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Ministry of Environment, Forest and Climate Change

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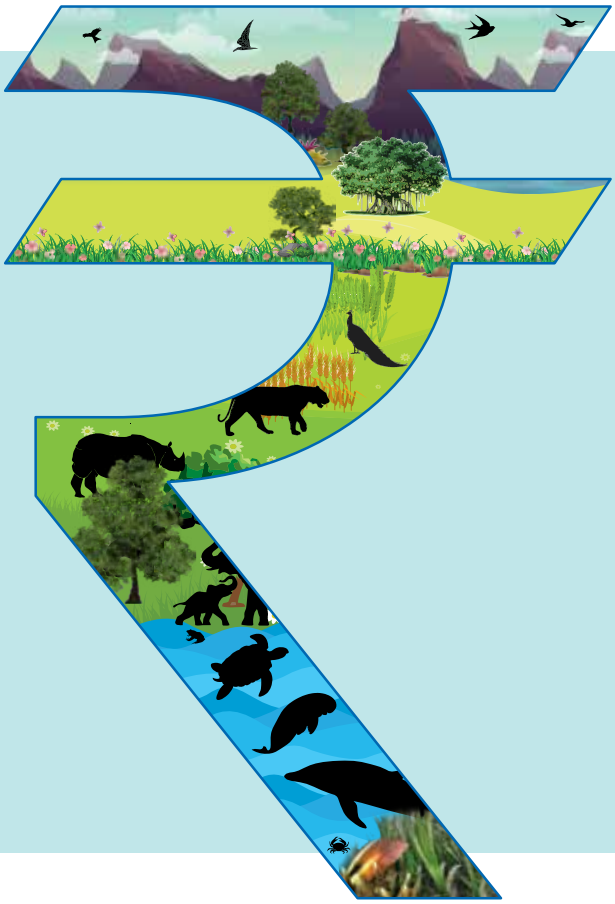
Biodiver₹sity Finance Plan

Working Document

May 2019



Biodiversity Finance Initiative INDIA

BIOFIN THE BIODIVERSITY FINANCE INITIATIVE

Biodiversity Finance Plan

Working Document

May 2019

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Disclaimer

The Biodiversity Finance Plan is a working document prepared based on first order assessments and reports of BIOFIN technical agencies. The figures and assessments are not conclusive or definitive, but only the best available estimates, and as such is a work in progress. The views expressed and statements are those of the authors and of respective institutions and do not necessarily represent those of the Ministry of Environment, Forest and Climate Change, National Biodiversity Authority or United Nations Development Programme.

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FOREWORD

Biodiversity, the variety of all life on earth, provides us with goods and services that provide the natural living infrastructure essential for a well-functioning global economy. This is especially true for India, a mega diverse country rich in biodiversity and associated traditional knowledge, where biodiversity is directly linked with providing livelihoods to and improving socioeconomic conditions of millions of our local people, thereby contributing to sustainable development and poverty alleviation. Conservation of biodiversity is therefore a national priority.

In order to strengthen measures for conservation and management of biodiversity, it is essential to not only understand and appreciate, but also estimate the value of biodiversity and the ecosystem services it provides in economic terms. Biodiversity being a multi-disciplinary and cross sectoral subject, assessing funding for biodiversity is quite challenging.

In this backdrop, I am pleased to note the exercise taken up by the Ministry in partnership with the National Biodiversity Authority under the project on Biodiversity Finance Initiative (BIOFIN) for undertaking Biodiversity Expenditure Review and Financial Needs Assessment, and preparing a nationally appropriate Biodiversity Finance Plan. As a working document, the Biodiversity Finance Plan presents strategies to bridge the gap in biodiversity funding based on the best available estimates.

I compliment everyone associated with the preparation of this publication. I hope that the document would be useful in informing the planning and decision making process towards enhancing financing for biodiversity funding in the country.

[C.K. Mishra]

Dated: 16th May, 2019
Place: New Delhi

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MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE

PREFACE

Biodiversity along with the ecosystem services it supports is the foundation of life which is vital for social and economic development. India is a biodiversity rich country where millions of people depend on biodiversity for their livelihoods. Incurring expenditure for conserving biodiversity is therefore a long-term investment for securing our own well being.

Global assessments have brought into focus the lack of adequate and sustained investments in the biodiversity sector resulting in significant gap in biodiversity funding for achieving the globally agreed biodiversity targets. In order to identify needs and gaps in biodiversity finance and determine related challenges and opportunities for resource mobilization, it is imperative to undertake detailed national level assessments.

Towards this, India has participated in an important UNDP supported global programme on Biodiversity Finance Initiative (BIOFIN). The project which is being implemented by the Ministry of Environment, Forest and Climate Change with National Biodiversity Authority as the host organization, entails assessing the expenditure being incurred presently on biodiversity in the country, the requirement of funds for implementing the National Biodiversity Action Plan, and preparing a Biodiversity Finance Plan (BFP) that identifies financial solutions to bridge the gap. Considering that there are over 100 schemes and programmes relevant to biodiversity in nearly 25 Ministries/Departments, in addition to funding for biodiversity by States and other sources, extensive consultations were held with all stakeholders. The BFP thus prepared is a first order assessment of biodiversity financing needs, resources available and strategy to narrow the gap through identifying finance solutions. Precise estimation for biodiversity funding is a challenge, and the figures and assessments presented in the BFP are not conclusive or definitive. The BFP as such is a work in progress.

I take this opportunity to congratulate all those who were involved in this arduous task.

(Anil Kumar Jain)

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Message

Biodiversity and Ecosystem Services (BDES) are the basis of life and human survival on Earth. BDES is the foundation of economic growth, food security and livelihoods security of every country. But today, biodiversity is under grave threat. A landmark report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services warns that nature is declining at unprecedented rates globally, and the rate of species extinction is accelerating. That means the health of ecosystems we all depend on to survive is deteriorating faster than ever before, and we cannot achieve the Sustainable Development Goals (SDGs) without safeguarding nature. Unless we act now to reverse course, the results will be catastrophic.

Finance is a key enabler in ensuring that we keep our pledge to conserve and protect our biodiversity. Solutions based in nature not only ensure sustainability but have very high returns on investments. Globally, nature contributes between USD 75 and 125 trillion to the economy – at par with global GDP (around USD 78 trillion). At USD 150-440 billion, the cost to sustain biodiversity and ecosystems is a mere fraction of this.

The United Nations Development Programme (UNDP) lays special emphasis on achieving the SDGs through nature-based solutions. Through the Biodiversity Finance Initiative, UNDP is currently working with 36 countries on finding innovative country-specific finance solutions to plug the huge finance gaps in meeting global and national targets for biodiversity.

India is among the first countries to join the BIOFIN programme. UNDP appreciates the exemplary ownership and support of the Government of India at the highest level in implementing this innovative initiative in India. With this leadership, India has prepared a Biodiversity Finance Plan identifying a range of potential finance solutions to bridge the finance gap to achieve India's National Biodiversity Targets.

UNDP hopes that this publication is widely used by key policy and decision-makers in the public and private sector to jointly implement the innovative finance solutions so that we can invest fully in nature and protect, restore and sustainably use the biodiversity and ecosystems crucial to all life.

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Biodiversity Finance Initiative (BIOFIN) - India is being led by the Ministry of Environment Forest and Climate Change (MoEFCC) and hosted by the National Biodiversity Authority (NBA), Government of India. We acknowledge the highest level of ownership of the Government of India in design and implementation of this project in the country. In this regard, we acknowledge the continued guidance and leadership of Dr Sujata Arora, Adviser, MoEFCC, in project implementation and showcasing India's progress on global platforms in the area of biodiversity finance.

The efforts made by Dr V Rajagopalan (Former Secretary, MoEFCC & Senior Technical Adviser, BIOFIN India) in providing technical inputs and guidance towards finalizing various BIOFIN assessments, as well as, in preparation of the first draft of the Biodiversity Finance Plan, is highly appreciated and acknowledged.

We acknowledge the guidance received at various stages of the project implementation from Prof. A Damodaran, Professor Indian Institute of Management, Bangalore and Chair of Technical Advisory Group (BIOFIN India). Acknowledge the critical role played by the BIOFIN team of the technical agencies, namely, the Wildlife Institute of India led by Dr V B Mathur & the BIOFIN team of the National Institute of Public Finance and Policy led by Dr Rita Pandey, in undertaking necessary assessments and revisions at National and State levels. Various other technical experts have also contributed to the development of methodologies and assessments undertaken in the project. The contribution of Dr J Soundrapandi in preparation of the Financial Needs Assessment for implementation of the National Biodiversity Action Plan, under the guidance of Mr. T Rabikumar, Former Secretary, NBA, is acknowledged.

Acknowledgement is due to the State Biodiversity Boards of Uttarakhand and Maharashtra in facilitating the implementation of project at subnational level in these pilot states.

The inputs and comments received from various institutions including relevant line Ministries/ Departments of the Government of India and other public and private institutions in assessments of biodiversity finance scenario in the country is highly appreciated.

Special thanks to the UNDP Global BIOFIN team led by Mr. Onno van den Heuvel, Manager - BIOFIN, Ms. Annabelle Trinidad, Senior Technical Adviser and Mr. David Meyers, former Senior Technical Adviser, for providing technical support and guidance at various stages of project implementation. The management and facilitation provided by the UNDP BIOFIN India team led by Dr Ruchi Pant and coordinated by Ms. Manisha Choudhary is appreciated and acknowledged.

Acknowledgements are due to the National Biodiversity Authority led by Shri A K Jain, Chairperson NBA & Additional Secretary MoEFCC and Dr Purvaja Ramachandran Secretary, NBA for facilitating in getting inputs and comments from the central line Ministries/Departments on Biodiversity Finance Plan and for the successful organisation of the National stakeholder consultation workshop on the Biodiversity Finance Plan.

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List of Acronyms

Acronym	Description
ABS	Access and Benefit Sharing
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BER	Biodiversity Expenditure Review
BFP	Biodiversity Finance Plan
BIOFIN	Biodiversity Finance Initiative
BMC	Biodiversity Management Committee
BSI	Botanical Survey of India
CAF	Compensatory Afforestation Fund
CAG	Comptroller and Auditor General
CAGR	Compound Annual Growth Rate
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CPCB	Central Pollution Control Board
CPSUs	Central Public Sector Undertakings
CBD	Convention on Biological Diversity
CII	Confederation of Indian Industry
CMIE	Centre for Monitoring Indian Economy
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
DBT	Department of Biotechnology
EBA	Ecosystem based Adaptation
EDF	Environment Damages Fund
EFT	Ecological Fiscal Transfer
ERF	Environment Relief Fund
ESAs	Ecologically Sensitive Areas
FAO	Food and Agriculture Organization
FNA	Financial Needs Assessment
FSI	Forest Survey of India
FTC	Forest and Tree Cover
FYP	Twelfth Five Year Plan
GCF	Green Climate Fund
GEF	Global Environment Fund
GIM	Green India Mission
GIZ	Gesellschaft für Internationale Zusammenarbeit
GST	Goods and Services Tax

Acronym	Description
HAM	Hybrid Annuity-PPP model
IBBI	India Business and Biodiversity Initiative
ICAR	Indian Council of Agricultural Research
ICFRE	Indian Council of Forestry Research and Education
ICRIER	Indian Council for Research on International Economic Relations
ICZM	Integrated Coastal Zone Management
IDWH	Integrated Development of Wildlife Habitats
IIFM	Indian Institute of Forest Management
INDC	Intended Nationally Determined Contribution
IAS	Invasive alien species
IPM	Integrated pest management
IUCN	International Union for Conservation of Nature
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
MKSP	Mahila Kisan Sashaktikaran Pariyojana
MDF	Moderately Dense Forest
MNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoEF&CC	Ministry of Environment, Forest and Climate Change
NAARM	National Academy of Agricultural Management
NBA	National Biodiversity Authority
NBAP	National Biodiversity Action Plan
NBT	National Biodiversity Target
NBS	Nutrient Based Subsidy
NEP	National Environment Policy
NGOs	Non-Government Organisations
NGT	National Green Tribunal
NIPFP	National Institute of Public Finance and Policy
NLCP	National Lake Conservation Program
NMCG	National Mission for Clean Ganga
NMSA	National Mission for Sustainable Agriculture
NFSM	National Food Security Mission
NPCA	National Program for Conservation of Aquatic Ecosystems
NPV	Net Present Value
NRCP	National River Conservation Plan
NRLM	National Rural Employment Mission

Acronym	Description
NTCA	National Tiger Conservation Authority
NWCP	National Wetlands Conservation Program
ODA	Overseas Development Assistance
OF	Open Forest
PA	Protected Area
PBR	Peoples' Biodiversity register
PES	Payment for Ecosystem Services
PIR	Policy and Institutional Review
PLI	Public Liability Insurance
REDD	Reducing Emissions from Deforestation and Forest Degradation
SBB	State Biodiversity Board
SBM	Swachh Bharat Mission
SPCB	State pollution Control Board
STP	Sewage Treatment Plants
SPV	Special Purpose Vehicle
NTFP	Non-timber forest products
TOFs	Trees Outside Forests
TEEB	The Economics of Ecosystem and Biodiversity
TK	Traditional Knowledge
USD	The United States Dollar
VDF	Very Dense Forest
WII	Wildlife Institute of India

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Executive Summary

For sustainable biodiversity management, it is necessary to make an assessment of biodiversity finance needs, policies, institutions and mechanisms for implementing the National Biodiversity Action Plan (NBAP). Biodiversity Finance Initiative (BIOFIN) a global UNDP programme, being implemented in India since May 2015 by the Ministry of Environment Forest and Climate Change (MoEFCC) through the National Biodiversity Authority (NBA), offers sophisticated and country specific methodological framework to assess current expenditures and finance needs for implementing the NBAP and suggests innovative and scalable financial solutions to fill the finance gap for achieving the National Biodiversity Targets.

Raising and managing capital and using financial incentives to support sustainable biodiversity management would essentially flow from findings of these National level assessments. Drawing on the quantitative and qualitative data gathered through detailed country level assessments based on innovative methodologies and wide range of consultations with key experts and stakeholders, BIOFIN supports in preparation of country specific Biodiversity Finance Plan (BFP) which suggests range of potential financial solutions suited to fill the finance gap for implementing the NBAP.

BIOFIN in India is a nationally driven initiative, with high level of Government ownership and builds on the earlier National level assessments undertaken by MoEFCC in consultation with key Ministries and line Departments on assessment of budgetary allocation and expenditure related to biodiversity conservation in India through the MoEFCC's core and non-core programmes, as well as indirect peripheral funding from schemes of other Government of India Ministries/ Departments that have some bearing on biodiversity conservation. The outcomes of this exercise were reported in India's Fifth National Report to the Convention on Biological Diversity (CBD).

Building further on this assessment, BIOFIN in India, based on an innovative methodological approach and wide range of consultation with various stakeholders, helped in the first order assessments of expenditure being incurred presently on biodiversity in the country through Biodiversity Expenditure Review (BER) and requirement of funds for implementing the NBAP through the Financial Needs Assessment (FNA).

The BER exercise undertook scheme-wise analysis of biodiversity attributable expenditures of relevant programmes and schemes at the Central and State levels for the period 2012-13 to 2016-17 and assessed projected expenditure for the next 5 years. Based on this exercise, the annual average public finance for the period 2017-18 to 2021-22 is assessed to be around Rs. 70,121 Crore (nearly USD 10 billion) and Financial needs assessment for the same period is assessed to be around Rs.1,15,970 Crore (nearly USD 16.5 billion).

The BFP prepared based on these assessments, seeks to bridge the gap in resources by implementation of feasible finance solutions. The BFP suggests twelve potential finance solutions to bridge the finance gap taking in to account all existing financial instruments as well as innovative instruments being tried out in the country. Out of the twelve finance solutions five finance solutions have been quantified which includes mainstreaming biodiversity in public schemes, Corporate Social Responsibility (CSR), Augmenting Public Finance, Ecological Fiscal Transfer (EFT) and Access and Benefit Sharing (ABS). It is envisaged that expected annual contribution from these five finance solutions is Rs. 19,800 Crore (nearly USD 2.2 billion), leaving an annual gap in resources of nearly Rs. 26,100 Crore (nearly USD 3.7 billion).

