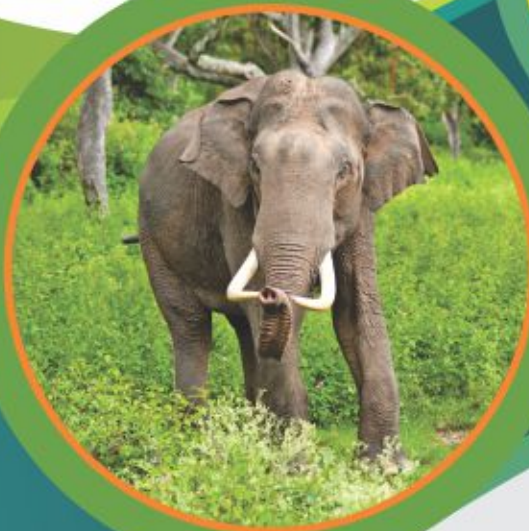


Mainstreaming Biodiversity Concerns into Forestry and Forest Management



Centre for Biodiversity Policy and Law
National Biodiversity Authority
2019



Mainstreaming Biodiversity Concerns into Forestry and Forest Management

C. Thomson Jacob, Giridhar Kinhal & B. Meenakumari



Centre for Biodiversity Policy and Law
National Biodiversity Authority

2019

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Citation

CEBPOL, NBA, 2018. Mainstreaming Biodiversity Concerns into Forestry and Forest Management. Centre for Biodiversity Policy and Law, National Biodiversity Authority, 57p.

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ISBN No.: 978-81-940589-0-8

Published by

Centre for Biodiversity Policy and Law (CEBPOL)

National Biodiversity Authority

5th Floor, TICEL Biopark, CSIR Road, Taramani

Chennai 600 113, Tamil Nadu

Website: www.nbaindia.org/cebpol

Layout and Design

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List of Abbreviations

ABS	Access and Benefit Sharing
ANR	Assisted Natural Regeneration
BD	Biological Diversity
BHS	Biodiversity Heritage Site
BMC	Biodiversity Management Committee
BNHS	Bombay Natural History Society
BR	Biosphere Reserve
BSI	Botanical Survey of India
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CBD	Convention on Biological Diversity
CBSE	Central Board of Secondary Education
CCA	Community Conservation Area
CEBPOL	Centre for Biodiversity Policy and Law
CEE	Centre for Environmental Education
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Conservation of Migratory Species of Wild Animals
CoP	Conference of the Parties
CR	Community Reserves
CR	Conservation Reserves
EDC	Eco Development Committee
EDF	Eco development Force
ENVIS	Environmental Information System
ESA	Ecological Sensitive Areas
EXIM	Export Import
FDA	Forest Development Agency
FRA	Forest Rights Act

FRI	Forest Research Institute
FSI	Forest Survey of India
GIM	Green India Mission
Goi	Government of India
IBA	Important Bird Area
ICFRE	Indian Council of Forestry Research and Education
ICSE	Indian Certificate of Secondary Education
IEG	Institute for Economic Growth
IIFM	Indian Institute of Forest Management
IGIDR	Indira Gandhi Institute of Development Research
IGNFA	Indira Gandhi National Forest Academy
ISFR	Indian State of Forest Report
IUCN	International Union for Conservation of Nature
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
KBA	Key Biodiversity Area
MAB	Man and Biosphere
MDF	Moderately Dense Forest
MEA	Multilateral Environmental Agreement
MoEFCC	Ministry of Environment, Forest and Climate Change
M.Ha	Million Hectare
MPA	Marine Protected Area
MPCA	Medicinal Plants Conservation Area
MoRT&H	Ministry of Road Transport and Highways
MoT	Ministry of Tourism
MoUD	Ministry of Urban Development
MSE	Madras School of Economics

NAEB	National Afforestation and Eco-Development Board
NAP	National Afforestation Programme
NBA	National Biodiversity Authority
NBAGR	National Bureau of Animal Genetic Resource
NBAII	National Bureau of Agriculturally Important Insect
NBAIM	National Bureau of Agriculturally Important Microorganism
NBAP	National Biodiversity Action Plan
NBFGGR	National Bureau of Fish Genetic Resource
NBIGR	National Bureau of Insect Genetic Resources
NBPGR	National Bureau of Plant Genetic Resource
NBSS&LUP	National Bureau of Soil Survey and Land Use Planning
NBT	National Biodiversity Target
NFP	National Forest Policy
NGO	Non-Governmental Organisation
NI	Nature Index
NLCP	National Lake Conservation Plan
NP	National Park
NRCD	National River Conservation Directorate
NRSC	National Remote Sensing Centre
NTFP	Non-timber Forest Product
NWAP	National Wildlife Action Plan
NWPC	National Working Plan Code
OECM	Other Effective Area Based Conservation Measures
OF	Open Forest
PA	Protected Area
PBR	People's Biodiversity Register
PESA	Panchayats (Extension to Scheduled Areas) Act

PPP&FRA	Protection of Plant Varieties & Farmers' Rights Act
PRI	Panchayati Raj Institutions
REDD++	Reducing Emissions from Deforestation and Forest Degradation
RF	Reserved Forest
SACON	Salim Ali Centre for Ornithology and Natural History
SBB	State Biodiversity Board
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SDG	Sustainable Development Goal
SFD	State Forest Department
SFDA	State Forest Development Agency
TEEB	The Economics of Ecosystems and Biodiversity
TK	Traditional Knowledge
TSG	Technical Support Group
UNCCD	United Nations Convention on Combat Desertification
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UT	Union Territory
VDF	Very Dense Forest
VSS	Vana Samrakshana Samithi
WCCB	Wildlife Crime Control Bureau
WII	Wildlife Institute of India
WLPA	Wildlife Protection Act
WLS	Wildlife Sanctuary
ZSI	Zoological Survey of India

Acknowledgements

I am grateful to Dr. Giridhar Kinhal, IFS (Retd.), Ex - Principal Chief Conservator of Forest, Madhya Pradesh, Former Director, Indian Institute of Forest Management for providing technical support and mentoring me for the policy analysis study and subsequently reviewing and providing necessary scientific and technical inputs for completion of this document.

I also express my sincere gratitude to Shri T. Rabikumar, Secretary, National Biodiversity Authority for providing necessary support for the successful conduct of regional and national level policy dialogues leading to the finalisation of the document.

I am grateful to Dr. A.K. Gupta, Former Principal Chief Conservator of Forests (PCCF) and Head of Forest Force, Tripura, for critically reviewing the document and providing his valuable comments.

I thank Shri Noyal Thomas IFS, Inspector General of Forests (FP&PE), Forest Policy Division, Ministry of Environment, Forest and Climate Change for attending the final discussion meeting and briefing the participants about the India's National Forest policy and REDD plus strategies.

I also express my sincere thanks to Dr. Dinesh Misra and Dr. Parimal Chandra Bhattacharjee, Members of NBA for helping me in organising the policy dialogues and for their valuable contributions.

I sincerely acknowledge the help rendered by Shri Tirupathai Kota IFS., Director, Telangana Forest Academy; Shri Abhay Kumar Johari, IFS., Member Secretary, Chief Conservator of Forests (Biodiversity & Climate Change) State Biodiversity Board, Assam; Shri A. K. Srivastav, IFS., Chairman, Gujarat Biodiversity Board and Shri G. Ramana Murthy, IFS., Member secretary of the Gujarat Biodiversity Board and CEBPOL team for helping me in organising the regional and national level consultative meetings in Telangana, Gujarat, Assam and Chennai.

I also thank Dr. S. Balaji IFS (Retd), Former PCCF, Government of Tamil Nadu and Dr. (Fr.) Lancelot Dcruz, Vice Principal, St. Xavier's College, Navrangpura, Ahmedabad for providing necessary technical inputs while drafting this document.

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सिद्धान्त दास
SIDDHANTA DAS



वन महानिदेशक एवं विशेष सचिव
भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
DIRECTOR GENERAL OF FOREST & SPL. SECY.
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND
CLIMATE CHANGE



Foreword

Biodiversity mainstreaming is the process of embedding biodiversity considerations into policies, strategies and practices of key public and private actors that impact or rely on plants and animal resources so that biodiversity is conserved and sustainably used, both locally and globally. The concept of mainstreaming was included in Article 6(b) of the Convention on Biological Diversity (CBD), which calls on the parties to "integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross sectoral plans, programs and policies". The Goal A of the Strategic Plan for Biodiversity 2011-2020 of CBD addresses the underlying causes of biodiversity loss and emphasises on mainstreaming biodiversity across government and society.

Forest are fundamental for food security and livelihood of millions of people. India's forest cover spread over an area of 708,273 sq.km and constitutes 21.54 percent of the geographical area of the country. Forest are major repositories of biodiversity, which includes, multitude of plants, animals and microorganisms and it provides habitat for large number of wild animals. The direct benefits of forests include the provisioning of fuel wood, timber, bamboo, food, Non Timber Forest Products (NTFPs), etc. The indirect benefits includes conservation of soil, provides pure drinking water, mitigate climate change & natural disasters, provide manure and soil carbon, etc.

It has been estimated that more than 40 percent of the poor in the country live in forest fringe villages and around 1.73 lakh villages located in and around forests. Forest fringe villages depend upon forests for variety of goods and services. There are about 1.2 Lakh Joint Forest Management communities consisting of 20 million people are involved in the protection and management of forests in partnership with forest department on the principle of 'care and share'. Some of the important concerns need to be addressed in the forest sector includes: loss of biodiversity, spread of invasive alien species, illegal wildlife trade, poaching, over harvesting of NTFPs, conversion of forest lands, open grazing, shifting cultivation, infrastructure development, mining, forest fire, fragmentation, etc.

