest density frequency and Importance Value Index (IVI) were observed in *Anogeissus pendula*.
- Result of seasonal study on gum production by *Commiphora wightii* revealed that the best month for gum harvesting is November, followed by February.

## Extension

- AFRI, Jodhpur organized series of events, to celebrate World Day to Combat Desertification (WDCD) 2016 at institute. On the occasion, atlas entitled Desertification and Land Degradation Atlas of India by Space Application Center, Ahmedabad; and one book on Cacti in Desert botanical Garden by Central Arid Zone Research Institute (CAZRI), Jodhpur were released. Also organized a workshop on "Desertification and Land Degradation: Assessment and Rehabilitation Measures" as a part of the daylong celebrations.



*Fig. 37 Release of Desertification and Land Degradation Atlas of India*

- Three days training-cum-demonstration programme on value addition of nutritionally rich and medicinally important *Momordica dioica* (Kankeda) for members of Bhurki Devi Mahila SHG, Jamboori (constituted with the help of SFD, Rajasthan and Prabhu Foundation, Sirohi) in tribal dominated area of Abu Road (Sirohidistrict, Rajasthan).

## Himalayan Forest Research Institute (HFRI), Shimla

### Research

- HFRI Shimla has recorded a larval parasitoid, *Apanteles ruficrus* Hal from *Thysanoplusia orichalcea* (Fab.)- a defoliator of Kuth. Being one of the important biological control agent, the same has the potential of being exploited further for the pest management.
- Under one of the ongoing studies on the planting performance of *Diploknema butyracea* (Cheura) under mid-hill field conditions of Himachal Pradesh, recently observed an attack of *Hystrix indica* (Indian Porcupine). The severe damage, which has been noticed for the first time in Cheura – may be due to the change in feeding behavior of the animal.

### Extension

- A consultancy for carrying out “Monitoring & Evaluation of plantations raised under CAMPA” has been awarded to HFRI, Shimla by Himachal Pradesh State Forest Department (HPSFD), Shimla.
- Five days training programme on “Bamboo Production, Management and Marketing to the Farmers of Himachal Pradesh” under Bamboo Technical Support Group Scheme of National Bamboo Mission, Govt. of India, New Delhi.
- Two days training programme on “Silviculture and Genetics Aspects of Forest



Management” for about 15 Forest officers of the rank of DCF and CF.

- Four days National conference on “Forestry in India: Current Challenges and Future Prospects”

## **Institute of Forest Productivity (IFP), Ranchi**

### **Extension**

- IFP, Ranchi attended the 2nd National Seminar on Conservation, Restoration and Sustainable Management of Mangrove Forests in India organized in Visakhapatnam to the Centre for Mangroves and Coastal Biodiversity of the Wood Biodegradation Centre (Marine), Institute of Forest Biodiversity, Visakhapatnam.
- IFP, Ranchi attended the National Conference on "Forestry in India : Current Challenges and Future Prospects" organized by the Scientific Committee of Himalayan Forest Research Institute, Panthaghati, Shimla.

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

### **Extension**

- IFB, Hyderabad conducted 3 trainings on agroforestry practices with medicinal plants to farmers and conducted on field training at Kalwakurthy at Gadwal to 60 progressive farmers.
- IFB, Hyderabad attended XXVI Annual

Conference of Indian Association of Angiosperm Taxonomy and international seminar on Conservation and sustainable utilization of biodiversity.

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

At the Initiative of Indian Plywood Industry and with participation of CSIR, the present day IPIRTI had a humble beginning in the year 1962 as a co-operative research laboratory for Plywood and Panel Products in the country. Its primary objective was to catalyze the growth and development of Plywood and Panel Industry in India which was at its infant stage. At present the Plywood and Panel industry in India stands abreast of its counterparts in developed countries in terms of Quality and Quantity.

The vision of IPIRTI and its objectives continuously keep pace with the changing need of the Plywood and Panel Industry of India. IPIRTI's headquarters is at Bangalore and field stations are at Kolkata and Mohali.

## **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 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.



## Objectives

### 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 through Information Management System as an essential input for policy formulation, project planning and strategy development in forestry, environment and allied sectors

## Policy Formulation, Analysis & 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 to safeguard the genuine interests of the disadvantaged stakeholders whenever necessary without compromising national interests.

### Activities undertaken

- Conducted of Educational Programmes:
  - Post Graduate Diploma in Forestry Management (PGDFM) Program
  - M Phil Programme in Natural Resource Management (NRM) Programme
  - Fellow Programme in Management (FPM)
  - Ph D Programme (FRI-DU)
- Conducted of Management Development (MDP) Programmes
- Carrying out Research and Consultancy Activities
- Publications

### Progress/Achievements

**Education:** The Institute offers three academic programmes, Post Graduate Programme in Forestry Management (equivalent to Masters Degree), Fellow Programme in Management and M.Phil. (Natural Resource Management).



The Institute is also recognized as a Nodal Centre for Research by Forest Research Institute, Deemed University (FRI), Dehradun for Doctoral programme.

**Research:** Research constitutes one of the core activities of the Institute. The Institute carries out its research agenda through the following Centres of Excellence:

- International Centre for Community Forestry (ICCF)
- Center for Ecological Services Management (CESM)
- Center for Sustainable Forest Management & Forest Certification

(SFM & FC)

- Center for Livelihood Management
- Center for Climate Change Studies
- Center for Policy Studies
- Center for Application of Management Techniques and Tools in Government
- Regional Center for National Afforestation and Eco-Development Board (RCNAEB)
- Geo-informatics Centre for Forestry, Climate Change and Livelihood support
- Centre of Excellence for IIFM – Industry Interface for Sustainable Development.

**Training:** The Institute has been organizing short-term training courses, seminars and workshops to transfer technical and managerial skills being generated by faculty areas of the institute. The focus of these programmes is on evolving, analyzing and synthesizing various management techniques/

tools, ideas and concepts relevant to the forestry and allied sector. The institute conducted 14 Management Development Programmes and a total of 849 persons were trained, organised 08 workshops / seminars were conducted in which 442 delegates participated.

**Consultancy:** Faculty members of the Institute undertake consulting assignments to provide solutions to the sector-specific problems and as inputs for policy making. The Institute has received five new consultancy assignments and currently the Institute is having 09 consultancy projects in the area of ecological studies, environmental-economic, socio-economic studies, evaluation of schemes and programmers and cross-functional areas of forest certification and sustainable forest resource management and non-timber forest products.

### Other Major Activities

- The 10<sup>th</sup> Convocation of the Institute was conducted on 15<sup>th</sup> April, 2016.
- The Orientation programme of PGDFM, FPM and M.Phil was held from 23<sup>th</sup> to 30<sup>th</sup> June, 2016.
- Conducted Two weeks “Hindi Pakavada” consisting of various programmes on Hindi i.e. Essay Writing etc., for encouraging the use of Official language at office. The programme was concluded on 14<sup>th</sup> September, 2016.
- The PGDFM students Organized Two day’s annual conclave “Coalescence” on 12<sup>th</sup> and 13<sup>th</sup> November, 2016. The theme of the



event was “Business, Climate Change and Society: Bridging the Sustainability Divide”. It was an annual event aimed to bring together the stakeholders such as policy makers, corporate houses, PSUs, NGOs and the academia

**Indira Gandhi National Forest Academy (IGNFA), Dehradun:** 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 mandate of the Academy is to impart training to IFS Probationers by way of knowledge and skills to the professional foresters and help them to develop competence for managing the country’s forest

and wildlife resources on a sustainable basis, besides enabling them to act as catalysts for environmental protection, economic development and social change. Its capacity building programmes include training the new entrants to the service, in-service training (Mid Career training programme) to contemporary batches of IFS officers, skill upgradation 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.

### Activities undertaken

During the year so far, IGNFA has conducted the basic professional training for three batches of Indian Forest Service probationers and foreign trainees. 61 Probationers of 2014-16 Course,



**Fig. 38** Peacock

including 2 participants from Royal Government of Bhutan passed out of the Academy in April, 2016.

There are 56 IFS probationers of 2015-17 Course including two foreign trainees from Bhutan, undergoing their Professional Training in the Academy. 28 IFS Probationers of 2016-18 Course, have joined the LBSNAA for foundation course at LBSNAA in September 2016 and the whole batch is going to join this academy in later part of December 2016.

## Progress/Achievements

- **Professional Training Courses for IFS Probationers**
  - IFS Probationers 2014-16 Course – 61 IFS Probationers including 2 from Bhutan have passed out of the academy in April 2016.
  - IFS Probationers 2015-17 Course – 56 IFS probationers of 2015-17 Course including two foreign trainees from Bhutan, undergoing Professional Training in the Academy.



*Fig. 39 (Probationers of 2015-17 Course with the Hon'ble President of India)*



- IFS Probationers 2016-18 Course - 28 IFS Probationers of 2016-18 Course, have joined the LBSNAA for their foundation course at LBSNAA in September 2016 and the whole batch is going to join this academy in later part of December 2016.

**Senior Foresters' Workshops:** As an annual feature at the academy, senior foresters workshops are organized in which the IFS officers, who have completed 25, 30, 35 & 50 years of service, are invited to participate, deliberate and share their experiences on emerging issues in forestry and biodiversity conservation. This year three workshops have been organized for officers with the 25, 30 & 50 years of experience.

**Professional Skill Upgradation Course (PSUC):** Apart from direct entry through UPSC, induction into Indian Forest Service also takes

place by promotion of the State Forest Service officers in various states. The Academy conducts Professional Skill Upgradation Courses for such inducted officers. The duration of this course is ten weeks. At present 30<sup>th</sup> PSUC is being conducted by the academy w.e.f. 7<sup>th</sup> November 2016 to 13<sup>th</sup> January 2017. Broad themes will be covered during the course are Wildlife Management, Biodiversity Conservation, Forest & Wildlife laws & policy, General Administration, Management, RS & GIS, JFM, Forestry Research, Environmental Economics, Computer Applications, Conduct Rules etc

**Sensitization Programme for the members of Higher Judiciary:** A 3-days "Sensitization Programme on Forest & Environmental Issues" for the members of Higher Judiciary was organized in the month of November 2016.



*Fig. 40 3-days "Sensitization Programme on Forest & Environmental Issues" for the members of Higher Judiciary was organized in the month of November 2016*



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

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).

**Directorate of Forest Education (DFE), Dehradun:** 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

- Central Academy of Forest Education, Kurseong 40

## 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

- Two batches of (2015-17 & 2016-18) Course commenced from 02-03-2015 & 14.3.2016 respectively of newly recruited SFS Officers are undergoing training at Central Academy for State Forest Service (CASFOS), Dehradun and two batches (2015-17 & 2016-18) Course commenced from 05-05-2015 & 04-01-2016 respectively SFS Officers are undergoing training at Central Academy for State Forest Service (CASFOS), Coimbatore



*Fig. 41 Activates on Induction Course (SFS/FRO)*

## Wildlife Institute of India (WII), Dehradun

Wildlife Institute of India (WII) was established in 1986 as an autonomous institute of the Ministry of Environment, Forest & Climate Change, Government of India. The Institute has emerged as a premier training and research institution in the field of wildlife and protected area management in South and South East Asia. Its primary mandates are to: (i) carry out scientific and applied research on various issues of wildlife and biodiversity conservation, (ii) develop wildlife science as a discipline through academic activities, (iii) build capacity in the field of wildlife management and conservation planning, (iv) provide technical inputs to MoEFCC and other international organizations. The Institute has been generating quality information and knowledge products in the field of wildlife science through research and mainstreaming it in capacity

building programmes for various target groups and provide advisory support to Central and State Governments.

## Research Projects

Wildlife researches at the Institute are largely multidisciplinary in nature covering ecological, biological and socio-economic aspects across various ecosystems in the country. The research projects generate valuable scientific information relevant to the Indian 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 (2016-17) WII has been implementing 7 research projects funded through Grant-in-Aid. At present, two projects were completed. The Institute worked on the following important research activities during the reporting period:

### **Biodiversity Conservation and Rural Livelihood Improvement Project**

Wildlife Institute of India (WII) is one of the implementing partners in this project for enhancing capacities of the project implementers and as a knowledge management centre on landscape approach to biodiversity conservation.

- A publication on highest elevation record of tiger presence in India in CAT Specialist Group (IUCN) News is prepared during the reporting period.

### **Academic and Training**

- XXXVII P.G. Diploma Course in Advanced Wildlife Management Concluded, 1<sup>st</sup> September, 2015 to 30<sup>th</sup> June, 2016.
- XXXVIII P.G. Diploma Course in Advanced Wildlife Management commenced, Dehradun, 1<sup>st</sup> September, 2016 – 30<sup>th</sup> June, 2017.

- XXXII Certificate Course in Wildlife Management commenced, November 1, 2016 to January 31, 2017.

### **Workshops, Seminars, Meetings and Other Activities**

During the reporting period, the following workshops, seminars and important meetings were also organised:

- Strengthening of Tiger Conservation Initiatives, Dehradun, 18-19<sup>th</sup> April, 2016. As a follow up of the 3<sup>rd</sup> Asian Ministerial Tiger Conservation Meeting, inaugurated by the Hon'ble Prime Minister of India in New Delhi on 12<sup>th</sup> April, 2016, a delegation from Clemson University, USA comprising Mr. Keshav Varma and Mr. Brett A. Wright.
- National Launch Workshop on 'Endangered Species Recovery Projects', Dehradun, 16<sup>th</sup> May, 2016. In 2015, the Ministry of Environment, Forest & Climate Change (MoEFCC), Govt. of India tasked the WII to prepare Endangered Species Recovery Plans (ESRP) of four wild animal species viz. Great Indian Bustard, Dugong, Gangetic Dolphin and Manipur deer and decided to fund them under the National Compensatory Afforestation Fund Management and Planning Advisory Council (NCAC). In all 60 participants participated in this workshop.
- Stakeholder Consultation for Gangotri – Govind Conservation Landscape, Uttarakhand, Dehradun, 25<sup>th</sup> May, 2016.



The MoEF&CC, Government of India is currently working with GEF–UNDP towards formulation of a project, entitled ‘Securing livelihoods, conservation, sustainable use and restoration of high range Himalayan ecosystems (SECURE - HIMALAYAS)’. WII has been given the role of identifying the priority activities for component on Biodiversity Conservation in this project. The meeting was attended by over 40 stakeholders.

- Capacity Building Workshop on Managing Wild Animals in Distress for Officials of Goa Forest Department, Goa, 13-15<sup>th</sup> June, 2016. A three-day workshop for the officials and veterinarians of the Goa Forest Department was organized by the Wildlife Institute of India at Bondla Zoo, Goa. The workshop was organized with the objectives of providing an exposure on various aspects of wild animal capture and restraint and enhancing the skills of forest officials in efficient rescue and rehabilitation of wild animals.
- World Day to Combat Desertification celebrated, Dehradun, 17<sup>th</sup> June, 2016. WII celebrated the World Day to Combat Desertification (WDCD) on 17<sup>th</sup> June 2016. This year’s theme for WDCD was ‘Inclusive cooperation for achieving Land Degradation Neutrality’ with the slogan ‘Protect Earth. Restore Land. Engage People.’ Land degradation neutrality is also one of the 17 targets of the Sustainable Development Goals. The event witnessed active involvement of more than one hundred participants.
- Celebrating World Heritage Inscriptions 2016, Istanbul, Turkey, 10–17<sup>th</sup> July, 2016. The 40th Session of the UNESCO World Heritage Committee, which was held in Istanbul, inscribed 21 new sites on the World Heritage List. It was especially memorable for India as three of its most remarkable sites were declared as World Heritage Sites. To celebrate the new Indian World Heritage Site Inscriptions, an event was organised by the UNESCO Category 2 Centre, WII, Dehradun at the India International Centre, New Delhi on 4<sup>th</sup> August, 2016. Nearly 40 eminent personalities from the Government of India’s Ministry of Human Resources, Culture, Environment, Forest and representatives from UNESCO, ICOMOS and IUCN and other organisations participated in the event.
- Country’s first Tiger Cell set up at WII, Dehradun, 6<sup>th</sup> August, 2016.
- India’s first Tiger Cell has been set up at WII on 6th August, 2016. WII has been working closely and providing technical support to the Project Tiger Directorate and the National Tiger Conservation Authority since the past several years. In order to institutionalize this relationship, a Memorandum of Understanding (MoU) has been executed between WII and National Tiger Conservation Authority (NTCA) for establishment of the Tiger Cell at WII.



- Training Workshop on Disaster Damage and Loss Assessment in Natural Heritage and Cultural Sites using Geospatial Techniques, Dehradun, 11<sup>th</sup> September to 2<sup>nd</sup> October, 2016. Natural as well as human-induced disasters are causing immense damage to cultural and natural heritage structures, hence it becomes important for all the countries to identify and list their cultural and natural heritage sites which are vulnerable to serious and specific dangers, such as the threat of disappearance caused by accelerated deterioration, large-scale public or private projects or rapid urban or tourism development projects; destruction caused by changes in the use or ownership of the land. For this, capacity building through education and information programmes for the heritage site managers is required. In all, 24 professionals and specialists from 11 countries participated in the training programme.
- First Himalayan Research Seminar, Dehradun, 23<sup>rd</sup> September 2016. A total of 23 presentations were made in three technical sessions.
- XII Internal Annual Research Seminar, Dehradun, 26<sup>th</sup> September 2016.
- A total of 16 presentations were made in four technical sessions in the XII Internal Annual Research Seminar.
- XXX Annual Research Seminar, Dehradun, 29-30 September 2016. The Annual Research Seminar (ARS) has been an annual feature of the Institute since 1987. The XXX ARS was conducted at WII under the Chairmanship of Additional Secretary, Ministry of Environment, Forest & Climate Change, Govt. of India; and Shri P.R. Sinha, Chairman, WII–Training, Research and Academic Council. For the first time, the live-streaming of ARS was done for the wildlife lovers sitting in any part of the globe. A total of 19 presentations were made in five technical sessions. In addition, 21 e-poster presentations were also made by the researchers. More than 250 delegates attended the ARS.
- Wildlife Week Celebrations at WII, Dehradun, 1<sup>st</sup> October, 2016.
- Workshop on Landscape Ecology and Wildlife Conservation, Dehradun, 4-5<sup>th</sup> October, 2016.
- Training Course on Landscape Ecology in Wildlife Research and Conservation, Dehradun, 7-11<sup>th</sup> October, 2016.
- Training Expedition on 'Integrated Management of Coastal and Marine Protected Areas in Maharashtra', Malvan, Maharashtra, 4-7<sup>th</sup> October, 2016.
- IPBES Asia-Pacific Workshop on Diverse Values, Dehradun, 10-11<sup>th</sup> November, 2016. The IPBES Asia-Pacific workshop on Diverse Values was held at Wildlife Institute of India, Dehradun. A total of 28 participants took part in the workshop.



- Sensitization Workshop on 'Biodiversity Conservation and Ganga Rejuvenation', Lucknow, 19<sup>th</sup> November 2016.
- Coordination Meetings and Dialogues on the UNESCO World Heritage Sites, Dehradun, 22-25 November, 2016.
- International Workshop on "Eld's Deer Conservation", Imphal, Manipur, 24-26<sup>th</sup> November, 2016.
- Constitution Day Celebrated at WII, Dehradun, 26<sup>th</sup> November, 2016.
- One-week refresher training course for Indian Forest Service Officers on "Management of Coastal and Marine Biodiversity in India: Challenges and Prospects", Port Blair, A& N Islands, 5-9<sup>th</sup> December 2016.
- Fourth Course on Wildlife Conservation, Dehradun, 12-21<sup>st</sup> December, 2016.
- Release of Best Practice Guidance "Eco-Friendly Measures to Mitigate Impacts of Linear Infrastructure on Wildlife" New Delhi, 16<sup>th</sup> December, 2016.
- Inauguration of Landscape Ecology and Visualization Laboratory at WII, Dehradun, 17<sup>th</sup> December, 2016.
- Shri Anil Madhav Dave, Hon'ble Minister of State (Independent Charge), Environment, Forest and Climate Change, Govt. of India visited Wildlife Institute of India and laid the Foundation Stones of the Women's Hostel and New Guest House on 18<sup>th</sup> December, 2016.



*Fig. 42 Elephant*





# Education and Awareness





## Education and Awareness

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.

## National Green Corps (NGC) Programme

MoEF&CC 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 15 years, making it one of the largest conservation networks. Under NGC programme as on date 86765 Ecoclubs have been supported during this year. During the current year all the Ecoclubs were advised to carry out the following activities:

1. Take up cleanliness drives within the school campus.
2. Carry out waste segregation into biodegradable and non biodegradable portions in two separate bins in the schools. The biodegradable waste can be sent to the compost pit/ vermicompost pit for preparing the green manure/ vermicompost for the school gardens.
3. Construct rain water harvesting structures in schools which will also help in checking of stagnation of water and thus preventing mosquito breeding.
4. Practice paper re-cycling thereby promoting the three R's -: Reduce, Reuse and Recycle.