Since many of the financial solutions cut across several thematic areas of NBAP, in the absence of adequate information on activity specific availability of public finance, financing needs and resource gaps, contribution of each finance solution has been assessed to bridge the overall gap in resources rather than against each thematic area or activity. The way forward is to move

towards activity specific resource gaps to plan further course of action. Needs assessment for specific activities based on quantitative targets and baselines is a step in this direction. Further, activity specific contribution from public finance at the Central and State levels would need to be assessed. Also, contribution from each of the finance solutions will need to be assessed activity-wise. In view of the foregoing, this BFP may be treated as a first order assessment and a working document.

The Biodiversity Finance Plan seeks to facilitate the achievement of India's biodiversity vision of conserving biodiversity and promoting its sustainable utilization by way of mobilizing resources through mainstreaming National Biodiversity Targets in relevant developmental targets of national priorities in terms of poverty alleviation, food security and elimination of hunger, sustainable livelihoods, women empowerment, health and nutrition, mitigating and adapting to climate change and others. India's biodiversity sector shall continue to be primarily financed by the public sector at both National and State levels and efforts to enhance awareness on the economic contribution of biodiversity shall be accelerated. While maintaining stability in funding the sector, improved delivery of service and efficiencies shall govern the use of public sector funds. This shall be accomplished through mainstreaming and ensuring that actors benefitting from commercialization of biodiversity resources are identified and duly contribute to the long term sustainable management of the sector. Cognizant of the role of the private sector in achieving the SDGs, the financing for biodiversity shall feature direct engagement especially those involved in the commercial use of said resources, and realignment of available CSR funds towards the sector. It is envisaged that the planning, programming and decision making of relevant public and private sector acknowledges the funding gap in achievement of National Biodiversity Targets and linked sectoral targets and work towards reducing the funding gap through implementation of innovative financial solutions.

1. Introduction

Launched on 22 May 2015, Ministry of Environment Forest and Climate Change (MoEFCC) –UNDP Biodiversity Finance Initiative (BIOFIN) India, is being implemented by the Ministry of Environment Forest and Climate Change (MoEFCC) through the National Biodiversity Authority (NBA) at the national level and also at the sub-national level in two states: Maharashtra and Uttarakhand. The technical agencies of BIOFIN India includes the National Institute of Public Finance and Policy and the Wildlife Institute of India. The BIOFIN process in India follows a highly consultative and participatory approach. It is a nationally driven process and builds on the exercise done by the MoEFCC on assessment of allocations for biodiversity conservation in the country in 2013-14 during the updation of the National Biodiversity Action Plan (NBAP). Building further on this, based on national level assessments for current biodiversity expenditures, financial needs for implementation of the NBAP, following a customised methodological framework and with exemplary support and ownership of the Government of India, the Biodiversity Finance Plan (BFP) prepared under the project seeks to bridge the gap in resources by implementation of feasible finance solutions.

The responsibility for implementing the NBAP is spread across several Ministries/ Departments and Institutions. In this regard engagement of stakeholders and consultations done at national and subnational level throughout the BIOFIN process helped in achieving the objectives of the project. Considering that there are over 100 schemes and programmes relevant to biodiversity being implemented by nearly 25 Ministries/ Departments, in addition to biodiversity relevant schemes/programmes/projects being implemented by State Governments, Externally Aided Projects and from CSR funds, extensive consultations were held with all stakeholders including the concerned Central line Ministries/Departments, line departments in two pilot states, (Uttarakhand and Maharashtra), corporate sector, NGOs and technical experts.

During implementation of the project, letters were sent to Secretaries of all concerned Ministries/Departments on several occasions. Three national level stakeholder consultations were held by the MoEFCC along with NBA and UNDP with participation from senior government officials, policy & decision makers of nearly 25 line Ministries/Departments implementing nearly 116 biodiversity relevant programmes and schemes. In addition, several one to one consultations with line departments were held in the state of Maharashtra and Uttarakhand. Surveys were also undertaken with public and private sector to have an in-depth understanding of biodiversity relevant programmes and schemes being implemented and biodiversity finance scenario in the country.

Further, based on national level assessments on biodiversity expenditures and financial needs for implementing the NBAP and the programme and Institutional review done in this regard, the first draft of the Biodiversity Finance Plan was prepared and circulated to 25 relevant line Ministries/Departments, 18 divisions within MoEFCC, technical experts from institutes like Indian Institute of Management, Madras School of Economics etc. for inputs and comments. A technical expert group consultation was held by the NBA to seek inputs of key experts on the BFP and the suggestions were incorporated accordingly. Following, comments received from some of the line Ministries/Departments and divisions of MoEFCC, a national stakeholder consultation workshop was held to seek comments/ inputs on the Biodiversity Finance Plan. The workshop was attended by 15 Central line Ministries/Departments and several divisions of the MoEFCC. The list of Central Ministries/ Departments consulted on the Biodiversity Finance Plan is annexed for reference.

1.1 Building on BIOFIN Assessments

The BFP seeks to facilitate in achieving India's biodiversity vision of conserving

biodiversity and promoting its sustainable utilization. Accordingly, the BFP is driven primarily by the imperative to implement the NBAP. Finance solutions, existing as well as new and innovative ones, being tried out in the country have been considered in terms of their potential to address various components of the NBAP. Public as well as private sources of finance have been considered. The BFPis a living document and given the limitations in terms of data, time and resources, further revisions of the BFP would be necessary and therefore, this Plan may be treated as the first version and a working document.

It needs to be stated upfront that, BFP implementation needs to be taken up alongside a supportive policy and regulatory regime spread across different sectors that impact biodiversity. To elaborate, in the absence of effective enforcement of regulations, ecosystems will continue to be degraded, restoration will be never ending and, in turn, the extent of resources required and time-frame will become indeterminate.

At this stage, four detailed technical proposals to operationalize the BFP have been prepared and more proposals would need to be framed in due course. In terms of methodology, the key outcomes of earlier assessments carried out under the BIOFIN project listed below formed the building blocks in developing the BFP.

- Biodiversity Expenditure Review (BER, Central Government, State Government of Maharashtra and Uttrakhand; Maharashtra figures extrapolated to all States to get total public finance along with projections for the next 5 years.
- Financial Needs Assessment (FNA)- 12th Plan based and projections for the next 5 years.
- Biodiversity Financing – Role of Corporate Sector, in particular, CSR funds and projections for the next 5 years
- Policy and Institutional Review (PIR)- Central Government, State Governments of Maharashtra and Uttrakhand.

Role of Technical agencies:

As stated earlier, the Wildlife Institute of India and the National Institute of Public Finance and Policy are the two key technical institutes of BIOFIN India who along with the National Biodiversity Authority have immensely contributed in first order assessments of current and projected biodiversity expenditures and financial needs for implementing the National Biodiversity Action Plan, respectively. These assessments served as the building blocks in preparation of the Biodiversity Finance Plan – Working document, which has been drafted and developed with technical guidance and diligent efforts of Dr V Rajagopalan, through review and revision of methodologies for the purpose of compatibility between BER and FNA, detailed Programme and Institutional Review at National level including analysis of key economic sectors having impact or dependency on biodiversity, identification and detailed assessment of 12 finance solutions and quantification of 5 finance solutions, to showcase the potential of these solutions in bridging the gap in financial resources for implementing the National Biodiversity Action Plan.

Some of the key assessments which formed the building blocks of the Biodiversity Finance Plan including the Biodiversity Expenditure Review (Central level), appraisal of biodiversity relevant programmes and schemes (national and in state of Uttarakhand), mapping, documentation and review of some of the existing finance mechanisms in the country and National Level Consultations for BER with central line Ministries/ Departments etc.. were done by the WII BIOFIN team led by Dr V B Mathur (Director WII).

The BIOFIN team of the NIPFP led by Dr Rita Pandey (Prof NIPFP) contributed immensely towards the state level assessments of available and projected public finance in the state of Maharashtra which was further extrapolated to all States to assess the total biodiversity attributable public finance along with projections for the next 5 years. In addition some of the other key assessments including biodiversity attributable expenditures at the central level based on review and analysis

of international fund flow, Public Sector Undertakings and CSOs etc., analysts of the trends in total revenue generated from biodiversity, assessment and extrapolation of CSR Expenditures of corporates to obtain national level CSR estimates and 5 and 15 year projections of CSR expenditures etc were undertaken by NIPFP.

Dr J Soundrapandi under the guidance of Mr T. Rabikumar IFS, Former Secretary, National Biodiversity Authority and Dr. V. Rajagopalan IAS (retd.), Senior Technical Adviser BIOFIN India & Former Secretary MoEFCC and with inputs from key technical experts prepared the Financial Needs Assessment for the Implementation of India's National Biodiversity Action Plan.

1.2 Review and Revision of Assessments

1.2.1 Biodiversity Expenditure Review (BER) (Central Govt.): BER provides estimates and assessments of the existing financial resources for biodiversity conservation in the country. It aims to use detailed data on public, private and civil society budgets, allocations and expenditures to inform and promote improved biodiversity financing and outcomes. It analyses the current public and private expenditures benefitting biodiversity and assesses past and projected expenditures on biodiversity.

BIOFIN India built on earlier assessment of biodiversity finance undertaken for the first time in 2010–2011. Funding was assessed for core schemes, which refer to the direct or immediate biodiversity impact of MoEFCC programmes or schemes, non-core (indirect) and net peripheral funding flows from 29 biodiversity relevant schemes of seven Ministries/Departments other than the MoEFCC, along with core funding by the State governments. Building on this study and using a similar methodology, an assessment was conducted as part of the preparation of the Fifth National Report to the CBD and updation of the NBAP for 2013–2014 that included expanded datasets based on peripheral funding related to 77 schemes of 23 Ministries/Departments of the Government of India, which were identified for their indirect relevance to biodiversity. Each State and Union Territory (UT) in India also allocates part of its budget for expenditure on the environment and this was also included.

This exercise estimated resource flows to the biodiversity sector in India in three categories:

- Direct core funding
- Non-core funding
- Peripheral funding

Building further on these assessments of biodiversity relevant budget allocations in India, further assessments were undertaken under BIOFIN to review and analyse biodiversity relevant expenditures in the country and projections for the years ahead.

The first step of the BER entailed identification and mapping of programmes, schemes and activities contributing to biodiversity conservation, directly or indirectly (hereafter referred to as biodiversity relevant programmes/schemes). There are more than 50 Ministries under the Government of India and programmes and schemes of these Ministries were reviewed for relevance to biodiversity conservation. Documents like Detailed Demand for Grants (DDG), annual reports, outcome budgets, websites etc., were examined and consultations held to identify biodiversity relevant Ministries and schemes. The MoEFCC along with the NBA facilitated data collection from relevant Central Ministries/Departments.

In order to meet its economic, social and sustainable development goals, the Central Government introduces various schemes and programmes which are implemented through several central level institutions and various subnational governments. Financial provisions for these are allocated in the budgets of the Central Government. The document DDG was used as a base for identification of biodiversity relevant schemes. Guidelines for each of the schemes were reviewed in detail to identify activities or components, directly or indirectly relevant for biodiversity conservation. A customized

methodology for assessing the 'attributable share' for biodiversity conservation was worked out.

Tagging and tracking of schemes

After selecting a scheme as biodiversity relevant, related expenditure figures were collected for different years. To avoid double counting of expenditure figures and to minimize errors, the 'tagging and tracking' method was adopted for the collection of relevant figures. Each scheme is codified through a special code which remains constant over the years. The nomenclature for coding of schemes is issued by the Comptroller and Auditor General (CAG) of India with the approval of the Governor General as per directions under Section 168 of the Government of India Act, 1935 (Diglot Edition, 2001). The government budget document DDG, includes all the schemes with specific codes. Each ministry has its own DDG for each financial year. Each DDG includes three kinds of figures for a scheme: Budget Estimate (BE) for the current year, Revised Estimate (RE) for the previous year and actuals for the year before the previous year called the Expenditure Figure.

After coding or tagging a biodiversity relevant scheme, it was tracked for five financial years from 2012-13 to 2016-17to understand the trend of expenditure over the years. The flow of funds in a scheme operates under various heads in the DDG such as Central Plan, State Plan, Tribal Sub-Plan, Special Component Plan, etc

Determining proportion of expenditure attributable to biodiversity conservation

Once the schemes were identified, the actual proportion of expenditure contributing to sustainable biodiversity management was calculated. This was done by first classifying 'direct' and 'indirect' expenditures and then determining what percentage should count towards expenditure for biodiversity management. To ascertain that the system/ methodology of attributing expenditures to specific biodiversity categories or national themes is accurate, precise, repeatable and defensible, the methodology for determining the expenditure attributable to biodiversity conservation was further guided by existing methodologies, e.g. the Rio Markers and consultations at national and subnational levels in India. To reflect the varied levels of contribution, the 'indirect' expenditures were further classified.

The biodiversity relevant schemes of the Central Government have, in the draft BER, been placed in four categories of biodiversity relevance: direct (range 91 to 100, average 95%), indirect high (range 51 to 90, average 70.5%), indirect medium (range 26 to 50, average 38%) and indirect low (range 1 to 25, average 13%). The percentages within brackets show the extent of scheme expenditure deemed biodiversity relevant considering scheme objectives. During review, to determine biodiversity relevance, in addition to scheme objectives, it was considered essential to take in to account scheme components/activities permissible under the scheme, focus areas and monitorable targets. Further, it was also decided to categorize the schemes in to six groups adopting modified Rio Marker methodology as shown below.

Further, future projections on budgetary support likely to be available were made based on year-wise scheme expenditures over five years, 2012-13 to 2016-17.

Table 1.1
Modified Rio Marker Methodology

Categories	Direct	Indirect Very High	Indirect High	Indirect Medium	Indirect Low	Indirect Marginal
Range	100-90%	90-75%	75-50%	50-25%	25-5%	5-0%
Target	95%	82.5%	62.5%	37.5%	15%	2.5%

BER was also carried out at the level of State governments of Maharashtra and Uttarakhand and projections made for the next 5 years including extrapolation to national level based on Maharashtra.

1.2.2 Finance Needs Assessment (FNA)

FNA is the third step in the BIOFIN process. This step is aimed at making a comprehensive estimate of the financial resources needed to implement the NBAP and achieve the associated National Biodiversity targets.

In India, financing biodiversity conservation is a complex policy issue with implications for the country level planning and budgeting process. Until the Twelfth Five Year Plan (FYP) (2012–2017), the Planning Commission of India (1951–2014) and the NITI Aayog (2015–2017) were responsible for assessing financial resources, taking decisions regarding the design and size of sectoral schemes and programmes at the country level, and allocating funds for their implementation. During the planning process, based on the overall objectives set for the FYP, the Planning Commission would set up various Working Groups and Steering Committees by taking into consideration diverse inter-sectoral and sector-specific issues. The Working Groups would then project realistic and realizable financial and physical targets for the BFP schemes and programmes under their purview.

FNA in India was done by the National Biodiversity Authority. It has taken the approach of assessing trends in the national planning and budgeting process for their relevance to biodiversity, with a view to developing baseline information about the funding needs for the biodiversity sector as a whole, as well as to arrive at an initial estimate of the financial resources required to achieve the activities listed in India's NBAP, 2008 & Addendum 2014 to NBAP, 2008 and the 12 National Biodiversity Targets (NBTs).

The principle part of India's NBAP, 2008 consists of 175 action points spread across 11 thematic areas (Table 1.2). These action points are in close harmony with the 12 NBTs developed as part of Addendum 2014 to NBAP 2008, which have been further cross-linked to the 175 action points from NBAP, 2008. The latter, in principle, allow for the monitoring and reporting of the NBT at the national level and enable India to contribute to the Aichi Biodiversity Targets at the global level.

India's adoption of NBAP (NBAP, 2008 & Addendum 2014 to NBAP, 2008) has not been accompanied by any allocation of funds for its implementation. It is envisaged that the objectives of NBAP are to be implemented through schemes and programmes of relevant Ministries, with the NBAP allowing the Ministries the flexibility to integrate biodiversity concerns in their respective schemes. Hence, a reasonable estimate of financial needs for the effective implementation of NBAP has proven to be a methodological challenge as India's NBAP is essentially a strategic policy document.