I understand, the Centre for Biodiversity Policy and Law (CEBPOL), National Biodiversity Authority (NBA) has brought out a set of recommendations for integrating biodiversity concerns into the forestry sector through a consultative process by involving forest planners and working plan officers. These recommendations/action points need to be integrated into the forestry sector towards conserving the forest biodiversity.

I congratulate Dr. Giridhar Kinhal, IFS (Retd.), Ex-Principal Conservator of Forest, Madhya Pradesh & Former Director, IIFM and Dr. C. Thomson Jacob, Consultant (Biodiversity Policy), CEBPOL, NBA who have done a commendable work in bringing out a comprehensive set of recommendations for the benefit of the policy makers and forest professionals.



(SIDDHANTA DAS)

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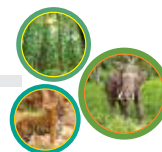
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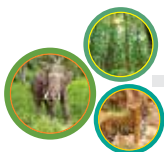
1.0 Introduction

Forests are one of the most biologically rich and evolving terrestrial systems harbouring vast majority of the world's floral and faunal species. The forest biodiversity provides livelihoods for people worldwide and plays important environmental, economic, social and cultural roles in the lives of many local communities and serves as a key reservoir of biodiversity. Forest biodiversity includes, multitude of plants, animals and microorganisms and it provides habitat for large number of wild animals. The direct benefits of forests include the provisioning of fuel wood, timber, bamboo, food, Non Timber Forest Products (NTFPs), etc. The indirect benefits include conservation of soil, free flow of pure drinking water, mitigation of climate change & natural disasters (droughts and floods) and providing manure, soil carbon, etc¹. In view of the multiple roles they play, now and in the future, the forests need to be conserved and nurtured. In India, forest is the second largest land use sector after agriculture².

1.1 Biodiversity richness in India

India is a mega diverse country, that harbours 7-8% of all recorded species, including over 48,000 species of plants³ and 96,373⁴ species of animals. Of the 35 global biodiversity hotspots, four are present in India, represented by the Himalaya, the Western Ghats, the North-east and the Nicobar Islands. Considering the outstanding universal values and exceptionally high level of endemism, seven natural World Heritage Sites have been identified in India which include: Great Himalayan National Park Conservation Area, Kaziranga National Park, Keoladeo

1. Strategic issues related to the implementation of the Strategic Plan for Biodiversity 2011-2020. Conservation and sustainable use of biodiversity, UNEP/CBD/SBSTTA/19/INF/17, 2015.
2. The regulatory Regime regarding felling and transit regulations for the tree species Grown on Non Forests/Private lands, 2012 (F.NO.8-14/2004-FP). Prepared by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India (GoI).
3. Singh, P and Dash, S.S. 2014. Plant Discoveries 2013. New Genera, Species and New Records. Botanical Survey of India, Kolkata. Botanicals Survey of India.
4. Animal Discoveries, Zoological Survey of India, 2018.



National Park, Manas Wildlife Sanctuary, Nanda Devi and Valley of Flowers National Parks, Sundarbans National Park and Western Ghats⁵. Such pristine and rich biodiversity needs to be protected, preserved and its evolutionary processes facilitated for eternity.

1.2 Forest cover in India

The forest cover of India, spread over an area of 708,273 sq.km, constitutes 21.54 percent of the geographical area of the country⁶. The area covered by Very Dense Forest (VDF) is 98,158 sq.km (2.99 percent), Moderate Dense Forest (MDF) is 3,08,318 sq.km (9.38 percent) and Open Forest (OF) is 3,01,797 sq.km (9.18 percent). The Forest Survey of India (FSI) 2017, has reported that 15 States/UTs have about 33 percent of the geographical area under forest cover. After taking into account the changes observed during the two assessment periods (Indian State of Forest Report (ISFR) 2015 and ISFR 2017) there has been an increase of 6,778 sq.km forest cover at the national level. Three states namely Andhra Pradesh, Karnataka and Kerala contribute to an increase of 4285 sq.km. The other states where significant increase has been observed are Odisha, Assam, Telangana, Rajasthan, Himachal Pradesh, Uttar Pradesh, Jammu and Kashmir and Manipur. The States showing reduction in forest cover primarily include Mizoram, Nagaland and Arunachal Pradesh⁷.

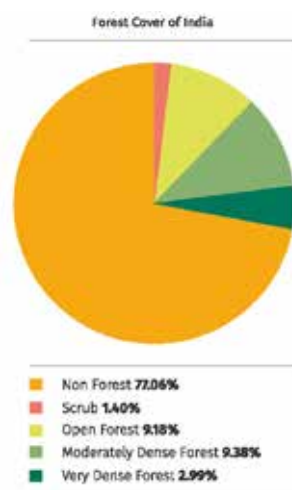


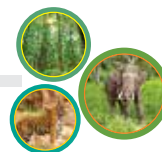
Figure 1: India's Forest Cover

The North - Eastern region of the country comprising eight states namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, is endowed with rich forest resources and is one of the 35 biodiversity hotspots of the world, which is 65.34 percent of its geographical area in comparison to the national forest cover of 21.54 percent. The current assessment shows an actual decrease of 630 sq.km in the North Eastern region. The

5. Web resource (<http://whc.unesco.org/en/statesparties/in>).

6. India State of Forest Report, 2017, Published by the Forest Survey of India (FSI), MoEFCC, GoI, Dehradun, Uttarakhand, India, (ISBN No. 97881929285-6-2).

7. *ibid*.



main reason for this decrease is attributed to shifting cultivation and other biotic pressures prevalent in this region⁸.

1.3 Protected area networks in India

India has 771 PAs designated under the Wildlife Protection Act, 1972 in the form of National Parks (NPs), Wildlife Sanctuaries (WLSs), Conservation Reserves (CRs), and Community Reserves (CRs) and it also established 30 Marine Protected Areas (MPAs) in peninsular India⁹. In addition, there are notified forests under the Indian Forest Act, designated wetlands under Environment Protection Act and Biodiversity Heritage sites notified under the Biological Diversity (BD) Act, 2002 and other conserved areas includes: Ecological Sensitive Areas (ESAs), Biosphere Reserves (BRs), Important Bird Areas (IBAs), Key Biodiversity Areas (KBAs) and Medicinal Plants Conservation Areas (MPCAs), etc¹⁰.

Table 1: Terrestrial Protected Areas of India

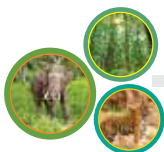
Protected Areas	No.	Total Area km ²	Coverage % of Country
National Parks	104	40501.03	1.23
Wildlife Sanctuaries	544	118931.80	3.62
Conservation Reserves	77	2594.03	0.08
Community Reserves	46	72.61	0.002
Protected Areas	771	162099.47	4.93

Source: Wildlife Institute of India, 2018

8. *ibid.*

9. Environmental Information System (ENVIS) Centre on Wildlife and Protected Areas: World Database on Protected Areas (Web source: <http://en.wikipedia.org/wiki/>).

10. Achievement of Aichi Biodiversity Targets 11 and 16. Success stories from India, 2018. Published by the MoEFCC, Gol.



For conserving India's wildlife, India has developed National Wildlife Action Plan (NWAP) covering a period from 2017 to 2031. The NWAP consist of 5 components, 17 themes, 103 conservation actions and 250 projects. These components are: (1) strengthening and promoting the integrated management of wildlife and their habitats; (2) adaptation to climate change and promoting the integrated and sustainable management of aquatic biodiversity; (3) promoting Eco-tourism, nature education and participatory management; (4) strengthening wildlife research and monitoring and development of human resources in wildlife conservation; (5) enabling policies and resources for conservation of wildlife¹¹.

1.4 Policy and legal frame work for managing forestry resources

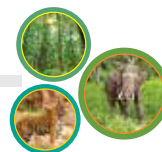
In India, the forest biodiversity conservation needs are addressed through various conventions, national legislations and policy measures. The international conventions dealing with the forestry issues are: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention on Combat Desertification (UNCCD) and Convention on Biological Diversity (CBD)¹². The policy and legal framework has evolved in tune with the constitutional provisions that are effectively attuned to safeguarding the natural resources of the country. This framework guides the sustainable management of forests ensuring the conservation of biodiversity and also respect upholding the rights of the local communities on lands and forest products. The national governance mechanism includes: Indian Forest Act, 1927; Wildlife Protection Act (WLP) 1972; Forest Conservation Act, 1980; Panchayat (Extension to Scheduled Area) Act, 1996; BD Act, 2002, The Schedule Tribes and other Traditional Forest Dwellers Act, 2006 and Compensatory Afforestation Fund Act (CAMPA), 2016.

India's National Forest Policy (NFP) 1952 declared that "forests to be administered for the national wellbeing" and the principal aim of the NFP, 1988¹³ is to ensure environmental stability and maintaining ecological balance. The policy aims for maintaining one third of the country's geographical area under forest and tree cover and calls for massive afforestation

11. India's National Wildlife Action Plan 2017-2031 (Web Source: www.wii.gov.in).

12. The Economics of Ecosystems and Biodiversity, India initiative – Interim Report Working Document, 92p. Published by MoEFCC and GIZ, 2014.

13. National Forest Policy, 1988. No.3A/86-FP. Published by the MoEFCC, GoI.



and social forestry programmes with people's participation for increasing the forest and tree cover in the country. The overall objective and goal of the NFP, 2018¹⁴ is to safeguard the ecological and livelihood security of the present and future generations based on sustainable management of forests for the flow of ecosystem services. In order to achieve the national goal for eco-security, India should have a minimum of one-third of the total land area under forest and tree cover. The forest policy lay emphasis on integrating climate change mitigation and adaptation measures in forest management through the mechanism of REDD plus so that the impacts of the climate change are minimised.