5. Identify dirty/unclean spots and take up cleanliness drives outside the school premises.
6. Sensitize parents, teachers and RWAs about cleanliness of public places like parks, gardens both within and outside the school campus through Nukad Nataks.
7. Mobilize action against environmentally unsound practices like garbage disposal in unauthorized places and unsafe disposal of hospital waste.
8. Educating the slum dwellers about the ill effects of open defecation.
9. Carry out campaign against plastic and leaf burning and their proper disposal.
10. During May – June, 2016 undertake measures to create awareness about water conservation/recharge. In light of district plans, concrete steps like building boribund, farm ponds, well recharge etc. should be taken up and propagated.
11. During July-August, 2016 take up massive programme for plantation.

Eco-clubs participated in the Swachh Bharat Pakhwada from 1st to 15th August 2016 in line with the International Youth Day which fell on 12th August. The Eco-clubs carried out various activities relating to Swachhta such as Safai Abhiyan at nearby commercial areas and markets, roads etc, meetings/lectures conducted on related themes, cleaning of public wells, ponds and rivers of the locality, Tree plantation drive/greening neighbourhood, Nukkad nataks played in prayer time to imbibe the sense of cleanliness among the students so that they can convey this message to their family & neighbourhood; volunteers took pledges on related themes, organised rallies and poster and slogan competitions on related themes etc..



*Fig. 43 Swachhta Abhiyan in Eco club (Sikkim)*



*Fig. 44 Cleaning drive along roadside under Eco-club programme*



*Fig. 45 Educating waste segregation*



*Fig. 46 Mass pledges by students of Eco-club (Nagaland)*

Apart from routine activities the Youth volunteers sensitize citizens and slum dwellers about safe sanitary practices and DSWM. And Youth groups also took mass pledges on mygov.in and undertook cleaning drives in

various locations in the cities and uploaded pictures on swachhbharat.mygov.in

Approx. Five lakhs participants undertook mass pledges on mygov.in and around 2500 pictures uploaded on swachhbharat.mygov.in. Overall

## Facts and figures about the fortnight

S. No.	Activity	Output
1.	Youth volunteers sensitize citizens and slum dwellers about safe sanitary practices and DSWM”	No. of awareness campaign conducted in this regard= 3,519 No. of participants = 1,38,630
2.	Youth groups take mass pledges on mygov.in and undertake cleaning drives in various locations in the cities and upload pictures onswachhbharat.mygov.in	No. of participants undertook mass pledges on mygov.in = 5,56,500 No. of cleaning drives= 1,36,190 Location of cleaning drives= temple premises, parks, roads, institution camps, slum area, school campuses, nearby markets, banks, hospitals, public places etc. No. of pictures uploaded on swachhbharat.mygov.in = 2,650
3.	Details of other activities conducted during the fortnight	Tree Plantation, water conservation, rally programme, debate, drawing, street theatre, awareness on low carbon lifestyle, solid waste management, etc. No. of participants = 11,24,090



Fig. 47



Also in order to strengthen monitoring mechanism of NGC programme, MoEF&CC is in process to establish Management Information system (MIS) which will open up vistas in sharing and accessing the information on NGC among all stakeholders. The MIS reporting and monitoring would be interactive and creative in ensuring NGC mobility and services.

**National Environment Awareness Campaign**

**(NEAC):** The NEAC 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 theme for 2016-17 is “Swachh Bharat Mission, Ganga Rejuvenation and River Cleaning”. The sub-themes under the theme Swachh Bharat Mission, Ganga Rejuvenation and River Cleaning. As on date the Regional meetings are yet to be conducted.

**Seminars/Symposia/Workshops/Conference**

**s:** This programme provides a platform to scientists/environmentalists/ University professionals/ technocrats, etc, to share their knowledge on various subjects related to environment. The Ministry provides financial assistance to the Universities/other institutions/NGOs to organise events (seminars /Symposia/Workshops/Conferences) and to publish the proceedings. The programme facilitates the transfer of technical know-how to different people

including local population. Universities/ professional bodies/technical institutions and other R&D organisations are very responsive to the programme as is evidenced by the increase in the number of proposals being received by the Ministry.

**National Nature Camping Programme:**

National Nature Camping Programme is an initiative of the Ministry of Environment, Forest and Climate Change (MoEF&CC) in environment education which is aimed at creating greater awareness, understanding and empathy of children with and for the environment. Through this initiative it is hoped that every child who goes through middle school (classes VI to VIII) will get at least one opportunity for a 2-3 day camping experience during these years. During financial year 2016-17, 80 nature camps have been approved by the Committee. The financial assistance not exceeding Rs. 2000/- (Rs. two thousand only) per student for a camp of 2 nights - 3 days duration (maximum five number of camps) is provided under this programme.

**GLOBE**

**Global learning and Observations to Benefit the Environment (GLOBE)**

is a hands on international environmental science and education programme that brings students, teachers and scientists together to study the global environment. MoEF&CC and US Government signed an agreement on 25<sup>th</sup> day of August 2000 to implement the GLOBE programme in India. Indian Environmental Society, Delhi is an implementing agency for GLOBE in India.



There are four domains of the hands-on activities. Each is detailed as follows:

- Atmosphere – The students will be collecting the daily measurements of cloud cover and cloud type, maximum/minimum and current temperature, precipitation and its pH.
- Hydrosphere – The students will do weekly measurements of water transparency, temperature, pH, alkalinity and conductivity.
- Pedosphere – The students will expose a soil profile, take soil samples, and analyse them to determine the characteristics of various soil layers.
- Biosphere – the student will monitor change in a local land biology study site and observe other quantitative land cover samples site where they will identify the dominant and subdominant species of vegetation.

Regional Meeting of the GLOBE Country Coordinators of Asia – Pacific Region was attended by Country Coordinator from Ministry held during 13-17 January 2016 at Mae Fah Luang University, Chiang Rai in Thailand.

### Progress / Achievements

Under NGC programme as on date 86765 Ecoclubs have been supported. Eco-clubs participated in the Swachh Bharat Pakhwada from 1<sup>st</sup> to 15<sup>th</sup> August 2016 in line with the International Youth Day which fell on 12<sup>th</sup> August.

The Eco-clubs carried out various activities relating to Swachhta such as Safai Abhiyan at nearby commercial areas and markets, roads

etc, meetings/lectures conducted on related themes, cleaning of public wells, ponds and rivers of the locality, Tree plantation drive/greening neighbourhood, Nukkad natak played in prayer time to imbibe the sense of cleanliness among the students so that they can convey this message to their family & neighbourhood; volunteers took pledges on related themes, organised rallies and poster and slogan competitions on related themes etc..

**State-wise status:** Under NGC programme, no. of Eco-clubs state wise status is detailed out below:

S. No.	States/UTs	No. of Eco-Clubs
1	Punjab	5500
2	Sikkim	766
3	Himachal Pradesh	3000
4	Orissa	7500
5	Rajasthan	8250
6	Kerala	3500
7	Karnataka	8500
8	Maharashtra	8807
9	Madhya Pradesh	12750
10	Gujarat	6360
11	Tamil Nadu	7935
12	Mizoram	1890
13	Puducherry	400
14	Delhi	1800
15	Assam	5407
16	West Bengal	4400
	<b>Total</b>	<b>86765</b>

## Media Cell

Media Cell of MoEF&CC is mandated with taking up awareness campaigns using print, electronic and other mass media to enhance awareness about various environmental issues which would in turn facilitate better compliance with environmental regulations.

A part from above, the main activity performed by the Media Cell is the running of Science Express Climate Action Special Train. It is an innovative mobile science exhibition mounted on a 16 coach AC train initiated by Department of Science & Technology (DST) by Indian Railway. This unique mobile exhibition was first launched in October 2007 by DST and since then it has completed 7 phases across India of 6-7 months duration each and currently it is on its 8th phase journey. Till date Science Express has travelled over 1,41,000 km with 456 halts, usually of 3-4 days duration each. So far, in 1611 exhibition days, more than 1.56 crore (15.60 million) people, primarily students & teachers, have visited it.

SECAS in its current phase is scheduled to travel across the country for about seven months, halting at 69 locations in 20 States, covering 19,800 km. The exhibition will convey a strong message about Climate Change and will also be a good opportunity to generate dialogue and discussion.

The previous 3 phases of Science Express' were rolled out as a joint initiative of DST and MoEF&CC as Biodiversity Special and showcased the myriad 'Biodiversity of India'. Thus it was rational to shift the focus to the theme 'Climate Change' as it will affect the

biodiversity of not just India but the entire globe as well.

The broad theme covered in each exhibition coach is as follows:

- Understanding Climate Change
- Impact of Climate Change
- Adaptation
- International Negotiations on Climate Change
- Handprint
- Biotechnology for bio-resources and nature conservation with emphasis on Tiger Conservation and Chemical Ecology.
- Exhibition put up by the National Innovation Foundation (NIF) showcasing innovations, demonstrating the ingenuity of common people, Science Education, Careers in S&T, etc.
- In fun-filled activities, games and puzzles in science, mathematics and environment.
- Students from Std. 5-10 can perform experiments and activities to understand concepts in environment, science and mathematics in an interesting manner. A training facility for teachers.
- Solar panels have been installed on the rooftop of Science Express.



**Fig. 48** Science Express



*Fig. 49 Flag-off of Science Express Climate Action Special*

### Platform activities in Science Express Climate Action Special

This Ministry has run Science Express Climate Action Special (SECAS) train which was flagged off on 15.10.2015 for awareness on Climate Change and Action. The train finished its

journey on 07.05.2016 covering 64 stations, students from 6283 schools/colleges visited the train with the total number of visitors being 23,24,240. Valediction of Science Express Climate Action Special (SECAS) held at Vikram A Sarabhai Community Science Centre (VASCSC) on 07.05.2016.



*Fig. 50 Allahabad (UP)*



*Fig. 51 Mangaluru (Karnataka)*



# Centers of Excellence





## Centre of Excellence

The Scheme "Centre of Excellence" was initiated in the 6th Five Year Plan. The objective of the scheme is to provide selective support to the Universities, reputed institutions including NGOs, professional organizations and other scientific and technological institutions to enable them to develop into advanced Centres at the national level in that particular subject area to cater the need of the Ministry. At present there are seven Centre of Excellences functioning under this Ministry.

## Centre for Environment Education (CEE), Ahmedabad

Centre for Environment Education (CEE) was identified as a Centre of Excellence in Environmental Education by the MoEF&CC.

## Achievement

Paryavaran Mitra is a nationwide initiative with the objective of creating young leaders from schools across the country, with awareness, knowledge and commitment to meet the challenges of environmental sustainability in their own spheres. As reported by CEE, 2000 teachers in Paryavaran Mitra and National Green Corps schools were trained in different parts of the country under this programme, to undertake action projects on the five themes. In order to support schools to resolve their problems related to environmental activities, CEE has introduced a toll-free helpline number (1800-3000-0996) under a provision called Paryavaran Sathi. Through this, CEE receives and responds to queries from schools on issues related to environment and sustainable development, and provides guidance to take up environmental activities.

About 150 colleges are being targeted for green campus initiatives to encourage youth to take up sustainability activities in their immediate surroundings; International student exchange programmes are being conducted at CEE regularly. A group of students from Netherlands and two groups from Australia visited CEE and took part in a 10-15 days water pollution and sustainability education programmes during December 2016-January 2017. A training programme was also organised for a group of Kerala Forest service personnel in Ahmedabad.

As part of building capacity of city stakeholders on climate resilient cities, CEE is working closely with Pune Municipal Corporation in participatory budgeting. Short term courses are being conducted with CEPT University Ahmedabad on climate change issues.

As part of CEE's association with the Clean Ganga Initiative in collaboration with Varanasi Municipal Corporation, schools and colleges in the Ganga ghats; a baseline survey of the Ganga has also been carried out.

'Swachhagraha' is an initiative of Adani Foundation undertaken in 500 schools in six cities of Gujarat to integrate Solid Waste Management in school curriculum by means of Project Based Learning (PBL). A strategy workshop for the project and a principals' meet have been organised and activities are being undertaken in the schools to create a culture of cleanliness.

CEE organised an international Conference on ESD for Transforming Education for Children and Youth in September 2016, in which delegates from more than 56 countries participated.



## **C.P.R. Environmental Education Centre (CPREEC), Chennai**

C.P.R. Environmental Education Centre (CPREEC) is a Centre of Excellence of the Ministry of Environment, Forests & Climate Change, Government of India.

The programmes related to biodiversity, education, waste management and sacred groves have been conducted in the states of Andhra Pradesh, Telangana, Goa, Karnataka, Kerala, Odisha and Tamil Nadu and the Union Territories of Andaman and Nicobar Islands and Puducherry.

CPREEC prepared a Glossary on environment for inclusion in the Ministry's website and submitted to the Ministry.

- As part of the Prime Minister's "Swachh Bharat" campaign, CPREEC organized a cleaning campaign involving school students at Mylapore temple.
- CPREEC in collaboration with the US Consulate, Chennai organized a tree planting event at our premises. Saplings of native species were distributed to volunteers and school students. GLOBE Kit was distributed to schools.
- CPREEC has been restoring sacred groves since 1994. At Rameshwaram, CPREEC has formed a rasi vanam, nakshatra vanam and medicinal plant garden.
- A total of twenty (20) workshops for teachers on "Education for Sustainable Development and Biodiversity Conservation" were organized in the states of Tamil Nadu, Kerala, Karnataka, Goa, Andhra Pradesh, Telangana, Odisha and the Union Territories of Puducherry and Andaman & Nicobar Islands.

- CPREEC conducted a total of 20 national nature camps for the NGC school students of five camps each in the states of Tamil Nadu, Karnataka, Odisha and Union Territory of Puducherry.
- The research project was implemented in six sacred groves in Villuppuram and Cuddalore districts in Tamil Nadu.
- CPREEC was sanctioned a project by the National Biodiversity Authority (NBA), Government of India for organizing Capacity Building workshops on "Island Biodiversity Conservation" for the pre-service teachers of Andaman & Nicobar Islands.
- CPREEC was sanctioned a project by the National Biodiversity Authority (NBA), Government of India for organizing nine (9) Capacity Building workshops on "Biodiversity Conservation" for the teacher trainees of DIETs of the Nilgiri Biosphere Reserve covering the states of Tamil Nadu, Karnataka and Kerala.
- CPREEC organized a seminar on "Is Chennai Prepared for the Monsoon?" at Chennai on Saturday, October 8, 2016. Dr. S.R. Ramanan, Former Director, Area Cyclone Warning Centre, Regional Meteorological Centre spoke on Rainfall Patterns of Chennai and Prof. S. Janakarajan, Visiting Fellow, Madras Institute of Development Studies spoke on Status of storm water drains of Chennai.

## **Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru**

The Centre for Ecological Sciences (CES) at the Indian Institute of Science (IISc) was set up in



1982-83 with financial support from the Ministry of Environment, Forest & Climate Change (MoEF&CC) for research and outreach activities in the area of ecology and environment, with a special focus on the Western Ghats. The objectives of CES are to conduct research in the broad area of ecology/environment with practical application in conservation and sustainable development of natural areas, with special emphasis on the Western Ghats.

### Progress/Achievements

The ongoing study of elephant-human conflicts in Kodagu district of Karnataka has shown the role of habitat fragmentation in promoting conflict as well as confirmed the higher propensity of male elephants to raid crops. Research work on the stress physiology of elephants, using non-invasive methods has shown that elephants that raid crops and are in better body condition have lower levels of stress hormones such as glucocorticoids. CES has completed the mapping of land use changes in Uttara Kannada district during the last four decades and assessed the role of agents such as developmental projects in LULC dynamics. We have recently built a mathematical model that incorporates the role of stochasticity in abrupt ecological transitions. Work on tropical forest ecology continued with the long-term monitoring of trees in the Mudumalai Forest Dynamics Plot. Roles of lithology, topography, vegetation and fire in generating local-scale (<1 km<sup>2</sup>) soil spatial variability in the 50-hectare tropical dry forest plot have been examined. The distribution of Ca, Cu, Mn and Mg appears to largely be

determined by the whole-rock chemical composition differences between amphibolites and hornblende-biotite gneisses. To assess soil Carbon stocks in different land-use categories in the Western Ghats, and its rain shadow region, we have sampled over 300 locations, and have analyzed 240 samples for soil C and N distributed across the rainfall gradient of 490 mm/yr to 5400 mm/yr. Wetter regions had higher soil C and soil N stocks. To examine the effects of risk, forage and human-related factors on the threatened blackbuck antelope distribution and behaviour and to examine how habitat management actions influence blackbuck grassland habitat, work was carried out at the Great Indian Bustard (GIB) Sanctuary in the area around Nannaj in Solapur district in Maharashtra.

CES also quantified the effect of urbanization on the morphology, behaviour and physiology of agamid lizards, including determining ectoparasite loads and immune responses of *Psammophilus dorsalis*.

In the context of the fig-fig wasp mutualism, the scientist investigated dispersal propensities; i.e. intrinsic dispersal capacities, of a highly specialized fig wasp community comprising of seven species, where only females disperse.

### Sálím Ali Centre for Ornithology and Natural History (SACON), Coimbatore

SACON's mission is "help conserve India's biodiversity and its sustainable use through research, education, and people's participation, with birds at the centre stage", 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 for MSc, MPhil and PhD and also short-term orientation courses in related subjects
- create data bank on Indian Ornithology and Natural History, and
- disseminate knowledge relating to Ornithology and Natural History for the benefit of the community
- SACON has undertaken 21 research projects funded by agencies such as Ministry of Environment, Forest and Climate Change, Departments of Science & Technology and , - Biotechnology, Raptor Research and Conservation Foundation (RRCF), and Forest Departments of Karnataka, Maharashtra and West Bengal, and National Geographic Society covering major biogeographic zones of the country.
- Annual Research Seminar (ARS) for 2016 was conducted on 25<sup>th</sup> May 2016 at Coimbatore. During the occasion, 15 presentations were made by the Researchers of SACON.
- A workshop on Bio – Statistics for the Research Fellows/ PhD students of SACON was conducted for 5 days (8<sup>th</sup> – 10<sup>th</sup> June and 13<sup>th</sup> and 14<sup>th</sup> June, 2016) at SACON. The topics covered during the workshop are Sampling techniques, Data analysis, Frequency Distributions, Measures of Central tendencies, Introduction to SPSS, Hypothesis testing and , Multivariate analysis.

### Progress /Achievements

- Forteen research projects are ongoing of which seven research projects were completed
- Thirty Five scientific papers were published in peer reviewed national and international journals.



*Fig. 52 Dr. Amita Prasad, Additional Secretary, MoEF&CC interaction with Faculty of SACON, Coimbatore*

- Seven Technical Reports were / would be submitted to the respective funding agencies.
- Three students are to be awarded PhD and 31 students are currently registered for their Ph.D.



*Fig. 53 Andaman Scops Owl Otus balli*



*Fig. 54 Andaman Serpent-eagle*

### **Centre for Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi, Delhi**

Land degradation, Biodiversity losses and vanishing grasslands are key environmental issues that are threatening ecosystems at all spatial levels. The Ministry of Environment, Forests & Climate Change (MoEF&CC) has been supporting the Centre of Excellence Programme to address these Environmental issues at local, sub-national and national levels through the Action Research and Capacity Building. To develop innovative technologies and creative solutions for these environmental challenges, the Centre of Excellence programmes has been continuing work on six approved subprogrammes: (i) Ecological

restoration of mined out areas in coal fields of Coal India Limited; (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.

Ecological restoration of mined out areas in coal fields of Coal India Limited through ecotechnologies: The ecological restoration process in the barren mined out sites of BCCL and CCL led to the development of tropical moist deciduous forest ecosystems with a canopy attaining to a height of 12 m – 15 m and the communities evolved have 60 to 80 native tree species. The soil organic carbon in restored sites was comparable to that of the natural forest ecosystem of the area.



*Fig. 55 4-year old restored site at the coal field of BCCL, Dhanbad showing vegetation with average canopy height ranging from 12 m – 15 m; the same site before restoration.*



*Fig. 56 4-year old restored OBD with coal fires at the coal field of CCL, Ranchi showing dry deciduous forest community*

Management of Invasive alien species: About 50 ha of Lantana infested area in Jhirna valley was restored to grassland after Lantana eradication by newly developed Cut Rootstock Method, and the restored site harbours rich wildlife; Tiger movement was sighted in the grassland developed. All restored grasslands after eradication of Lantana did not show any secondary reinvasion of Lantana inspite of existence of pockets of Lantana along the

periphery of the forest. However, the weed free landscapes managed by the CTR showed not only the re-invasion of Lantana but also secondary invasion of other native weeds due to: (i) non restoration of the area to grasslands/woodland after removal of Lantana, and (iii) failure of timely removal of other weeds. A new invasive trait that makes Lantana to prevent regeneration of native forest has been found.