The 175 action points spread across 11 thematic areas form the basis for seeking funds from domestic and external sources. In order to sharpen the interlinkages between the Aichi Biodiversity Targets and India's NBAP, the plan schemes and programmes of the MoEFCC and of other Ministries/Departments of the Government of India have to be further aligned for the desired outcomes in terms of indicators provided by the Aichi Biodiversity Targets.

The implementation of India's NBAP and the associated NBTs needs explicit alignment with plan schemes and programmes of the government, resulting in the preparation of a comprehensive biodiversity finance plan to identify periodic and continuous funding needs. This is the context for the biodiversity FNA under the BIOFIN, which estimates the finances required to implement NBAP and to achieve the NBTs.

Table 1.2
Action points of India's National Biodiversity Action Plan, 2008

S. no.	NBAP thematic area	No. of action points[1]	% of NBAP actions
1a.	Strengthening and integration of in-situ conservation	22	12.5
1b.	Strengthening and integration of on-farm conservation	4	2.2
1a.	Strengthening and integration of ex-situ conservation	12	6.8
2.	Augmentation of natural resource base and its sustainable utilization: Ensuring inter- and intra-generational equity	20	11.4
3.	Regulation of introduction of invasive alien species and their management	9	5.1
4.	Assessment of vulnerability and adaptation to climate change, and desertification	16	9.1
5.	Integration of biodiversity concerns in economic and social development	21	12.0
6.	Pollution impacts	10	5.7
7.	Development and integration of biodiversity databases	10	5.7
8.	Strengthening implementation of policy, legislative and administrative measures for biodiversity conservation and management	16	9.1
9.	Building of national capacities for biodiversity conservation and appropriate use of new technologies	24	13.7
10.	Valuation of goods and services provided by biodiversity, and use of economic instruments in decision making processes	7	4.0
11.	International cooperation	4	2.2
	Total action points	**175**	**100**

The FNA assessment was based on assessment of various expert groups (called Working Groups) constituted by the Planning Commission as part of 12th FYP formulation to estimate budgetary support for various Ministries. The expert groups, wherever required, were constituted for each thematic area within a given ministry. The expert groups had come up with their estimates of budgetary support necessary for various schemes.

As part of the review exercise, it was decided to review the draft FNA also on the lines of BER to determine biodiversity relevance of various schemes as well as their categorization.

In addition, it was decided to incorporate in to FNA quantitative targets, wherever possible, from biodiversity relevant policies/ missions/strategies and programs of the Central Government. In such a case, the fund estimation for the future was based on present status indicated by baseline, future target, time-frame to achieve the target and unit cost estimates.

[1] For the purpose of financial needs assessment, NBAP Thematic Area 1 consisting of 38 actionable points were segregated into three parts: in-situ (22), on-farm (4) and ex-situ conservation (12).

As a result of review of draft BER and draft FNA, the methodologies with regard to assessment of biodiversity relevance of schemes have been synchronized and the two assessments have become compatible. Introduction of quantitative targets in FNA helped assess activity specific fund requirements and thereby refine the FNA. The gap in resources as seen from the two assessments (along with CSR funds), therefore forms a meaningful basis to formulate the BFP. However, there are limitations due to gaps in data, etc. as explained in section 3.5.

1.2.3 Role of Corporate Sector

In a country which grapples with various socio-economic, environmental and ecological challenges, the corporate sector has the potential to contribute significantly in addressing these challenges. Corporate sector in India has a history of playing an important role in addressing the socio-economic challenges in partnership with the governments, through civil society organizations, trusts and private foundations. In an effort to systematically encourage the corporate sector to incorporate environmental sustainability in its operations, various government institutions have issued notifications and guidelines. It was with the Companies Act, 2013, that CSR spending was made a statutory obligation for companies incorporated under the Act (Section 135 of the Act).

In order to assess funds likely to be available for biodiversity financing from the corporate sector as part of their mandatory obligation in terms of CSR, the Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE) database was made use of to estimate CSR liability of all companies covered under CSR. Funds likely to be available for biodiversity were estimated @2.97% of CSR funds considering the earlier work of National Institute of Public Finance and Policy (NIPFP) on biodiversity relevant expenditure of selected Central Public Sector Enterprises. Future projections on funds likely to be available were based on Compound Annual Growth Rate (CAGR) of industry sector.

1.2.4 Programme and Institutional Review (PIR)

The PIR looks at policy, regulatory regime and institutional structure in terms of their relevance to biodiversity. It also considers economic sectors which have a significant bearing on biodiversity in terms of impacts as well as dependence by way of raw materials, etc. It also takes stock of chronological status of different ecosystems and examines steps needed for their conservation given development imperatives of our country.

It may, therefore be seen that, PIR is important in the context of BFP. Particularly in terms of steps needed to prevent further degradation of ecosystems by way of changes in regulatory regime, monitoring and enforcement, unsustainable consumption practices and their relation to subsidies, etc. The PIR has implications for containing the resource requirements under BFP since prevention of damage is far easier and much more cost-effective as compared to restoration. In fact, the success of BFP depends on how seriously the suggestions arising from PIR are taken and acted upon.

The full report on Biodiversity Expenditure Review and the Finance Needs Assessment could be accessed at the following web link *https://www.biodiversityfinance.net/index.php/india*

1.3 Implementing the NBAP, a Joint Responsibility

The NBAP, 2008 is a comprehensive document consisting of 11 thematic areas and 175 action points spread across the thematic areas. The NBAP was revised in 2014 to be in line with the Strategic Plan for Biodiversity (2011-2020) and its 20 Aichi Targets which the CBD had adopted in 2010. Rather than re-write the NBAP, 12 NBTs were formulated keeping the Strategic

Plan and the 20 Aichi Targets as a flexible framework. Under each NBT, descriptive indicators and composite indicators have been provided to track progress. The target-wise agencies responsible have been included and such agencies include various Ministries of the Central Government, their agencies/institutes as well as State Governments.

It is therefore seen that, while MoEFCC has a coordinating role, the responsibility for implementing NBAP, in addition to MoEFCC, rests with various other Central Ministries such as Agriculture, Water Resources, etc and the concerned departments of the State governments. as well . Consequently, financing of the BFP has to be a joint effort of all responsible ministries/agencies. The finance solutions that form part of the BFP have, therefore, been selected, inter-alia, keeping this distribution of responsibility in mind. Considering that, several Central Ministries have much larger budget allocations as compared to MoEFCC, mainstreaming biodiversity in the planning process of concerned Central Ministries would form the core strategy to implement BFP. Mainstreaming has to be piloted by the concerned Ministry.

Given the subject specific mandates of various Central Ministries, to ensure that biodiversity gets adequate attention in formulation of programs/schemes across Ministries and Departments, it is necessary to establish linkages between NBTs and over-arching national priorities in terms of poverty alleviation, food security and elimination of hunger, providing livelihoods, meeting minimum basic needs of people as well as mitigating and adapting to climate change. The agenda of Sustainable Development Goals (SDGs) incorporates all these priorities and therefore provides an ideal platform to anchor and articulate priorities of biodiversity conservation. Establishing such a linkage with the SDGs would enable larger public acceptance and help convince policy makers in prioritizing biodiversity conservation through programs/schemes of various Ministries. Since biodiversity in itself does not get adequate traction across Ministries, the strategy to mainstream biodiversity has to be built on NBTs-SDGs linkages.

1.4 Economic Rationale for investments to implement NBAP

It is well recognised that investment in natural capital delivers significant co-benefits for sustainable development. For example, restoration of ecosystems such as mangroves, wetlands and reefs could deliver significant livelihood benefits to local communities and improve resilience and adaptation to climate change. At a global scale, reforestation and restoration are cost-effective forms of climate change mitigation and adaptation. Restored forest ecosystems will add to the productivity of sustainable agriculture as well as serve to improve upstream supplies of freshwater by facilitating nutrient and freshwater recycling and by preventing soil erosion. Sustainability of ocean fisheries will be enhanced by increases in Marine Protected Areas. It is thus important that Aichi Biodiversity Target expenditures are recognized as part of such wider investment needs for promoting sustainable development.

In fact, a compelling rationale for the Strategic Plan for Biodiversity and the Aichi Biodiversity Targets is that ***"Biological diversity underpins ecosystem functioning and the provision of ecosystem services essential for human***

well-being. It provides for food security, human health, the provision of clean air and water; it contributes to local livelihoods, and economic development, and is essential for the achievement of the Millennium Development Goals, including poverty reduction" [2].

As regards quantification of net benefits of biodiversity conservation, The Economics of Ecosystem and Biodiversity (TEEB) Quantitative Assessment estimated that reduced deforestation scenario could yield net benefits of USD 183 billion by 2030.[3] The TEEB Synthesis Report contains quantification of economic benefits of conservation of ecosystems such as corals as well as specific activities such as bee keeping.[4] In terms of poverty alleviation, it has been estimated that biodiversity conservation could yield aggregate benefits valued at three times the estimated opportunity costs and exceed $1 per person per day for 331 million of the world's poorest people.

To drive home the rationale for commitment of resources for conservation of ecosystems and biodiversity, it is necessary to ensure that economic value of ecosystem services is captured and communicated to all policy and decision makers. This would help in proper appreciation of all ecosystem services and, in turn, cost-benefit analysis of proposed investments could be based on a more rational framework. Economic valuation of ecosystem services, especially of those services which do not have a market at present is essential. To elaborate, as far as mangroves are concerned, the ecosystem services provided and absence of market for many of them are captured in the table below which indicates alternative valuation options. Therefore, decision-making on investment in a set of short-listed projects based on cost-benefit analysis which ignores, as at present, those services that do not have a market is bound to lead to sub-optimal decision-making.

[2] Report of the High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011-2020

[3] SAC (undated) The Economics of Ecosystems and Biodiversity - The Quantitative Assessment. Final Report to the United Nations Environment Programme

[4] TEEB (2010) TEEB Synthesis Report

Table 1.3
Suitable Methods for Economic Valuation of Mangrove Ecosystem

S. No	Ecosystem Services Classification	Goods and Services	Suitable Methods for Economic Valuation
1	Provisioning Services	Fishery	Market pricing method
2		Aquaculture (Shrimp spawners)	Market pricing method
3		Fuelwood and timber	Market pricing method, Substitute cost method, Contingent valuation method
4		Fodder/Grazing	Market pricing method, Substitute cost method, Contingent valuation method
5		Honey collection	Market pricing method, Contingent valuation method
6		Medicinal uses	Market pricing method, Substitute cost method, Contingent valuation method
7	Regulating Services	Protection function (Protection against storm, flood, etc.)	Replacement cost method, Restoration cost method, Damage cost avoided method, Benefit transfer method
8		Erosion prevention & soil accretion	Damage cost avoided method, Benefit transfer method
9		Water quality maintenance	Replacement cost method, Damage cost avoided method, Benefit transfer method
10		Carbon sequestration	Market pricing method, Damage cost avoided method, Benefit transfer method
11	Cultural Services	Tourism	Travel cost method, Market pricing method, Contingent valuation method
12		Bird nesting ground	---
13		Research & Education	Travel cost method, Benefit transfer method
14	Supporting Services	Biodiversity & nursery ground support	Choice experiment approach, Benefit transfer method
15		Nutrient & soil formation support	Market pricing method, Replacement cost method, Benefit transfer method

Source: Presentation by Dr. Asir Ramesh at the National Dialogue on Economic Valuation of Coastal and Marine Ecosystem Services held at Chennai on June 11, 2018

*Two or more methods might be suitable for economic valuation of particular ecosystem services. In that case, the most effective method has to be selected for valuation process based on situation at the studied location.

While there have been a large number of economic valuation studies world-wide, in India, comprehensive studies have been rather limited. Values of ecosystem services obtained from studies conducted elsewhere can give only a broad idea of their likely value in the Indian context. Adopting such values may lead to erroneous decision-making as economic valuation of ecosystem services is essentially site-specific. For instance, the benefits of flood damage avoidance attributable to a wetland would depend on number of people, homes and property involved[5].

Hence, there is an urgent need to launch a program for economic valuation of all major ecosystems and their services. Incidentally, this, along with regular monitoring and assessment of ecosystems, both in terms of extent and quality, would help in transitioning to integrating ecosystem service values in a step-wise manner into existing national accounting framework [6].

When monitoring and assessment of ecosystems and their services along with their accounting gets institutionalized, the agenda of mainstreaming biodiversity in the planning process will get much greater traction since justification for investments in biodiversity conservation in terms of net benefits would be clearly visible. Along with this, the linkages showing (a) role of biodiversity in achieving SDGs and (b) in mitigating/ adapting to climate change will help biodiversity conservation receive its due share of public funds. While the role of biodiversity and ecosystems in mitigating climate change by way of carbon sequestration is well understood, their role in adaptation, for example, the role of mangroves, corals, salt marshes, etc. in building coastal resilience both against sea level rise and extreme weather events such as cyclones is beginning to emerge as a cost-effective option to 'hard' coastal protection measures such as sea walls and groynes.

1.5 Need for an integrated approach to quantitative targets

As stated earlier, quantitative targets were introduced in FNA wherever feasible. For purposes of BFP, an overall resources gap (essentially FNA – BER) is not of much help in identifying priorities for planning activities. Gap in resources would need to be assessed against specific activities that need to be taken up in respect of different thematic areas and NBTs contained in NBAP. The action points of NBAP 2008 as well as NBTs introduced in 2014, however, do not contain quantitative targets. Hence, there is a need to consider NBAP along with targets contained in biodiversity relevant national policies/missions/action plans/commitments such as India's Nationally Determined Contribution under United Nations Framework Convention on Climate Change (UNFCCC), etc. It may be noted that, these policies, etc. have also been approved at the highest levels in government and therefore a holistic approach by way of considering the NBAP along with these policies, is necessary to arrive at specific actions to close the gap between present status (baseline) and the target/goal.

[5] https://www.moore.org/materials/white-papers/Ecosystem-Services-Seminar-3-Valuation.pdf

[6] http://ec.europa.eu/environment/nature/biodiversity/economics/pdf/EU%20Valuation.pdf

In fact, such a course of action is advised as per BIOFIN Workbook 2016 (hereinafter called the Workbook). When important sectoral strategies (that significantly impact biodiversity) are not included in the NBSAP, the Workbook observes that it is important to expand the scope of BIOFIN due to the following:

- Other national strategies may have stronger public and private sector buy-in and could benefit from other financial resources.
- They help identify links to sectoral policies.
- The goal is to achieve the CBD's Strategic Plan, including the 20 Aichi Biodiversity Targets.

The Workbook states that it is essential the NBSAP and BIOFIN process integrate effectively into these broader plans to support their implementation and coordination with other related initiatives. These plans may have specific actions directly related to biodiversity management that may not be explicitly included in the NBSAP, but do represent significant national biodiversity needs.

In view of the above, the Workbook advocates that targets available in the NBSAP and other sources as relevant need to be taken in to account in financial needs assessment.

In fact, specific activity-wise gap in resources would help identify the finance solutions including new and innovative solutions necessary in addition to the financing mechanisms in place at present. In turn, this would help in drafting BFP with specific activity-wise time-frames, additional resources needed and the appropriate finance solutions to be put in place. However, to reach such a stage of refinement, the BFP may have to undergo a few revisions to assess potential of each of the finance solutions including new and innovative ones in implementation of NBAP and meeting the activity-specific gaps. Therefore, in the first version of BFP, it would be appropriate to limit to identifying finance solutions and indicating their role with respect to the thematic areas of NBAP as well as the quantitative target-specific gaps in resources.

A case in point is that of river conservation. The national Environmental Policy, 2006 identifies degradation of water resources as a key environmental challenge. Water borne diseases attributable to poor bacterial quality of drinking water account for a large proportion of disease burden amongst children.[7] Given that discharge of untreated/partially treated sewage is the major source of bacterial and organic pollution load discharged in to rivers, the government has identified river cleaning with focus on sewage collection and treatment as a priority area. High organic pollution load in water extracted from rivers for purposes of drinking makes it difficult for water treatment plants to get rid of bacterial load. The national action plans such as the Ganga Action Plan launched in 1986, National River Conservation Plan and the National Mission for Clean Ganga launched in 2015 are in pursuance of this national commitment to clean up rivers.