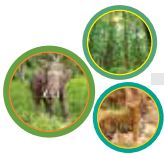
1.5 Initiatives for conserving the biodiversity

The Ministry of Environment, Forest and climate change (MoEFCC), is addressing the concerns of biodiversity through various schemes/programmes/projects which include: conserving and protection of wildlife; habitat restoration and habitat protection; *in-situ* and *ex-situ* conservation; controlling the spread of invasive alien species and forest fire; curbing poaching and illegal trade; afforestation and Joint Forest Management (JFM) activities. The Wildlife Crime Control Bureau (WCCB) is a statutory multi-disciplinary body which helps combat organised wildlife crime in the country and it assists and advises the customs authorities in inspection of the consignments of flora & fauna as per the provisions of WLPA, 1972, CITES¹⁵ and Export and Import (EXIM) Policy. The Central Zoo Authority, established under the provisions of the WLPA, 1972 suggests ways and means for the improvement of zoos in the country, so that they can be transferred into potent centres for *ex-situ* conservation of endangered wild fauna. The MoEFCC has been persistently working towards increasing the total forest cover in India through Assisted Natural Regeneration (ANR) and by initiating targeted afforestation programmes. The aim of the Green India Mission (GIM), is to increase the forest or tree cover by over five M.ha (Million Hectare) and to increase forest based livelihood income for about three million households¹⁶. The National REDD+ Strategy 2018 aims at enhancing and improving the forest and tree cover thereby enhancing the quantum

14. National Forest Policy, 2018, Policy Division, MoEFCC GoI, F. No. 1-1/2012-FP (Vol.4).

15. Wildlife Crime Bureau, established under the Wild Life (Protection) Act, 1972, under the MoEFCC, GoI (Web source: wccb.gov.in).

16. National Mission for a Green India, 2010. Consultative report prepared by CEE, Published by MoEFCC, GoI.



of forest ecosystem services that flow to the local communities¹⁷. The Compensatory Afforestation Fund Management and Planning Authority helps States/Union Territories (UTs) for conservation, protection, improvement and expansion of forest and wildlife resources of the country¹⁸. Under the JFM, local communities and the forest departments jointly protect and implement forest regeneration programmes and the communities are rewarded for their efforts in protection and management. Also the essence of biodiversity conservation and related actions and processes have been integrated into the National Working Plan Code (NWPC)¹⁹.

The protected area network in India has been used as a tool to manage natural resources for biodiversity conservation. The Man and Biosphere (MAB) Committee has identified and recommends potential sites for designation of Biosphere Reserves, following the United Nations Educational, Scientific and Cultural Organisation's (UNESCO's) guidelines and criteria. A total of 18 BRs are notified in India, of which 10 BRs have been included in the World Network of Biosphere Reserves of UNESCO. The Bombay Natural History Society (BNHS) has identified 465 IBAs in India and 40% of these IBAs falls outside the PA network and thus form an important tool for landscape-level conservation planning. Further, BNHS has also identified 126 KBAs in the Western Ghats as high priority conservation areas. KBAs comprise an 'umbrella' which includes globally important sites for different taxa and realms²⁰.

The Secure-Himalaya 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 biodiversity²¹. The project on Human-Wildlife conflict mitigation is implemented at the national level through the selected states to address distinct, representative and conceptually complementary human-wildlife scenarios in India with wide

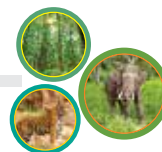
17. National REDD+ Strategy India, 2018. Published by MoEFCC, Gol.

18. The Guidelines on State Compensatory Afforestation Fund Management and Planning Authority. Published by the MoEFCC, Gol.

19. National Working Plan Code - 2014. Published by the Forest Research Institute, Dehradun, MoEFCC, Gol.

20. India's Fifth National Report to the Convention on Biological Diversity, 2014. Published by MoEFCC, Gol.

21. MoEFCC, Gol Annual Report, 2016-2017(Web source: www.moef.gov.in).



ranging species at the landscape level, remote rural areas facing severe livelihood issues and areas where innovative preventive measure are being used. The project focuses conserving species such as elephants, leopards, wild boar and blue bull and monkey²². The objective of the Project Elephant is to protect elephants, their habitat and corridors; to address the issues of man-elephant conflict and welfare of domesticated elephants²³. The Project Tiger was launched 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 people²⁴.

The Community Conservation Areas (CCAs) containing significant wildlife and biodiversity values are being conserved by communities for cultural, religious, livelihood, or political purposes, using customary laws or other effective means. India has one of the richest and oldest medicinal plant cultures of the world and nearly 6560 species of medicinal plants have been identified and 110 MPCAs have been established across 13 States each of an average size of 200 ha²⁵.

1.5.1. JFM resolution of 1990- Participatory Initiative

India's NFP, 1988²⁶ and the guidelines of the MoEFCC, Government of India (GoI), 1990, has initiated the participation of people in forest management. Participation of the communities in the decision making process is the main objective and means of forest development under JFM. This initiative of GoI has introduced an approach of building local level institutions that not only take responsibility of protecting the forests but also to get involved in management of forests.

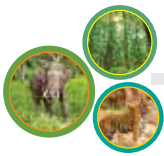
22 Ibid.

23 Project Elephant, a centrally sponsored scheme of the MoEFCC, GoI. (Web source: <http://wildlifeofindia/projectelephant.htm>).

24 Project Tiger, a centrally sponsored scheme of the MoEFCC, GoI (Web source: <http://wildlifeofindia.org/projtiger.htm>).

25 Web source: <http://envis.frlht.org/traded-medicinal-plant-database.php#>.

26 National Forest Policy 1988 (No:3-1/86-FP), Published by MoEFCC, GoI.

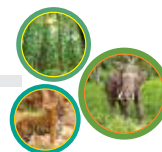


1.5.2. National Working Plan Code 2014

India's NFP mandates ten years working plan for each forest division for scientific management of forest areas which includes: harvesting and regeneration, protection and rehabilitation of degraded forests; soil and water conservation; wildlife protection and fulfilling the demand for minor forest products of local people through JFM. The NWPC, 2014 provides an easy mechanism to introduce newer concepts and requirements of forestry and forest management²⁷. The MoEFCC has issued the NWPC to lend contemporary relevance to planning and forest management. The overall aim of this code is to see that all forests in country are managed under the prescriptions of a working plan / scheme prepared on the basis of principles of sustainable forest management and biodiversity conservation, on recognized and innovative silvicultural practices. It makes clear that forests cannot be worked without having an approved working plan/ scheme for forest division or any such administrative unit. Thus to make the working plans respond to the demands and expectations of the National Biodiversity Action Plan (NBAP), it is prudent and pertinent to introduce such requirements into the process prescribed by the NWPC.



27. National Working Plan Code, 2014. Published by the Forest Research Institute, Dehradun (Indian Council for Forestry Research and Education), MoEFCC, Gol.



2.0 Convention on Biological Diversity and Biological Diversity Act

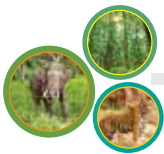
India is a party to the CBD. To give effect to the Convention, a Biological Diversity Act, 2002 was enacted by the Parliament for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources and associated knowledge²⁸. The Convention guides countries to prepare the National Biodiversity Action Plan (NBAP) and to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact on biodiversity²⁹. This global Strategic Plan for Biodiversity (known as twenty Aichi Biodiversity Targets) was developed towards five Strategic Goals each with subset of targets, namely, (a) halting biodiversity loss by mainstreaming biodiversity across government and society; (b) reducing the direct pressures on biodiversity and promote sustainable use; (c) improving status of biodiversity by safeguarding ecosystems, species and genetic diversity; (d) increasing benefits to all from biodiversity and ecosystem services; and (e) enhancing implementation through participatory planning, knowledge management and capacity building³⁰. The sustainable biodiversity management require the functional convergence of global and national policies and regulatory framework. India had revised its NBAP by developing 12 national biodiversity targets (NBTs) and 175 action points³¹. The NBAP provides the framework for targeted actions and timelines for each one of them. The Section 36 of the

28. The Biological Diversity (BD) Act, 2002, ISBN 978-81-926996-3-9. Published by the National Biodiversity Authority (NBA), 2004.

29. Convention on Biological Diversity (CBD), 2011. Published by the Secretariat for the CBD in Canada.

30. CBD, Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets (Web source: cbd.int/nbsap).

31. National Biodiversity Action Plan (NBAP) Addendum 2014 to NBAP 2008. Published by the MoEFCC, Gol.



BD Act, 2002 specifies that the Central Government shall, as far as possible to integrate the conservation, promotion and sustainable use of biological diversity into relevant sectoral or cross sectoral plans, programmes and policies³².

2.1 Aichi and national biodiversity targets

Aichi target 11 stipulates that by 2020, at least 17 percent of terrestrial and inland water and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services are conserved. The protected areas can include sustainable potential of species, habitats and ecosystem processes, indigenous and local community conserved areas as well as private protected areas³³. The National Biodiversity Target 6 envisages that ecologically representative areas on land and in-land waters, as well as coastal and marine zones, especially those of particular importance for species, habitats and ecosystem services are conserved effectively and equitably by covering over 20 percent of the geographical area of the country by 2020³⁴.

2.2 Local level Institutional set-up

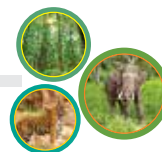
Some of the local level Institutions present in the forest ecosystem are Joint Forest Management committees (JFMC), Biodiversity Management Committees (BMCs), Eco-development committees (EDCs), etc. The Eco-development programme are being implemented in and around PAs with the objective of reducing the dependency of rural communities on the PA resources, their involvement in conservation of biological resources, capacity building and alternative employment generation interventions³⁵. The National Afforestation and Eco-Development Board (NAEB), is responsible for promoting afforestation, tree planting, ecological restoration and eco-development activities in the

32. Section 36 of the BDA, 2002, ISBN 978-81-926996-3-9, NBA, 2004.33. Consultations on Mainstreaming Biodiversity, NBAP, NBTs and India's Sixth National Report to CBD.