**Fig. 57** Tiger sighted at the restored grasslands after removal of Lantana by cut-rootstock method at Jhirna; Lantana infested site before restoration.



**Fig. 58** Patches of Vetiveria colonized in Cynodon community at the Ramganga reservoir basin.

Restoration and Management of grasslands in protected areas: The grassland communities in the Ramganga reservoir basin showed spectacular changes in 2016 as compared to that of 2015 due to non submergence of vast tracts of lowland resulting in replacement of: (i) intermediate Vetiveria dominated grassland by tall upland grassland, and (ii) Paspalum dominated community by Vetiveria – Imperata community and (iii) the invasion of Cynodon community by Vetiveria (Figure 4). In the absence of annual flooding the lush green highly palatable short grasslands may vanish from Dhikala. No major difference was observed in the density of weeds/woodland

species between 2 year old and 1 year old burned grasslands.

Long-term monitoring of already restored ecosystems: Restored limestone mined out area at Purnapani and morrum mined out areas at Asola and Bhatti Wildlife Sanctuaries appear to be climate resilient as evident by their stability in the face of changing rainfall patterns. The percent organic matter and percent organic carbon in soils of restored ecosystems at Purnapani was one fold higher than that found in the soils of natural forest ecosystem suggesting high nutrient turnover and greater CO<sub>2</sub> sequestration in the former than in the latter.



**Fig. 59** Acacia woodland of old restored site at Asola Wildlife Sanctuary showing nearly closed canopy.





Changing Flora and Ecology of Delhi: The New Flora of Delhi is under preparation. Interface Programme: About 100 tribal men and women, NGOs, and field officers of Forest Department of Odisha participated in the workshop on Restored Ecosystems and Sustainable Livelihoods held at the Restored Ecosystems of Purnapani, Odisha.

### **Madras School of Economics (MSE), Chennai**

The Centre of Excellence carried out projects on the scope of eco-taxes in the emerging Goods and Services Tax (GST) regime in India. The Centre's work argued in favour of integrating the eco-taxes in the GST framework to facilitate the country's progress towards sustainable development goals. The Centre further assessed the cost due to air and water pollution in India based on the principles of Meta-Analysis. The centre also suggested policy options for enhancing the country's trade prospects of Indian Textile Exports vis-à-vis the environmental regulations in the importing countries.

### **Research Achievements**

The Centre evaluated the value of biodiversity and linked ecosystem services explicit for consideration and mainstreaming into developmental planning the Ousteri wetland. Ousteri lake can irrigate 3,800 acres of land and plays a crucial role in recharging groundwater aquifers. It is a bird sanctuary, and has rich flora and fauna. It has suffered pressure from land-

use changes in the catchment area, encroachment, siltation, pollution from industry and agriculture, over fishing, poaching, and groundwater exploitation. The Centre examined on how much access to ecosystem services needs have to be restricted for the sake of conservation in the wetland. The recreational benefits enjoyed by all the visitors is estimated to be INR. 5.72 millions (US\$ 95,333). Agricultural benefits amounted to INR. 11.5 millions (US\$ 191,667) per year. The estimated value of groundwater used for irrigation was INR. 269,652 (US\$ 4450) per year. The economic value of biodiversity conservation was estimated to be INR. 2.44 millions (US\$ 40,000) per year. It was analysed that since 2004, 2800 acres of land around the lake has been converted for commercial, non-agricultural purposes, causing water to stay permanently. While this enhanced groundwater recharge and recreational benefits, it has also caused eutrophication. Untreated wastewater from 250 industrial units upstream ends up in the wetland. The total economic value of ecosystem services with management was INR. 19.67 millions (US\$ 327,834) per year and the net present value of the benefits was INR. 82.89 millions (US\$ 1.4m). The economic valuation of the wetland has benefited the ministry to plan the restoration measures of the ouster wetland. The policy recommendations provided by the Centre has paved the way for the Ousteri wetland to enter the list under the Ramsar Convention.



## Foundation for Revitalization of Local Health Traditions (FRLHT), Bengaluru

The Centre of Excellence on Medicinal Plants & Traditional Knowledge based at FRLHT, Bengaluru was initiated during 2002-03 to bring to focus and address various issues related to conservation & sustainable utilization of medicinal plants in India. The CoE's vision has been stated as:

Demonstration and making available field tested innovative strategy prototypes for Survey, Data collection, Research, Analysis, Education & Outreach in respect of Indian Medicinal plants and Traditional medical knowledge, in order to meet the demands of the sector. The vision is being realized through the following key activities:

- Establishing a National Bio-cultural Herbarium of medicinal plants of India.
- Establishing Ethno-Medicinal Garden.
- Pharmacognostic Studies of controversial botanical raw drug groups.
- GIS based Geo distribution maps for prioritised medicinal plants.
- Training & Capacity Building initiatives for key stakeholder groups in respect of medicinal plants conservation & management.

- Informatics and computer enabled Educational products on medicinal plants and Indian medical knowledge.
- Threat of Medicinal Plants and Species Recovery Research.

### Highlights of the progress

The Centre continued to successfully implement its activities under these focal areas as per the approved action plan during the year 2016-17 and following are the highlights of its progress.

- The team carried out botanical surveys in Tamil Nadu and Uttarakhand, and collected 400 voucher specimens of medicinal plants.
- Critical identification of the voucher specimens from the previous surveys, revealed many new botanical records to Tamil Nadu and southern India, as well as 24 new records to Nagaland.
- Around 1500 authentic plant images were added to the digital collections.
- The team also collected >150 authentic botanical drugs (from critically identified plant sources in the wild) and >250 samples (from raw drug markets) and added to the raw drug repository.



**Fig. 60** *Strobilanthes paniculiformis*, a plant from Nagaland collected by the Herbarium team. Its last recorded collection was in 1885 by C.B. Clarke from Naga hills, which was identified as *S. anisophylla* by T. Anderson in 1887. Subsequently, JRI Wood described it as a new species, *S. paniculiformis* in 2006. The present collection is after a gap of 131 years.

- The garden team added 56 species of plants to the live repository at the Ethno Medicinal garden.
- Two new thematic plant assemblages were created within the garden.
- Extracts of *Cyperus scariosus* & endophyte culture filtrate were prepared as a part of Abhava Pratinidhi Dravya studies.
- Anti-inflammatory study of *Aconitum heterophyllum* and *Cyperus rotundus* was repeated and the results obtained during 2015-16 were confirmed.
- 250 Geo distribution maps with datasheets were prepared.
- Eco geographic maps with datasheets were prepared for 25 prioritized species.
- The conservation training team conducted Capacity building training course for the frontline forestry staff of Chhattisgarh at Jagdalpur, Chhattisgarh during October 2016.
- Profiles (containing Sanskrit sloka, and its English translation) of 505 Medicinal plants from Kaideva Nighantu were prepared.
- CAMP (Conservation Assessment and Management Prioritization) Workshops for Tripura and Manipur states were held at Agartala and Imphal respectively, during 3-

5th August 2016 and 9-11<sup>th</sup> November 2016.

- Two MPCAs (Savanadurga and Kollur) in Karnataka were identified for the

population studies of Red listed species. Preliminary field survey to locate the populations of *Decalepis hamiltonii* completed in Savanadurga MPCA.



*Fig. 61*

# Environmental Information





## Environmental Information

The ENVIS provides scientific, technical and semi-technical information on various environmental issues, serving the interests of environmental management at all levels of government facilitating decision-making for environmental protection. It comprises a decentralized system of ENVIS Centres spread across the country. The Centres have the mandate to develop a distributed network of subject-specific databases. The Scheme has its objective to develop ENVIS as a comprehensive web-enabled, content-based, interactive, disaggregated information network on environment through a distributed database. The network presently consists of 69 Centres, of which, 30 Centres dealing with “State of the Environment and Related Issues” are hosted by the respective State Governments/ UT Administrations and the remaining 39 Centres are hosted by various eminent institutes and organisations of repute, having a thematic mandate.

## Review of Performance

- During the XII Plan period ENVIS Focal Point and its partners together responded to more than 114749 queries till December 26, 2016 on various subject-areas of environment and its associated fields and provided substantive information to users as far as possible. It provided substantive information mainly on climate change, ozone layer, environmental conservation, water and air pollution, waste management, environmental standards, applicable laws, environmental education

and awareness, etc. Wherever information was not readily available, ‘Referral Service’ was provided to the users concerned.

- ENVIS Portal (URL: <http://www.envis.nic.in>), connecting all ENVIS Centres, is being upgraded. The new comprehensive system will facilitate inter-Centre interaction and disseminate information across subject categories, about major events, activities and updates of the entire network and will also serve as Online Monitoring and Evaluation System for 36 ENVIS Centres. The number of visitors has increased on ENVIS Portal since its inception in February, 2016 and the total number of hits as on 26.12.2016 was 2,47,016.
- The functioning of ENVIS Centres is evaluated at National/Regional Workshops by independent Expert Committees constituted by the Ministry as well as through visits undertaken by senior officers of the Ministry, to the Centres. The National Workshop for 2016-17 is scheduled to be held in February, 2017.

## Activities undertaken during the financial year 2016-17

- The celebration of World Environment Day on 5th June every year has been a tradition for the past 44 years. The United Nations Environment Programme (UNEP) initiated the observance of this day to globally celebrate the spirit of positive environmental action. This year, the theme was “Go Wild for Life” with the slogan “Zero Tolerance for the Illegal Wildlife Trade”. To



support the cause, the MoEF&CC and Delhi based 8 ENVIS Centres (hosted by TERI, SPA, IES, JNU, CPCB, CMS, Sulabh, and WWF) came together and organized a big event as part of the Raahgiri at New Delhi. The occasion was graced by Shri Ajay Narayan Jha, Secretary, MoEF&CC and senior officers of the Ministry. An exhibition, Quiz Contest, Painting competition, Slogan-writing competition and Street Plays were organised.

The other highlights of the event were a march-past of volunteers holding placards bearing messages to generate awareness, a Selfie corner (where cut-outs of different protected species and related themes were put on display for participants to take Selfies with), a Painting Wall (individuals painted their thoughts and ideas about wildlife conservation and protection) and a Pledge Wall (individuals pledged to say “NO to buying illegal wildlife products” in order to support efforts to curb poaching and illegal wildlife trade).

- On the occasion of World Environment Day, various programmes were organized by other ENVIS Centres also, across the country.
- Officers of the Environmental Information (EI) Division of the Ministry conducted visits to 24 ENVIS Centres, upto December 2016, for physical verification and assessment in order to strengthen and further enrich the activities of ENVIS Centres.
- In order to further strengthen the quality of information in ENVIS quarterly

brainstorming meetings of ENVIS Centres were conducted. 4 Brain Storming Sessions were held for the Eastern, Western, Northern and Southern Region ENVIS Centres respectively, during F.Y. 2016-17.

- A new State ENVIS Centre on “Status of Environment and related issues” at the Department of Environment & Forest, Kavaratti, Lakshadweep has been established during the year.
- In terms of financial performance, as compared to extension of support to 64 ENVIS Centres in 2015-15, 63 Centres have been supported, up to December 2016.

### **Progress/Achievements made during XII Plan Period (2012-13 to 2016-17)**

The number of visitors to the ENVIS Websites has increased significantly during the XII Plan period. The total number of visits during the XII plan period till 26.12.2016 were recorded at 8.29 Crore. During the current financial year, the total number of visitors on ENVIS Websites is recorded as 1.92 Crore till 26.12.2016 and it is estimated to reach 2.50 Crore by 31.03.2017.

The ENVIS network presently consists of 69 Centres, of which, 30 Centres dealing with “State of the Environment and Related Issues” are hosted by the respective State Governments/ UT Administrations and the remaining 39 Centres are hosted by various eminent institutes and organisations of repute, having a thematic mandate.

### **Under ENVIS**

During the year, ENVIS Centres printed,



*Fig. 62 Secretary, MoEF&CC released 25 ENVIS Knowledge products*

published and uploaded around 320 knowledge products including newsletters, books, theme based special publication, e-books, e-bulletins, booklets, environment

calendars, brochures, pamphlets, posters, DVDs, CDs, mobile apps, etc.

The National Workshop of ENVIS Centres was



*Fig. 63 Secretary, MoEF&CC released 25 ENVIS Knowledge products*



held on 17<sup>th</sup> and 18<sup>th</sup> March, 2017 at Mahatma Mandir Convention & Exhibition Centre, Gandhinagar, Gujarat. It was inaugurated by Shri Ajay Narayan Jha, Secretary, Ministry of Environment, Forest & Climate Change (MoEF&CC) in the presence of Shri Arvind Agrawal, Additional Chief Secretary, Forests and Environment Department, Government of Gujarat and Chairman, Gujarat Pollution Control Board. Secretary, MoEF&CC released 25 ENVIS Knowledge products comprising Mobile Apps, DVDs, CDs, Books, Special Publications, Posters, etc.

On the occasion of completion of 35 years of ENVIS Scheme, Secretary, EF&CC also inaugurated an Exhibition of ENVIS publications and Information products. During

the National Workshop, a summary evaluation of the ENVIS Centres for the year 2016-17 was carried out, followed by the roll out of the proposed revamped ENVIS Scheme for the next 3 years (2017-18 to 2019-20).

### Statistical Cell

The Ministry of Environment, Forest & Climate Change created a Statistical Cell with the objective to develop an efficient and centralised statistical database on environment, forest & climate change with the assistance of various Environment Centres, under the 'ENVIS' Scheme. Secondly to Liaison with State/UT Governments and UT Administrations, and where necessary, to strengthen the processes of data collection, validation, processing and interpretation of



**Fig. 64** Third Apex Committee meeting of State of Environment Report (SoER), National.



*Fig. 65 Third Apex Committee meeting of State of Environment Report (SoER), National.*

statistical data, with the assistance of ENVIS Centres and Centre for excellence.

This Ministry has decided to prepare the state of Environment Report (SoER) of national/sates/metropolitical cities and other hotspots under the State of Environment Reporting (SoER) Scheme. This report, hence forth would be a departure from the past practices. Now it would be comprehensive document, intended for use by policy-makers, planners, regulators, and researchers. It would be amore structures analytical tool.

Earlier, State agencies used to prepare the Report, but to enhance its intrinsic value, it was decided to prepare it by an independent agency along with expert institutions of high reput, with the active involvement of planners and policy makers so that its utility increases. The list of few Experts Institutions has already been drawn up which needs to be

extended. However, the involvement of the State Government and its Planning Department/Board would be vital. The environment issues should be taken in planning process by the respective States as the stakeholders are planning departments and environment departments. SoER reporting will be a continuous and rigorous process. The Report would be reviewed after two year of additionality and improvement. There is a need to make it an online tool in planning process so that impacts on the environment may be analyzed well in time.

Process for preparation of the State of Environment Report 2015 (National) has been assigned to the Development Alternative, New Delhi and is at final stage. Preparation of the SoER for the state of Telangana, Hyderabad, Mizoram, Sikkim are at final stage. The SoER, Nagaland has already started. SoER for the



*Fig. 66 Sub-Regional Workshop on Environment Statistics for South and South-West Asian Countries organized by UNESCAP in Bangkok, Thailand during 6-8 February 2017*

State of Arunachal Pradesh, Assam, Bihar, Delhi, Himachal Pradesh, Karnataka, Madhya Pradesh, Meghalaya, Tripura, Uttarkhand and Uttar Pradesh are in the pipe line.

The statistical cell has also already initiated work for development of National Green Accounting, Development of Environmental Statistics & Indicators and Interaction with National and International organization etc. the statistical adviser is the nodal officer in the Ministry. Statistical studies related to Agriculture and River Ymuna basin etc. are in the pipeline.

### **Non-Governmental Organization (NGO) Cell**

A Non-Governmental Organisation (NGO) Cell has been set up in the Ministry to handle various policy matters relating to NGO's work in diverse field of environment. The basic functions of the Cell are:

- Collection and dissemination of information to various NGOs.

- Liaison with the NITI AAYOG and other Government Ministries in respect of various guidelines/directions concerning NGOs. Besides replying to Parliament Questions, the NGO Cell also handles RTI applications.

It has been decided to publish a new directory of Environmental NGO's in India. The information of various NGOs working in the field of environment and the associated areas is being collected in digital mode through on-line. For this purpose a new software application has been developed in consultation with NIC and same has been uploaded on the website of the Ministry i.e. <http://www.envfor.nic.in>. The portal can be accessed at <http://www.moefngo.nic.in>. A link for 'Environmental NGO portal' is also available under 'Public Information' on the home page of the Ministry's Website. The NGOs who are working in the field of Environment, Forest & Climate Change can now register on this portal.



# Legislation and Institutional Support





## Policy and Law

The Policy and Law Division is implementing the Scheme “National Green Tribunal and others”. The budget under this scheme is allocated to:

- The National Green Tribunal;
- Loss of Ecology (Prevention and Payment of Compensation) Authority; and
- Dhanu Taluka Environment Protection Authority

## National Green Tribunal (NGT)

The National Green Tribunal (NGT) was set up on 18<sup>th</sup> October, 2010 under the NGT Act, 2010, for the purpose of 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 the principles of natural justice. The Tribunal is mandated to make an endeavor for disposal of applications or appeals finally within 6 months of filing.

NGT has five places of sitting, i.e., the Principal Bench in Delhi and Zonal Benches in Pune, Kolkata, Bhopal and Chennai Apart from this,

the Tribunal holds three circuit Benches at Shimla, Shilong and Jodhpur.

Since its inception and upto 31.8.2016, the Tribunal has received a total of 17903 cases, against which 14201 cases have been disposed of and 3702 cases are pending.

## Legal Monitoring Cell (LMC)

A Legal Monitoring Cell has been constituted to monitor the progress in court cases. As on 7<sup>th</sup> December, 2016 the number of Court cases was 2650 out of which replies were pending in 132 cases. The LMC organized two interactive sessions during the year to sensitize Officers and Legal Counsels about the need for proper handling of court cases.

## Eco-labelling Scheme

The Eco- labeling Scheme, first introduced in 1991, did not see much of development in the intervening years. However, MoEF&CC has now decided to provide impetus to the scheme and a broad framework has since been developed.

Self-certification has been initially envisaged for enabling faster Eco-labeling process. The products are required to adhere to compulsory quality standards specified by BIS, as a pre-requisite to Eco-labeling.

Consequent to the decisions taken in the Steering Committee meeting held on 11.05.2016 under the chairmanship of Secretary (EF&CC) the Ministry vide its order dated 15.06.2016 constituted Sub-Committee of the Steering Committee to identify product categories to be included in the first phase and to develop criteria/guidelines for the identified



product categories for further consideration of Steering Committee, Officials from CPCB and BIS will propose a list of product categories produced from wastes for consideration of Technical Committee.

## Economic Cell

The Economic Cell is the nodal point in the Ministry for all matters pertaining to the Cabinet/ Cabinet Committees (Cabinet Notes) for handling matters referred by the Ministry of Finance and also for Global Innovation Index (GII), initiated and monitored by the NITI Aayog. Officers of the Economic Cell represented the Ministry in the roundtables/ workshops organized by NITI Aayog with international stakeholders including World Intellectual property Organization (WIPO) and International Labour Organization (ILO) and other Ministries. The DBT Cell of the Ministry, created in the Economic Cell, has constantly engaged with Direct Benefit Transfer (DBT) Mission, Cabinet Secretariat for onboarding of schemes on DBT Platform.