It may be noted that ecosystem restoration in terms of river rejuvenation by arresting pollution discharge in to rivers is fully aligned with Aichi Biodiversity target 8 which deals with reduction in pollution load and target 15 which involves restoration of ecosystems. Also, the expected outcome in terms of reduction in water borne diseases burden amongst children is aligned with SDG 3, in particular, SDG Target 3.9 which seeks to reduce by 2030 illnesses and deaths on account of factors including water pollution.

In respect of the following activities/programs, targets indicated in policies, etc. mentioned above have been made use in assessment of

[7] http://www.downtoearth.org.in/news/dirty-air-and-water-increase-cradle-deaths-in-india-57305

resources needed considering the present status (baseline), target, gap and unit costs.

- River conservation/rejuvenation
- Forest and tree cover enhancement and restoration of degraded forests
- Relocation of people from core areas of tiger reserves
- Cleaning/restoration of wetlands
- Sanitation

While quantitative targets do bring about greater accuracy in needs assessment, the nature of several action points contained in NBAP make it necessary to rely on subjective expert group assessments since the underlying goals are aspirational in nature. However, for all the above items for which the requisite data is available, the results of assessments based on quantitative targets are captured under section 2.2. The FNA also incorporates these assessments.

2. Resources Gap Assessment from Quantitative Targets

2.1 Linking NBTs to goals/targets from relevant Policy/Mission/Strategy

2.1.1 Forestry related NBTs and Indicators from NBAP, 2014

The need to adopt an integrated approach for proper appreciation of NBTs deserves to be reiterated. For instance, NBT 3 observes as follows:

'Strategies for reducing rates of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being'.

Against this the prescribed composite, descriptive indicators and agencies responsible for monitoring are given below.

Table 2.1.1
Descriptive indicators and agencies responsible for monitoring

Composite Indicator	Descriptive Indicator	Responsible Agencies
Trends in forest cover	Change in proportion of forest cover in different forest categories (VDF, MDF, OF and Scrub)	Forest Survey of India (FSI)
Trends in aquatic ecosystems	Changes in area under riverine ecosystems and wetlands (terrestrial and coastal)Number of wetlands under integrated management plans	Department of Space (DoS), Wetlands International-SouthAsia, SACON
Trends in mangrove cover and coastal area management	Change in mangrove cover over the years Trends in area covered under integrated coastal area management	FSI; Integrated Coastal and Marine Area Management (ICMAM), Ministry of Earth Sciences; Integrated Coastal Zone Management (ICZM) Project Unit of Society of Integrated Coastal Management (SICOM); National Centre for Sustainable Coastal Management (NCSCM), MoEF; DoS
Trends in river water quality	Changes in water quality (by interception, diversion and treatment of domestic sewage and preventing agricultural runoff, toxic wastes, industrial effluents, chemical wastes and unburnt bodies from entering water bodies)	National Ganga Authority, National River Conservation Directorate (NRCD) (Ganga Action Plan, Yamuna Action Plan and other action plans for polluted water bodies), SPCBs, CPCB
Trends in afforestation and restoration	Monitoring canopy cover, grasslands and traditional grazing lands Monitoring carbon stock Assisted natural regeneration Rehabilitation of mined out areas	Green India Mission, NRSC, DoS, ICFRE, forest departments, FSI Central Mine Planning and Design Institute (CMPDI)
Combating desertification	Trends in land degradation Status and trends in area under desert, levels of water in wells/ groundwater table	National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), Department of Agriculture & Cooperation, Disaster Management Support Programme, DoS, Department of Land Resources, Ministry of Rural Development, Ministry of Water Resources

Like-wise, under NBT 8, the relevant composite and descriptive indicators are given below.

Table 2.1.2
Relevant composite and descriptive indicators under NBT 8

Composite indicator	Descriptive indicators
Extent of restored forest cover in India	Trends in area of forests under Restoration Trends in area under plantations in rural/urban areas Trends in very dense forest/moderately dense forest in protected areas

Putting together NBTs 3 and 8 along with their composite and descriptive indicators, as contained in the 2014 addendum to NBAP, 2008, the following may be observed.

- Restoration of degraded forest land is a focus area and progress is to be monitored by periodically assessing area under forests of different density categories.
- The composite indicator on trends in afforestation along with the descriptive indicator monitoring canopy cover as under NBT 3 and the descriptive indicator under NBT 8 on trends in area under plantations in rural/urban areas clearly indicate enhancing Forest and Tree Cover (FTC) as a focus area.

2.1.2. National Forest Policy

Let us consider the composite indicators on forestry, namely, trends in forest cover and trends in afforestation and restoration in the context of forest policy.

The National Forest Policy, 1988 and the Draft Forest Policy, 2018 seek to achieve the following:

Forest Policy	Descriptive Indicator	Responsible Agencies
National Forest Policy, 1988	Increasing substantially the forest/ tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.	The national goal should be to have a minimum of one-third of the total land area of the country under forest and tree cover. In the hills and in mountainous regions, the aim should be to maintain two-third of the area under such cover in order to prevent erosion and land degradation and to ensure the stability of the fragile eco-system.
Draft National Forest Policy, 2018	Degraded forests will be rehabilitated by promoting natural regeneration, by taking strict protection measures and also by planting locally suitable indigenous species for assisting the existing regeneration.	The overall objective and goal of the present policy is to safeguard the ecological and livelihood security of people, of the present and future generations, based on sustainable management of the forests for the flow of ecosystem services. In order to achieve the national goal for eco-security, the country should have a minimum of one-third of the total land area under forest and tree cover.

As seen clearly, the National Forest Policy, 1988 and the Draft National Forest Policy, 2018 also emphasize both restoration of degraded forest land as well as afforestation and tree plantation in non-forest land. They go further and stipulate the extent of the country's geographical area to be brought under FTC.

2.1.3 Intended Nationally Determined Contribution (INDC)

India submitted its INDC under UNFCCC in 2015 and committed to creating an additional carbon sink of 2.5 to 3 billion tons of CO2 equivalent through additional forest and tree cover by 2030. It may also be noted that, addressing the drivers of degradation and deforestation as well as afforestation of degraded areas forms part of the objectives of India's draft Reducing Emissions from Deforestation and Forest Degradation (REDD +)Policy and Strategy released in 2016.

Therefore, an integrated view of NBTs, the National Forest Policy, INDC and Draft REDD + Policy and Strategy would require the following to be incorporated in the BFP.

- Restoration of degraded forest land in the 'open' category with tree canopy density in the range of 10-40%.
- Enhancing FTC from the present level of 24.39% to 33.33% of the country's geographical area.

In fact, this has already been incorporated as part of revision of FNA.

Now, let us consider descriptive and composite indicators under NBT 3 as contained in the 2014 Addendum to NBAP along with National River Conservation Program (NRCP), National Environment Policy (NEP, 2006), and the National Mission for Clean Ganga (NMCG). The relevant activities are conservation/ rejuvenation of polluted rivers and restoration of degraded wetlands and lakes.

The following is from Addendum, 2014 to NBAP.

NBT	Descriptive Indicator	Composite Indicator
Strategies for reducing rate of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being.	Trends in river water quality	Changes in water quality (by interception, diversion and treatment of domestic sewage and preventing agricultural runoff, toxic wastes, industrial effluents, chemical wastes and unburnt bodies from entering water bodies)

The observations contained in NEP, 2006 along wi th objectives of NRCP and NMCG are captured below. Given that NRCP was initially focused on Ganga only, the objectives of NRCP with regard to Ganga could be extended to all other rivers as well. The same is true of NMCG's objectives as well.

NEP, 2006	NRCP	NMCG
Urban environmental degradation, through lack of (or inappropriate) waste treatment and sanitation, industry and transport related pollution, adversely impacts air, water, and soil quality, and differentially impacts the health of the urban poor.	The main objective of GAP was to improve the water quality of Ganga to acceptable standards by preventing the pollution load reaching the river.	The Mission seeks to restore wholesomeness of river Ganga defined in terms of ensuring continuous flow, unpolluted flow and Geologic and Ecological Integrity.

- It is seen quite clearly that an integrated view of NBAP, NEP, 2006 and NRCP would require that domestic waste water (sewage) is fully treated prior to discharge in to water courses including rivers, wetlands and lakes. Almost the entire bacterial pollution load and 80% of the organic pollution load reaching water bodies is accounted for by untreated/partially treated domestic sewage. As far as industrial waste water treatment is concerned, as part of 'Polluter Pays' principle, it is the responsibility of every industrial establishment to treat wastewater to prescribed effluent disposal standards. Further, given that establishment of effluent treatment facilities to meet discharge standards is a must to get regulatory approvals and further, in view of strict action taken by the CPCB and SPCB to ensure that industrial effluents conform to prescribed standards, estimate of cost of river rejuvenation would be guided by resource requirement to ensure 100% treatment of domestic sewage.
- The assumptions in working out fund requirements are explained by way of notes accompanying Table 2.2.1 below.

2.2 Needs Assessments based on Quantitative Targets

- The table below captures financial resources required to meet the following quantitative targets.
- Rejuvenation of rivers by ensuring that all domestic sewage generated from Class I cities is treated prior to discharge in to water bodies
- Create additional FTC to close the gap between present FTC of 24.39% and targeted FTC of 33%
- Sanitation
- Cleaning/Restoration of wetlands
- Relocation of people from core areas of tiger reserves

As stated earlier, the underlying assumptions are captured in the notes below the table.

[8] Source: CPCB

[9] Source: Forest Survey of India and cost norms adopted in Green India Mission (double the cost norms assumed due to labour wage rates in States being more than double the assumed rate of Rs.100 per day); however, these costs could go up if the norms evolved by ICFRE for tree plantation along Ganga under National Mission for Clean Ganga (afforestation of 1,34,106 hectares proposed at a cost of 2293.73 Crores. @ about Rs. 1.71 lakhs/hectare) are adopted; https://nmcg.nic.in/csr/csrtreeplantation.aspx. Also, as per an assessment by TERI, to meet INDC commitment of achieving an additional carbon sink of 2.5 to 3 billion tons of CO2 equivalent by 2030, the estimated fund requirements is about Rs. 1 lac Crore. per annum - http://www.teriin.org/sites/default/files/2018-02/co2e-sequestration.pdf

[10] Source: National Tiger Conservation Authority

Table 2.2.1

Assessment of funds requirement based on quantitative targets/mission e estimates

Program/ Activity	Baseline	Target	Gap	Unit cost in INR	Funds needed (approx.)	Time-frame	Requirement of funds (approx.)		
							Annual	5 yrs	15 yrs
River conservation/rejuvenation	23,277 MLD of sewage treatment capacity[7]	61,948 MLD (total sewage generated in Class I cities)[8]	38,671 MLD[7]	5 Crore. per MLD	About 200,000 Crore.	30 years	6667 Crore	33,335 Crore	100,000 Crore
Forest and Tree Cover (FTC)[9] (a) Create addl. FTC	708,272 sq.km	1002,272 sq.km	294,000 sq.km	120,000 per hec.	353,000 Crore (approx.)	30 years	11,800 Crore	59,000 Crore	177,000 Crore
(b) Improve degraded 'open' forest	301797 Sq.km	301797 Sq.km	301797 Sq.km	60,000 per hec.	181,000 Crore (approx.)	30 years	6000 Crore	30,000 Crore	90,000 Crore
Relocation from core areas of tiger reserves[10]	44,506 families still remain	44,506 families still remain	44,506 families still remain	2 million per family	8900 Crore.	10 years	890 Crore	4450 Crore	8900 Crore. (10 years)
Cleaning/ restoration of wetlands and lakes	2.04 lac hecs.[4]	2.04 lac hecs.[4]	2.04 lac hecs.[11]	0.21 Crore. per hec.[12]	42,840 Crore.	30 years	1428 Crore.	7140 Crore.	21,420 Crore.
Sanitation	SBM (urban)				62,009 Crore. [13]				
	SBM (rural)				200,000 Crore. [14]				

Total annual requirement of funds (excluding sanitation) works out to Rs.26, 785 Crore.

[11] 10% of 2.04 million ha. under lakes, ponds and tanks (source: National Wetlands Atlas,2011) assumed to be in need of restoration

[12] Assuming 70% of restoration cost (of 0.3 Crore. per ha., source: MoEF&CC)) is accounted for by waste water treatment which has been accounted for under river cleaning/river rejuvenation

[13] SBM Mission (Urban) portal

[14] https://economictimes.indiatimes.com/news/economy/infrastructure/swachh-bharat-abhiyaan- government-builds-7-1-lakh-toilets-in-january/articleshow/46269612.cms

It may be noted that, program/ activity-wise annual fund requirement constitutes a key input in formulating the BFP. The magnitude of resource gap as well as biodiversity relevance (ranging from direct to indirect marginal as stated earlier) of a given program/activity helps in identifying suitable finance solutions including combination of solutions required given limitations of individual solutions. The category of relevance shows priority areas for enhancing allocation of public finance/mainstreaming biodiversity in public finance.

In addition, the need to devise new financial instruments and solutions would come to light if the presently available solutions are not considered adequate.

2.3 Priority Areas for Quantitative Assessment

2.3.1 Management of Protected Areas (PAs)

Central funding support for PAs under the scheme of 'Integrated Development of Wildlife Habitats (IDWH)' during 2015-16 to 2017-18 is as follows:

Further, taking in to account data on number of PAs in each State/Union Territory, it is seen that, in all, during 2015-16, 2016-17 and 2017-18 - 321, 314 and 397 PAs were benefitted respectively. This works out to an average release per PA of about Rs.19 lakhs during 2015-16, Rs.29 lakhs during 2016-17 and Rs.38 lakhs during 2017-18. This is grossly inadequate considering that a large number of PAs are 500-1000 sq.km. in size and face anthropogenic pressures due to people living inside the PAs as well as in the periphery.

Given that total number of PAs as of July, 2018 stood at 771,[15] it is also clear that, a large number of PAs did not receive any funding support from the Central Government.

Table 2.3.1
Details of funds (Rs. in lakhs) released to State/ UT Governments under CSS- 'Development of Wildlife Habitats' during 2015-16 to 2017-18

Name of States/UTs	2015-16	2016-17	2017-18
A& N Islands	100.00	118.49	141.934
Andhra Pradesh	0	0	0
Arunachal Pradesh	304.02	256.8107	269.9348
Assam	87.10	0	275.827
Bihar	108.011	100.576	322.674
Chandigarh	0	26.06514	26.065
Chhattisgarh	213.409	278.9453	435.014
Goa	00	0	85.9938
Gujarat	395.798	497.604	558.52
Haryana	99.33	124.6572	181.4448
Himachal Pradesh	431.837	280.31	237.4107
Jammu & Kashmir	354.00	336.50626	577.9151

[15] http://www.wiienvis.nic.in/Database/Protected_Area_854.aspx

Name of States/UTs	2015-16	2016-17	2017-18
Jharkhand	18.62	0	95.607
Karnataka	262.13	325.52	427.89
Kerala	967.386	1,928.42	900.834
Madhya Pradesh	394.565	322.265	1,379.488
Maharashtra	277.94	497.35	808.0555
Manipur	248.919	340.032	425.664
Meghalaya	38.3902	55.23	114.061
Mizoram	94.55	1234.95	487.445
Nagaland	235.48	357.846	565.871
Odisha	246.8365	279.65	342.9370
Rajasthan	314.788	453.87878	622.421
Sikkim	290.32635	145.52	202.154
Tamil Nadu	113.261	0	394.725
Telangana	0	0	157.0833
Uttar Pradesh	235.05	250.956	386.968
Uttarakhand	188.318	545.30576	2,979.361
West Bengal	100.934	237.66	657.992
Puducherry	00	0	6.71
MEE-Dehradun Uttarakhand)	0	0	932.00
TOTAL	6,120.99905	8,994.54814	15,000.00

Further, data obtained from National tiger Conservation Authority (NTCA) on tiger reserve -wise funds released during 2016-17 and 2017-18 along with details of national parks/sanctuaries that form part of these 50 tiger reserves, shows the following:

Grants have been released to each of the 50 tiger reserves amounting to a total of about Rs.324 Crore. in 2016-17 and Rs.345 Crore. during 2017-18.