33. Consultations on Mainstreaming Biodiversity, NBAP, NBTs and India's Sixth National Report to CBD, 2017. Published by MoEFCC, NBA and UNDP.

34. National Biodiversity Action Plan (NBAP) Addendum 2014 to NBAP 2008. Published by the MoEFCC, GoI.

35. MoEFCC, 2018. National REDD+ Strategy India, MoEFCC, GoI.



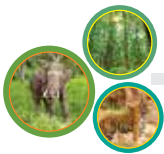
country, with special attention to the degraded forest areas and lands adjoining the forest areas, national parks, sanctuaries and other protected areas as well as the ecologically fragile areas like the Western Himalayas, Aravallis, Western Ghats, etc³⁶ through (a) National Afforestation Programme (NAP) scheme; (b) Eco-development forces (EDF) scheme and (c) NAEB Scheme: support regional centres, monitoring and evaluation and communication. The NAP is now implemented through a three tier system of the State Forest Development Agency (SFDA) at the State level, Forest Development Agency (FDAs) at the district/forest division level and JFMCs at the village level.

The concept of JFM recognises the share of protecting communities over forest produce. The local communities and the State Forest Department jointly plan and implement forest regeneration and development activities and the communities are rewarded with substantial share in forest produce in return for their efforts in protection and management of forests. JFM based principle of “care and share” has more than 1, 18,213 JFMCs involving around 20 million people managing over 25 M.ha of forest area³⁷. JFM has enabled protection and regeneration of existing forests and raising of indigenous forest plantations, which is contributing to the conservation of existing forests as also in increasing the carbon stocks. As per the provisions of NFP, 1988, the GoI, has outlined and conveyed to State Governments a framework for creating massive people’s movement through involvement of village committees for the protection, regeneration and development of degraded forest lands. This has given impetus to the participation of stakeholders in the management of degraded forests situated in the villages.

The PESA prescribes to ensure self-governance through traditional Gram Sabhas for people living in the Scheduled Areas of India. PESA sought to enable the Panchayats at appropriate levels and Gram Sabhas to implement a system of self-governance with respect to a number of issues such as customary resources, minor forest produce, minor minerals, minor water

36. National Afforestation & Eco-Development Board, MoEFCC, GoI, Web source: <http://www.naeb.nic.in/projects.html>.

37. Dependence of Local communities on Forest resources and Concept of JFM (2018). National REDD+ Strategy India.

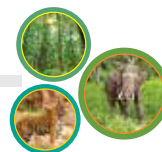


bodies, etc³⁸ . The BMCs are statutory committees constituted under the BD Act with the purposes of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms³⁹ .



38. Panchayat (Extension to Scheduled Areas) Act, 1986. National REDD+ Strategy India, MoEFCC, P 11.

39. Ravishankar Thupalli, K. Jahir Hussain and Thomson Jacob et al, 2013. Biodiversity Management Committees Operational Tool Kit. Published under the UNEP-GEF ABS Project, NBA.



3.0 Concerns

The Global Forest Resources Assessment 2015, has reported that the annual forest loss for the period 2010-2015 was 7.6 M.ha while the gain was 4.3 M.ha over year resulting in net annual decrease in forest area of 3.3 M.ha⁴⁰. However, the most important factors associated with the decline of biological diversity are of human origin. In India, some of the contributory factors leading to the loss of biodiversity in the forest areas include: the conversion of forest lands to agriculture, open grazing, shifting cultivation, insect and pest infection, unsustainable forest management, rampant spread of invasive alien species, infrastructure development (e.g., road building, hydro-electrical development, urban sprawl), mining, pollution, unsustainable logging, over harvesting of NTFPs, extinction of rare tree species of high value timber, unregulated tourism and encroachments⁴¹.

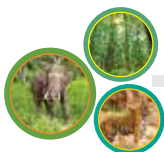
The other anthropogenic activities include illegal wildlife trade, poaching, industrialization, urbanisation, desertification, soil erosion, forest fire, fragmentation, excessive use of fertilizers, man animal conflict and climate change. All of these are having negative impacts on forest diversity and they are lowering the resilience of forest ecosystems making it more difficult to cope with changing environmental conditions. It was reported that considerable area of forests is under high (5.16%), medium (21.89 %) and low fragmentation (49.63%)⁴². Loss and degradation of grassland across the country has affected grass land dependent species such as members of the bustard family - Bengal florican, Lesser florican, Houbara bustard and Great Indian bustard. It was also reported that 163 cases of poaching and seizures of body parts of leopards were recorded in 2018, an increase from 159 in 2017⁴³.

40. Global Forest Resources Assessment 2015: How are the World's forests changing. 2nd Edition. FAO, Rome, 2016; pp 3. <http://www.fao.org/3/a-i4793e.pdf>, ISBN 978-92-5-109283-5.

41. SBSTTA, 2015, UNEP/CBD/SBSTTA/19/INF/17, item 3.1 of Provisional Agenda. Strategic issues related to the implementation of the Strategic plan for Biodiversity 2011-2020. Conservation and Sustainable use of Forest Biodiversity.

42. Forest Survey of India, 2015. Published by the MoEFCC, Government of India.

43. Lok Sabha unstarred question No.844. Published in The Hindu on 26th December, 2018 PP9.



Fuel wood is the dominant source of cooking energy for rural population in India with forests contributing significantly to this. About 216 million tonnes of fuel wood is consumed in India, of which about 27% is sourced from forests⁴⁴. Domestic demand for timber and fuel wood is well above the sustainable level. Harmful impacts of uncontrolled grazing include death of seedlings, reduced porosity of soil due to compaction resulting in poor aeration and increased run-off and loss of palatable grasses. Incidence of moderate to high grazing pressure is reported for more than 30% of the recorded forest area⁴⁵.

The uncontrolled fire is one of the major causes of degradation of forests and loss of biodiversity, which adversely impact the flow of goods and services from forests. The State of Forest Report, 2017 has reported that the maximum number of forest fire occur in open forests followed by moderately dense forests in most of the years. The open cast mining, has significant impacts on forest and biodiversity. In the Western Ghats region, iron ore mining activities have resulted in the degradation of forest land and it affects the water quality in the Bhadra river on account of siltation and contamination of water by ore⁴⁶.

Fragmentation decreases habitat through loss of land area, reducing the probability of maintaining effective reproductive units of plant and animal populations. Landscape fragmentation, which results in less connectivity of habitat to allow natural migration, limits the adaptive capacity of species and the viability of ecosystems⁴⁷. Invasive Alien Species are one of the major threats to biodiversity throughout the world. The major forest invasive species includes *Lantana camara*, *Eupatorium glandulosum*, *Parthenium species*, *Mimosa species*, *Eichornia crassipes*, *Mikania micrantha*, *Ulex europaeus*. *Prosopis juliflora*, *Cytisus scoparius*, *Euphorbia royleana*, etc. Highly invasive climbers like *Chromolaena odorata* and *Mikania* species have over-run the native vegetation in north-east Himalayan region and the Western Ghats⁴⁸.

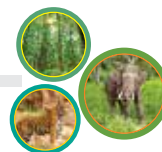
44. The Economics of Ecosystems and Biodiversity, India initiative - Interim Report Working Document, 92p. Published by MoEFCC and GIZ, 2014.

45. *ibid*.

46. *ibid*.

47. Vos. C.C. Berry, P. Opdam, P.Baveco, H.Nijof, B. O'Henely J. Bell. C. and Kuipers, H (2008). "Adapting landscapes to climate change: examples of climate-proof ecosystem networks and priority adaptation zones" et al. 2008. *Journal of Applied Ecology* 2008, 45:1722-1731.

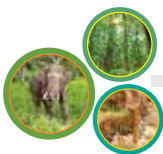
48. Bhatt, J.R., Singh, J.S., Tripathi, R.S., and Kohli R.K (Ed., 2012). *Invasive Alien Plants: An ecological appraisal for the Indian subcontinent* (Vol.1), CABI, UK.



4.0 Approaches

The present study has been carried out through a series of stakeholder consultations/ policy dialogues and it provides the strategies and action elements to incorporate long, medium and short term processes into forest governance of the GoI and state forest departments. Three regional policy dialogues were organised in various parts of India such as Telangana (28th April, 2018), Gujarat (28th May, 2018) and Assam (28th June, 2018) and one national policy dialogue was organised in Chennai on 5th September, 2018 and the following recommendations were brought out through intensive deliberations (the list of participants of the national and regional level consultative meetings are given in Annexure III). The expert participants from forest departments, relevant Non-Governmental Organisations and research agencies made a comparative assessment of the NWPC provisions vis-a-vis the expectations of the NBAP and identified the gaps. The action elements enlisted by the experts are given below. This document aims to provide a stepwise guidance to help the forestry sector and its professionals to progressively integrate biodiversity conservation themes/actions and processes into the forest management.





5.0 Recommendations

5.1 Protection of ecologically representative areas

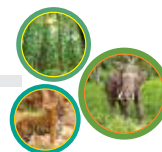
India has enacted WLP Act with the objective of effectively protecting the wildlife and to control poaching, smuggling and illegal trade in wildlife and its derivatives⁴⁹. It provides protection to the scheduled endangered flora, fauna and ecologically important protected areas such as NPs, WLSs, CRs and CRs. The present study recommends to increase the PA network by adopting Other Effective Area Based Conservation Measures (OECMs) towards conserving the biodiversity wealth of the country.