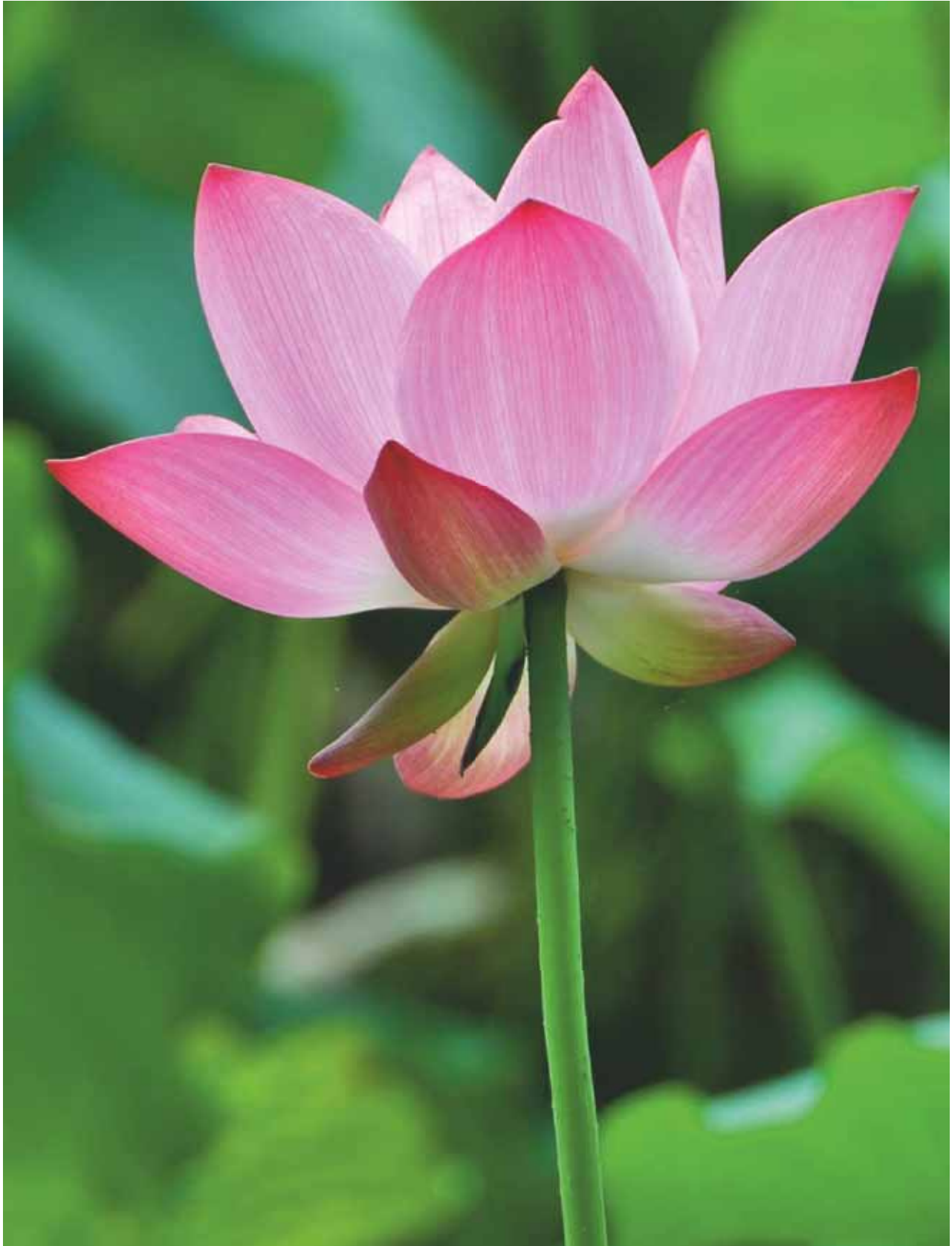
The Economic Cell drafted and finalised comments on different economic issues related to the environment, particularly on the Cabinet Notes, EFC Memos, India US CEOs Forum Recommendations, Draft Report on OECD's Economic Review of India 2017, etc. The Economic Cell contributed inputs for the UN proposed project proposal on Natural Capital Accounting and valuation of Ecosystem Services Project in India.

## Trade and Environment

The Division coordinated and contributed

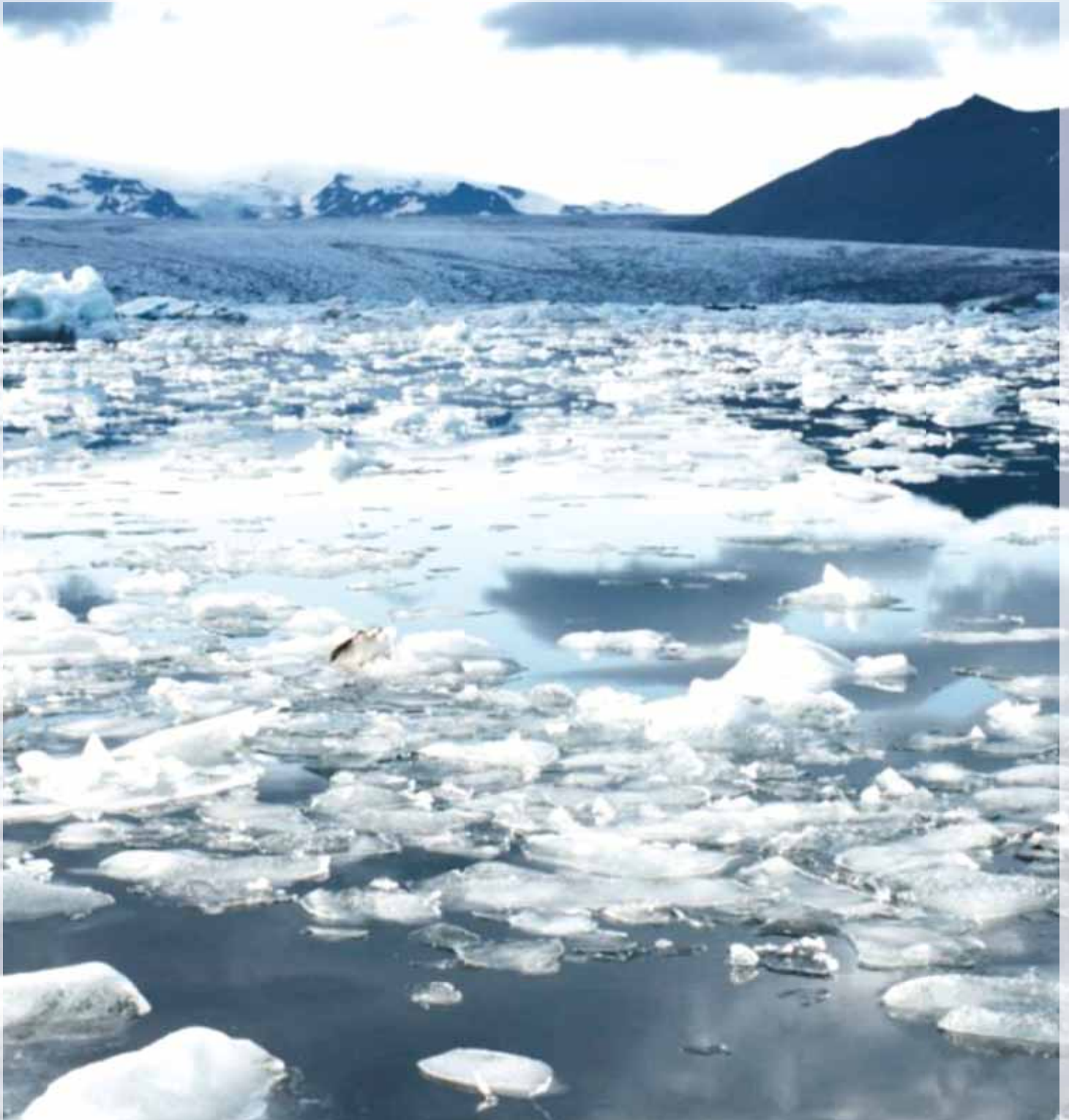
comments on Cabinet Notes and different Memorandum of Understanding documents referred to the Ministry by the Ministry of Commerce and Industry as well as Ministry of External Affairs. Most prominent amongst these include the Cabinet Note on holding negotiations for entering into trade agreement with Peru on trade in goods, services and investment, National Intellectual Property Rights Policy, Cabinet Note on Trade in Services, MoU between India and UAE on Institutional Cooperation on Maritime Transport, MoU between India and South Korea on cooperation in the field of Fisheries and Aquaculture. The Division provided inputs on the Goa Declaration (Zero Draft) for the 8th BRICS Summit held in Goa in October, 2016. The Division has also actively engaged in the consultations regarding India MERCOSUR Preferential Trade Agreement and consolidated comments of this Ministry.

The Division has coordinated meetings related to National Committee on Trade Facilitation (NCTF) headed by the Cabinet Secretary, wherein Secretary, EF&CC is a Member. The Division has also provided comments/inputs on certain products (Sal, Kokum etc.) to be included in the Merchandise Exports from India Scheme (MEIS) announced under Foreign Trade Policy 2015-20. The Division dealt with matters related to draft export policy Trade Policy Review of China, USA and Russia, pointing out the deficiencies in laws, policies and practices that restrain free and fair international trade in goods and services.





# Climate Change





## Climate Change

The Earth's climate has always changed and evolved. Some of these changes have been due to natural causes but others can be attributed to human activities such as deforestation, emissions from industry and transport etc, which have led to accumulation of gases and aerosols 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 year (2016-17) saw the release of the Biennial Updates Report (BUR) on 22 January 2016 and the initiation of the third National Communication (NATCOM) for submission to the United Nations Framework Convention on Climate Change (UNFCCC).

In order to create and strengthen the scientific and analytical capacity for assessment of climate change in the country different studies under Climate Change Action Programme (CCAP) has been initiated. During this year, many important bilateral and multilateral meetings and negotiations including Conference of Parties (CoP-22) on climate change were held in which Hon'ble Minister and senior Officials of the Ministry participated.

### 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 (CBDR) and Respective Capabilities (RC) 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 GHGs, 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 an overview of the national circumstances detailing geography, imperatives of development priorities, climate and economy; based on which the country 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 GHGs for the years 2000 and 2007. The Ministry is currently preparing India's Third National Communication (TNC) and in this connection workshops on National Inventory Management System (NIMS) have been organised. The purpose of this workshop was to provide inputs for establishment of National Inventory Management System (NIMS) and increased accuracy of GHG inventory preparation with use of higher tier methods.

The Biennial Update Reports (BURs) are new reporting obligation under the transparency



arrangement of sharing information on implementation of the Convention. The BUR is a form of enhanced reporting, containing updates of national greenhouse gas inventories and information on mitigation actions, financial, technical needs and support received and an update to previous National Communication. The first BUR encompassing information on National Circumstances, GHG inventories for the year 2010, Mitigation Actions, Analysis of Constraints, Gaps, and related Financial, Technical and Capacity Needs and other related information along with information on domestic Monitoring, Reporting and Verification (MRV) arrangements has been released on 22-January-2016.

### **National and State Action Plans on Climate Change**

India's domestic strategy for addressing climate change is embedded in many of its social and economic development programmes. The National Action Plan on Climate Change (NAPCC) coordinated by the Ministry of Environment, Forest & Climate Change (MoEF&CC) is being implemented through the Nodal Ministries in specific sectors. Eight national missions in the area of solar energy, enhanced energy efficiency, sustainable agriculture, sustainable habitat, water, Himalayan eco-system, Green India and strategic knowledge for climate change form the core of NAPCC. All national missions were approved by the Prime Minister's Council on Climate Change (PMCCC) and are being

implemented now. The Missions are under constant review by 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 with regular monitoring of the eight National missions along with other initiatives on Climate Change and coordinating with various agencies. Some of the important relevant decisions taken by the PMCCC are:

- Revisiting of all National Missions under NAPCC in the light of new scientific information especially Fifth Assessment Report (AR5) and technological advances;
- Setting up new missions on wind energy, health, waste to energy, coastal areas;
- Revisit deliverables of the National Water Mission and National Mission on Sustainable Agriculture.

The Ministry has also motivated State Governments to prepare State Action Plan on Climate Change (SAPCC). These SAPCCs aim to create institutional capacities and implement sectoral activities to address climate change at the state level. So far, 32 SAPCC namely Andaman and Nicobar, Andhra Pradesh, Telangana, Arunachal Pradesh, Assam, Bihar, Chandigarh Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Karnataka, Lakshadweep, Madhya Pradesh, Manipur, Meghalaya,



Mizoram, Nagaland, Odhisa, Puducherry, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand and West Bengal, Uttar Pradesh, Maharashtra have been endorsed by MoEF&CC. Other states are in the process of finalising their SAPCCs.

### The National Adaptation Fund for Climate Change (NAFCC)

National Adaptation Fund on Climate Change is a Central Sector Scheme under implementation in the 12th Five Year Plan with National Bank for Agriculture and Rural Development (NABARD) as the National Implementing Entity (NIE).

The overall aim of the fund is to support concrete adaptation activities, which are not covered under on-going activities through the schemes of State and National Government, that reduce the adverse impact of climate change facing the communities, sectors and states. The adaptation projects contribute towards reducing the risks and vulnerability to Climate Change. The projects on adaptation in agriculture, water, forestry, infrastructure etc. are being implemented under this Scheme.

**Activities undertaken during 2016-17:** The Ministry has approved 18 Projects till date. 6 projects submitted by Andhra Pradesh, Madhya Pradesh, Karnataka, Haryana, Assam and West Bengal have been approved in the current Financial Year at a total cost Rs. 133.29 Crores.

### Climate Change Action Programme (CCAP)

Ministry of Environment, Forest and Climate

Change is implementing a scheme titled 'Climate Change Action Programme' since January, 2014, with an objective to create and strengthen the scientific and analytical capacity for assessment of climate change in the country, putting in place appropriate institutional framework for scientific and policy initiatives and implementation of climate change related actions in the context of sustainable development. Total budget for the scheme is Rs. 290 crore for the 12<sup>th</sup> plan period. In order to enhance understanding of climate change the CCAP includes components like 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 multi-institutional and multi-agency study. In this initiative, MoEF&CC is collaborating with the Ministry of Earth Sciences, the Indian Space Research Organization, the Ministry of Science and Technology and other associated agencies to enhance the understanding the role of Black Carbon in climate change through monitoring and assessment of the impacts of black carbon using modeling techniques. The work programme envisages three Working Groups namely Long term Monitoring of Aerosol (Working Group-I), Impact of Aerosol on Himalayan Glaciers (Working Group-II) and Modeling of Black Carbon emissions in India and assessment of its impacts (Working Group-III).

LTEO is another program under CCAP scheme which aims at creating a network of field sites for undertaking observations to study effects of



climate change. A Science plan was developed in December 2015, for launching long-term ecological observatories programme at eight sites to study the health of eight different biomes and assess its linkagewith climate change.

The Ministry launched the “Modeling Studies on Greenhouse Gas Emissions and Emission Intensity of Indian Economy” through The Energy and Resources Institute (TERI), Integrated Research for Action and Development, (IRADe) and Institute of Economic Growth (IEG) consortium. The aim of the studies was to obtain the projections of the GHG emissions in various time slices from 2010 to 2050 in a decadal fashion. Further, the studies examined the GHGs emission intensity of Indian economy during 2005 - 2020 taking into account the ongoing and planned policies and the impacts thereof besides possible options for mitigation by 2020 including the economic implications thereof. The reports of the studies have been finalised and submitted to MoEF&CC in April 2016.

### Paris Agreement

India has ratified the Paris Agreement to the UNFCCC on 2<sup>nd</sup> Oct, 2016. The Paris Agreement entered into force on 4 November 2016 and as on 5 Oct, 2016, 116 Parties have ratified the Paris Agreement. The action plan for implementation of Paris Agreement and its components is being developed.

### International Negotiations on Climate Change

During the financial year 2016-17, many

important bilateral and multilateral meetings and international negotiations on climate change were held in which Hon’ble Minister of this Ministry and senior officials of the Ministry participated. These meetings were crucial in the run up to the 22nd Conference of Parties. Hon’ble Minister and senior officials of Climate change division attended important meetings such as the UN Secretary-General’s high-level ceremony for the signing of Paris Agreement on 22nd April, 2016 in New York, meeting of the Major Economies Forum during 22-23 September, 2016 in New York, Petersberg Climate Dialogue VII during 3rd-5th July 2016, Berlin. Delegates also participated in the 23rd BASIC Ministerial Meeting on Climate Change, held in 16-17 October, 2016 and Pre-COP Ministerial Meeting of the UNFCCC on 18-19 October, 2016 in Marrakech, Morocco.

Ministry of Environment, Forest and Climate Change organized the 22nd BASIC Ministerial Meeting on Climate Change in New Delhi, India on 6<sup>th</sup> and 7<sup>th</sup> April 2016. The meeting was attended by H.E. Mr. Prakash Javadekar, Minister of State (Independent Charge) for Environment, Forest and Climate Change of India, H.E. Mr. Xie Zhenhua, Special Representative for Climate Change of China, H.E. Ambassador Antonio Marcondes, Under Secretary-General for the Environment, Energy, Science and Technology, Ministry of Foreign Affairs of Brazil and Mr. Maesela Kekana, Chief Director, International Climate Change Relations and Negotiations of South Africa.

The 22<sup>nd</sup> Conference of Parties under UNFCCC was held in Marrakech, Morocco from 7 to 18



November, 2016. Shri Anil Madhav Dave, Hon'ble MoEF&CC led an inter-ministerial delegation that participated in the Marrakech Conference. India participated in the Conference with a positive approach and with the aim to protect India's long term interests and propagate a growth paradigm of sustainable development, poverty eradication & providing energy access to all. Marrakech COP followed the historic COP 21 that adopted the Paris Agreement. The Agreement aims to keep the global temperature rise below 2°C. It maintains differentiation in all operative sections of mitigation, adaptation, loss and damage, finance, technology development and transfer, capacity building and transparency of action and support.

One of the key outcomes of the COP 22 was "Marrakech Action Proclamation for Our Climate and Sustainable Development". The call affirmed world's commitment to full implementation of Paris Agreement and emphasized the need to strengthen and support efforts to eradicate poverty, ensure food security and enhance resilience of agriculture. With India's continuous efforts, COP-22 urged early ratification of the Kyoto Protocol second commitment period through 'Marrakech Call'. A number of procedural decisions were taken regarding the evolution of guidelines and modalities for the Paris rule book including features and accounting of Nationally Determined Contributions (NDCs), modalities, procedures and guidelines for the transparency framework for action and support, modalities of global stocktake etc.

The important decisions that were reached in CoP-22 are as follows: -

- I. The importance of adaptation action in developing countries and its treatment at par with mitigation was re-iterated. The developed countries had raised certain issues about Adaptation Fund serving the Paris Agreement. In the end, it was decided that the Adaptation Fund should serve the Paris Agreement. The governance and institutional arrangements, safeguards and operating modalities of the Adaptation Fund for serving the Paris Agreement would be finalized by 2018. Thus the uncertainties regarding the Adaptation Fund was dispelled.
- II. The organization of the facilitative dialogue in 2018 would be undertaken in consultation with parties would be finalized by 2017.
- III. A joint meeting will be held with the Conference of the Parties (CoP) serving as the meeting of the Parties (MoP) to the Paris Agreement, to review progress on the implementation of the work programme under the Paris Agreement, at its twenty-third session (November 2017).
- IV. Preparatory work on matters concerning the implementation of the Paris Agreement would be undertaken and its outcome will be considered in the resumed first session of the CoP serving as the MoP to the Paris Agreement (CMA 1) to be convened in conjunction with the twenty-fourth session of the COP 24 in 2018. It is proposed to conclude the work programme under the Paris Agreement latest by 2018 (COP-24).



V. The enhancement of action in the pre-2020 period was another important outcome. The COP urged early ratification of the second commitment period Kyoto Protocol.

India reiterated the urgency of climate action and support, well in advance of 2020 and emphasized that all decision should be based on the principles of Equity and CBDR & RC of UNFCCC and the Paris Agreement. It was highlighted that all climate actions must stem from 'Climate Justice'.

On the sidelines of COP-22, the Framework Agreement of International Solar Alliance (ISA) was opened for signature on 15 November,

2016. So far 24 countries have signed the ISA framework agreement. It will be a unique international and intergovernmental treaty-based organization to be registered under Article 102 of the United Nations (UN) Charter and will come into operation with ratification by 15 parties.

Shri Anil Madhav Dave, Hon'ble Minister of Environment, Forest and Climate Change inaugurated the India Pavilion at COP-22 in Marrakech. It hosted over 22 sessions with 200 speakers/panellist, over 100 presentations, 1100 participants. 110 Films and short videos etc were screened. 2 Books on Sustainable Lifestyles were released at the India Pavilion.



**Fig. 67** Shri Anil Madhav Dave, Hon'ble Minister of Environment, Forest and Climate Change inaugurated the India Pavilion at COP-22 in Marrakech.



The Pavilion was appreciated and viewed by nearly 4000 visitors from different countries.

It was the centre of attraction as it was a high technology-driven pavilion that demonstrated India's commitment to climate change.

It focussed on sustainable lifestyles for a positive climate action. Many visitors made it a special point to get themselves photographed in front of it. There were various elements in India Pavilion to depict the importance of traditional and sustainable lifestyles in following ways:

1. A large format visual screen to describe the overall Indian story of being a nation with sustainability at its roots, in a spectacular, compelling format that also worked as an excellent overall ambience-creator.
2. Water, as the most important element that helps sustain life. Hence Aquagraphic curtain was used to complement & communicate with the visuals on the large screen as an exciting medium to bring alive India's message to the world.
3. There were trees all around the pavilion that reiterated the strong roots of India's age-old belief in living in harmony with nature, with visual mediums and touch screens on them showcasing the same.