A total of 89 national parks and sanctuaries form part of these tiger reserves.

From the above, it is seen that grants released to tiger reserves are significantly higher than those released to PAs under IDWH. Considering that there are 89 PAs in these 50 tiger reserves, the average annual grant per PA works out to about Rs. 3.6 Crore. during 2016-17 and Rs.3.9 Crore. during 2017-18. Hence, PAs that form part of tiger reserves receive a much higher level of grants as compared to other PAs.

The 771 PAs include 104 national parks, 544 wildlife sanctuaries, 46 community reserves and 77 conservation reserves (77). Considering that there are 648 national parks and sanctuaries, after taking in to account grants under IDWH and grants released by NTCA, it is clear that a significant number of PAs do not receive any funds from the Central Government.

But for tiger reserves for which foundations have been established to collect revenue from tourism and spend on activities to promote wildlife, set up tourist amenities and address welfare needs of people living in such reserves: the revenues from tourism arising from PAs accrue to the State Exchequer and hence not available to the PAs. In such a situation, financial needs assessment of all PAs based on Management Action Plans would help highlight the resources crunch faced by them and help attract attention of policy makers. Such an assessment could be incorporated in the next revision of BFP. In addition, such an assessment would also help identify PAs which are good candidates for funding from CSR budgets of corporates.

2.3.2 Invasive Alien Species

a. Invasive alien species (IAS) are a major driver of biodiversity loss. They suppress native biodiversity, cause local extinctions and alter wildlife habitat. In fact, an analysis of the International Union for Conservation of Nature (IUCN) Red List shows that they are the second most common threat associated with species that have gone completely extinct, and are the most common threat associated with extinctions of amphibians, reptiles and mammals.[16] They affect livelihoods directly by suppressing species that people depend on (e.g., non-timber forest products, (NTFP')) and by encroaching on private and commonly held agricultural and grazing land. They affect livelihoods and well-being indirectly by altering hydrology, damaging soils, affecting the provisioning of ecosystem services, and due to costs incurred in their control or management. [17]

b. Nevertheless, a systematic assessment of the problem posed by IAS remains to be undertaken. Evaluation of 28 tiger reserves carried out by the erstwhile project Tiger Directorate of MoEFCC in 2006[18] included weed growth as one of the 45 parameters for assessment. While field visits were undertaken by independent experts as part of this exercise, in respect of several tiger reserves, the evaluation report does not include an assessment of the area affected but for approximate estimation in a few cases. The report, however, shows that many of the tiger reserves face this problem and that it has assumed serious proportions in tiger reserves such as Corbett. Moreover, the number of tiger reserves has gone up to 50 and hence the need to assess the problem in other tiger reserves as well.

c. In the case of tiger reserves, control and management of IAS forms part of management action plan. However, in tiger reserves, species-wise mapping could provide valuable inputs to control and management of IAS. As mentioned earlier, the funding of other PAs is grossly inadequate and consequently, control and management of IAS in such PAs would be enabled only when funds become available provided the extent of the problem is assessed, species-wise.

d. The problem of invasives has been well known including their impact on biodiversity and discussed in several forums. (Raghubanshi, 2005) India's fifth national report to CBD identified IAS as a major threat to biodiversity in the country. Mapping and inventorisation of IAS has been stressed in India's National Wildlife Action Plan III as well.

[16] https://www.iucn.org/theme/species/our-work/invasive-species

[17] https://thewire.in/environment/invasive-species-prosopis-lantana

[18] https://projecttiger.nic.in/WriteReadData/userfiles/file/Report-2_EvaluationReportsofTRinIndia.pdf

Considering that PAs harbor rich biodiversity, control and management of IAS in PAs is clearly a priority. Hence, a country-wide exercise on mapping IAS species-wise (plants and animals) in all the PAs would be essential so that, an action plan for managing IAS and requirement of funds and financial solutions thereof could be considered. The outcomes could be incorporated in subsequent revisions of BFP.

In the meantime, the next India State of Forest Report (SFR), 2019 could provide some useful inputs as SFR, 2017 observes that, in subsequent SFRs, the status of IAS would also be covered.

2.3.3 Other Major Gap Areas

There are major data gaps in other core biodiversity areas with large resource requirements such as the following:

- Restoration of degraded mangroves
- Restoration of degraded corals
- Restoration of other degraded coastal systems such as sea grass, salt marsh, etc.

Assessment of status of these ecosystems at regular intervals on the lines of forest survey carried out by FSI (which covers mangroves) would be a pre-requisite to quantify resource requirements. The BFP revisions could take such requirements in to account.

3. Key outcomes of completed BIOFIN Assessments

3.1 Policy and Institutional Review

The PIR process sets the tone by understanding the trends of a country's biodiversity status. The key factors underlying the existing trends: important programmes and policies influencing biodiversity conservation and finance, maps the existing systems and processes for biodiversity finance, including policy, legal and institutional frameworks and capacities.

The Programme and Institutional review in India was done at the National level as well as the State level of Uttarakhand and Maharashtra. Keeping in view the guidance provided in the Workbook as well as the country context, the endeavour was to provide a comprehensive analysis of the gaps and suggestions in terms of policies, regulations, enforcement, etc. The need to strengthen some of the core institutions entrusted with biodiversity conservation and management has also been stressed. The PIR includes brief description of biodiversity management in the country, relevant national policies and legislations with particular reference to gaps and suggested improvements. The status, trends, economy and policy drivers of key ecosystems like Forests, Rivers and Coastal Ecosystems and major sectors of the economy which have a bearing on biodiversity management, their impacts, dependencies and need for reforms in terms of policy measures and regulations, were reviewed (key sectors including mining, hydro-power tourism , agriculture) were analysed based on the following criteria:

- Dependence on biodiversity for raw materials
- Overall economic significance assessed in terms of contribution to GDP
- Dependence in terms of revenue
- Impact in terms of extent of forest land diversion that the sector accounts for
- Impact in terms of biodiversity degradation

As stated earlier in section 1, PIR is important in the context of BFP particularly in terms of steps needed to prevent further degradation of ecosystems by way of changes in regulatory regime, monitoring and enforcement, unsustainable consumption practices and their relation to subsidies, etc. The PIR has implications for containing the resource requirements under BFP since prevention of damage is far easier and much more cost-effective as compared to restoration. In fact, the success of BFP depends on how seriously the suggestions arising from PIR are taken and acted upon.

Salient recommendations that emerge from the PIR are as follows:

- A holistic view of NBAP by considering it alongside other relevant policies, strategies and plans helps to embed biodiversity concerns within the large canvas of sustainable development.
- The Fifth Assessment Report (AR5) of IPCC contains greater details at the regional level (including Asia) on climate change impacts, adaptation and mitigation interactions, inter- and intra-regional impacts and a multi-sector synthesis. It is therefore necessary to re-visit the NBAP, incorporate IPCC AR 5 observations and findings, in particular, for Asia and draw up specific actions along with time-frames to mitigate the impacts.

As regards ecosystems, the PIR observes as follows:

- In terms of enhancing the overall forest and tree cover to achieve the goal of one-third of the country's geographical area under forest and tree cover, enhancing cover of Trees Outside Forests (TOFs) has been rightly accorded due importance by the government. The PIR flags several issues to be addressed in order to enhance TOFs cover significantly.

- It needs to be recognized that recycling and re-use of treated wastewater is a critical component of the strategy to reduce pollution load discharged in to surface water bodies and thereby to rejuvenate and restore their ecological status. While recycling and re-use of treated industrial wastewater has benefitted from major regulatory interventions by the CPCB, there is still a long way to go with regard to re-use of treated domestic wastewater notwithstanding a limited number of notable initiatives. Both regulatory and market instruments would need to be explored further.

- In managing coastal and marine ecosystems, particularly in terms of rationale for their preservation vis-à-vis other land use options, economic valuation of ecosystem services that they provide would be very useful. In the absence of such valuation following suitable methodology for each ecosystem service under the three broad categories of provisioning, regulating and cultural services, the ecosystems tend to be under-valued and hence liable to degradation and loss in the face of anthropogenic pressures. Given the anthropogenic pressures on the one hand arising from the needs of development and the paucity of resources on the other for conservation of coastal and marine ecosystems, ICZM, which seeks to strike a balance between the two, needs to be promoted and resources from agencies such as the World Bank mobilized for the second phase of ICZM project.

As regards Policy and Regulatory Regime, the PIR suggests amendments/changes including those contained in Supreme Court orders and report of the Shah Commission on iron mining in Goa, Odisha and Jharkhand. The recommendations are briefly captured below:

- Revision of Net Present Value (NPV) rates fixed in 2008 are long overdue and early action would help bring down demand for diversion of forest land.

- Criteria-based identification of pristine forest areas and declaring them inviolate under the EP Act would help conserve for posterity forest areas of the greatest ecological significance and biodiversity richness.

- Amending the Environment (Protection) Act, 1986 to appoint an independent regulator to accord environmental clearances, etc, amending the Forest (Conservation) Act, 1980 to provide for deterrent punishment against illegal mining in forest land.

- Amending the Biodiversity Act, 2002 to bring in clarity on applicability of access and benefit sharing provisions to manufacturers of drugs based on traditional systems of medicine and having commercial scale operations.

Sector- specific recommendations contained in PIR include the following:

- Need to re-consider subsidy and pricing strategies in respect of nitrogenous, phosphatic and potassic fertilizers in order to achieve the objectives of balanced fertilization.

- Erosion of agricultural biodiversity threatens the long-term stability and sustainability of agriculture and poses danger to food security. Biodiversity should, therefore, be mainstreamed, inter-alia, in government programs, with focus on conserving on-farm diversity including that of livestock.

- Given the energy-irrigation nexus, nine States- Haryana, Punjab, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, Maharashtra, Rajasthan and Tamil Nadu, face a precarious groundwater situation. Therefore, bold decisions are called for in respect of rural energy pricing which determines groundwater use for irrigation purposes.

- To achieve the objectives of restoration of degraded forest land as well as one-third forest and tree cover for the country as a whole, the Finance Commissions may be urged to earmark at least a portion of the forest grant for forestry purposes.

- Illegal mining in forest land should be punishable with imprisonment as suggested earlier by amending the FC Act.
- In respect of hydro-power projects, ecological flow should be worked out on a case by case basis and enforced strictly to maintain the status of rivers as ecological entities.

It may therefore be seen that, the PIR recommendations cover policy and regulations, ecosystem conservation and major economic sectors that impact biodiversity. As regards BFP, they have significant implications to prevent further deterioration of ecosystems as well as sustaining conservation outcomes such as rejuvenation of rivers, restoration of wetlands, degraded forests and other ecosystems. In fact, this presumption forms the basis for working out resource requirements based on current baseline and target. Hence, investing upfront to strengthen policy and regulatory regime including use of market based instruments along with institutional strengthening for effective enforcement would be a cost-effective way of implementing NBAP and achieving the country's biodiversity vision.

3.2 Biodiversity Expenditure Review

Total public finance available for biodiversity relevant programs consists of biodiversity relevant expenditure of the Central Government and that of all the States put together. Based on scheme-wise analysis of biodiversity attributable expenditure at the Central and State levels, the year-wise details of total biodiversity attributable expenditure have been worked out for the period 2012-13 to 2016-17. Projections are made for the next 5 years to provide an estimate of year-wise total biodiversity attributable public finance likely to be available at the Central and State levels.

3.2.1 Biodiversity Attributable Expenditure of Central Government

As stated earlier, the BER as per revisions carried out is based on modified Rio-Marker methodology to determine biodiversity relevance of government schemes/programs both at the Central and State levels. The BER exercise of the Central Government covered 24 Ministries which had biodiversity relevant schemes.

In all, annual expenditure was tracked year-wise for 116 schemes/programs during 2012-13 to 2016-17. Individual scheme guidelines were reviewed carefully to determine biodiversity relevance. As stated earlier, the following were taken in to account.

- Scheme/program objectives
- Activities/components permissible under each scheme
- Focus areas
- Monitorable targets

The scheme-wise biodiversity attributable expenditure may be seen in the Wildlife Institute of India (WII) report. (Ansari, Barthwal, Hembrom & Mathur, 2018) Based on Rio-Marker category in which a scheme was placed, scheme-wise biodiversity attributable expenditure was worked out. Cumulative year-wise total expenditure as well as biodiversity attributable expenditure across 116 schemes was calculated and projections made for the next 5 years. The results are reproduced below.

Figure 3.2.1.1
Annual total and biodiversity attributable expenditures during the years 2012-13 to 2016-17.

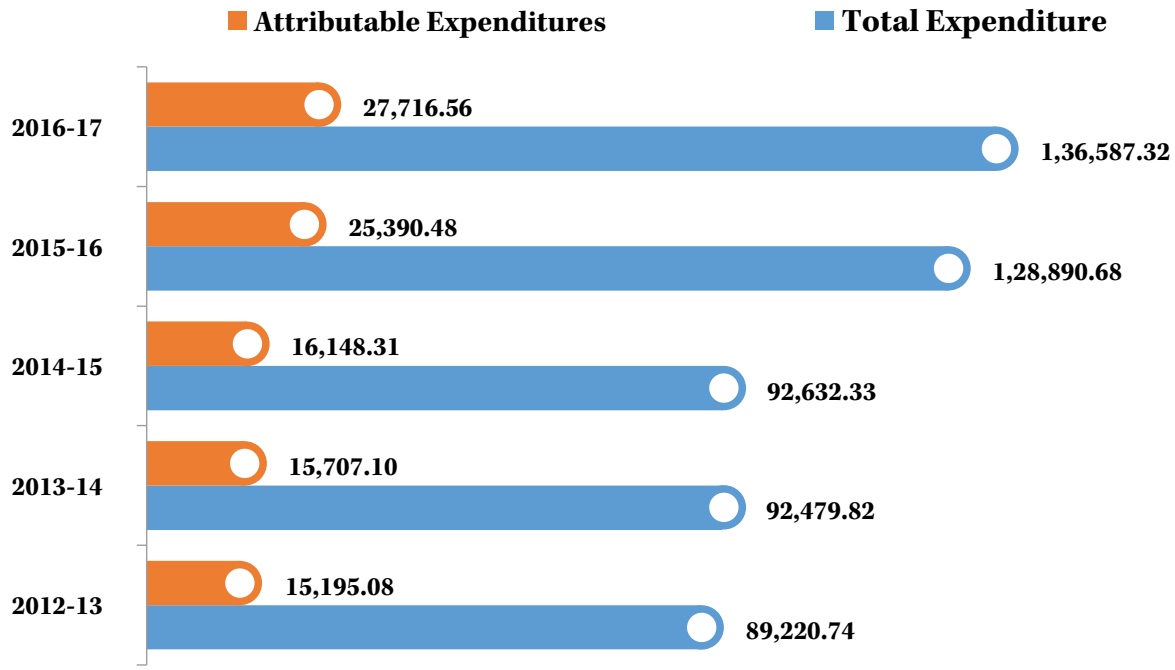


Figure 3.2.1.2
Projection (exponential) up to 2021-2122 based on actual expenditure and biodiversity attributable expenditure during 2012-13 to 2016-17