Ecosystems having area of biodiversity importance viz high endemism, rare and threatened species, keystone species, species of evolutionary significance, wild relatives/ancestors of domestic/cultivated species or their varieties can be identified and conserved. The State Governments can notify these areas as biodiversity heritage sites under the Section 37 of the BD Act. Some of the biodiversity important areas having rich biodiversity are: sacred groves, wetlands, connecting corridors, eco tone regions, nesting habitat, wintering habitats, fly over habitats of the migratory birds, etc. Also there is substantial biodiversity lying outside the PAs such as private properties, common lands, inland water bodies, urban areas, etc. These areas need to be mapped and documented by the forest working plan officers and necessary protective measures taken towards conserving the biodiversity therein.

5.2 Minimising genetic erosion and safeguarding genetic diversity

The loss of forest genetic resources have important implications on ecosystem functions and ecosystem services. The genetic diversity within forest species is vulnerable to fragmentation,

49 The Wildlife (Protection Act), 1972, No.53 of 1972. Published by MoEFCC, Gol.



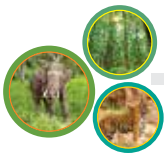
disturb plant pollinator interactions, overexploitations of resources, increasing invasion of alien species, climate change impacts, etc. Hence it is essential to assess the biodiversity available inside the PAs. It is recommended to survey the PAs for every 5 years and also the traditional knowledge associated with the bio resources need to be documented with the help of Botanical Survey of India (BSI) and Zoological Survey of India (ZSI). The lower forms of life (*viz* algae, fungi, lichens, epiphytes, parasites, etc.) should also be made part of the biodiversity assessment of a forest division. Remote sensing technology and Nature Index (NI) tool can be used to monitor the changes in populations of targeted species. It is also recommended that the Central Government in consultation with the concern State Government to notify species which are in the verge of extinction or likely to become extinct in the near future as threatened and to develop mutually supportive linkages between *in situ*, on-farm and *ex situ* conservation programmes to recover those species.

5.3 Access and benefit sharing

The NTFPs obtained from forests are crucial commercial resource in the lives of tribal and other forest dwelling communities. In India, more than 275 million rural people are dependent on the sale of minor forest produce for their livelihoods and nearly 50% of forest revenues and 70% of forest based exports are coming from the NTFPs. Some of the NTFPs commercially utilized are Tendu (*Diospyros melanoxylan*), Karanj seed (*Pongamia pinnata*), Mahua seed (*Mahua longifolia*), Sal leaf and seeds (*Shorea robusta*), Lac (*Kerria lacca*), Chironjee (*Buchanania lanzan*), wild honey (*Apis dorsata*), Myrobalan (*Terminalia spp.*), tamarind (*Tamarindus indica*), Gum karaya, red sanders (*Pterocarpus santalinus*), etc⁵⁰.

Owing to the large domestic and international demand for NTFPs, there is tremendous potential to create large scale employment opportunities for rural people, especially tribals and women and help reduce poverty and empower communities. Sustainable harvesting, value addition and marketing of NTFPs need to be enhanced among the NTFP gatherers. Necessary permission should be obtained from National Biodiversity Authority (NBA)/State

50. Jitendra Vir Sharma, Yogesh Gokhale, Nishant Jain, Yatish A. Lele, Aparna Tyagi and Souvik Bhattacharjya, 2018. Methodology for determining Minimum Support Price for Minor Forest Produce in India, Indian Forester, 144(7): 604-610: ISSN No: 0019-4816.



Biodiversity Boards (SBBs) for accessing and utilizing the NTFPs for research/ commercial purposes and the benefits arising from the utilization of NTFPs should be shared with the community from where the resources are taken. In this connection, the BMCs need to be strengthened in the forest fringes to prevent over exploitation of NTFPs and to facilitate Access and Benefit Sharing (ABS) as per the provisions of the BD Act.

5.4 Sustainable management of forest resources

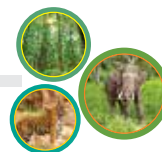
The CBD has reported that illegal logging and unsustainable exploitation of NTFP is prevalent in many countries. To sustainably utilize the forest products, Parties are certifying their forest produce⁵¹. In Germany there are three certification systems were used, viz (a) Endorsement of Forest Certification Schemes; (b) Forest Stewardship Council and (c) Naturland. In Sweden more than 60% of forest areas were certified and in Finland, approximately 500,000 hectares of forests have been certified by the forest-based industrial companies and private forest owners under group certification⁵². Indonesia has developed a Legal Wood Verification System to ensure that wood products and its material originate from legally managed sources. China is adopting compulsory conservation measures in the “ecologically significant areas” and it ensures that 90% of the forests and biodiversity is protected. The remaining 10% of the total area of the PAs have been set aside as “production areas”, where local communities harvest bamboo, tea to develop ecologically friendly industries consuming less natural resources⁵³. This model has been recognized by UNESCO as a successful example of addressing conflicts between development and conservation in protected areas. China is also eliminating export subsidies on a number of highly energy-consuming, polluting and resource-consuming products, including products from endangered species, leather products, wood products and some disposal of wood-made products to avoid negative impacts on biodiversity⁵⁴.

51. SBSTTA, 2015, UNEP/CBD/SBSTTA/19/INF/17, item 3.1 of Provisional Agenda. Strategic issues related to the implementation of the Strategic plan for Biodiversity 2011-2020. Conservation and Sustainable use of Forest Biodiversity.

52. *ibid.*

53. *ibid.*

54. *ibid.*



The present study recommends that, the Forest certification for timber and NTFPs need to be introduced to enhance the value of sustainably harvested forest products. Certification can be introduced for seeds and planting materials used for afforestation. Also, it is recommended that the local communities are encouraged to regulate harvest /collection of NTFPs to ensure availability of those forestry resources such as fruits, seeds, vegetables available inside the forest, in requisite quantities for use by wild animals.

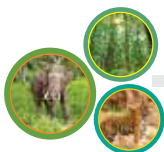
5.5 Integrating local institutions

In India, around 1,73,000 forest fringe villages exist, where local communities are highly dependent on forest for their livelihood needs for *e.g.*, energy, food supplement, fodder, livestock grazing, construction material, NTFPs, traditional medicines etc. Some of the local level multiple grass root level institutions available in the forestry sector includes: Vana Samrakshana Samithi (VSS), JFMCs, EDCs, Panchayat Raj institutions (PRIs) and BMCs. It is suggested to functionally integrate these local institutions with the BMCs by tapping their functional domains and strengths towards undertaking the mandates of the BMCs such as documentation of forest bioresources and associated traditional knowledge; (TK) eco restoration of local biodiversity; identification and management of BHSs, regulation of access to the biological resource and associated TK, conservation of traditional varieties/ breeds of economically important plants/

Best Practices 1: In Gujarat, Vasava tribe is involved in the income generation activities by developing medicinal products. Nearly 250 medicinal plants were surveyed and 5 plants were collected for mass cultivation and marketing and this initiative was facilitated by the Xavier research foundation, Sky quest lab Private limited and the local NGO. The local BMC is facilitating these activities.

Best Practices 2: In Assam, the Forest ranger was made as a Secretary for the Hajo BMC and SBB is handholding BMCs on all the technical issues and the block level BMCs have been established. BMCs were actively involved in the preparation of PBRs, identification of BHS and the local communities were fully involved in protection of forest resources.

Best Practices 3: In Tripura, the Chairperson of the gram Panchayats and village committees (in Autonomous District Council) has been made the Chairperson of the BMCs to set up a direct link between the BMCs and the PRI. It has facilitated internalization of the BMCs into the PRI system at the local gram panchayat level to streamline many activities in favour of implementation of the BD Act.



animals⁵⁵. Some of the experiences gained through the best practices adopted in Gujarat, Assam and Tripura can be integrated while forming BMCs in other states.

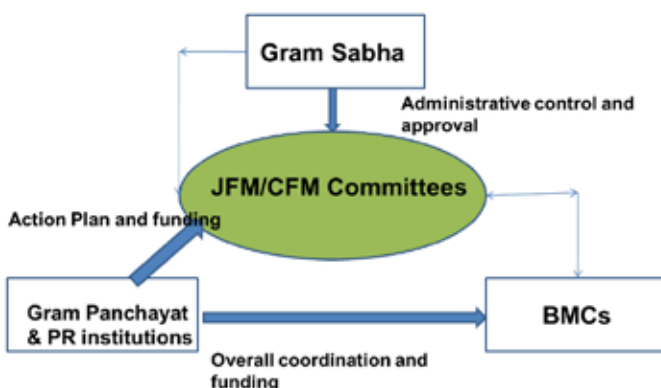


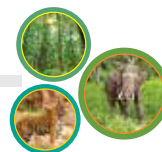
Figure 2: Integration of local institutions

5.6 Biodiversity governance

Biodiversity governance can be defined as ‘the manner in which stakeholders participate effectively in policy setting and decision making that is based on rule of law, is transparent, and is based on equity and accountability in order to ensure that the strategic vision of conserving biodiversity and ecosystems, using them sustainably, and sharing of the benefits are enforced at the national, regional and global levels for current and future uses⁵⁶. India is a signatory to various MEAs and enacted various legal frame works and policies towards safeguarding the natural resources of the country. To facilitate the implementation of various MEAs, it is recommended to prepare a guiding document for synergising biodiversity and MEAs and national policies/legislations. Also it is suggested to establish synergy between WLPA, BD Act, FRA, & PPV&FRA for their effective implementation at the ground level. Also it is recommended to integrate the essence of the NFP, NBAP and the provisions of the BD Act into the NWPC towards integrating the biodiversity components into forestry activities through various programmes, plans, projects, etc.

55. Ravishankar Thupalli, K. Jahir Hussain and Thomson Jacob et al, 2013. Biodiversity Management Committees Operational Tool Kit. Published under the UNEP-GEF ABS Project, NBA.