### **Book Launch at India Pavilion**

Two books were released on 14<sup>th</sup> November, 2016 in India Pavilion by Hon'ble Minister of Environment, Forest and Climate Change 1) 'LOW CARBON LIFESTYLES - RIGHT CHOICES FOR OUR PLANET' & 2) LIFESTYLE FOR MINIMUM CARBON FOOTPRINT. Both the

books describe how simple lifestyle changes will help the planet and reduce economic costs. It quantifies emission reduction that can be achieved by an action as effortless as turning off an unnecessary light or a fan, and expresses it in a format that people can easily understand– like the number of additional trees that a specific action is equivalent to and the amount of money that we can save.

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 Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, The Department for International Development (DFID) and United Nations Development Programme (UNDP). Since 2002, GIZ has been supporting the Climate Division of MoEF&CC in strengthening the Designated National Authority (DNA), support in Clean Development Mechanism (CDM). An online Management Information System (MIS) has been launched by the National Clean Development Mechanism Authority (NCDMA) in the Ministry of Environment, Forest and Climate Change with the support of GIZ. Further, a project on Nationally Appropriate Mitigation Actions (NAMAs) is also operational to support the MoEF&CC with the coordination and implementation of NAMAs in waste and forestry sectors.





*Fig. 68 Book was released on 14th November, 2016 in India Pavilion by Hon'ble Minister of EF&CC*

- Two (2) projects under Indo-EU Cooperation are also operational viz. 1. Indo-EU Technical Cooperation for Environment in India and 2. India-EU Cooperation on Clean technologies and Energy Efficiency for Eco-Cities.
- Climate Change Innovation Programme, a partnership initiative between MoEF&CC and DFID has been supporting six states namely, Assam, Bihar, Chhattisgarh, Kerala, Maharashtra and Odisha, in implementing the SAPCC. Through Climate Change Innovation Programme (CCIP), the state Governments are provided with technical assistance in preparing and refining SAPCCs. It also assists in preparing sectoral action plans and projects to address

climate change adaptation in thematic areas such as water, urban flooding, agriculture, forestry, coastal vulnerability, health as well as securing finance for implementing the plans.

## Ozone Cell

### Ozone Layer Protection

- Ozone, a tri-atomic molecule of oxygen is formed from oxygen naturally in the upper levels of the Earth's atmosphere by high-energy Ultraviolet (UV) radiation from the Sun. The UV radiation breaks down oxygen molecules, releasing free atoms, some of which bond with other oxygen molecule to form ozone. About 90 per cent of ozone formed in this way lies between 10 and 50



kilometers above the Earth's surface, called the Stratosphere. The ozone found in this part of the atmosphere is called the ozone layer.

- The ozone layer absorbs all the harmful UV-B radiations emanating from the Sun. It protects plant and animal life from UV-B radiation. The UV-B radiation has the potential to cause skin cancer, eye cataract, suppress body's immune system, decrease crop yield etc., which led to the adoption of the Vienna Convention for the Protection of the Ozone Layer in 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987. The mandate of the Montreal Protocol is to phase out the production and consumption of the Ozone Depleting Substances (ODSs). 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/adjustments.
- India has been producing and using nine of the 96 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. Out of these, all ODSs except HCFCs, have been phased out. Currently HCFCs are being phased out as per the accelerated phase out schedule of the Montreal Protocol
- The Ministry of Environment, Forest and Climate Change (MoEF&CC) handles the work relating to ozone layer protection and implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer.
- The MoEF&CC 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 constituted an Empowered Steering Committee (ESC) Chaired by the Secretary (EF&CC) which is supported by two Standing Committees viz. Technology and Finance Standing Committee (TFSC) and Standing Committee on Monitoring. The ESC is responsible for overall implementation of the Montreal Protocol provisions, review of various policy and implementation options, project approval and monitoring.
- 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 stipulated phase-out schedule of the Montreal Protocol. The Country Program was updated in 2006.
- The Project Management Unit (PMU) was set up in 2002 to implement the National ODS Phase-out Plans.



## The Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer

- The Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer are the international treaties specific for the protection of the Stratospheric Ozone (Ozone layer). The Montreal Protocol has been recognized as the most successful international environmental treaty in history. It has been universally ratified and all the 197 United Nations Member countries of the world are the Parties to the Vienna Convention and its Montreal Protocol. In the 29 years of operation of the Montreal Protocol, extraordinary international cooperation under this agreement has led to phase-out of production and consumption of several major ODSs such as CFCs, CTC and halons globally from 1<sup>st</sup> January, 2010. The production and consumption of Methyl Chloroform has been phased out globally as on 1.1.2015, with possible essential use exemptions. The production and consumption of Methyl Bromide has been phased out globally as on 1.1.2015, except use in quarantine and pre-shipment applications. Global systematic observations have confirmed that atmospheric levels of key ODSs are declining and it is estimated that with continued, full implementation of the

Montreal Protocol's provisions, the global ozone layer should return to pre-1980 levels by around the middle of this century. The Montreal Protocol has also delivered substantial climate benefits.

- The Protocol is currently addressing the phase-out of HCFCs with an accelerated phase-out schedule.
- The UN General Assembly on 19th December, 1994 adopted a resolution 49/114 which proclaims 16th September as the International Day for the Preservation of the Ozone Layer, to commemorate the signing of the Montreal Protocol on Substances that Deplete the Ozone Layer which was signed on 16th September, 1987.

### Activities undertaken

- The ODS (Regulation and Control) amendment Rules, 2014 control production and consumption of HCFCs from the date of publication of the Rules. According to the Rules quota system for production has been introduced. The Amendment Rules, 2014 prohibit import of pre-blended polyols containing HCFCs and blends containing ODSs including HCFCs. The Rules also prohibit creating new capacities to manufacture products with HCFCs. Further, import of HCFC based Air-conditioners is prohibited from 1st July, 2015.

### India-US Task Force on Hydrofluorocarbons (HFCs)

- During the year 2016, one meeting of the

Task Force was held from 30th June, 2016 to 1st July, 2016. The meetings provided a unique opportunity for the industry, experts and the concerned officials, from the two countries to have in-depth discussions on various aspects related to HFCs and to develop better understanding on the issues of concern.

### **Kigali Amendment to the Montreal Protocol for phase-down of HFCs**

- The 28th Meeting of Parties to the Protocol held in Kigali adopted an amendment to the Protocol which is historic and aimed at phasing down the HFCs that contribute to global warming.
- HFCs do not deplete the Ozone layer, however, they have high global warming potential.

- The negotiations for phasing down of HFCs under the Montreal Protocol were initiated way back in 2009, but these negotiations gathered momentum only after India submitted an amendment proposal for phase down of HFCs under the Montreal Protocol in April, 2015.
- India represents only around 2 % of the global production and consumption of HFCs but our manufacturing and consumption sector is expected to grow in future.
- India has been a strong advocate of the principle of Common but Differentiated Responsibility and relevance of national circumstances in the matter of global actions to protect environment.



*Fig. 69 Shri Ajay Narayan Jha, Secretary, Ministry of Environment, Forest and Climate Change during the 28th Meeting of the Parties to the Montreal Protocol*



- In the Kigali Amendment, it has been agreed that the developing countries will have two set of baselines – one for the early movers in which case it will be 2020-2021-2022 and the other for those whose national circumstances

were different and the manufacturing of HFCs and consumption in whose case was still rising in the absence of clear alternative technologies. In case of such countries the agreed baseline years are 2024, 2025 and 2026.



*Fig. 70 Shri Anil Madhav Dave, Hon'ble Minister, Environment, Forest and Climate Change during the High-Level Segment Ministerial Round Table 'Towards an Agreement on the HFC Amendment under the Montreal Protocol' during the 28th Meeting of the Parties to the Montreal Protocol*

- The developed countries will have baseline years of 2011-2013 with separate reduction schedule starting 10% in 2019, 40% in 2024, 70% in 2029, 80% in 2034 and 85% in 2036. For Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan initial two steps will be different as 5% reduction in 2020 and 35% reduction in 2025.

- India piloted a realistic baseline of 2024-2026 for production and consumption of HFCs in developing countries for phase-down of HFCs. As per the agreement reached in Kigali, India will freeze its manufacturing and consumption of HFCs in 2028 with reference to the baseline years 2024, 2025 and 2026. The Freeze year is subject to technology review and could be



further deferred to 2030. India will complete its phase down in 4 steps from 2032 onwards with cumulative reduction of 10% in 2032, 20% in 2037, 30% in 2042 and 85% in 2047.

- This agreement facilitates adequate carbon

space for growth on domestic industry while minimizing the cost to the economy during the transition period.

The agreed baseline years, freeze year and reduction schedule as Kigali Amendment of the Montreal Protocol for phase-down of HFCs:

	A5 Group 1 (Developing)	A5 Group 2 (Developing)	A2 (Developed)
Baseline	2020-2022	2024-2026	2011-2013
Formula	Average HFC consumption	Average HFC consumption	Average HFC consumption
HCFC	65% baseline	65% baseline	15% baseline*
Freeze	2024	2028	-
1st step	2029 – 10%	2032 – 10%	2019 – 10%
2nd step	2035 – 30%	2037 – 20%	2024 – 40%
3rd step	2040 – 50%	2042 – 30%	2029 – 70%
4th step			2034 – 80%
Plateau	2045 – 80%	2047 – 85%	2036 – 85%

\* For Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan 25% HCFC component of baseline and different initial two steps (1) 5% reduction in 2020 and (2) 35% reduction in 2025

Notes:

1. Group 1: Article 5 parties not part of Group
  2. Group 2: GCC, India, Iran, Iraq, Pakistan
  3. Technology review in 2022 and every 5 years
  4. Technology review 4-5 years before 2028 to consider the compliance deferral of 2 years from the freeze of 2028 of Article 5 Group 2 to address growth in relevant sectors above certain threshold.
- On India's initiative, it was agreed in Kigali that the Multilateral Fund under the Montreal Protocol will provide funds for

maintaining or increasing the energy efficiency with new technology. Funding for R&D and servicing sector in developing countries has also been included in the agreed solutions on finance.

- India has been able to secure an agreement that provides adequate space for growth of our economy, while providing adequate time for industry to shift to sustainable alternatives in the interest of environment. The agreed arrangements will minimize the cost to consumers in transitioning away from HFCs and provide for domestic innovation to develop in the sector of new



generation refrigerants and related technologies.

- As there is a national focus on research, innovation and technology development reflected in Make in India Programme of the Government, and to have least cost to economy while transitioning away from HFCs, and maintain the position of exporter

of refrigerants, the Ministry had decided to launch a collaborative research programme in development of low GWP non ODS cost effective alternative technologies to HFCs indigenously involving research and academia institutions, industry and civil society organization.



*Fig. 71 High-Level Segment Ministerial Round Table 'Towards an Agreement on the HFC Amendment under the Montreal Protocol' during the 28th Meeting of the Parties to the Montreal Protocol*

The following workshops/ meetings were conducted during 2016:

- The then Hon'ble Minister (EF&CC) Mr. Prakash Javadekar and senior officials of the MoEF&CC participated in the Roundtable discussion on phase down of

HFCs in the context of India's proposal on Amendment to the Montreal Protocol, organized by Natural Resources Defence Council (NRDC) and CEEW on 17th March, 2016 at New Delhi.

- A DVC, as part of the India-US Task Force on HFCs under the Co-Chairmanship of Mr. R. R. Rashmi, Additional Secretary, MoEF&CC and Ms. Jennifer Haverkamp, Special Representative for Environment and Water Resources, Department of State, USA with representatives of officials from India and USA was held on 15th June, 2016.
- Stakeholders Consultative meeting on India's Amendment proposal on phasedown of HFCs under the Montreal Protocol was held on 23rd June, 2016 under the Chairmanship of the then Hon'ble Minister (EF&CC) Mr. Prakash Javadekar.
- Meeting of the India-US Task Force on HFCs under the Co-Chairmanship of Mr. R. R. Rashmi, Additional Secretary, MoEF&CC and Ms. Jennifer Haverkamp, Special Representative for Environment and Water Resources, Department of State, USA was held from 30<sup>th</sup> June, 2016 to 1<sup>st</sup> July, 2016 at New Delhi. Besides officials from India and USA, industry representatives from both India and USA participated in the meeting.
- A meeting was held to discuss modalities for undertaking research for development of low-GWP alternatives was held on 10<sup>th</sup> August, 2016 under the Chairmanship of Secretary (EF&CC). Representatives from research institutions, industry and civil society participated in the meeting.
- Hon'ble Minister (EF&CC) Shri. Anil Madhav Dave and senior officials of the MoEF&CC participated in the Roundtable discussion on HFCs in the context of India's proposal on Amendment to the Montreal Protocol, organized by NRDC and CEEW on 26<sup>th</sup> September, 2016 at New Delhi.



*Fig. 72 Stakeholders consultative meeting on India's Amendment proposal for phase-down of HFCs held on 23rd June, 2016*





- The XXXXI meeting of ESC for Implementation of the Montreal Protocol was held on 19th December, 2016 under the Chairmanship of Shri. Ajay Narayan Jha, Secretary (EF&CC).
- Training, workshops were organized across the country for RAC servicing technicians by GIZ, Government of Germany as part of the Servicing Sector strategy of HPMP Stage-I. These include training to service technicians on good servicing practices of HCFC based appliances/ equipment. Through 408 programmes organised across the country, a total of 11000 servicing technicians have been trained.
- Participation in the meetings of the OEWG of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, MOP to the Montreal Protocol on Substances that Deplete the Ozone Layer, 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 being collected from various sources, collated and submitted to the Secretariat for the Vienna Convention and the Montreal Protocol (The Ozone Secretariat) and the Country Program Progress Report (CPPR) to the Secretariat of the MLF for the implementation of the Montreal Protocol by the end of September

each year as per the Article 7 of the Montreal Protocol.

- Recommendations were issued to enterprises for import and export of ODSs and ODS based equipment for getting license from the Directorate General of Foreign Trade (DGFT).

### Achievements made

- India has met the following compliance targets either on or ahead of the control schedule of the Montreal Protocol:-
- The Ex-Com of the MLF so far has approved a total of 305 projects involving MLF funding of US \$ 327,657,464 to the Indian industry for phase-out of production and consumption of 59,749.49 ODP tonne of the ODSs in India.
- Phase-out of production and consumption of virgin halons as early as 2002, eight years prior to the Montreal Protocol schedule, being high ODP ODSs.
- Phase-out of production of CFCs with effect from 1.8.2008, 17 months prior to the Montreal Protocol schedule except use of Pharmaceutical grade CFCs in manufacturing of MDIs.
- Complete phase-out of production and consumption of CFCs, CTC and halons with effect from 1.1.2010.
- Successful implementation of the National Strategy for transition to non-CFC MDIs and plan for phase-out of CFCs in the manufacture of MDIs in India.
- The production and consumption of



- Methyl Chloroform has been phased out globally as on 1.1.2015, with possible essential use exemptions.
- The production and consumption of Methyl Bromide has been phased out globally as on 1.1.2015, except use in quarantine and pre-shipment applications
  - India in consultation with the MDI manufacturers withdrew the EUN of pharma grade CFCs for 2011 and beyond EUN for pharmaceutical grade CFCs. India was one of the first countries to withdraw the EUN, for which India was congratulated by the MOP.
  - The implementation of National MDI Transition Strategy has resulted successful phase-out of pharmaceutical grade CFCs in manufacturing of MDIs as of December, 2012, 11 months prior to the schedule approved by the Ex-Com of the MLF for the Implementation of the Montreal Protocol.
  - India has successfully met the freeze as on 1.1.2013 and 10% reduction of production and consumption of HCFCs as on 1.1.2015 in line with the accelerated phase out schedule of the Montreal Protocol.
  - The Ozone Depleting Substances (Regulation and Control) Rules, 2000 have been amended to align with the accelerated phase-out of HCFCs. The Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2014 had been notified in the Gazette of India in March, 2014.
  - Continuation of the Institutional Strengthening (IS) project implemented by UNDP as lead implementing agency.
- The 74<sup>th</sup> Ex-Com approved a proposal for survey on ODS alternatives in India with a funding of US\$ 1, 80, 000.
  - India has been elected as a Member of the Ex-Com of the MLF for the implementation of the Montreal Protocol for the year 2016.
  - The 77th Meeting of the Ex-Com of the MLF approved HPMP Stage-II with a total funding of US \$48,315,261 for reduction of 769.49 ODP tonnes of HCFCs from the remaining HCFC consumption eligible for funding.
  - The Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer reached agreement at the 28th Meeting of the Parties on 15 October 2016 in Kigali, Rwanda to phase-down HFCs.

### **Awards & Appreciations received so far**

- The Ozone Cell of India has been conferred with several awards/appreciations/recognitions for successful implementation of the Montreal Protocol and its ODS phase out activities.

### **United Nations Convention to Combat Desertification**

The concern for arresting and reversing land degradation and desertification gets reflected in many of our national policies (for e.g., National Water Policy 2012; National Forest Policy 1988; National Agricultural Policy 2000;

Forest (Conservation) Act 1980; Environment (Protection) Act 1986; National Environmental Policy 2006; National Policy for Farmers 2007; National Rainfed Area Authority (NRAA)- 2007) which have enabling provisions for addressing these problems. It is also implicit in the goals of Sustainable Forest Management (SFM), Sustainable Agriculture, Sustainable Land Management (SLM) and the overarching goal of sustainable development which the country has been pursuing.

India became a signatory to the United Nations Convention to Combat Desertification (UNCCD) on 14th October 1994 and ratified it on 17th December 1996. MoEF&CC is the nodal Ministry in the Government of India for the UNCCD, and Desertification cell is the nodal

point within MoEF&CC to co-ordinate all issues pertaining to the convention. The UNCCD 10 year strategy (2008-2018) adopted during CoP-8 (Conference of the Parties), was further modified (2018-30) by giving special emphasis on Sustainable Land and Environmental Management (SLEM) practices and LDN. In COP 12, UNCCD has established the concept of Land Degradation Neutrality (LDN) as Target 15.3 in the Sustainable Development Goals.

### Progress/Achievements

**Desertification and Land degradation Atlas of India:** “Desertification and Land Degradation Atlas of India (Based on IRS AWiFS data of 2011-13 and 2003-05)” was prepared by the Space Application Centre, Department of Space,



*Fig. 73 Sparrow*

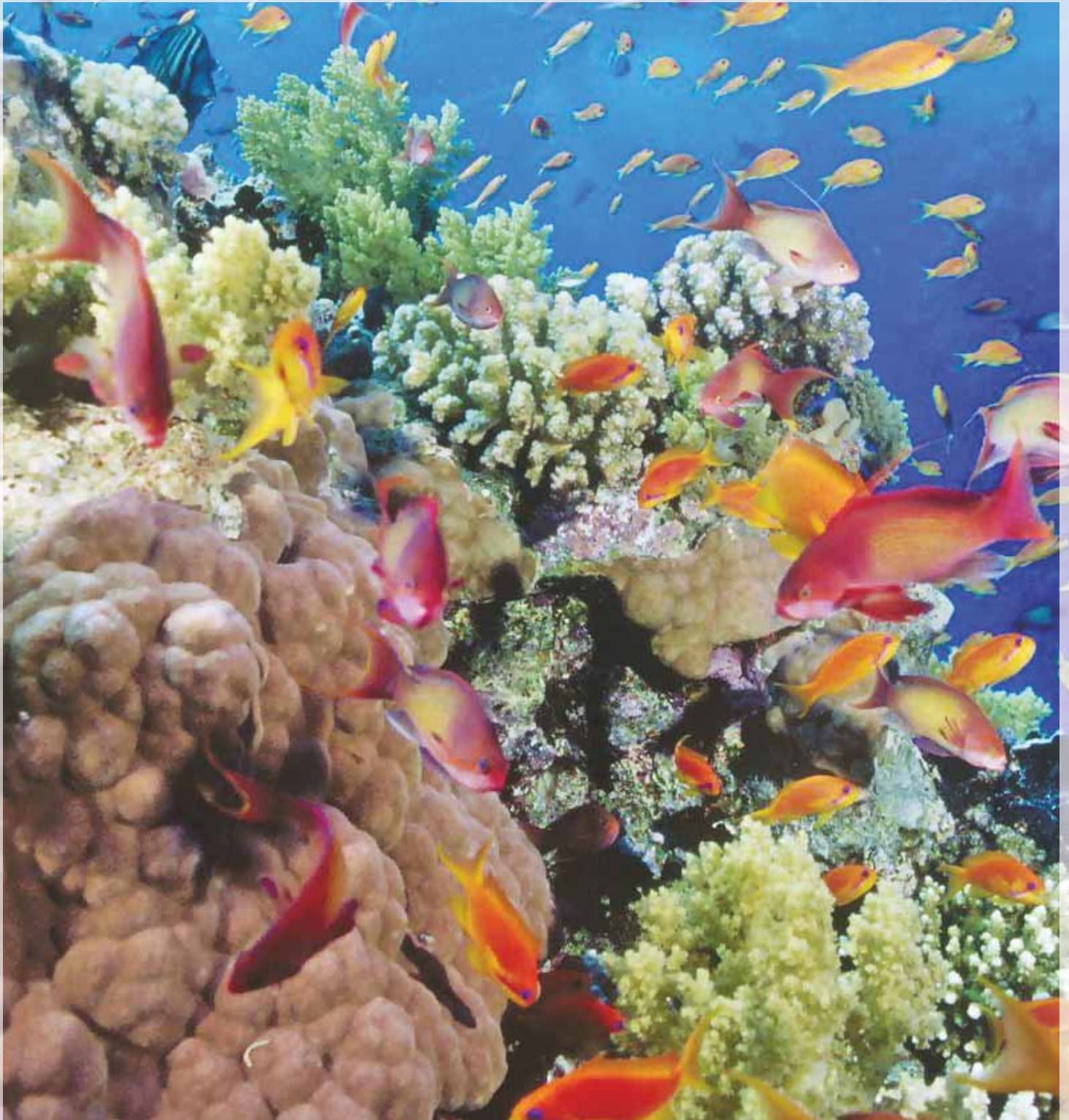
Government of India in collaboration with MoEF&CC and other State level institutions and was released on 17<sup>th</sup> June, 2016. This Atlas presents Desertification /Land Degradation Status Maps depicting Land Use, Process of Degradation and Severity Level along with area statistics consolidated for entire country as well state-wise for 2011-13 and 2003-05 time frame and reports the changes.