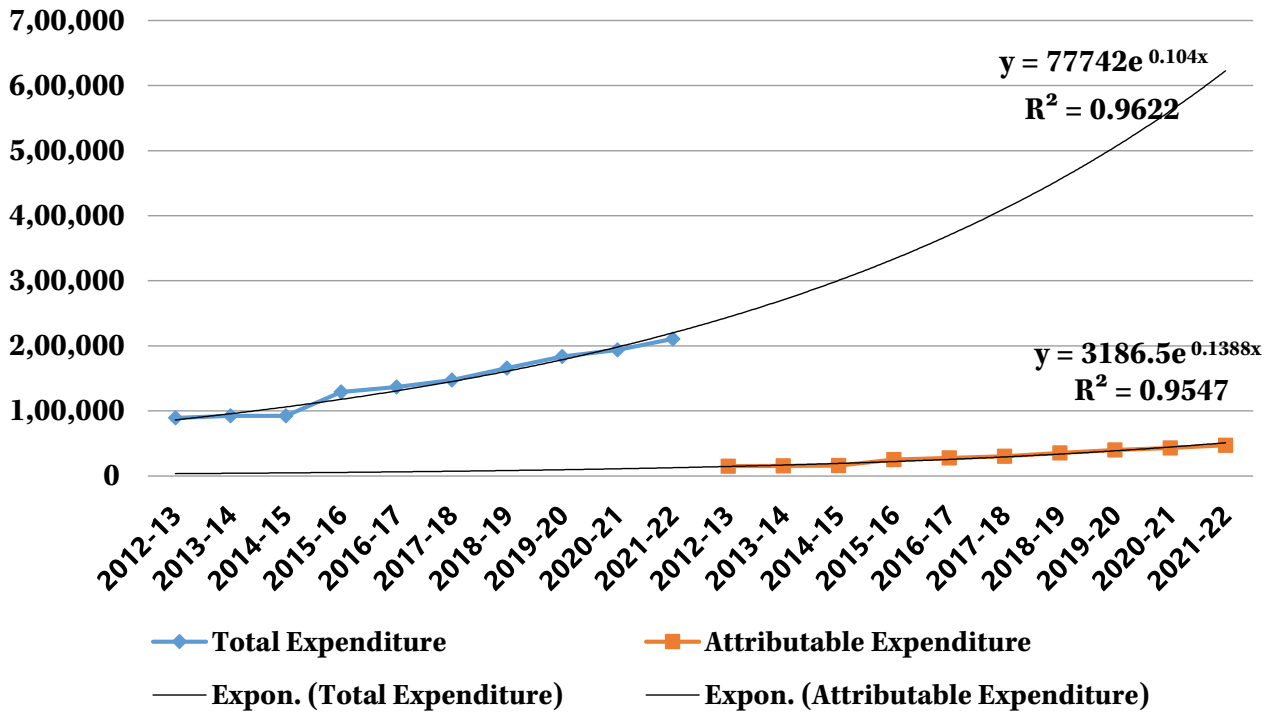


Table 3.2.1.3
BER Actual 5 years (2012-13 to 2016-17) Expenditure Figures and Future Projections/Forecast for 5 years (2017-18 to 2021-22)

Name of States/UTs	Financial years	Total Expenditure (INR in crore)	Attributable Expenditure (INR in crore)
5-Year Actual Expenditure Figures	2012-13	89,220.74	15,195.08
	2013-14	92,479.82	15,707.10
	2014-15	92,632.33	16,148.31
	2015-16	1,28,890.68	25,390.48
	2016-17	1,36,587.32	27,716.56
5- Year Future Forecast/ Projections of Expenditure Figures	2017-18	1,47,305.39	30,449.41
	2018-19	1,65,660.94	35,398.23
	2019-20	1,83,556.91	40,088.22
	2020-21	1,93,922.08	42,931.73
	2021-22	2,10,682.84	47,337.57

3.2.2 Biodiversity attributable expenditure at the State (Maharashtra) Level

Following the revised biodiversity attribution methodology worked out to categorize schemes/programs, etc. which formed the basis for revision of draft BER (Central) and FNA, the Maharashtra level draft BER was also revised. Projections were made considering biodiversity attributable expenditure of Maharashtra as a fraction of (a) GSDP and (b) total expenditure of Maharashtra. Then it was proportionately extended to all States considering total GSDP of all States and total expenditure of all States respectively along with five year projections. This estimate was undertaken by NIPFP. The results are shown below:

Table 3.2.2.1
Estimates of biodiversity Attributable Expenditure: All States (Based on GSDP)

Estimates of biodiversity Attributable Expenditure: All States (Rs. Crore)			
	Year	Real	Nominal
Actuals	2009-10	13804.85	18665.89
	2010-11	13173.02	18703.59
	2011-12	29251.60	29251.60
	2012-13	22370.28	24145.22
	2013-14	22037.82	25257.93
	2014-15	16140.30	19115.02
	2015-16	19238.92	23256.79

Estimates of biodiversity Attributable Expenditure: All States (Rs. Crore)			
	Year	Real	Nominal
Projections	2016-17	21577.09	24142.52
	2017-18	22113.62	24521.15
	2018-19	22650.15	24899.78
	2019-20	23186.68	25278.41
	2020-21	23723.21	25657.04
	2021-22	24259.74	26035.67

Figure 3.2.2.1
Biodiversity expenditure (Based on GSDP)

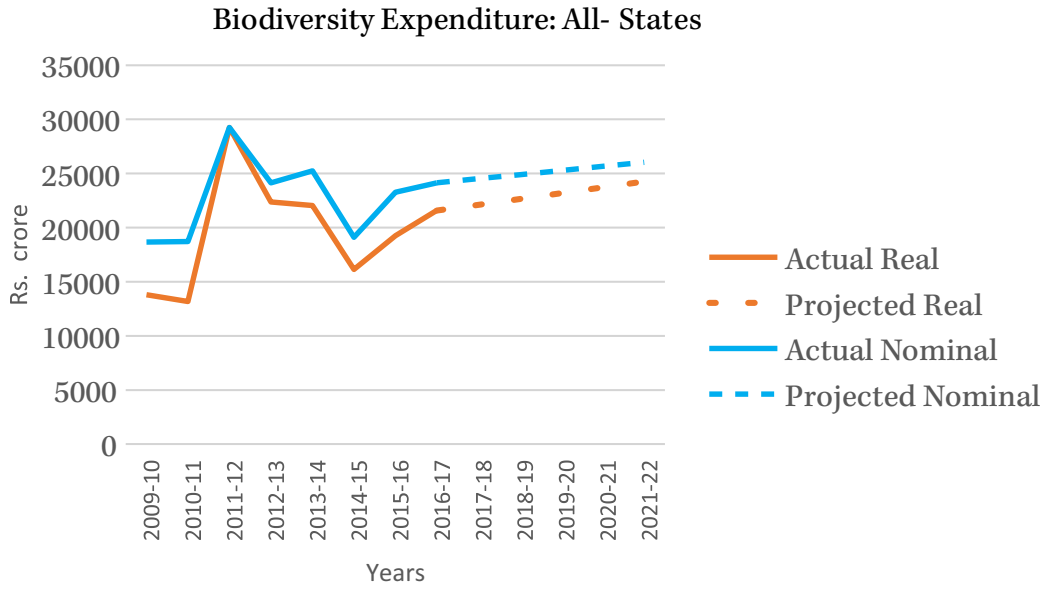
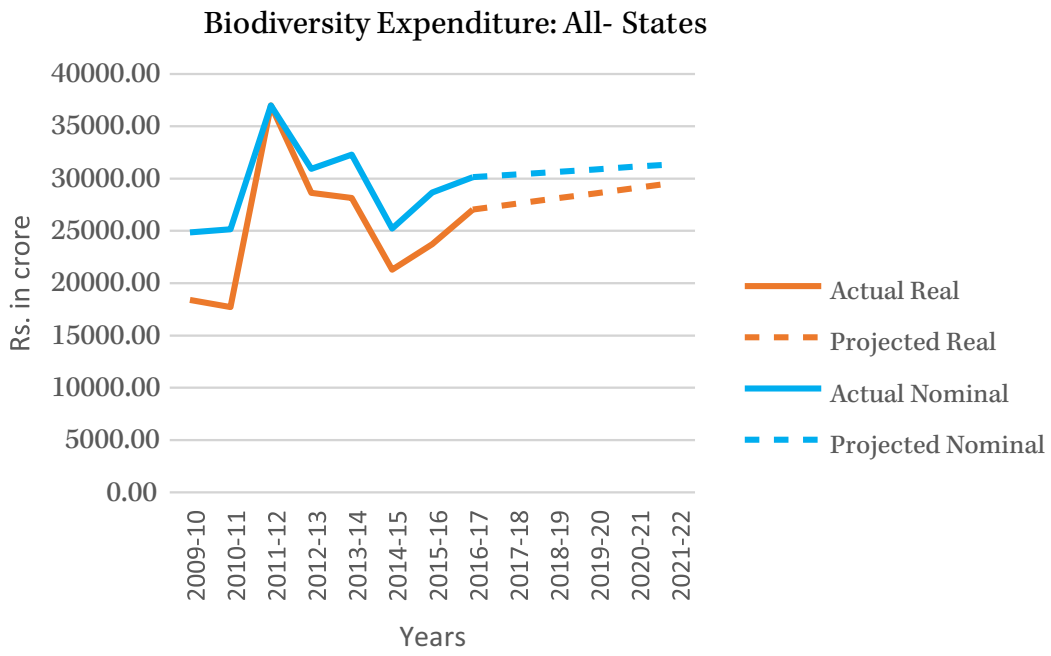


Table 3.2.2.2
Estimates of biodiversity Attributable Expenditure: All States (Based on total expenditure of the State)

Estimates of biodiversity Attributable Expenditure: All States (Rs. Crore)			
	Year	Real	Nominal
Actuals	2009-10	18383.14	24856.32
	2010-11	17718.18	25156.99
	2011-12	36994.81	36994.81
	2012-13	28647.76	30920.78
	2013-14	28160.12	32274.81
	2014-15	21298.36	25223.72
	2015-16	23726.04	28681.01

Estimates of biodiversity Attributable Expenditure: All States (Rs. Crore)			
	Year	Real	Nominal
Projections	2016-17	27040.37	30142.26
	2017-18	27553.02	30388.24
	2018-19	28065.67	30634.22
	2019-20	28578.32	30880.20
	2020-21	29090.97	31126.18
	2021-22	29603.62	31372.16

Figure 3.2.2.2
Biodiversity expenditure (Based on total expenditure of the state)



3.2.3 CSR Funds for Biodiversity

Corporate social responsibility has been made mandatory by way of an amendment in the Companies Act with effect from April 01, 2014. Companies with market cap of more than Rs. 5 billion or a turnover of Rs. 10 billion or net profit of Rs. 50 million, are required to spend in a year 2% of the average net profits during the immediately preceding three financial years.

The NIPFP has, based on a sample of large Central Public Sector Undertakings (CPSUs) estimated that, on an average, companies spend 2.97% of the available funds on biodiversity related projects. Applying this percentage to the Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE) database on profits of companies, the details of biodiversity attributable expenditure were worked out. The number of companies in CMIE database varied from about 37,000 to 38,000 during the study years. Using the stipulation of net profit of Rs. 5 crore in a given financial year, companies that fall under the purview of the CSR were identified. Availability of CSR funds including projections based on CAGR of industry sector has been estimated by NIPFP. The results are as follows:

Table 3.2.3
Estimates of potential CSR expenditure and share of biodiversity (Rs. Crore)

Projections using CAGR		
Year	**Potential CSR expenditure**	**Biodiversity Share**
2013-14	15245.38	452.79
2014-15	16411.94	487.43
2015-16	17783.62	528.17
2016-17	18342.55	544.77
2017-18	19203.80	570.35
2018-19	20344.61	604.24
2019-20	21553.20	640.13
2020-21	22833.58	678.16
2021-22	24190.02	718.44

Figure 3.2.3.1
Potential CSR expenditure based on estimates in Table 3.2.3

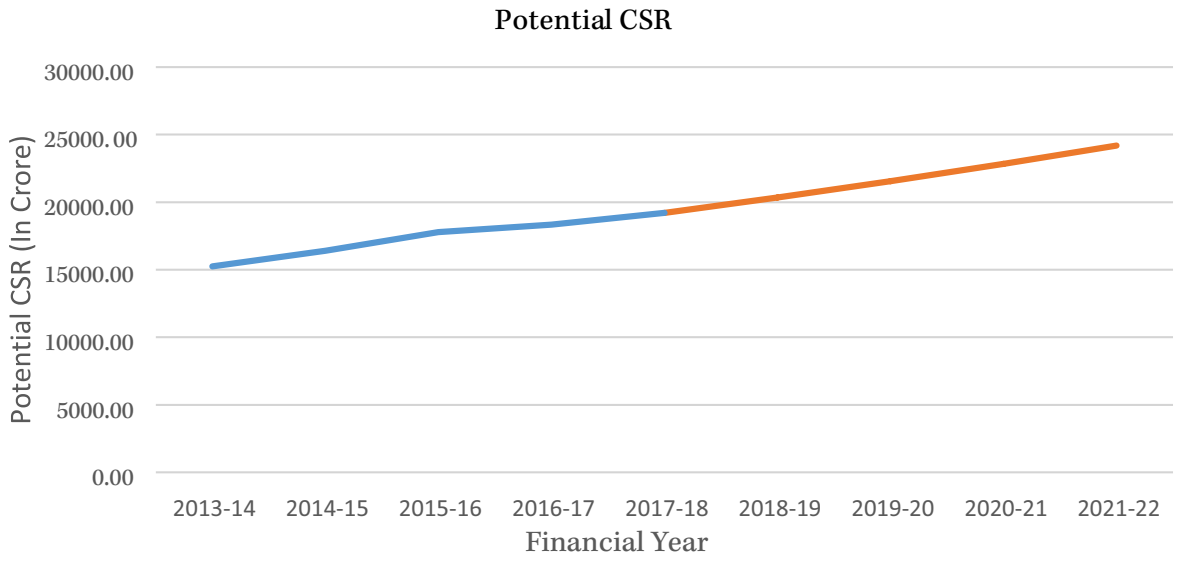
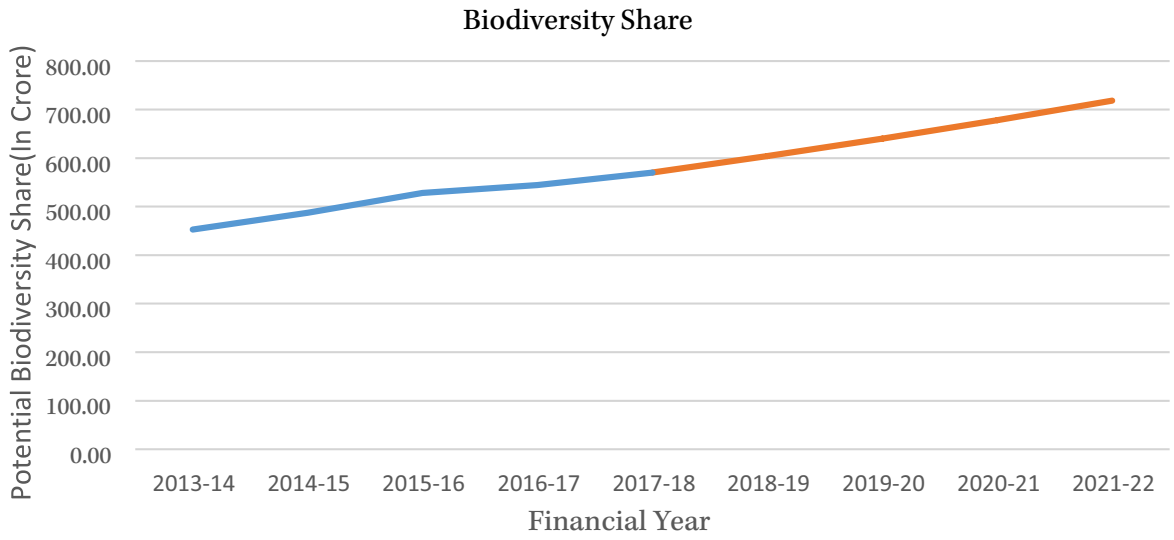


Figure 3.2.3.2
Biodiversity share based on estimates in Table 3.2.3



3.3 Financial Needs Assessment

As mentioned earlier in section 1.2 (Review and Revision of Assessments), the methodology for estimating biodiversity attributable expenditure was reviewed and revised. Also, for assessing financial needs, the same methodology was followed.

The process of biodiversity Financial Needs Assessment began with the compilation of all the Working group/Steering Committee documents of the 12th FYP covering 2012-13 to 2016-17. These Working Group (WG) Reports of 12th FYP contain the Group's assessment of financial needs for the concerned sectors. These Groups included subject matter specialists and policy planners. As such, they provide a valuable assessment of a sector's financial needs. This holds good for biodiversity as well.