56. Balakrishna Pisupati, 2013. Lessons for International Environment Governance Biodiversity Governance, Published by the NBA, Chennai.



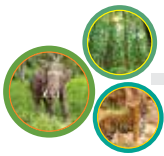
6.0 Conclusion

Forests ecosystems are reservoirs/repositories of biodiversity with the greatest assemblage of species and provide varied ecosystem services. In India, around 275 million rural people are dependent on forest for their subsistence and livelihood⁵⁷ such as water supply, food, nutrition and health. The health of the forest depends upon the diversity of species between and within species and the density of forest types. Hence it is important to conserve the forest biodiversity towards enhancing the ecosystem services provided by the forest for the human wellbeing. India's forest biodiversity conservation measures are addressed through the implementation of various national legislations and policy measures. The global and national biodiversity action plans suggest to integrate biodiversity concerns into various sectors and cross sectoral programmes and plans.

The present study emphasises to integrate the biodiversity actions into the forest working plan document towards enhancing the biodiversity conservation at the ground level. It is suggested to increase the PA network by documenting the ecologically representative areas important for conservation of some unique biodiversity both at species and ecosystem level. It is also suggested to assess valuation of those ecologically representative areas and to encourage cultivation of economically high-valued plants. Site specific plantations can be increased both inside and outside the PAs by planting native species to increase the carbon stock and to undertake biodiversity regeneration assessment periodically.

Forest certification aims to protect and increase the resilience of forests and associated ecosystems by protecting and enhancing their biodiversity and ensuring their roles in providing ecological services, such as biodiversity, water, soil management, and carbon capture and storage, hence it is suggested to encourage certification for timber and NTFPs.

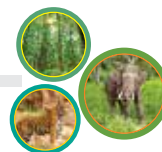
57. World Bank, 2006. India: Unlocking Opportunities for forest dependent people in India. Report No. 34481-IN, World Bank: South Asia Region, pp.85.



The existing local level institutions must be integrated towards participatory management of forest resources to help in reducing the deforestation and forest degradation ultimately leading to biodiversity conservation.

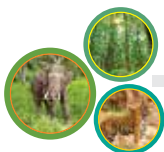
The action points and the responsible agencies for implementing the above said recommendations are given in Annexure-I and the short, medium and long term recommendations are given in Annexure-II.



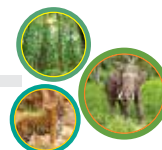


Annexure – I : Action points and the responsible agencies

	Action Points	Responsible agencies
5.1	Biodiversity awareness	
1	To provide necessary training and capacity for the working plan officers on biodiversity issues. Working plan offices need to be strengthened by providing adequate man power and technical support through the Technical Support Group (TSG) and parataxonomists for documenting the bioresources available inside and outside the forest areas.	IIFM, WII, ICFRE, FRI, IGNFA and other state level training institutions.
2	To prepare training modules/capsule courses for all the working plan officers and BMCs. The training modules should include details on (a) BD Act (b) Constitution of BMCs; (c) Preparation of PBRs; (d) details about the NWPC (e) national legislations related to biodiversity and forestry issues and related international commitments.	IIFM, WII, FRI, IGNFA, State level training institutions, NBA, SBBs and BMCs.
3	To impart crash courses to deal with BD Act violation cases for officers from the forest department, customs, ports and harbour authorities, etc.	IIFM, WII, IGNFA, SBBs, NBA and State level training institutions.
4	Sensitizing policy makers and politicians on biodiversity and its importance (viz Ministers, Member of Parliamentarians, Secretaries and PCCFs).	IGNFA, IIFM, WII, SFDs, SBBs and NBA.
5	To encourage academic institutions to focus on imbibing/ sensitization of youths on the importance and value of biodiversity through both formal (Academic institution) and informal education (Nature Education) curricula.	ICSE, CBSE Board and CEE.
6	Introduce topics on biodiversity conservation and its sustainable uses in the forestry curriculum.	FRI, IIFM, WII and Universities.
7	To include biodiversity awareness components into the NWPC, so as to integrate the awareness generation in the working plan preparation process.	MoEFCC and SFDs.
8	Develop integrated syllabus/course for forest officials on conservation and enhancement of biodiversity; maintenance and enhancement of forest health, vitality, soil, water, social, economic, cultural and spiritual benefits (Refer NWPC: Para 89).	IIFM, WII, IGNFA, SBBs, NBA and SFDs.



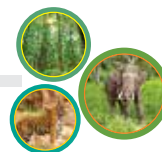
5.2	Valuation of Forest Genetic resources	
1	Valuation of ecologically representative areas needs to be carried out.	SFDs, FSI, FRI, IIFM, and IEG.
2	Encourage cultivation of economically high-valued species to reduce pressure on the wild resource.	SFDs, FSI, MoEFCC and CAMPA.
3	Integration of biodiversity valuation in the working plan preparation process and other forestry related activities.	MoEFCC and SFDs.
4	Integration of values of biodiversity in national and state planning process, development programmes and poverty alleviation strategies.	NITI Aayog, State Governments, FRI, IIFM, IEG and IGIDR.
5.3	Reduce rate of degradation, fragmentation and loss of all natural habitats	
1	Intensive site specific plantations of native species both inside and outside the PAs.	GIM, NRCD, NLCP, NBSS&LUP, MoUD, MoT, MoRT&H and CAMPA.
2	Periodic assessment of biodiversity and its regeneration status.	SFDs.
3	Address and manage human animal conflict. Prevent habitat modification to protect the migratory routes.	SFDs and WII.
5.4	Eradication of Invasive alien species	
1	Regional, state and nation level quantitative and qualitative inventories of forest invasive species (exotic/indigenous). Research on early warning and pathways of invasion needs to be identified towards controlling and managing harmful invasive alien species.	SFDs, FSI, BSI, ZSI, BMCs, SBBs, NBA and GIM.
2	Prioritized removal and control of spread of invasive species inside the Reserved Forest (RF)/Protected Areas (PAs) and outside the PAs.	FSI, ZSI, BSI, SFDs, SBBs and NBA.
3	Undertake extensive plantations of bamboo, local grass species/ faster growing species to fill up blanks created following removal of invasive species.	SFDs.
5.5	Sustainable management of forestry	
1	Initiate Forest Certification for timber, NTFPs, seeds, and planting materials is recommended.	MoEFCC and SFD.
2	Monitor and regulate (by fixing period of collection) the sustainable use of NTFPs by the local communities.	SFDs.
3	Devise effective management and conservation techniques to set up forest preservation plots for conservation of representative forest types.	SFDs.



4	Adoption of advanced technologies and techniques for quick detection and developing a real time fire management plan.	SFDs.
5	Preparation of soil health card for the selected pockets in the forest ecosystem to monitor time series change in the soil fauna including microbes, etc.	SFDs.
6	Documentation and assessment of seasonal availability of water resources (water bodies, dry and seasonal streams, perennial streams, rivers) to monitor the forest health.	SFDs.
7	Development of self-sustaining monitoring system for overseeing the activities and effectiveness of the Protected Areas (PAs) network.	SFDs, NRSC and FSI.
5.6	Protection of ecologically representative areas important for species, biodiversity, and ecosystem	
1	Widen the PA network by adopting OECM, such as, community conservation area, sacred groves, connecting corridors, areas with high endemism, rare and threatened species, ecotone regions, areas having keystone species, species of evolutionary significance, etc. To map, document and protect the nesting habitat, wintering habitats, fly over habitats of the migratory birds.	MoEFCC, FSI, ICFRE, SFDs and WII.
2	Adopt landscape approach, formulate and implement programmes for conservation of biodiversity including endangered species even outside the PA network, on private property, common lands, water bodies and urban areas.	MoUD, MoEFCC and SFDs.
3	Conservation of ecologically sensitive areas prone to biodiversity loss due to natural or anthropogenic factors.	SACON and WII.
4	Strengthen research for developing baseline information both within and outside PAs, biosphere reserves and fragile ecosystems by involving local research institutions and universities.	Gol, MoEFCC, UTs, State Governments, SBBs, NBA, WII, ICFRE, IIFM and FSI.
5.7	Minimise genetic erosion and safeguard their genetic diversity	
1	Periodic (five yearly) assessment and documentation of biodiversity richness and status of both floral and faunal diversity and TK in the PAs using Nature Index tool.	BSI, ZSI, FSI, BMCs, SBBs, NBA, NBPGR, NBAGR, NBAII, NBAIM and NBFGR.
2	Forest division wise periodic assessment of the lower forms of life (algae, fungi, lichens, epiphytes, parasites, etc.). Regular monitoring of the populations of target species (wild and domesticated) through surveys using remote sensing and other scientific tools and techniques.	SFDs, SBBs, NBA, ZSI, BSI and WII.