**Book release on World Day to Combat Desertification:** The book entitled “Cacti in Desert Botanical Garden” was published by Central Arid Zone Research Institute (CAZRI), Jodhpur. This book consists details of 33 cacti, their cultivation and maintenance and is useful to researchers, foresters, teachers, growers, gardeners and common public alike.



*Fig. 74 Parrot*

# International Cooperation and Sustainable Development





## International Cooperation and Sustainable Development

International Cooperation and Sustainable Development (IC&SD) Division of the Ministry coordinates matters related to international environmental cooperation and sustainable development including Sustainable Development Goals (SDGs). The major achievements of the division in the year 2016–2017 are as follows:

### International Cooperation – Bilateral matters

The Ministry has entered into Agreements / Memorandum of Understanding (MoUs) with 21 countries like Norway, Sweden, France, Finland, Canada, Bangladesh, Egypt, Morocco, Brazil, Russia and others on various environmental issues of mutual benefits. Most of these MoUs/agreements are operated through the Joint Working Groups (JWGs) thus, providing an opportunity for dialogue and to work with the international community. A number of Joint Working Groups (with Germany, European Union, etc.) have also been constituted which flows from Agreements / MoUs / Joint Statements entered into by other Ministries.

Shri Anil Madhav Dave, Hon'ble Minister of Environment, Forest and Climate Change encouraged dialogue with the international community to invite investment, knowledge and cooperation to meet country's environment-related priorities and needs. Some of his major meetings were with:

- Mr. Benjamin Cardin, US Senator in May 2016.
- Mr. Brian Deese, Senior Advisor to the President of the USA in June 2016.

- Dr. Olumuyiwa Benard Aliu, President, International Civil Aviation Organization in August, 2016.
- Mr. Slawomir Mozurek, Deputy Minister of Environment, Poland in October, 2016.
- Mr. Eric Solheim, Executive Director, UNEP in October, 2016.
- Mr. Karmenu Vella, EU Commissioner in October, 2016.

In addition, the year witnessed a series of active bilateral dialogues between the Hon'ble Minister of State (Independent Charge) / senior officers of the Ministry and Ministers / Ambassadors / senior representatives from other countries on various environment, forest and climate change related matters.

### Working Group (WG) meetings:

**BRICS (Brazil, Russia, India, China & South Africa) Environment Ministers meeting:** India being BRICS Chair for the year 2016, from environment perspective, the Ministry of Environment, Forest and Climate Change (MoEFCC) hosted the second BRICS Environment Ministers meeting at Goa on 15–16 September 2016.

The Environment Ministers / representatives of the BRICS nations, accompanied by their senior officials participated in a two-day long event held in Goa to discuss the global climate change and other environmental issues. During the meeting, the Ministers agreed to enhance cooperation in the areas of abatement and control of air, and water pollution, efficient management of liquid and solid waste, climate change and conservation of bio-diversity.



*Fig. 75 Shri Anil Madhav Dave, Hon'ble Minister, EF&CC with the BRICS leaders*

The BRICS nations agreed upon entering a joint Memorandum of Understanding on Environmental Cooperation. A Text of the Memorandum of Understanding (MoU) on Environmental Cooperation between the BRICS countries covering the priority areas of Air quality, Water, Biodiversity, Climate change, Waste management, Agenda 2030 for Sustainable Development Goals and other areas of mutual interest as agreed to by the countries was finalised during the meeting. The Ministers announced the setting up of a Joint Working Group on Environment composed of the relevant official representatives of BRICS Environment Ministries, institutionalizing their mutual cooperation on environment-related

issues. The Joint Working Group which shall meet annually will be instrumental for the implementation of the MoU.

### **BRICS Nations Join Hands to Save Environment:**

The BRICS Environment Ministers adopted a Goa Statement on Environment during the BRICS Environment Meeting and called upon the developed countries to honour their commitments related to means of implementation and facilitate its operationalisation with a clear road-map for the successful achievement of various global environmental agreements and sustainable development goals.



*Fig. 76 Meeting of Indo-Bangladesh Working Group on conservation of the Sundarbans*

The BRICS countries resolved to develop a 'BRICS platform on Green Technology' for sharing environmentally sound technologies as a new international mechanism for public private partnership that can assist in addressing environmental challenges in our countries and promote innovations, knowledge management and capacity building including by means of a common website, a network of technical institutions and to undertake joint projects in areas of mutual interest.

**Indo-German WG:** The second meeting of Indo-German Working Groups (WGs) on Water; and Waste Management & Circular Economy was held in New Delhi from April 5 to 7, 2016. There were presentations followed by discussions on varied topics viz. water conservation/pollution abatement and waste area, water management development of Best Available Technology (BAT) standards on Water Management for future cooperation, waste

management challenges and opportunities in waste water and solid waste management, Waste to energy rapid technology assessment tool. In the meeting it was agreed that Germany would like to invest €5 to 6 billion for developmental initiatives in India to build enabling systems and addressing capacity gaps effectively. The BAT Project can be operationalized immediately for three identified sectors, namely, textiles, tannery and chemical production (pharmaceutical and dyes) and the milestones may be mutually worked out. It was agreed to develop an E-platform to exchange experience and technical expertise of mutual interest on an on-going basis. CPCB will interact from the Indian side. The Indian side welcomed the proposed cooperation in three cities, namely, Coimbatore, Bhubaneswar and Kochi as well as in Uttarakhand (city of Haridwar) in water and waste management while requesting the German side to consider Patna, Kolkata and Kanpur for future cooperation.





*Fig. 77 2nd Meeting of the Indo-German Working Groups on Water and Waste Management & Circular Economy in New Delhi.*

**Indo-Bangladesh Working Group:** The first meeting of India - Bangladesh Joint Working Group (JWG) on "Conservation of the Sunderbans" was held in New Delhi on July 21, 2016. Both the sides expressed keen interest in comprehensive biodiversity mapping of Sunderban following a common approach and methodology through identified agencies to develop baseline data for improved understanding of diversity of flora and fauna in the Sunderban region. The Central Pollution Control Board (CPCB) made a presentation on the national water quality monitoring programme in context of rivers in West Bengal especially in Sunderban. It was agreed that a study may be conducted to arrive at a set of indicators to measure health of the ecosystem

of Sunderban. The two sides noted the agreement related to joint study of biodiversity mapping of Sunderban, compilation of good practices, common approach towards monitoring of river pollution, management of marine ecosystem and the proposed study on indicators for assessment of the health of the ecosystem of Sunderban. It was agreed to designate one nodal officer each at senior level for wildlife crime control in Sunderban. The Bangladesh delegation expressed interest in enhancement of number of seats with scholarship in Wildlife Institute of India (WII).

### **Bilateral projects:**

- **Indo-German:** As part of Indo-German Co-operation programme, 9 projects have



been developed (worth € 43.2 million (m)). Out of these, the following 3 are dealt under IC&SD Division.

a. **Fostering Resource Efficiency & Secondary Raw Material Management (RE Project):**

The project focuses on fostering resource efficiency and secondary raw material management in two sectors namely, automotive and construction & demolition. With an objective to contribute towards agenda setting for overall legislative framework, provide policy recommendations to the Govt. of India and to develop an action plan to promote material resource efficiency and utilization of secondary resources thereby making an important contribution towards a closed loop recycling economy in the country, an Indian Resource Panel (InRP) on Resource Efficiency” has been constituted. India is the first country to constitute a resource panel at national level.

b. **Waste to Energy- Nasik Project:** It is being implemented by Maharashtra’s Nasik Municipal Corporation. Using the bio-methanation process, the project aims to showcase ways of handling municipal organic waste while generating energy. It is a pilot demonstration plant for solid and liquid waste management to reduce GHG emissions and generate energy (as bi-product) through co-fermentation of organic solid waste and septage.

c. **Sustainable and Environment Friendly Industrial Production (SEIP Project):** This

project aims to promote public private partnership for strengthening monitoring capacities of relevant actors on waste water and waste management issues.

**The activities scheduled/proposed for the next year is as follows:**

- Signing of the Memorandum of Understanding between India and Australia in the field of environment, forest and wildlife.
- Entering into Memorandum of Understanding between India and Bangladesh in the field of Environment.
- Entering into Memorandum of Understanding between India and Nepal On Dolphins
- Entering into Memorandum of Understanding in the field of environment with BRICS nations.
- Entering into Memorandum of Understanding between India and Qatar in the field of Environment.
- Organisation of Indo-German Environment Forum at New Delhi.
- Third meeting of the Indo-German Working Groups on (i) Water; and (ii) Waste Management & Circular Economy
- Eighth meeting on India-European Union Environment Forum.
- Ninth meeting India-European Union JWG on Environment.



- Second meeting of the India – Sweden JWG on Environment.
- Fourth meeting of India – France JWG on Environment.
- Second meeting of the India – Bangladesh JWG on Conservation of Sunderbans.
- Ninth meeting of the Indo-Norway JWG on Environment.

**International Cooperation - Multi-lateral matters:**

The division is nodal for United Nations Environment Programme (UNEP), Global Environment Facility (GEF), United Nations Development Programme (UNDP), International Resource Panel (IRP), the World Bank (WB), and regional bodies like Economic & Social Commission for Asia & Pacific (ESCAP), South Asian Association for Regional Cooperation (SAARC), South Asia Cooperative Environment Programme (SACEP), Association of South-East Asian Nations (ASEAN), Asian Development Bank (ADB), European Union (EU), India-Brazil-South Africa (IBSA) Summit on Environment amongst others. The Division supports annual contributions to various UN and other international bodies working on environmental matters. The Division directly contributes USD 31,850 annually to South Asia Cooperative Environment Programme (SACEP).

**United Nations Environment Programme (UNEP):** India is a member of UNEP and provides annual financial contribution of USD

100,000 to UNEP Environment Fund. Three of the thirty three members on UNEP's International Resource Panel (IRP) are currently from India. The Ministry is a member of the IRP Steering Committee. IRP supports UNEP's Resource Efficiency/Sustainable Consumption and Production (SCP) sub-programme and is carrying out assessments of the world's most critical resource issues with a view to developing practical solutions for government policymakers, industry and society. The 18th meeting of International Resource Panel (IRP) and Steering Committee was held in Cape Town on 6-10 June 2016. The 19th Meeting of the International Resource Panel and Steering Committee was held in Paris, France on 14-18 November, 2016. This Ministry represented in both the meetings.

United Nations Environment Assembly (UNEA) is the governing body of UNEP. The second session of UNEA was in Nairobi, Kenya from 23 to 27 May, 2016 focusing on 'Delivering on the Environmental Dimension of the Agenda 2030 for Sustainable Development'. A delegation from this Ministry actively participated in the 2nd Session of United Nations Environment Assembly alongwith concerned stake-holders. This Ministry also represented in the "Second Open-ended Meeting of the Committee of Permanent Representative (OECPR-2) held in Nairobi, Kenya from 15-19 February, 2016 convened to firm up the agenda of the UNEA-2. Mr. Eric Solheim, newly appointed Executive

Director, United Nations Environment Programme, Nairobi had visited India and had a meeting with Minister of State (Independent

Change) for Environment, Forest and Climate Change on 6th October, 2016 and had deliberations on enhancement of India-UNEP partnership.



*Fig. 78 Mr. Eric Solheim, Executive Director, United Nations Environment Programme, Nairobi had a meeting with Hon'ble Minister, EF&CC.*

**The Global Environment Facility (GEF) India:** India is a founder member of Global Environment Facility (GEF). Set up in 1991, GEF is the designated multilateral funding mechanism of 183 countries to provide incremental finance for addressing global environmental benefits which are also identified national priorities. The GEF mandate is decided as per the guidance provided by the Conference of the Parties of the multilateral environmental conventions namely Convention on Biological Diversity (CBD), United Nations Framework Convention on

Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), Stockholm Convention on PoPs and Minamata Convention on Mercury. The GEF grants are available under five focal areas namely, biodiversity, climate change, land degradation, international waters and chemicals & waste. The full-sized (> USD 2 m), medium-sized (up to USD 2 m) and small grants (exclusively for NGOs/CBOs up to USD 50,000) projects are supported. The GEF works through its 18 designated agencies of which ten are operational in India (ADB, WB, UNDP, UNEP,



UNIDO, FAO, IFAD, IUCN, WWF and Conservation International).

The Ministry of Environment, Forest and Climate Change is India's GEF Operational Focal Point (OFP) responsible for all in-country coordination. The Department of Economic Affairs (DEA) is India's GEF Political Focal Point. India is both a donor and recipient of GEF grant. In 2016-2017, two projects were completed successfully. The major impacts of these projects are as follows:

- "Energy Efficiency Improvements in Indian Brick Industry" is a UNDP/ GEF project aimed at promoting production and use of resource efficient bricks (REBs) and reduce energy consumption, soil use and GHG emissions. The project had supported 12 REB production units of which 3 new units were set in 2015-2016. Investment plans were developed for 26 units and knowledge products for architects, engineers, builders and government officials was prepared and disseminated. REB has been included in procurement schedule by Public Works Department of Punjab. The project provided technical inputs for the revision of BIS code on perforated bricks.
- "Promoting Clean Energy Technology Innovations and Competitiveness of SMEs in India" is a UNIDO/ GEF project for small and medium enterprises (SMEs) that develops innovation and entrepreneurship by enhancing emerging cleantech startups to address energy, environmental and

economic challenges. This project was a part of global initiative with 8 countries participating. In India, in last three years, the project reached out to more than 500 innovators out of which 69 were semi-finalist from 41 cities were shortlisted through a competitive process. The Cleantech Open (CTO) USA which is the knowledge partner for the project, trained the innovators on the commercialization of their product and provides a global platform for exchange of ideas and learning. CTO, in form of webinars, guided the innovators on various aspects of cleantech business and business models, to bring them at par with the Silicon Valley Start-ups. The webinars gave the innovators a virtual connect to many startups, investors, experts, mentors from all over the globe. After the guidance and assessment which continues throughout the year, the final winners are given the opportunity to pitch in the Cleantech Open Global Forum in Silicon Valley, California, where they receive recognition, awards and connections to potential partners, customers and investors world-wide. These market-ready innovators have been connected to potential investors, customers, and partners.

**GEF Small Grants Program (SGP):** The GEF's SGP works exclusively with NGOs and CBOs providing project grants up to Rs 20 lakhs to undertake activities in identified priority sectors. The Centre for Environment Education (CEE) is working on behalf of the Ministry as



National Host Institution (NHI) for GEF SGP India program.

The entire allocated grant of USD 3.691 million has been committed through nine National Steering Committee meetings held so far, out of which two were held in the reporting year. About 18 projects were approved this year. About 44 projects have been completed relating to biodiversity conservation, climate change mitigation and adaptation, land degradation and waste management. The achievements of the project completed this year are as follows:

- 645 biogas units, 118 vermi-compost pits, 116 water harvesting systems, 112 water tanks set up, 3,000 meters of door bandi constructed, more than 100 dry wells re-activated, 9 grain banks established and 50 energy-efficient jageri furnaces set up.
- 12,110 energy-efficient smokeless cook-stoves set up so far. From these cook-stoves alone, about 27,000 MTs of CO<sub>2</sub> emission reduced. In addition, 324 large size cook-stoves also reduced 1134 MTs of CO<sub>2</sub> emission.
- 16,731 MTs of CO<sub>2</sub> emission also reduced through adoption of renewable energy technologies, against the target of 12,277 MTs by the end of the project.
- 93,000 hectares of land brought under sustainable land and resource management so far against the target of 100,000 hectares.
- 198 panchayats adopted village level

resource use planning.

- A total of 1,750 women Self Help Groups have been formed in projects with 24,174 women members, benefitting about 2,29,614 households directly and indirectly. These women meet regularly every month and save nearly Rs.50-Rs.100 per month and majority of these SHGs have been linked through Banks, NABARD for credit/grants for taking up economic enterprise and technology interface in a sustainable manner.
- 8 GEF-SGP NGO partners won various awards this year.

**The World Bank (WB):** The Ministry-WB project portfolio comprises of four projects worth USD 322.56 m. Of these two projects are GEF projects managed by the Bank with a GEF grant of USD 32.78 m. All these projects are implemented by the respective thematic divisions. The project details are as follows:

- Integrated Coastal Zone Management (IDA USD 221.96 m)
- Capacity Building for Industrial Pollution Management (USD 54.18 m - IDA USD 28.97 m and IBRD USD 25.21 m)
- Biodiversity Conservation and Rural livelihood Improvement project (USD 21.78 m - IDA USD 13.64 m; GEF USD 8.14 m)
- Ecosystem Services Improvement project (GEF USD 24.64 m)
- The Ministry is in the process of developing a



future strategy of cooperation with the Bank.

**South Asian Association for Regional Cooperation (SAARC)** is an intergovernmental body which was established in 1985 to promote regional cooperation on sustainable development related issues amongst its eight member states namely Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In this regard, the SAARC secretariat organizes a meeting of the Heads of States once a year also known as SAARC summit. During the reporting year, the secretariat had organized the following event which was attended by the Ministry:

- SAARC Expert Group Meeting on Forest Management Techniques with Special Focus on Enhancing Ecosystem Services in the Climate Change Scenario' on 24-26 June, 2015 in Paro, Bhutan.

**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. This Ministry provides Government of India's annual contribution to the SACEP @ US\$ 31,850 per annum.

The SACEP Secretariat had organized the following meeting which were participated by the representative of this Ministry:

- First meeting of South Asia Forum on Sustainable Consumption and Production from 20-22 October, 2016;
- Back to back meeting on 5th Asia-Pacific Climate Change Adaptation (APAN) Forum on 17-19 October, 2016; and
- A session on Climate Change Adaptation Challenges on 18<sup>th</sup> October, 2016.

## Sustainable Development

17 Sustainable Development Goals (SDGs) and 169 associated targets were adopted by the UN General Assembly in September 2015. The outcome document is known as "Transforming Our World: The 2030 Agenda for Sustainable Development" highlights poverty eradication as the overarching goal of the new development agenda and has at its core the integration of the economic, social and environmental dimensions of sustainable development. The emerging development agenda is unique in that it calls for action by all countries, poor, rich and middle-income. The 'five Ps'- People, Planet, Prosperity, Peace, and Partnership-capture the broad scope of the agenda. The SDGs are expected to be achieved by 2030.



As SDGs are cross-cutting in nature, NITI Aayog has been given the task of coordinating the achievement of these targets with the concerned ministries and line departments. The Ministry has been made nodal for the achievement of the following SDGs:

## Sustainable Development Goals

1. No Poverty
  2. Zero Hunger
  3. Good Health and Well-being
  4. Quality Education
  5. Gender Equality
  6. Clean Water and Sanitation
  7. Affordable and Clean Energy
  8. Decent Work and Economic Growth
  9. Industry, Innovation and Infrastructure
  10. Reduced Inequalities
  11. Sustainable Cities and Communities
  12. Responsible Consumption and Production
  13. Climate Action
  14. Life Below Water
  15. Life on Land
  16. Peace and Justice Strong Institutions
  17. Partnership for the Goals
- Goal 12 Ensure sustainable consumption and production patterns
  - Goal 13 Take urgent action to combat climate change and its impacts
  - Goal 15 Protect, restore and promote

sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

- Target 17.16 Enhance the global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries
- Target 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

The Division is actively working with Ministry of Statistics and Programme Implementation (MoSPI) by contributing in the development of global indicators for each of the SDG and targets. Development of indicators for achieving the targets under the SDGs is delicate and intricate process requiring a series of consultations with stakeholder Ministries and State Governments to assess their appropriateness and implementability. Many of the targets are overlapping and may require a composite indicator. In fact, this may also require a new data system to be created to facilitate this process.