Accordingly, an assessment was made by looking at each scheme recommended by the Working Groups. The biodiversity attributable needs were arrived at in terms of their biodiversity relevance and depending on their categorization. Summation across all biodiversity relevant schemes on the above lines for schemes/programs in 24 Central Ministries and 2 Departments yielded an estimate of Rs.71,348 Crore. (Soundrapandi, 2018)

Further, as shown in Table 2.2.1, an assessment based on quantitative targets and baselines wherever feasible has shown that, for the activities covered, the annual financial requirement works out to Rs.26,785 Crore. However, these two assessments, one based on WG Reports and the other based on quantitative targets and baselines need to be considered together and cannot be just added.

For example, the 12th FYP outlay included Rs.2600 Crore. for Green India Mission (GIM) and National Afforestation Plan. The annual outlay works out to Rs. 520 Crore. In addition, under NRM component of Mahatma Gandhi National rural Employment Guarantee Act (MNREGA) which accounts for 56.15% of the expenditure, afforestation related expenditure could be taken as around 20% (one of the six components is plantation works and afforestation will also be part of soil and water conservation) which means afforestation accounts for 11.23% of total MNREGA expenditure. Further considering that average annual expenditure during 2013-14 to 2017-18 was Rs. 46,614 Crore., afforestation related expenditure under MNREGA works out to Rs.

5235 Crore. per annum. Total expenditure/ outlay under afforestation would therefore be Rs.5755 Crore. per annum.

Against this, the estimated annual financial needs for enhancing FTC (Rs.11,800 Crore.) and improving quality of degraded forest land (Rs.6000 Crore.) as seen from Table 2.2.1 is Rs. 17,800 Crore. Like-wise, for river rejuvenation/ conservation, against quantitative needs assessment of Rs. 6667 Crore., the 12th FYP outlay is Rs.2520 Crore.

The details are shown below.

To predict financial needs for the period 2017-18 to 2021-22, we need to look over time at trends in FYP outlays (which are based on needs projected by Working Groups constituted for the purpose).

The following table captures outlay trend since the 6th FYP , increase from one FYP to the next and average increase up to the 12th FYP.

As seen above, outlays from one FYP to the next, on an average, have nearly doubled. Keeping this in view, as WG Reports in various

Table 3.3.1

Outlay/expenditure as a percent for enhancing FTC plus improving forest cover and river rejuvenation/ conservation

Scheme/Program						For both the programs put together		
Enhancing FTC plus improving forest cover			River rejuvenation/ conservation					
Need as per Quantitative targets (Rs.Crore.)	12th FYP outlay (Rs. Crore.)	Outlay / expenditure as a percent	Need as per Quantitative targets (Rs.Crore.)	12th FYP outlay (Rs. Crore.)	Outlay as a percent	Need as per Quantitative targets (Rs. Crore.)	12th FYP outlay/expenditure (Rs.Crore.)	outlay/ expenditure as a percent
17,800	5,755	32.33%	6,667	2,520	37.8%	24,467	8,275	33.8%

It may therefore be seen that, outlay/ expenditure (expenditure is usually less than outlay), for these two major areas for which quantitative targets are available, works out to about 33.8%. However, often approved scheme/ program outlays were below the recommended amount by the respective Working Groups. Since FNA assessment was based on WG Reports, it would be reasonable to presume that about 25% of the needs assessed based on quantitative targets are covered under estimates provided by different Working Groups. As such, it would be appropriate to add 75% of quantitative needs assessment to needs assessment based on WG Reports.

This leads us to the following:

sectors are also guided by outlay trends over the years, the biodiversity attributable financial needs for the period 2017-18 to 2021-22 could be estimated based on average increase in FYP outlay as above. Accordingly, given that FNA has assessed financial needs on account of biodiversity as Rs. 71,348 Crore. for the period, 2012-13 to 2016-17, for the period 2017-18 to 2021-22, considering methodology to forecast financial needs based on Reports of Expert Groups (Working Groups), the financial needs could be estimated at Rs. 149,831 Crore. per annum. This is estimated by enhancing FNA during 2012-13 to 2016-17 by about 110%

As in the case of 2012-13 to 2016-17 period,

Period 2012-13 to 2016-17, annual needs		
Needs assessment from WG Reports (Rs. Crore.)	Needs assessment from quantitative targets (Rs. Crore.)	Re-assessed financial needs (Rs. Crore.) after adding 75% of needs assessed based on quantitative targets (0.75x26,785) Crore.
71,348	26,785	91,437

FYP	Outlay in Rs. Crore	As a percent of the preceding FYP
Six	97,500	
Seven	1,80,000	184.6
Eight	4,34,100	241.2
Nine	8,59,200	197.9
Ten	15,25,639	177.6
Eleven	36,44,719	238.9
Twelve	80,50,124	220.9
Average Percent Increase		**210.2**

this amount would go up when we take in to account assessment based on quantitative targets. This leads to the following assessment.

Annual average needs during 2017-18 to 2021-22 based on WG Reports of 12th FYP and outlay trends over successive Plans	Needs assessment from quantitative targets (Rs. Crore.)	Reassessed annual average needs during 2017-18 to 2021-22 after adding 75% of needs assessed based on quantitative targets (0.75x26,785) Crore.
Rs. 1,49,831 Crore.	26,785	Rs. 1,69,920 Crore.

However, if the quantitative needs assessment is also adjusted for inflation at approximately5% per year (25% over the period 2017-18 to 2021-22), the re-assessed annual average needs during this period will be Rs. 1,76,616 Crore.

It is possible to predict needs assessment for 2017-18 to 2021-22 based on predicted inflation rates as well. Considering that inflation during this period is expected to be in the range of 4 to 5%,[19] for the five year period up to 2021-22, an enhancement of 25% over the previous five years could be reasonable for purposes of FNA. This leads to the following:

Annual average financial needs during 2012-13 to 2016-17	Annual average financial needs during 2017-18 to 2021-22 (allowing for 25% for total inflation)
Rs. 71,348 Crore	Rs. 89,185 Crore

When quantitative needs assessment is also taken in to account, this leads to the following revised assessment.

Annual average financial needs during 2017-18 to 2021-22 (allowing for inflation) in Rs	Revised annual average needs assessment after adding 75% of needs based on quantitative targets (0.75x26,785 Crore.)
Rs. 89, 185 Crore.	Rs. 1,09,274 Crore.

[19] https://www.statista.com/statistics/271322/inflation-rate-in-india/

However, if the quantitative needs assessment is also adjusted for inflation at approximately 5% per year (25% over the period 2017-18 to 2021-22), the re-assessed annual average needs during this period will be Rs. 1,15,970 Crore.

With this, there are two assessments of financial needs as shown below

Annual average needs during 2017-18 to 2021-22 based on WG Reports of 12th FYP and outlay trends over successive Plans	Final assessment after adding 75% of needs based on quantitative targets and accounting for inflation (25% during 2017-18 to 2021-22 @ 5% per year)	Annual average needs during 2017-18 to 2021-22 based on WG Reports of 12th FYP and projected inflation trends	Final assessment after adding 75% of needs based on quantitative targets and accounting for inflation (25% during 2017-18 to 2021-22 @ 5% per year)
Rs. 1,49,831 Crore.	Rs.1,76,616 Crore.	Rs.89.185 Crore.	Rs.1,15,970 Crore.

Considering that, Plan outlays for several schemes and sectors could be way below financial needs as assessed by the respective Working Groups, it appears more appropriate to estimate financial needs during 2017-18 to 2021-22 making use of projected inflation and the WG Reports based assessment for the 12th FYP.

Accordingly, for assessment of resource gap, we would be guided by estimated annual average financial needs of Rs.1,15,970 Crore.

3.4 Resources Gap based on FNA, BER (Central and all State Governments) and CSR Funds

As mentioned above, biodiversity attributable expenditure from BER (Central) and BER (all States) as well as CSR sources are available year-wise for the period 2012-13 to 2016-17. Year-wise projections are also available for the next 5 years. However, as stated above, FNA covers the 12th FYP period spread across 2012-13 to 2016-17 and provides an assessment of financial needs for 5 years including an annual average. The same would be true of projected FNA for 2017-18 to 2021-22. Therefore, to work out gap in resources, only two 5 year time spans are considered relevant, 2012-13 to 2016-17 and 2017-18 to 2021-22. As we have biodiversity attributable financial needs data only for the periods 2012-13 to 2016-17 and 2017-18 to 2021-22 for five years put together. Since CSR is proposed as a finance solution, its projected contribution will be accounted for under finance solutions.

The following table captures the funding gap.

Table 3.4.1
Annual Average Resources Gap for the period 2017-18 to 2021-22

Projected Central government expenditure	Projected State government expenditure	Projected Total Public Finance	Total Financial Needs Assessed	Gap in resources
Rs. 39,241.03 Crore.	Rs.30,880.2 Crore.	Rs.70,121 Crore.	Rs.1,15,970 Crore.	Rs.45,849 Crore.

3.5 Activity specific resource gap assessments

The next logical step is to move towards activity specific resource requirements so that BIOFIN solutions could be related to specific activities and the mobilization of finance through each of the solutions could be determined with respect to the activity specific gaps. The quantitative assessments above provide a basis to move forward on this.

By way of illustration, let us consider the resource requirements for relocation of people from core areas of tiger reserves. The annual financial requirement as seen from Table 2.2.1 is Rs.890 Crore. Against this, the total fund release to all the States during 2016-17 and 2017-18 was Rs.342 Crore. and Rs. 345 Crore. respectively. Even assuming that 20% of the funds were spent on relocation, the funding gap is large. In core areas of biodiversity concern such as this with no conceivable incentives for the private sector to participate, it is clear that enhancing public finance is perhaps the only option.

However, an exercise on these lines for other items that figure in Table 2.2.1 would require obtaining scheme-wise and, where necessary, component-wise expenditure data from the Central and State Governments. Since only two State Governments. (Maharashtra and Uttarakhand) have been covered so far for purposes of BER, this exercise could be carried forward in future BFP revisions.

3.6 Limitations

The time and resources available for formulating the first draft of BFP as well as gaps in available data as explained with examples in sections 3.3.1 and 3.3.2 in respect of resource requirement in core areas of biodiversity management such as managing PAs in accordance with their Management Action Plans as well as managing IAS present significant challenges. Therefore, it may be recognized that the assessment of gap in resources needs to be treated as a first order assessment. The assessment would undergo refinements over time as finance needs assessment covers more areas/activities for quantitative targets. Along with this, the finance solutions would also undergo revisions.

In terms of financial resources available including projections, the following need to be assessed and incorporated in future revisions of BFP.

- Private sector investment in biodiversity related projects in the interest of business promotion, enhancing brand equity; although IORA has carried out a limited assessment, a national level assessment would be required for purposes of BFP.
- Investment in activities beneficial to biodiversity undertaken as part of regulatory compliance; although such activities are undertaken to mitigate environmental impacts of proposed projects and mandated as part of environmental, forest, etc. clearances. A comprehensive assessment of all major projects in environmentally sensitive locations, those involving diversion of large forest areas/significant impacts on ecosystems, etc. is necessary to determine the contribution to biodiversity beyond mitigation of negative impacts that could be attributed to environment management plans of such projects.
- Biodiversity relevant finance available from externally aided projects; although some work has been done by NIPFP in this

regard, projection of contribution from such projects including those in pipeline with regard to agencies such as the World Bank, Green Climate Fund (GCF), etc. would be necessary for purposes of BFP.

Hence, given the gaps in quantitative targets based financial needs assessment as well as assessment of financial resources available, this first version of BFP would serve to provide a basis for discussion and steps needed to improve.

4. Finance Solutions

4.1 Scope of finance solutions

4.1.1 Purpose of Finance Solutions

Finance solutions are a means to undertake biodiversity conservation activities as part of implementing the NBAP viewed in conjunction with relevant national policies, strategies, etc. They make use of one or more finance instruments in a given context and could contribute in one of the following ways:

- Help attract greater funding from existing sources, public and private
- Help realize the full potential of existing finance instruments by making them more effective
- Make use of innovative finance instruments with a track record of success in other domains
- Identify new funding sources

4.1.2 Building on BIOFIN Assessments

As seen from the BIOFIN assessments (Table 3.4.1), the projected annual average resource gap for the period 2017-18 to 2021-22 after taking in to account the following has been worked out.

- Projected financial needs based on Working Group Estimates of 12th FYP (2012-13 to 2016-17)
- Financial needs based on available quantitative targets
- Reassessed financial needs after accounting for both the above put together and taking in to account possible overlap
- Public finance projected to be available from Central Government
- Public finance projected to be available from all the State Governments put together

To recap, the overall resource gap for the period 2017-18 to 2021-22 is as follows:

Table 4.1.1
Overall Resource gap for the period 2017-18 to 2021-22

Projected Central government expenditure	Projected State government expenditure	Projected Total Public Finance	Total Financial Needs Assessed	Gap in resources
Rs. 39,241.03 Crore.	Rs.30,880.2 Crore.	Rs.70,121 Crore.	Rs.1,15,970 Crore.	Rs.45,849 Crore.

The overall resource gap serves to guide scale of additional resource mobilization to be targeted through the bouquet of finance solutions. Activity specific resource gaps would need to be worked out so that selection of solutions could be specifically guided by the objective of closing activity specific resource gaps.

4.1.3 Constraints at this stage

However, as stated in section 3.5, working out activity specific resource gaps has to be preceded by scheme-wise (and, where necessary, component-wise expenditure data collection including from all the State governments) and future revisions of BFP could benefit from such data. In the present exercise, the available information with respect to scheme-wise expenditure at the Central Government, overall resource gap along with quantitative needs assessments where available and, taking in to account, priority areas identified for further quantitative assessment, it is proposed to move forward with selection of financial solutions. Of course,

the overarching objective of implementing NBAP in terms of thematic areas, action points along with NBTs including descriptive and comprehensive indicators would remain the primary focus of BFP. The bouquet of finance solutions selected should therefore be capable of achieving this objective and this has been on worked accordingly.

Since many of the financial solutions cut across several thematic areas of NBAP, in the absence of adequate information on activity specific resource gaps, it is proposed to not get in to assessing contribution of each finance solution against each thematic area or activity. Rather, wherever feasible, some indicative assessment of their role in addressing the resource gap has been provided in this plan so that subsequent BFP revisions could give a more definitive assessment of the actual potential which is likely to emerge over time including by way of trying out some of the solutions as part of BIOFIN Phase II.

4.2 Identifying feasible solutions

4.2.1 Prioritization of solutions

At his stage, it is not proposed to prioritize solutions for the following reasons:

- Many of the targets require either large resources and/or longer time spans for implementation and a blend of financial solutions would be called for. Given the data gaps listed above and uncertainties listed below in public and private finance sources, it would be difficult to precisely quantify likely contribution from each of the solutions over long time horizons.
- Linear projections based on 12th FYP expenditure figures predict availability for the next five years based on annual trend witnessed between 2012-13 to 2016-17. Given competing and equally urgent demands on public finance, it is not feasible to precisely determine availability of additional resources in future, scheme-wise /activity-wise, which is the prime focus under finance solutions pertaining to public finance.
- In fact, one of the proposals proposed to be taken up in Phase II of BIOFIN seeks to estimate fund requirement to manage PAs in accordance with their Management Action Plans. While the Working Group on Forest and Wildlife has pointed out that government funding support to PAs is woefully inadequate. A proper needs assessment would help place the problem in proper perspective and help attract greater public finance.
- There are other gap areas as well such as managing IAS in terms of availability of data for needs assessment. As pointed out in Chapter 3, a country-wide exercise on mapping IAS (plants and animals) in all the PAs would be essential so that requirement of funds and financial solutions thereof could be considered. Other major gaps in core areas of biodiversity have also been listed under section 2.3.2.
- Unlike the agenda of climate change which has witnessed mainstreaming in the development process at Central and State Government levels for quite some time since action plans at Central and State levels are in place, for all practical purposes, a beginning needs to be made to mainstream biodiversity in the planning process.
- One of the proposals of this BFP to be taken up during BIOFIN Phase II, it seeks to attract more public finance for agro-biodiversity conservation by mainstreaming biodiversity in programs/schemes of the Union Ministry of Agriculture. Over time, when mainstreaming gets underway in all the major sectors of biodiversity relevance, it would be possible to estimate the scope for attracting more public finance.
- CSR funds constitute a significant source of potential private sector finance for environment. Attracting more CSR funds for biodiversity is proposed to be attempted in one of the finance solutions and some proposals to be taken up during BIOFIN Phase II are based on this. The scope for attracting more CSR funds for biodiversity conservation would become clearer over time.