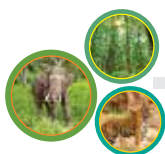


3	Develop mutually supportive linkages between <i>in situ</i> , on-farm and <i>ex situ</i> conservation programmes.	NRSC, FSI, BSI and ZSI.
4	Assessment and recovery plans of locally extinct, critically endangered, endangered and vulnerable species as part of the NWP mandate.	NBAGR, NBPGR, NBIGR, BSI and ZSI.
5.8	Valuation of Ecosystem services	
1	Undertake quantification (economic valuation) and assessment of ecological services provided by the forest ecosystems by involving the research institutions.	IIFM, MSE and SFDs.
5.9	Facilitation of access and benefit sharing	
1	Promoting and undertaking implementation of the ABS mechanism for reaching the due economic benefits to the local owners of the bio-resources under commercial utilization.	SBBs, NBA and SFDs.
5.10	Inclusive Governance	
1	Preparation of Guiding Document for synergising biodiversity and MEAs and national policies/legislations (Some of the suggested MEAs are CBD, CITES, CMS, UNFCCC, UNCCD and CHS).	MoEFCC, WII, NBA and SFDs.
2	Develop synergy and convergence between WLPA, BDA, FRA, & PPV&FRA, NFP and NWPC.	MoEFCC, SFDs and PPV&FRA.
3	The VSS, EDC, JFMC and PRI should be integrated/ synergised with the BMCs in consonance with their roles, potentials and functions.	VSS, EDC, BMCs, JFM and SFDs.
4	Amendment to the NWPC could be effected to facilitate develop synergy and complementarity.	MoEFCC and SFDs.
5	Forestry related Acts, guidelines, Rules to be reviewed and suitably amended and fine-tuned to do away with the conflicting provisions for preventing fragmentation, natural habitat loss and degradation.	NITI Aayog, State Governments, SFD and MoEFCC.
6	Integrate biodiversity conservation strategies with other national and state planning processes such as Agroforestry and NREGA schemes.	MoEFCC and SFDs.
7	Documentation of the faunal, microbial and soil diversity and the available water resources inside the forest areas must also be made an integral part of NWPC.	MoEFCC and SFDs.



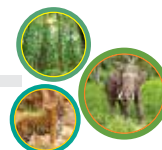
8	Mapping of streams, water bodies in forests and aquifers be also done to facilitate implementation of the watershed approach.	SFDs.
5.11	Protecting Traditional Knowledge	
1	Document and analyse the dependency of people on forest, TK associated with the bioresources by undertaking periodic socio-economic surveys.	SBBs, NBA and SFDs.
2	Document and update database on sacred groves and sacred ponds and associated knowledge for conserving them.	ENVIS and SFDs.
3	Document and analyse best practices based on traditional sustainable uses of biodiversity and devise mechanisms for providing benefits to local communities.	SFDs.



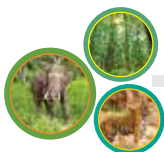


Annexure II : Short, medium and long term recommendations

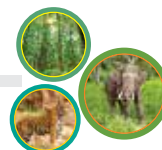
	Short term	Medium term	Long term
5.1	Biodiversity Awareness.		
	<ol style="list-style-type: none"> 1. Impart training and build capacity for the working plan officers on biodiversity issues. 2. Prepare consolidated training modules/ capsule courses for all the working plan officers and BMCs. 	<ol style="list-style-type: none"> 1. Impart crash courses on booking offences related to biodiversity elements, for the selected target groups. 2. Sensitizing Policy and law makers on relevant aspects of biodiversity and its importance. 3. Encourage all academic institutions to focus on imbibing/ sensitization of youth on the value of biodiversity. 	<ol style="list-style-type: none"> 1. Introduce issues concerning biodiversity conservation and sustainable use in the Forestry curriculum. 2. Integrate biodiversity awareness component during working plan preparation process into the NWPC. 3. An integrated syllabus/course needs to be developed for forest officials.
5.2	Valuation of Forest Genetic Resources.		
	<ol style="list-style-type: none"> 1. To carry out economic valuation of ecologically representative areas. 2. Encourage cultivation of plants having high economic values. 	<ol style="list-style-type: none"> 1. Integrate economic valuation of biodiversity in the working plan preparation process, in national and state planning process, development programmes and poverty alleviation strategies. 	
5.3	Reduce rate of degradation, fragmentation and loss of all natural habitats.		
	<ol style="list-style-type: none"> 1. Undertake massive site specific native species plantations drive both inside and outside the PAs. 	<ol style="list-style-type: none"> 1. Periodic assessments of the biodiversity and regeneration assessments. 	<ol style="list-style-type: none"> 1. Undertake mitigating measures to address human and animal conflicts. Prevent habitat modification to protect the migratory routes.



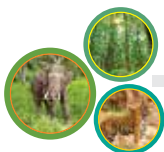
	Short term	Medium term	Long term
5.4	Invasive alien species.		
	1. Regional, state and nation level quantitative and qualitative inventories of forest invasive species (exotic/ indigenous). Research on early warning and pathways of invasion needs to be identified towards controlling and managing harmful invasive alien species.	1. Prioritized removal and control of spread of invasive species inside the RF/PAs/outside the PAs.	1. Undertake extensive plantations of bamboo, local grass species/ faster growing species to fill up blanks created following removal of invasive species.
5.5	Sustainable management of forestry Resources.		
	1. Initiate Forest Certification for timber, NTFPs, seeds, and planting materials is recommended. 2. Monitor and regulate (by fixing period of collection) to ensure sustainable use of NTFPs by the local communities.	1. Devise effective management and conservation techniques to set up forest preservation plots for conservation of representative forest types.	1. Adoption of advanced technologies and techniques for quick detection and developing a real time fire management plan. 2. Preparation of soil health card for the selected pockets in the forest ecosystem to monitor the time series change in soil fauna including microbes, etc. 3. Documentation and assessment of seasonal availability of water resources (water bodies, dry and seasonal streams, perennial streams, rivers) to monitor the forest health. 4. Development of self-sustaining monitoring system for overseeing the activities and effectiveness of the PAs network.



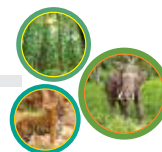
	Short term	Medium term	Long term
5.6	Protection of ecologically representative areas important for species, biodiversity, and ecosystem.		
	<p>1. Widen the PAs network by adopting OEC Measures, such as, community conservation area, sacred groves, connecting corridors, areas with high endemism, rare and threatened species, eco tone regions, areas having keystone species, species of evolutionary significance etc. To map and document and protect the nesting habitat, wintering habitats, fly over habitats of the migratory birds.</p> <p>2. Adopt landscape approach, formulate and implement programmes for conservation of biodiversity including endangered species even outside the PA network, on private property, common lands, water bodies and urban areas.</p>	<p>1. Strengthen research for developing baseline information both within and outside PAs, biosphere reserves and fragile ecosystems by involving local research institutions and Universities.</p> <p>2. Conservation of ecologically sensitive areas prone to biodiversity loss due to natural or anthropogenic factors.</p>	



	Short term	Medium term	Long term
5.7	Minimise genetic erosion by safeguarding their genetic diversity.		
	1. Forest division wise periodic assessment of the lower forms of life (algae, fungi, lichens, epiphytes, parasites, etc.).	1. Develop mutually supportive linkages between <i>in-situ</i> , on-farm and <i>ex-situ</i> conservation programmes. 2. Periodic (five yearly) assessment and documentation of biodiversity richness and status of both floral and faunal diversity and TK in the PAs using Nature Index tool.	1. Assessment and recovery plans of locally extinct, critically endangered, endangered and vulnerable species as part of the NWP mandate.
5.8	Valuation of Ecosystem services.		
	1. Undertake quantification (economic valuation) and assessment of ecological services provided by the forest ecosystems by involving local people.		
5.9	Facilitation of access and Benefit Sharing.		
	1. Promoting and undertake implementation of the ABS mechanism for reaching the due economic benefits to the local owners of the bio-resources under commercial utilization.		

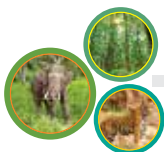


	Short term	Medium term	Long term
5.10	Inclusive Governance.		
	<ol style="list-style-type: none"> 1. Preparation of Guiding document for synergising biodiversity and MEAs and national policies/ legislations (Some of the suggested MEAs are CBD, CITES, CMS, UNFCCC and UNCCD and CHS). 2. Develop synergy and convergence between WLPA, BD Act, FRA, PPV&FRA, NFP and NWPC. 3. The VSS, EDC, JFMC and PRI should be integrated/ synergised with the BMCs in consonance with their roles, potentials and functions. 4. Amendment to the NWPC could be effected to facilitate develop synergy and complementarity. 5. Reintroduction and establishment of viable populations of threatened plant species. 	<ol style="list-style-type: none"> 1. Forestry related Acts, guidelines, Rules to be reviewed and suitably amended and fine-tuned to do away with the conflicting provisions for preventing fragmentation, natural habitat loss and degradation. 2. Integrate biodiversity conservation strategies with other national and state planning processes such as Agroforestry and NREGA schemes. 3. Documentation of the faunal, microbial and soil diversity and the available water resources inside the forest areas must also be made an integral part of NWPC. 	<ol style="list-style-type: none"> 1. To establish working plan council with sector experts at district/ State level. 2. Mapping of streams, water bodies in forests and aquifers be also done to facilitate implementation of the watershed approach.



	Short term	Medium term	Long term
5.11	Protecting Traditional Knowledge.		
	1. Document and analyse the dependency of people on forest, TK associated with the bioresources by undertaking periodic socio-economic surveys.	1. Document and analyse best practices based on traditional sustainable uses of biodiversity and devise mechanisms for providing benefits to local communities. 2. Document and update database on sacred groves, sacred ponds and associated knowledge for conserving them.	