This Ministry is of the view that the primary focus of India should be on means of implementation, capacity building and transfer





of technology. Through a study commissioned by this Ministry, it has been estimated that roughly an amount of RS.35 lakh crores per annum will be required for achieving the targets under the SDGs. The developed countries should be asked to assist the developing countries in achieving these targets through financial assistance and transfer of cutting edge technology.

The Ministry developed and submitted action plan for achieving 41 Sustainable Development Goals (SDG) targets with environmental dimension to NITI Aayog through a consultative participatory process. The Ministry organized a National Workshop on Environmental Dimension of Sustainable Development Goals (SDGs) in New Delhi on 30th September 2016. This was a public consultation to discuss the ways, means, roadmap and measurable indicators for achieving 41 SDG environment-related targets assigned by NITI Aayog to the Ministry. The workshop was inaugurated by Hon'ble Minister for Environment, Forest and Climate Change and attended by senior officers from NITI Aayog, ministries, states, multilateral/ bilateral agencies, civil society organizations, academia and experts. The Ministry has initiated the process of developing national indicators for monitoring 41 SDG targets while sending inputs to MoSPI for ongoing global negotiations.

### Externally Aided Projects

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. The external funding agencies include Japan International Cooperation Agency (JICA), AFD (Government of France), etc. During the financial year 2016-17, efforts were made to seek assistance from JICA, World Bank, KFW & GIZ etc.

The projects help 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.

Currently twelve Externally Aided Projects are under implementation. Out of these projects,



eleven are State Sector Forestry Projects which are being implemented in the States of West Bengal, Rajasthan, Tamil Nadu, Sikkim, Uttar Pradesh, Gujarat, Tripura, Himachal Pradesh, Assam and Uttarakhand and one is a Central Sector project titled “Capacity Development for Forest Management and Training of Personnel”. 8 State Sector Projects and the Central Sector Project are being funded by JICA .The remaining three are being funded by AFD (Govt. of France) in Assam, KFW-Government of Germany and GIZ- Government of Germany in the state of Himachal Pradesh.

The following forestry projects are under consideration:

- Nagaland Afforestation and Eco-development project (JICA)
- Odisha Forestry Sector Development Project (JICA)
- Himachal Pradesh Forest Ecosystem Management & Livelihood Project (JICA)
- Country Focused training of Officials of MoEF&CC and State Forest Department on issues around sustainable Forest Management, Biodiversity conservation and adoption of new technologies –(JICA)
- Himachal Pradesh: Forests for Prosperity – (World Bank)
- Innovation in Green Growth Management, Uttarakhand – (World Bank)
- World Bank project on Situation analysis on Forest Fire -(World Bank)
- Application for Technical Cooperation project on Project Development of REDD plus implementation mechanism for Sustainable Forest Management in Odisha- (JICA)

# Administration and Civil Construction





## Administration and Civil Construction

There are three sections in Administration viz. P-I, P-II and P-III.

Section-wise brief description is given hereunder:-

### P-I Section

- Cadre Management of Technical posts of the Ministry of Environment, Forest and Climate Change (EF&CC);
- Creation and continuation of technical posts;
- Establishment/service matters of all Technical posts (other than National River Conservation Directorate) viz. appointment, Promotion, review cases, leave cases (other than National River Conservation Directorate, National Afforestation and Eco Development Board, Regional Offices);
- Recruitment and retirement benefits of Technical Officers;
- Recruitment Rules of Technical Posts;
- Work allocation among Technical Officers;
- Foreign deputation sanction Orders of Minister of EF&CC and Officers/officials of Ministry;
- Cadre Management of scientific posts of the Ministry;
- Creation and continuation of scientific posts of Ministry;
- Establishment/service matters, including reservation of posts (other than National River Conservation Directorate) viz.

appointment, Promotion, review cases, leave cases (other than Regional Offices) of all scientific posts;

- Recruitment and retirement benefits of Scientists of Ministry;
- Court cases on above-mentioned issues;
- Disciplinary cases of Group 'A' 'B' & 'C' officials of Ministry other than IFS officers under Central Staffing Scheme of the Ministry for IFS officers. Work allocation among scientists;
- Maintenance of ACRs of Group 'A' 'B' & 'C' officials of Ministry other than IFS officers under Central Staffing Scheme of the Ministry for IFS Officers.

### P- II Section

- Cadre management of CSS/CSSS/CSCS;
- Establishment/service matters of Secretariat Group 'A', 'B' & 'C' posts (except officers working at the strength of IFS, NRCDC and NAEB Divisions) viz. appointment, review cases, leave cases, retirement and retirement benefits, medical claims, tuition fee reimbursement, leave encashment, children education allowance, court cases etc.;
- Training Programme of All India Services and Central Secretariat Services officers;
- Personnel matters relating to Minister's staff.

### P-III Section

- Recruitment, of Group 'A' Scientific Posts in the Ministry including its Regional Offices and all the subordinate offices;



- Review/assessment of Group 'A' Scientists for promotion under Flexible Complementing Scheme in the Ministry and Subordinate offices;
- Framing/Amendment of Recruitment Rules relating to Ministry of Environment, Forest and Climate Change, Scientific Group 'A' Posts;
- Policy matters of Group 'A' Scientific Posts in connection with Flexible Complementing Scheme.

**Activities undertaken so far during 2016-2017:** During the year 2016-2017, the major activities undertaken by Administration division are as under:-

### Promotion

The details of cases of promotion of Scientists

Grade	Ministry (Main)	ZSI	Total
Scientist 'B'	03	-	03
Scientist 'C'	10	39	49
Scientist 'D'	03	32	36
Scientist 'E'	-	05	05
Scientist 'F'	02	-	02
<b>Total</b>	<b>19</b>	<b>76</b>	<b>95</b>

- Appointment of 3 Research Assistant (Environment) through SSC.
- Appointment of 3 Technical Officer (Forestry) Gr. II through UPSC.
- Recruitment of 7 posts of Technical Officer (F) Gr. II and 4 posts of Research Assistant (E) Gr. II and 6 post of Research Investigator (F).

of the Ministry under Flexible Complementing Scheme, including its attached and subordinate offices, during the year 2016-17 are hereunder:-

- 01 case of promotion from the grade of Scientist 'E' to 'F'.
- 12 cases of promotion from the grade of Scientist 'C' to 'D'.
- 05 cases of promotion from the grade of Scientist 'B' to 'C'.

### Recruitment

The details of Direct Recruitment of Group 'A' Scientists undertaken in various grades in the Ministry, including its attached and subordinate offices, during the year 2016-17 have been tabulated hereunder:-

- Issuing Sanction Orders of 74 delegations of foreign tours of Minister and officers upto 09/12/2016.
- Processing of retirement benefits of 09 employees.
- Initiating the process of filling of 07



vacancies for the year 2016-17 in various grades of Scientists.

- Placement of newly recruited 18 Scientists in various divisions and Regional Offices of the Ministry.
- Processing of three suspension cases and two disciplinary cases. Besides, one court case involving disciplinary case also taken care of.
- Premature-retirement of two officials of the Ministry as a result of review of service under FR 56(j).
- During the year, a total number of 37 Officials were transferred under Rotational Transfer Policy.
- One case of alleged sexual harassment was reported which was timely attended by the Internal Complaints Committee on Sexual Harassment of the Committee.

## Indian Forest Service (IFS) Cadre Management

### Mandate

- Ministry of Environment Forest & Climate Change is the Cadre Controlling Authority for the Indian Forest Service (one of the three All India Service).
- IFS division deals with all cadre Management related matters.
- The total authorized cadre strength of the Indian Forest Service as on 1st January, 2016 is '3152' (three thousand one hundred fifty two) which includes '2196' Direct Recruits and '956' 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 large number of the IFS officers are in various Ministries and institutions both in the State and at the Cadre.

### Activities of IFS Division

- Determination of vacancies and framing of rules for Direct Recruitment through Union Public Service Commission 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 Meetings, Notification of Select List and year of allotment to officers inducted in Indian Forest Service.
- 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 cadre clearance for appointment 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.
- Confirmation of IFS officers in Service.

### Achievements

- Vacancy determination and Cadre Allocation for IFS batch 2016 was done.
- Cadre review completed in respect of Maharashtra, Uttarakhand & Tripura.
- Smart Performance Appraisal Report Recording Online Window (SPARROW) implementation for online filing of PAR in respect of IFS Officers is under process. So far, Digital Signature has been assigned to '1074' IFS officers.
- 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). The website also has information pertaining to the vacancy circulars, training programme circulars, Rules and Regulations concerning IFS. Further website also has Annual Confidential Report (ACR), availability status of IFS officers which can be accessed by concerned officer. Each and every members of the Service has been provided facility to have his unique Email account through NIC on this site and members of Service have been provided facility to update data relating to their posting details online for periodical upgradation.
- Eighty-Eight State Forest Service officers were included into the Indian Forest Service under IFS (Appointment by Promotion) Regulations, during January–December, 2016.
- Thirty-Three IFS officers joined at various levels under the Central Staffing Scheme of the Ministry and Twenty-six IFS officers joined under the Central Staffing Scheme of the Department of Personnel & Training. Eighteen IFS officers have been empanelled at the level of Joint Secretary and equivalent at the centre.
- Cadre Review of Nagaland, Manipur, Gujarat, Tamil Nadu, Telangana and Sikkim are under process for approval of Department of Personnel & Training. Cadre review of IFS of Andhra Pradesh, Jammu & Kashmir, Odisha, Haryana, Uttar Pradesh and Rajasthan is under process for approval of Cadre Review Committee.
- Around 15 Court Cases are pending in various Courts across the Country were liquidated.
- Around 422 Court Cases relating to the issues of Indian Forest Service are pending in various Tribunals / Courts all over the Country.



## Vigilance Division

The Vigilance Division is responsible for examination and processing of complaints, disciplinary cases, appeals, reviews and memorials preferred by Indian Forest Service Officers and maintenance/scrutinization of Annual Immovable Property Returns (AIPRs) etc. Besides, examination and processing of cases referred by the Central Bureau of Investigation (CBI) relating to grant of sanction for prosecution/RDA in respect of officers/staff of the Ministry and IFS officers is also handled by the division.

A total of 101 complaints were received during the year, including 24 from CVC portal. 102 complaints including old ones were finally disposed of during the year, 30 Disciplinary Proceedings cases including old ones, 02 Memorial, 10 Appeal cases and 07 Prosecution cases were processed in the Vigilance Division. Out of these, 09 Disciplinary cases, 02 Appeal case and 01 Prosecution case of previous years were finally disposed of. Court cases were also pursued in the respective Court/CAT Bench. Total 37 numbers of RTI applications and Appeals were received and disposed of with suitable replies.

1590 Annual Immovable Property Returns (AIPRs) as on 01.01.2016 were received from Group 'A','B' & 'C' officers of the Ministry including IFS officers, as well as organisations under it, of which 749 AIPRs were scrutinised till the end of December, 2016.

The Vigilance Awareness Week was observed in the Ministry during the period from from 31<sup>st</sup> October to 5th November, 2016, with the

theme "Public participation in promoting Integrity and eradicating Corruption" and a pledge was administered by Secretary (E,F&CC) to the officers & staff on the occasion for eradication of corruption from all spheres of life and adherence to principles of transparency and integrity.

The Monthly Report of CVO on the cases relating to prosecution sanctions, disciplinary proceedings, complaints etc. was regularly sent to the CVC during the year.

The Ministry of Environment, Forest and Climate Change has taken following measures to curb corruption as preventive vigilance:

- Online Environmental Clearance: The process of receipt of applications for granting of environmental clearances has been brought online. The applicants can now see the status of their applications on the portal apart from agenda and minutes of Environmental Appraisal Committee meetings. There is considerable improvement in time taken for decisions. The weighted average time taken in granting environmental clearance before launching online system (4th July, 2014) was 599.29 days, which has now come down to 192.59 days after launch of online system for applications for environmental clearance.
- Online Forest Clearances – The forest clearances have now been brought online and the process of decision making has been streamlined thereby removing arbitrariness and improving predictability.
- Online CRZ Clearances – The process of clearances regarding Coastal Regulation





Zone is being brought online and is likely to be completed within a short time.

- Decentralization of Powers – State Level Environment Impact Assessment Authorities (SEIAAs) and District Level Environment Impact Assessment Authorities (DEIAAs) have been empowered for grant of specific categories of projects to cut down delays. The standardization of terms of reference of Environment Impact Assessment Report and Environment Management Plan has been carried out and the timeline for finalization of terms of reference has been laid down as 30 days.
- Transparency in Categorization of Industry – The system of classification of industries into Red, Orange, Green and White has been made completely transparent. It is now possible for industries to assess the categorization on their own and also take necessary steps towards adoption of more environment friendly processes in their production systems. The basket of Red category of industrial sectors has been reduced from 85 to 60; the Orange category of industrial sectors have increased from 73 to 83 and the silo of Green category of industrial sectors have shrunk from 83 to 63. A new White category of industry has been introduced which are non-polluting and will not require consent to operate.

### Parliament Section

The Parliament Section in the Ministry is assigned with the responsibility of handling entire parliamentary work of the Ministry. It ensures that the parliamentary work

pertaining to the Ministry of Environment, Forest and Climate Change is accomplished as per the prescribed schedule and procedures. The Section maintains liaison with the Ministry of Parliamentary Affairs, Secretariats of Lok Sabha/Rajya Sabha, other Ministries/ Departments with a view to fully discharge the parliamentary obligations of the Ministry. The Section also coordinates the visits of various Parliamentary Committees to various parts of India.

During the year 2016-17, a total number of 995 Parliament Questions pertaining to various aspects of environment were answered by the Ministry. It included 611 questions in the Lok Sabha, out of which 44 were starred and 567 were un-starred. A total of 384 questions were asked in the Rajya Sabha, out of which 34 were starred and 350 were un-starred. The questions covered a wide range of issues with which the Ministry is concerned, prominent among them being questions related to Freshwater/Marine Conservation, Prevention/Control of Air Pollution, Waste Management, Protection and Management of Forests, Climate Change, Environmental Clearance, Habitat Improvement and Protected Areas, Protection of Tigers, Protection of Elephant, Clean Energy and Production Processes, Monitoring Devices, Crimes related to Environment and Animals, Endangered Species, Environmental Norms and Regulations, Livelihood and Protection of Local Communities, & Awareness Camps and People's Participation etc.

The ENVIS Centre at WWF-India, under ENVIS scheme of the Ministry compiles the above mentioned Parliament Questions as replied by MoEF & CC and Other Ministries pertaining to various environmental issues.



Parliament Questions replied by the Ministry during 2016-17 both in Lok Sabha and Rajya Sabha in various Sessions are as under:-

➤ **Lok Sabha**

Type Session	Budget Session	Monsoon Session	Winter	Total
Starred	20	13	11	44
Unstarred	245	184	138	567
Total	265	197	149	611

➤ **Rajya Sabha**

Type Session	Budget Session	Monsoon Session	Winter	Total
Starred	10	12	12	34
Unstarred	118	111	121	350
Total	128	123	133	384

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 1130 and 684 respectively. After classification, the total number of questions in both Lok Sabha and Rajya Sabha rises in comparison to the unclassified data, because of the fact that a single question can be attributed to more than one subject sub-head.

Statistical representation depicting the subject-wise coverage of total number of questions asked in both the houses of Parliament (Lok Sabha and Rajya Sabha) during the year 2016-17 is given in Table (A) and Table (B) respectively.

Table (A) Subject-wise depiction of questions replied by the Ministry in Lok Sabha during 2016-2017

Subjects	Budget Session	Monsoon Session	Winter Session	Total
Agriculture	6	14	5	25
Alternative Technologies	10	10	3	23
Biosafety	0	1	1	2
Climate Change and Meteorology	24	22	12	58
Disaster Management	2	4	1	7
Energy Studies	19	16	11	46
Environment and Forest Trade	5	0	0	5
Environmental Conservation	39	36	20	95
Environmental Education, NGOs and Media	24	27	20	71
EIA	26	31	24	81
Forest Conservation	58	56	33	147



Subjects	Budget Session	Monsoon Session	Winter Session	Total
Freshwater and Marine Conservation	9	17	6	32
Health and Sanitation	26	31	18	75
Medicinal Plants	4	3	3	10
Pollution	95	55	47	197
Water Management	36	39	21	96
Wildlife Management	57	62	41	160
<b>Total</b>	<b>440</b>	<b>424</b>	<b>266</b>	<b>1130</b>

**Table (B) Subject-wise depiction of questions replied by the MoEF&CC in Rajya Sabha during 2016-2017**

Subjects	Budget Session	Monsoon Session	Winter Session	Total
Agriculture	9	11	23	43
Alternative Technologies	6	5	4	15
Climate Change and Meteorology	7	6	16	29
Disaster Management	4	3	3	10
Energy Studies	10	13	10	33
Environment and Forest Trade	1	3	0	4
Environmental Conservation	22	15	14	51
Environmental Education, NGOs and Media	12	10	9	31
EIA	10	14	10	34
Forest Conservation	30	44	29	103
Freshwater and Marine Conservation	5	14	4	23
Health and Sanitation	23	10	16	49
Medicinal Plants	4	0	0	4
Pollution	42	29	45	116
Water Management	21	14	11	46
Wildlife Management	39	36	18	93
<b>Total</b>	<b>245</b>	<b>227</b>	<b>212</b>	<b>684</b>



The ENVIS Centre, WWF-India has published the compendium of Environment in the Indian Parliament: An Analysis 2016-17 in collaboration with Parliament Section, MoEF&CC. The preparation of the Trends & Analysis of the above-mentioned Parliamentary questions replied by the Ministry of Environment, Forest and Climate Change and Other Ministries related to Environment is available with the ENVIS Centre at WWF-India. Online accessibility is also available on the Centre's website: <http://www.wwfenvis.nic.in>.

During the year 2016-17, Parliament Section coordinated nine meetings of Department related Parliamentary Standing Committee of Science and Technology, Environment, Forest and Climate Change and three meetings of Consultative Committee of the Ministry. The subject matter of Deptt. Related Parliamentary Standing Committee of Science and Technology, Environment, Forest and Climate Change is as under:-

- a. The Compensatory Afforestation Fund Bill, 2015,
- b. Environmental Pollution in Delhi,
- c. Problem of Environmental Pollution by Public Sector,
- d. Management of Elephant Corridors,
- e. Recent Forest Fires and its effects on Environment, Forests, Biodiversity and Wildlife and Remedial/Preventive Measures,
- f. Impact of Mining on Environment,

- g. Air Pollution in the National Capital Region,
- h. 'Reforestation Status in India'; 'Status of Marine and Coastal Pollution in India and efforts made by the Ministry for its Mitigation'; 'Identification, Inventory and Documentation of Medicinal Plants in India' and 'Delay in Submission of Action Taken Note on 283rd Report of the Committee' and
- i. 'Marine and Coastal Pollution in Indian and efforts made by the Ministry of Environment, Forest and Climate Change for its Mitigation' – regarding.

The subject matter of three Consultative Committees is as under:-

- a. Biodiversity in general and Wetlands, Mangroves and Coral Reef in particular,
- b. Project Tiger,
- c. COP-22

In addition of the above other meetings relating to Committee Subordinate Legislation, Public Accounts Committee, Estimate Committee, Committee on Petition, and Committee on Government Assurances etc. were also co-ordinated.

## **Information Technology (IT) and e-Governance**

Government working is based on intensive knowledge and information sharing. Effective communication and sound Information and Communication Technology (ICT) go hand in hand. For speedy implementation and



monitoring of various programmes / schemes and to make most of ICT to secure efficiency in working, Ministry has embarked upon a comprehensive exercise to implement various e-Governance activities/projects.