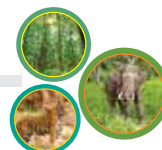




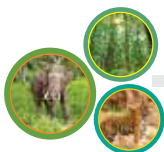
Annexure III

a) List of participants for the 1st regional Policy Dialogue on Mainstreaming Biodiversity Concerns into Forestry & Forest Management held on 28th April, 2018 at Hyderabad, Telangana

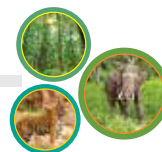
Sl. No	Name & Address
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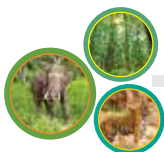
Sl. No	Name & Address
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11	Shri C.S.Ramalakshmi IFS (Retd.) Telangana State Forest Department Hyderabad, Telangana csrlakshmi@gmail.com 9849903399



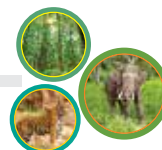
Sl. No	Name & Address
12	Dr. Manoranjan Bhanja Former Principal Chief Conservator of Forest (Wildlife) & CWLW Advisor, EPTRI, 91/4 Gachibowli, Hyderabad - 500 032 Andhra Pradesh mrbhanja@gmail.com 9440810024
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14	Shri Rajeev Mathew Consultant and Wildlife Expert Committee Member Telangana State Biodiversity Board raajeevmatt@gmail.com 8008290221
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Sl. No	Name & Address
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21	Shri G. Maddilety Deputy Director (Retd.) Telangana Forest Department Hyderabad - 500 004, Telangana 9440815591
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23	Shri M. Sandeep Biologist Telangana Forest Department Aranya Bhavan, Saifabad Hyderabad - 500 004, Telangana 9966143013
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25	Shri M. Bhabji Rao Telangana State Forest Department Aranya Bhavan, Saifabad Hyderabad - 500 004, Telangana 9440810597
26	Ms. Sunitha Forest Ranger Officer Telangana State Forest Academy Aranya Bhavan, Saifabad, Hyderabad - 500 004, Telangana 8333908108

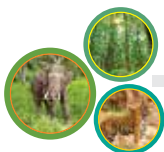


Sl. No	Name & Address
27	Shri P. Anil Kumar Deputy Director Telangana Forest Academy Telangana Forest Department Aranya Bhavan, Saifabad Hyderabad - 500 004, Telangana 8333908109
28	Shri P. Mahendar Reddy Scientist Centre for Cellular and Molecular Biology Hyderabad, Telangana 9493521454
29	Shri R. Deepak Kumar Assistant Professor Forest College and Research Institute Dulapally, Telangana 9787207332
30	Shri P. Sagar Forest College and Research Institute Dulapally, Telangana
31	Dr.C.Thomson Jacob Consultant (Biodiversity Policy) National Biodiversity Authority, TICEL Biopark, Taramani Chennai -600 113 9003071833 Convener of the 1st Policy Dialogue on Mainstreaming Biodiversity Concerns into Forestry and Forest Management.

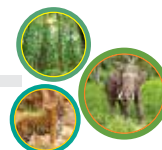


b) List of participants for the IInd regional Policy Dialogue on Mainstreaming Biodiversity Concerns into Forestry and Forest Management” on 28th May, 2018 at Hotel Fortune Park, Ahmedabad, Gujarat

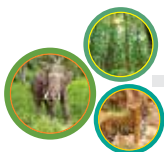
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1	Dr. Giridhar Kinhal, IFS (Retd.) Ex - Principal Chief Conservator of Forest, Madhya Pradesh Former Director, Indian Institute of Forest Management A-103, Vishwaraj Golflinks Apartments Jadhavnagar, Belagavi - 590 019 09742333686 giridharkinhal@gmail.com
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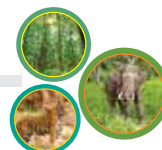
Sl. No	Name & Address
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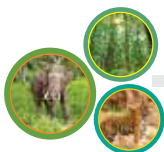
Sl. No	Name & Address
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16	Dr. Aesitha Mukherjee-Wilske Team Leader Indo-German Biodiversity Programme Access and Benefit Sharing (ABS) Partnership Project, GIZ project C-2, 102, Aura Solis CHGS, Azad Nagar Wanwadi, Pune - 411 022 aeshita.mukherjee@giz.de 9978691179
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22	Ms.Kinjal Joshi, SRF GEER Foundation Indroda Nature Park, P.O. Sector -7 Gandhinagar - 382 007, Gujarat kinjal.joshi90@gmail.com 7573020443
23	Shri Chinmag Macwan, GEER Foundation Indroda Nature Park, P.O. Sector -7 Gandhinagar - 382 007, Gujarat chinmagmac@gmail.com 9426138591
24	Dr. RashmiYadav GEER Foundation Indroda Nature Park, P.O. Sector -7 Gandhinagar - 382 007, Gujarat rashmisheu@gmail.com 9920855902
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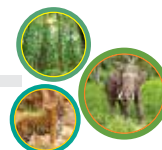


Sl. No	Name & Address
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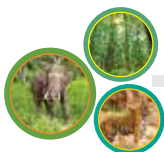
Sl. No	Name & Address
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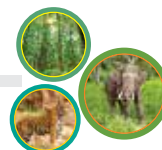


c) List of Participants for the 3rd regional dialogue on “Mainstreaming Biodiversity Concerns into Forestry and Forest Management” on 28th June, 2018 at The Lily Hotel, Guwahati, Assam

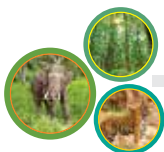
Sl. No	Name & Address
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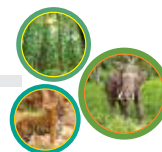
Sl. No	Name & Address
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21	Mr. Nayan Das Technical Assistant Assam State Biodiversity Board, Guwahati, Assam nayan89das@gmail.com 8638067341

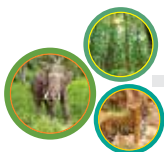


Sl. No	Name & Address
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28	Dr. Prakash Nelliya Fellow (ABS), CEBPOL National Biodiversity Authority, TICEL Biopark, Taramani Chennai - 600 113 fabscebpol@nbaindia.org 9840165462



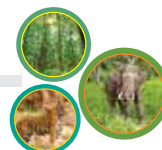
Sl. No	Name & Address
29	Mr. Charanjeev Singh Biotech Consortium India Limited New Delhi 09871099034
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31	Ms. Kajoli Begum Assam State Biodiversity Board Guwahati, Assam 8134851136
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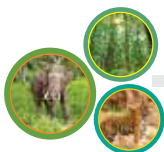


d) List of Participants for the National level discussion meeting on “Mainstreaming Biodiversity Concerns into Forestry and Forest Management” held on 5th September at NBA Conference hall, Chennai.

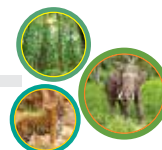
Sl. No	Name & Address
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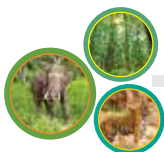
Sl. No	Name & Address
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11	Shri Manoj Chandran Chief Conservator of Forest (Nodal Officer) Land transfer - Forest Conservation Uttarakhand 9837851572



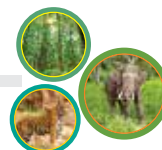
Sl. No	Name & Address
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13	Dr. Jeetendra Kumar Vaishya Research Officer National Medicinal Plants Board, 301 & 309 3rd Floor Ministry of AYUSH, Government of India AYUSH Bhawan, B Block, G.P.O Complex New Delhi -110 023
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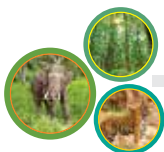
Sl. No	Name & Address
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21	Ms. Sangita Mitra Consultant National Biodiversity Authority TICEL Biopark, Taramani Chennai - 600 113 9477464145
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26	Ms.Sandhya Chandrasekharan Fellow (Multilateral Environmental Agreements) Centre for Biodiversity Policy and Law National Biodiversity Authority TICEL Biopark, Taramani Chennai - 600 113 9840450345
27	Dr.Prakash Nelliya Fellow (Access and Benefit Sharing), Centre for Biodiversity Policy and Law National Biodiversity Authority TICEL Biopark, Taramani Chennai - 600 113 9840165462
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Sl. No	Name & Address
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31	Shri G.Karthirsinivasan Office Executive (Administration) Centre for Biodiversity Policy and Law National Biodiversity Authority TICEL Biopark, Taramani Chennai - 600 113 8925372507
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33	Shri N.Singaram Information Technology Executive Centre for Biodiversity Policy and Law National Biodiversity Authority TICEL Biopark, Taramani Chennai - 600 113 9443292298
34	Dr. C. Thomson Jacob Consultant (Biodiversity Policy) National Biodiversity Authority TICEL Biopark, Taramani Chennai - 600 113 tomson09@yahoo.co.in/bpcebpol@nbaindia.org 9003071833 Convener of the national level Policy Dialogue on Mainstreaming Biodiversity Concerns into Forestry and Forest Management at Chennai.



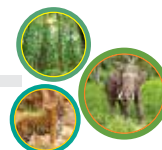
Annexure IV : Photo Gallery



Participants at the Ist regional Policy Dialogue meeting held on 28th April, at Telangana.



Participants at the IInd regional Policy Dialogue meeting held on 28th May, at Gujarat.



Participants at the IIIrd Policy Dialogue Meeting held on 28th June, 2018 at Assam.



Participants at the national Policy Dialogue Meeting held on 5th September, 2018 at Chennai.

About CEBPOL

Government of India in collaboration with the Norwegian Government has established "Centre for Biodiversity Policy and Law (CEBPOL)" at the National Biodiversity Authority (NBA), an autonomous and statutory body of the Ministry of Environment Forest and Climate Change towards strengthening of expertise in Biodiversity Policy and Law in India. This programme is executed by the NBA in collaboration with Norwegian Environment Agency through the Royal Norwegian Embassy, New Delhi, India.

The Centre aims to provide advice and support to the Government of India and Norway on Biodiversity Policy and Law related issues including complex negotiations on Access and Benefit Sharing and Traditional knowledge as well as governance issues relating to biodiversity at the National and International level. The Centre proposes to help NBA in the effective implementation of International agreements on conservation, sustainable use and the associated access and benefit sharing components of it.

CEBPOL is set up as a specialized Centre of Excellence in Biodiversity Policy and Law to network, organize and consolidate expertise on issues of Biodiversity Policy and Law in India and Norway. The Centre, located at NBA, would function as an independent think tank on Biodiversity Policy and Law. In addition, CEBPOL aims to contribute to the effective implementation of the Biological Diversity Act 2002 and Rules 2004.

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