### Progress/Achievements

- Implemented e-Office in the Ministry under Digital India Programme (collected details of officers and staff, Registered 970 Users in eOffice portal, Posting and Promotion, Role Post, Setting of Workflow, Updated Leave Balance details, Provided Training, updation in Notice Board).
- Created email IDs in .gov.in domain for all the users of eOffice.
- Management of Wi-Fi System at Indira Paryavaran Bhawan including addition/deletion of users, configuration in mobile phones, installation of certificates in iPhones.
- Management of Biometric Attendance System including sending reports to all divisional heads.
- Photographic digitization of 9000 images (including Dorsal, Ventral, Lateral) of Faunal Type Specimens at Zoological Survey of India, Kolkata has been completed.
- Monitored the regular updation of material in eSamikSha (<http://cabsecmis.gov.in>) - a real time, on-line system to review follow-up action.
- Implemented Budget Expenditure Management System for IFD, PAO, B&A, PC and Divisions.
- Implemented Online Stationary Request Management System for submitting the request for stationary.
- Management of Smart Performance Appraisal Report Recording Online Window (SPARROW) for online submission of APAR of IAS and CSS Officers.
- Implemented Smart Performance Appraisal Report Recording Online Window for submission of APAR of Scientists in the Ministry.
- Conducted workshops in the Ministry to explain the concept of “My Mobile, My bank, My wallet” to enable all officers and staff to understand the steps to be taken to use various options for making digital payments on day-to-day basis.
- Arrangement of Video Conferencing System for PRAGATI and other meetings.
- IT infrastructure of the Ministry was strengthened.
- Examination of all policy issues pertaining to Information Technology.

### RTI Cell

The Ministry received 3045 Applications and 376 Appeals under RTI Act, 2005 during the year 2016-17 (01-04-2016 to 31-12-2016) as per RTI-MIS portal.



Central Public Information officer (CPIOs) and First Appellate Authorities (FAAs) in the Ministry have been designated for effective implementation of the RTI Act, 2005. The notification designating CPIOs/FAAs is revised periodically as and when there is change in the work among CPIOs/FAAs. The list of CPIOs/FAAs of the Ministry has also been uploaded on the Ministry's website.

During the year, two training programme were organized on 27th July and 17th October, 2016 for alignment with DOPT's - RTI online portal. Upto 31-12-2016 all Attached/ Subordinate/ Autonomous organization under this Ministry have been aligned except two organizations. They have been requested to get themselves aligned with the portal.

### **General Administration**

The General Administration (GA) Division of the Ministry is entrusted with the responsibility of providing logistics and support services to senior officers and staff for discharging their duties and smooth functioning of the Office. It includes procurement and supply of stationery, stores, equipments, support services to the officials of the Ministry including provision of transport, communication and general upkeep etc. The Ministry is housed in a new building at Jor Bagh Road, New Delhi which is a green building, with net zero energy consumption. It has the unique distinction of getting LEED India Platinum & GRIHA-5 Star Green Building ratings. Under 'Swachh Bharat Abhiyan', waste disposal

mechanism has also been put in place during the year 2016 in the building.

### **Public Grievance Cell**

The Public Grievance Cell has been functioning in the Ministry to attend to the complaints of public regarding forestry and environmental matters etc. Presently Shri Anil Sant, Joint Secretary is the Nodal Public Grievance Officer of Public Grievance Cell of this Ministry.

As on 1st December, 2016 out of total 19119 number of Public Grievance, 17863 Grievances had been disposed of online and 1253 grievances are pending for disposal. The rate of disposal is 93%. Efforts are however, being continued by the Public Grievance Cell to further reduce the pendency by issuing periodical reminders to the Division/Sections concerned for settlement/disposal of pending grievances.

### **Implementation of Official Language Policy**

The Quarterly Progress Reports regarding progressive use of Hindi in the official work received from Sections/Desks as well as from Attached/ Subordinate/ Regional Offices/ Autonomous bodies/ Corporations/ Boards/Undertakings etc. were reviewed and remedial measures were suggested to avoid recurrence of the shortcomings.

Quarterly meetings of Official Language Implementation Committee constituted under the chairmanship of Sh. Anil Sant, Joint



Secretary (In-charge-OL Division) in MoEF&CC were organised and decisions taken therein were complied with. Decisions taken in the meetings of- (i) Kendriya Hindi Samiti constituted under the Chairmanship of Hon'ble Prime Minister and (ii) Kendriya Rajbhasha Karyanvayan Samiti constituted under the chairmanship of Secretary (OL) were complied with alongwith Presidential Orders issued on the recommendations of the Committee of Parliament on Official Language constituted under Chairmanship of Hon'ble Minister for Home Affairs, comprising 30 Hon'ble Members of Parliament. Official Language related inspection meetings of the Hon'ble Committee of Parliament on Official Language were also organised and efforts were made to comply with the assurances given to them during such inspections;

### **Phase-wise Hindi Typewriting Training of employees was started.**

Hindi month was organized in September, 2016 during which various Hindi competitions aimed at increasing progressive use of Official Language Hindi were organized for the staff/officers of Ministry (proper), NAEB, NRCD and CCU.

Hindi workshops were organized in every quarter for the officers/staff in the Ministry in order to remove their hesitation in doing work

in Hindi and to enable them to carry out their day-to-day transaction in Hindi.

Support was extended to Officers/Sections in installation of Unicode Hindi Software in their computer systems.

### **Civil Construction Unit (CCU)**

The works being taken up by CCU consist of construction of office-cum-laboratory buildings, herbariums, national regional museums of natural history, staff quarters and other building works relating to various units of the Ministry of Environment, Forests and Climate change viz. Botanical Survey of India, Zoological Survey of India, National Museum of Natural History, State Forest Service Colleges, Indira Gandhi National Forest Academy, Forest Survey of India, National Zoological Park, New Delhi and Regional Offices of Ministry located in different part of the country. The CCU also undertakes works of renovation/up-gradation of existing Residential as well as Non residential buildings as per requirement.

**Renovation of Hari Singh Auditorium for IGNFA, Dehradun:** The work involved new provision of VRF Air conditioning system, replacement of Acoustic treatment, refurbishing of Chairs, New projection system, stage lighting, replacement of carpet and making the dais accessible for differently able persons including painting and finishing complete Cost of Rs. 212 lacs.



**Fig. 79** Renovation of Hari Singh Auditorium for Indira Gandhi National Forest Academy (IGNFA), Dehradun



# Plan Coordination and Budget





## Plan Coordination Division

Plan Coordination Division is entrusted with the coordination of all Plan Schemes and Programmes of the Ministry of Environment, Forest & Climate Change. It functions as the nodal Division for issues and matters related to the NITI Aayog and the Ministry of Finance (Department of Economic Affairs' Budget Division and the Department of Expenditure). The work handled in the Division covers preparation, monitoring and review of the Ministry's Five Year Plans, Annual Plans and Annual Action Plans and it also performs the tasks associated with the Union Budget and the Outcome Budget of the Ministry. The responsibility of monitoring of the progress in utilization of Plan funds, released for implementation of various Schemes is also assigned to the Division. The work relating to Budget allocation/outcome Budget is now being looked after by Budget Accounts Section.

## Twelfth Five Year Plan (2012-2017)

The Twelfth Plan Document, duly approved by the National Development Council (NDC) on

27<sup>th</sup> December 2012, had the basic theme of "Faster, Sustainable, and more Inclusive Growth", and laid out major targets, key challenges to meet them and the broad strategy to be followed to achieve the stated objectives. The Ministry of Environment, Forest & Climate Change has been allocated an outlay of Rs 17,874 crores, which works out to 0.41% of the Plan allocation across various Ministries/ Departments as against a share of 0.42% or Rs 9231.00 crores allotted in the Eleventh Five Year Plan. At current prices, the enhancement in this Ministry's Twelfth Plan outlay over the Eleventh Plan outlay, however, works out to 109%.

## Annual Plan 2016-17:

The Ministry has been allocated an outlay of Rs 2000.00 crore in the Budget Estimates (BE) for Financial Year 2016-17, which has been subsequently increased at Revised estimates (RE) stage to Rs. 2060.23 crores. The sector-wise summary of the Outlays and Expenditure for the Twelfth Plan and the Annual Plans falling therein is given in the following Table:

**Sector-wise Summary of Twelfth Plan Outlays/ Actual Expenditure (as on 31<sup>st</sup> December 2016)**

(Rs. in crore)

Sector Period	Environment	NRCD#	Forests & Wildlife	NAEB@	Animal Welfare	Total
XII Plan Approved Outlay	3,802.00	4,273.00	4,818.80	4,780.00	200.20	17,874.00
<b>2012-13</b>						
Outlay (BE)	580.42	771.80	606.09	446.49	25.20	2430.00
Actual Expenditure	388.13	421.02	577.81	224.08	25.09	1636.13
<b>2013-14</b>						
Outlay (BE)	614.37	619.80	719.14	451.49	25.20	2430
Outlay (RE)	431.10	530.26	580.31	300.93	7.40	1850
Expenditure as on 31.03.2014	416.43	517.11	571.33	299.07	7.4	1811.34



Sector Period	Environment	NRCD#	Forests & Wildlife	NAEB@	Animal Welfare	Total
<b>2014-15</b>						
Outlay (BE) (Interim)	678.01	632.79	713.11	432.89	23.20	2480.00
Outlay ( BE) (Regular)	873.80	*	713.11	432.89	23.20	2043.00
Expenditure as on 31.03.2015	504.29	114.61	617.67	270.57	16.19	1523.33
Revised Estimate	551.98	84.00	623.37	273.65	17.00	1550.00
<b>2015-16</b>						
Outlay (BE)	723.16	81.00	558.94	182.00	11.50	1556.60
Outlay (RE)	802.74	113.63	575.82	190.00	11.50	1693.69
Expenditure as on 31.01.2016*	763.73	112.36	556.89	181.49	6.85	1621.32
<b>2016-17</b>						
Outlay (BE)	827.49	162.00	867.50	130.01	13.00	2000.00
Outlay (RE)	931.84	172.80	825.44	123.40	6.75	2060.23
Expenditure as on 31.12.2016	498.62	143.99	594.40	88.42	2.32	1327.76

# National River Conservation Directorate (NRCD) and National Plan for Conservation of Aquatic Eco Systems (NPCA).

@National Afforestation & Eco-Development Board (NAEB), National Afforestation Programme (NAP) and Green India Mission (GIM).

\* Expenditure as per sanctions.

### Important activities during 2016-17:

- I. Preparation of the Annual Plan 2016-17 was also done in respect of all Demands/Appropriations controlled by the Ministry. This includes regular monitoring of physical and financial progress of the Annual Plan for 2016-17 against the targets set out therein. Revised Estimates for 2016-17 were also finalised in a timely manner.
- II. To review the Central Sector Schemes (CS) and Centrally Sponsored Schemes (CSS) of the Ministry, an Evaluation Committee under the Chairpersonship of the Senior Economic Adviser was constituted. This Committee had four Sub-Committees on the major areas, which were as follows:
  - a. Sustainable Management of Natural Resources
  - b. Wildlife Management & Animal Welfare

- c. Education, Training, Monitoring, Research and Development.
- d. Environment and Climate Change.

Each Sub-Committee had two domain experts as members to render service in assessing and evaluating programmes and schemes and also to finalise the recommendations of the Committee. Several meeting of all the Committees were held. All Schemes were evaluated on the basis of performance, achievements and shortcomings noticed. The members of the Committee also undertook field visits to the ground realities.

The Committee submitted its report to the Secretary, EF&CC in October, 2016 with a set of wide-ranging recommendations for revamping the Schemes, in order to make them more meaningful and effective in achievement of the desired objectives/targets and goals.



## Annexure-I

### Significant Audit Paras as per Report No. 30 of 2016

Sl. No.	Report No. & Year	Para No.	Brief Subject
1	27 of 2014	6.4	Non-establishment of model facilities for management of Municipal Solid Wastes
2	30 of 2015	7.1	Implementantion of E-waste (Management and Handling) Rules, 2011 by Central Pollution Control Board.
3	27 of 2014	6.3	Wasteful expenditure on hiring of office accommodation
4	22 of 2013	6.1	Unauthorized creation and Up-gradation of posts by Centrla Pollution Control Board.
5	21 of 2013	Entrie Report	Report on Compensatory Afforestationin India.
6	3B of 2001	1	Implementationof Environment Acts relating to water pollution
7	30 of 2015	7.2	Inordinate delay in completion for pilot projects for sewage treatment.



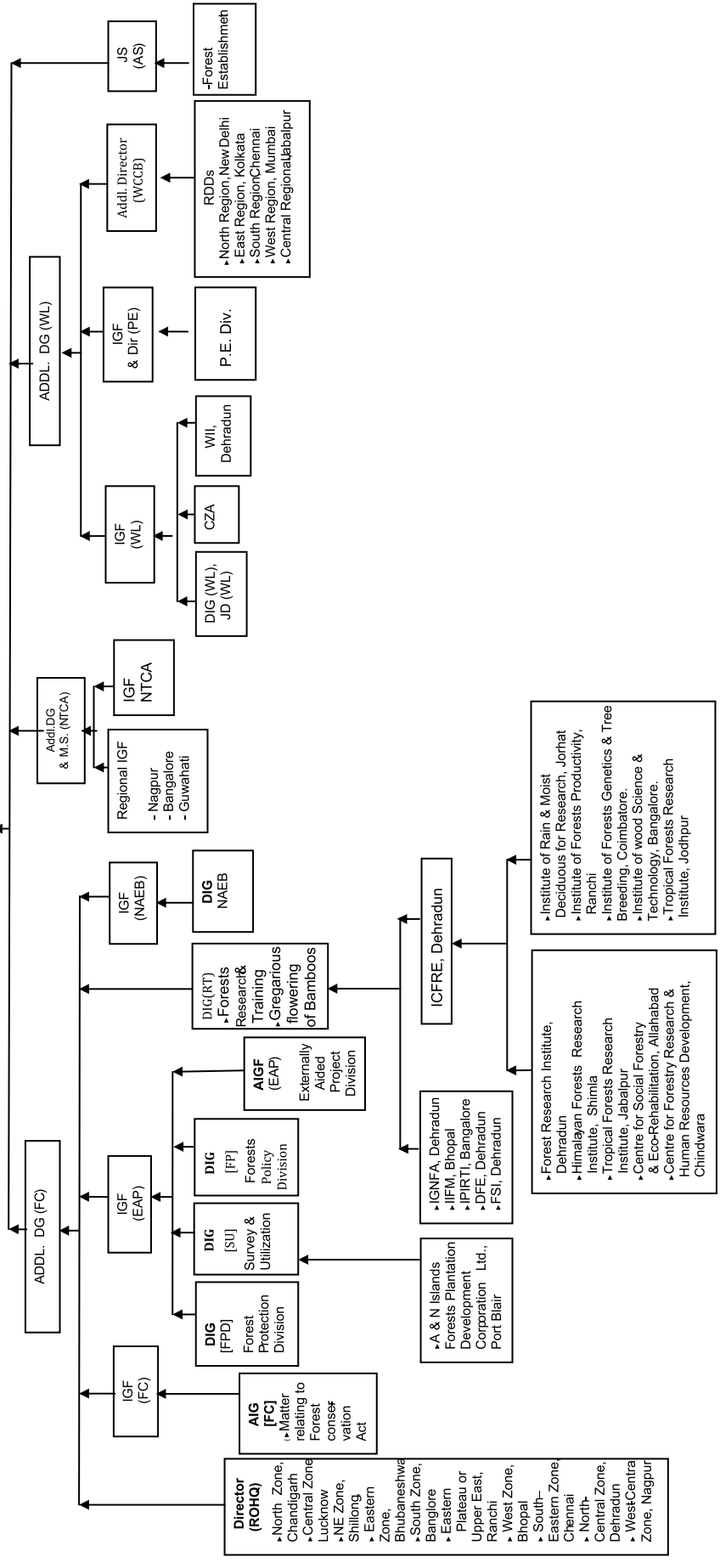
**ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE (DIVISIONS UNDER FORESTRY & WILDLIFE SECTOR)**

As on 01 December, 2016

MINISTER FOR ENVIRONMENT, FOREST & CLIMATE CHANGE

SECRETARY

DGF & SS



- ▶ Institute of Rain & Moist Deciduous for Research, Jorhat
  - ▶ Institute of Forests Productivity, Ranchi
  - ▶ Institute of Forests Genetics & Tree Breeding, Coimbatore.
  - ▶ Institute of wood Science & Technology, Bangalore.
  - ▶ Tropical Forests Research Institute, Jodhpur
- ▶ Forest Research Institute, Dehradun
  - ▶ Himalayan Forests Research Institute, Shimla
  - ▶ Tropical Forests Research Institute, Jabalpur
  - ▶ Centre for Social Forestry & Eco-Rehabilitation, Allahabad
  - ▶ Centre for Forestry Research & Human Resources Development, Chindwara



## Annexure-IV

## List of Wetlands of International Importance in India under Ramsar Convention

S. No.	Name of Wetland	State	Date of declaration
1.	Chandratal	H.P.	08/11/05
2.	Renuka	H.P.	08/11/05
3.	Rudrasagar	Tripura	08/11/05
4.	Uppar Ganga	U.P.	08/11/05
5.	Hokarsar	J&K	08/11/05
6.	Surinsar - Mansar	J&K	08/11/05
7.	Bhitarkanika Mangroves	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.	Hariker Lake	Punjab	23/03/90
21.	Loktak Lake	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	Rajasthan	01/10/81
26.	Nalsarovar Wetland	Gujarat	24/09/12



## NOTES

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## NOTES

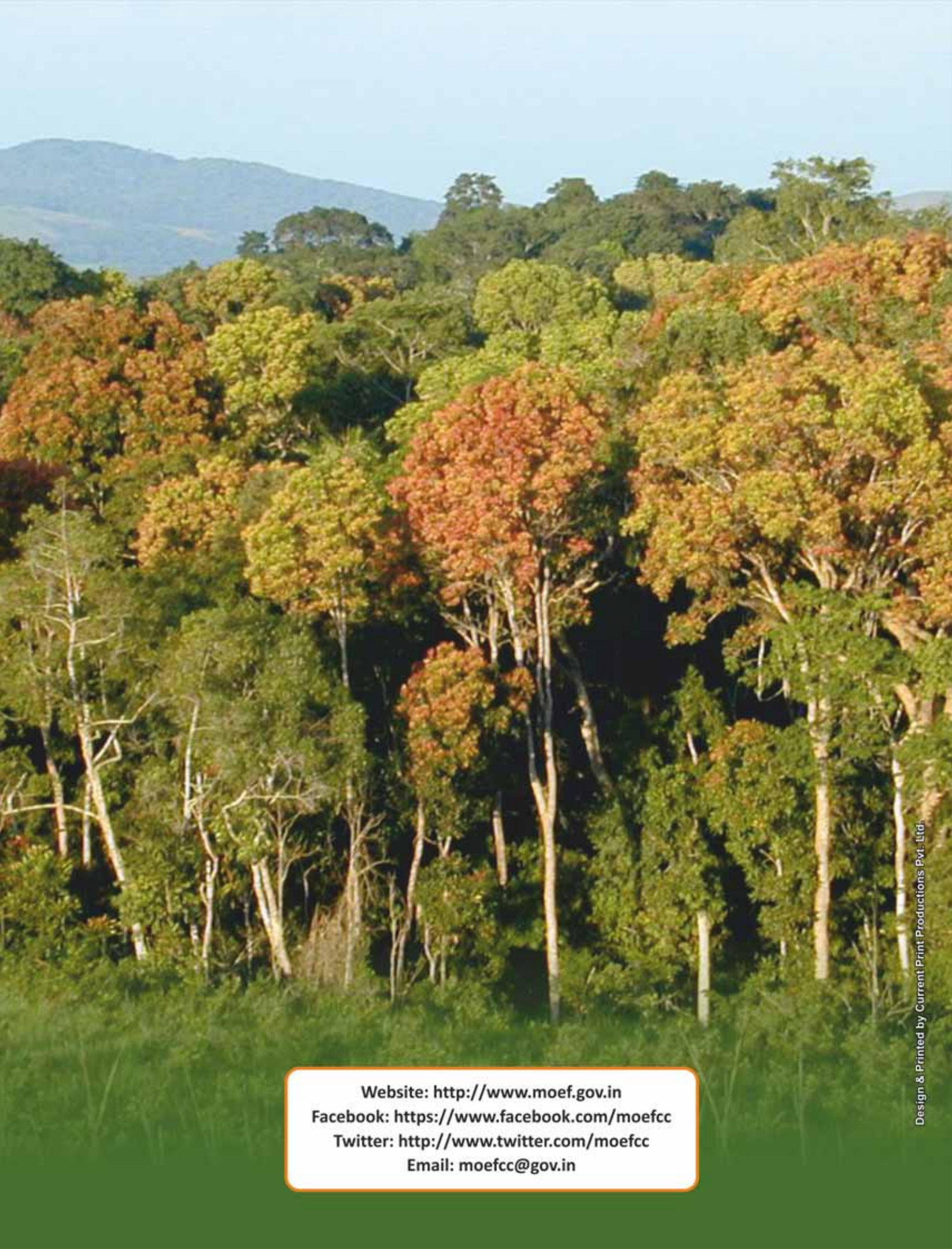
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## NOTES

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