- World-wide, new and innovative finance solutions are at an experimental stage. Hence, it is considered appropriate to focus on those solutions which have been tried earlier in some form in India, albeit to a limited extent. However, feasibility of some innovative solutions would be explored while implementing phase II proposals (for example, biodiversity offsets) so that subsequent revisions of BFP could take them in to account.
- Many National Biodiversity Targets are aspirational and not amenable to quantification for estimation of resources.
- In view of the foregoing, it is not feasible to determine the priority of finance solutions in terms of the following important criteria suggested in the Workbook for screening and prioritization.
    - whether a large volume of resources would be mobilized
    - stability and predictability of resources mobilized
    - whether financial risks are adequately managed
    - whether financial resources will remain targeted to biodiversity over time
    - whether backed by political will
    - whether political risks have been managed
    - whether start-up costs are onerous in comparison to expected financial results
    - Likelihood of success

However, many of these difficulties would be overcome in due course of time, with availability of more data, for example, on activity specific resource gaps. Also, there would be greater clarity on potential of solutions tried out during BIOFIN Phase II in terms of mobilizing additional resources. Hence, in subsequent revisions of BFP, it would be possible to undertake prioritization of solutions.

The Global BIOFIN team has identified all existing biodiversity finance solutions and this has also been kept in view in identifying the bouquet of finance solutions. Based on current scenario, as already observed, public finance, would continue to be the mainstay of biodiversity financing. Therefore, a prime focus area has to be to augment budget of government schemes, both Central and States, in core biodiversity areas such as management of protected areas, biosphere reserves and ecologically sensitive areas, restoration of degraded ecosystems and conservation of threatened species. Equally important is mainstreaming of biodiversity concerns in large multi-purpose schemes administered by various ministries. These facts have been considered in selection of finance solutions.

4.2.2 Categories of Finance Solutions

For several areas of biodiversity management, multiple solutions have been proposed. Blended finance solutions are necessary to bridge the large gap in resources in areas such as rejuvenation of rivers, restoration of wetlands, afforestation, etc.

As stated earlier, innovative finance solutions are at an experimental stage world-wide and hence, it is considered appropriate to focus on those solutions which have been tried earlier in some form in India. However, as already stated, feasibility of some innovative solutions would be explored while implementing BIOFIN Phase II proposals (for example, possible role of biodiversity offsets in wetlands conservation) so that subsequent revisions of BFP could take them in to account.

The draft BFP incorporates the following solutions. The following tables include basis for the proposed categories and an indicative list of NBAP relevant activities that would get covered.

As stated above, for several areas with large resource requirements, more than one solution has been proposed. This is because relying on just one solution could unduly extend the time-frame to reach targets. In addition, given competing demands on public finance, it is

Table 4.2.1
Finance Solution categories

Category of finance Solution	Rationale
'A'	Improve implementation of existing finance instrument, enhance biodiversity finance
'B'	Apply instrument with proven track record of success in other domains of environment
'C'	Innovative solution with limited experience
'D'	Blend existing solutions

Table 4.2.2
Finance Solutions and their Scope

Finance Solution	Category	Activities relevant in the context of NBAP and relevant national policies, etc
Augment dedicated Public Finance	'A'	Protected Areas management, Afforestation, Restoration of water bodies including rivers, Restoration of degraded ecosystems, Conservation of endangered species, etc
Conservation Fund for PAs	'C'	Management of lesser known PAs not known to harbor charismatic mega fauna
Mainstreaming Biodiversity in Public Finance	'A'	Agro-biodiversity conservation, afforestation, soil and water conservation, groundwater recharge, restoration of degraded ecosystems, etc
Public Private Partnership	'B'	River rejuvenation, afforestation
Augmenting CSR finance, blending with other sources of finance	'D'	Across all thematic areas of NBAP including conservation (in-situ, ex-situ and on-farm) except international co-operation
Green Fund	'C'	Ecological restoration, afforestation, etc
Access and Benefit Sharing	'A'	Access and Benefit Sharing
Environment Damages Fund	'C'	Restoration of ecosystems, etc
Ecological Fiscal Transfers	'C'	Across all thematic areas of NBAP, in particular, Conservation and restoration of ecosystems, afforestation, etc
Accessing Global Climate Change Funds, Overseas Development Assistance (ODA) including GEF, REDD+,	'A'	Restoration of eco-systems including water bodies, soil and water conservation, groundwater re-charge, afforestation
Taxes, Cess, subsidies, etc	'A' and 'C'	Resource conservation, etc
PES, Accessing Compensatory Afforestation Fund Management and Planning Authority (CAMPA) Funds	'C' and 'A'	Afforestation, ecosystem conservation, groundwater re-charge, etc

difficult to predict quantum of funds likely to be available activity-wise and hence multiple solutions provide the requisite cushion.

The proposed finance solutions are dealt with below.

4.3 Augmenting dedicated Public Finance

For several core areas of biodiversity such as conservation of endangered species, management of protected areas, afforestation, conservation of ecosystems including rejuvenation of rivers, conservation of wetlands, coastal ecosystems, etc, public finance has over the years been the primary source of funding. While there is a need to explore private sector sources, the bulk of funding for areas listed above has to be by way of public finance.

4.3.1 Legacy of fund shortage

Several areas of high biodiversity relevance such as management of protected areas, afforestation, rejuvenation/conservation of rivers and wetlands have, over the years, faced paucity of funds. For purposes of illustration, let us consider management of PAs.

Protected areas are rich in terms of biodiversity, serve as repositories of our natural heritage and enjoy legal protection under the Wildlife (Protection) Act, 1974. Nevertheless, they face anthropogenic pressure due to dependence of people living inside as well as in the periphery of PAs. The 12th FYP Working Group on Wildlife, Ecotourism and Animal Welfare has observed that there is an urgent need to launch a rehabilitation and development program for various communities and tribes traditionally known to be involved in illegal exploitation of wildlife resources including hunting. Many of such communities and tribes live around and operate in some of India's best known tiger reserves and have the potential to severely undo years of good management efforts with their hunting skills.

The above Working Group on Wildlife, underscored the need for greater budgetary support and observed that 'the sector urgently needs reforms and much higher quantum of support to effectively discharge its roles and responsibilities'. To substantiate, the Working Group pointed out that 'Only 379 of India's 661 PAs (i.e. 57.3%) have received any form of funding support during the 11th FYP. Establishing PAs without being able to extend any support to strengthen and improve management practices is a process doomed to fail. Of the PAs receiving support, the sums received are often too meagre to make any meaningful difference on ground. As such, there is hardly any incentive for establishment of PAs.

This Working Group has gone a step further and observed that 'overall, the biodiversity conservation sector suffers from a very low place on the priority list of planners and policy makers'.

Despite the strong observations of the 12th FYP Working Group and recommendations to step up 12th Plan outlay for wildlife conservation from about Rs. 2250 Crore. in the 11 FYP to about Rs.10,500 Crore., the sector continued to suffer from paucity of funds during the 12th Plan and beyond. This is seen clearly from data obtained from MoEFCC on fund releases to PAs under the IDWH scheme and from NTCA on fund releases to tiger reserves. The details provided at section 2.3.1 may be seen. The salient findings based on fund release under IDWH scheme are briefly reproduced below.

'Further, taking in to account data on number of PAs in each State/Union Territory, it is seen that, in all, during 2015-16, 2016-17 and 2017-18, 321, 314 and 397 PAs were benefitted respectively. This works out to an average release per PA of about Rs.19 lakhs during 2015-16, Rs.29 lakhs during 2016-17 and Rs.38 lakhs during 2017-18. This is grossly inadequate considering that a large number of PAs are 500-1000 sq.km. in size and face anthropogenic pressures due to people living inside the PAs as well as in the periphery.

Given that total number of PAs as of July, 2018 stood at 771, it is also clear that, a large number of PAs did not receive any funding support from the central Government.

It is seen that grants released to tiger reserves are significantly higher than those released to PAs under IDWH. Considering that there are 89 PAs in these 50 tiger reserves, the average annual grant per PA works out to about Rs. 3.6 Crore. during 2016-17 and Rs.3.9 Crore. during 2017-18. Hence, PAs that form part of tiger reserves receive a much higher level of grants as compared to other PAs.

The 771 PAs include 104 national parks, 544 wildlife sanctuaries, 46 community reserves and 77 conservation reserves. Considering that there are 648 national parks and sanctuaries, after taking in to account grants under IDWH and grants released by NTCA, it is clear that a significant number of PAs do not receive any funds from the central Government'.

In addition, given that the average size of a national park is about 400 sq.km. and that of a sanctuary about 219 sq.km., even in the case of PAs that received funding, it is clear that annual funding for PAs other than those that form part of tiger reserves is grossly inadequate.

In such a situation, financial needs assessment of all PAs based on Management Action Plans would help highlight the resources crunch faced by them and help attract attention of policy makers. Such an assessment could be incorporated in the next revision of BFP. In fact, such an assessment is also proposed as part of BIOFIN Phase II.

The above situation of gross under funding holds true for areas such as restoration of degraded forest areas and enhancing FTC as envisaged under GIM. As per MoEFCC's data, against a five year requirement under GIM of about Rs.23,000 Crore., the ministry envisaged pooling funds from various sources as follows[20].

While this projected pooling of funds fell short of the GIM requirement of about Rs.23,000 Crore. by about Rs.10,000 Crore., the actual year-wise outlays that materialized were much less. As a result, GIM remained grossly under-funded.

GIM	Rs.2,000 Crore (12th FYP outlay)
13th Finance Commission Grants	Rs.400 Crore
Through convergence with MNREGA	Rs.4,000 Crore
Through convergence with CAMPA	Rs.6,000 Crore
Through convergence with NAP	Rs. 600 Crore
Total	**Rs.13,000 Crore**

The analogy could be extended to other programs/activities for which quantitative targets have been provided in Table 2.3.1.

4.3.2 Case for this finance solution

The program areas stated above lie primarily in the domain of MoEFCC in terms of 'Allocation of Business Rules' which determine domain of functional responsibility of various Union ministries. However, as sated above from the above, except management of PAs, the financial resources for meeting MoEFCC's domain responsibility with regard to afforestation, river rejuvenation, etc , MoEFCC has to co-ordinate with other ministries with large program budgets such the Ministry of Rural Development in-charge of MNREGA which has a significant role to play in achieving afforestation targets. Like-wise, in the case of river rejuvenation, the Ministry of Water Resources, which manages NMCG and the Ministry of Urban Development which manages Atal Mission for Rejuvenation & Urban Transformation (AMRUT) have much larger financial resources available with them.

Hence, for augmenting resources for functions which lie in its functional domain, MoEFCC has a dual role as follows:

- Financial resources to come primarily

[20] http://www.moef.gov.in/sites/default/files/Green%20India%20Mission.pdf

from MoEFCC's budget such as the case with management of PAs, avoiding man-animal conflict and recovery of endangered species.

- Financial resources partly from MoEFCC but primarily from other ministries as in the case of river rejuvenation and afforestation.

4.3.3 Implementation modalities

In the case of management of PAs, as already pointed out, the case for additional budgetary resources has to be built around a proper need assessment based on management action plans. Hence, it is necessary to ensure that management action plans are prepared for all PAs so that cost of implementing them could be assessed. Thereafter, the case for additional budgetary resources has to be argued in terms of biodiversity conservation and economic valuation of ecosystem services provided.

Where financial resources and program implementation largely lie in the domain of other ministries, an effective co-ordination mechanism needs to be put in place. The mechanism has to be a standing arrangement at the level of secretaries of the concerned ministries with provision for periodical review. Mere representation of concerned ministries at the stage of approval of projects under various schemes or involvement in program formulation has not proved to be effective in the absence of a high level mechanism for inter-ministerial coordination.

4.3.4 Estimate of expected contribution

As mentioned in section 1.2, schemes/ programs of the government have been classified in terms of their biodiversity relevance and assigned different attribution percentages to estimate biodiversity relevant expenditure. Schemes/programs falling under direct and indirect very high categories have been assigned attribution percentages of 95 and 82.5 respectively. These cover all schemes/ programs in core biodiversity areas such as management of protected areas, afforestation, conservation of endangered species, river conservation/rejuvenation, organic farming and schemes of the Department of AYUSH including those on medicinal plants, national mission on AYUSH, etc. Although other finance solutions such as Public Private Partnership (PPP), CSR funding, Conservation Fund, etc would make a contribution, public finance would remain the mainstay. As such, given that programs in these core areas of biodiversity have been grossly under-funded, for the period 2017-18 to 2021-22, it is envisaged that flow of public finance by way of augmentation would at least increase by 150% as compared to 2012-13 to 2016-17. This assumption takes in to account that, in successive five year plans, Central Plan Outlay, on an average, has gone up by 100% and that projected biodiversity attributable expenditure during 2017-18 to 2021-22 is expected to be about 100% more than 2012-13 to 2016-17.

Therefore, the estimated contribution (in terms annual average biodiversity attributable expenditure) of this solution for the period up to 2021-22 is as follows:

Table 4.3.4
Estimated Contribution of Augmenting Dedicated Public Finance

Expenditure on schemes/ programs with attribution percentage of 95 (period 2012-13 to 2016-17)	Expenditure on schemes/ programs with attribution percentage of 82.5 (period 2012-13 to 2016-17)	Total for the period 2012-13 to 2016-17*	Expected expenditure up to 2021-22	Additionality (50% of Rs.2588 Crore.) considering that public finance (Central Govt.) is projected to go up by 100% during 2017-18 to 2021-22 vis-à-vis 2012-13 to 2016-17	Remarks
Rs. 2,174 Crore	Rs. 413.8 Crore	Rs. 2,588 Crore	Rs. 6,466 Crore	Rs. 1,293 Crore	150% enhancement envisaged

* Source: Personal communication from Dr.Nasim Ahmad, WII

It is therefore estimated that, by way of augmenting public finance (Central), the expected additional annual average contribution by way of biodiversity attributable expenditure for the period 2017-18 to 2021-22 would be about Rs.1293 Crore., say, Rs.1300 Crore.

4.4 Conservation Fund for PAs

4.4.1 Fund crunch faced by less visited PAs

In general, tourists tend to flock to PAs which provide good chances of sighting iconic mega fauna, often large and charismatic mammal species, in particular, tiger, rhino and lion. The other PAs except some such as Eravikulam national park in Kerala with wild goats as the primary tourist attraction, though not less important from biodiversity perspective, tend to attract much less tourists and hence generate relatively little income from eco-tourism. In general, funding support to such PAs from the State Governments. is also very limited. Also, given that a major share of Central Government. funding for wildlife conservation goes to tiger reserves, the other PAs suffer an acute resources crunch.

Inadequate Central Government financial support for Pas, other than those that form part of Tiger Reserves, has been highlighted under section 2.3.1.

4.4.2 Case for Conservation Fund

In the above scenario, there is a need to look for other funding sources for PAs with no charismatic mega fauna but rich in biodiversity in terms of invertebrates, reptiles, rare plants, etc and usually not preferred by much tourists. The rationale for this solution lies in the fact that while tourism industry benefits from biodiversity, conservation of biodiversity does not receive adequate compensation. The overarching goal of the conservation fund is to address biodiversity conservation priorities in PAs.

The tourism industry around PAs is sustained by non-consumptive use of wildlife resources and it is the local communities which were dependent for their livelihood on NTFP. Inside the PAs that gets adversely impacted due to declaration of PAs on account of the concomitant restrictions. Hence, there is an urgent need to provide for their welfare through alternative employment, which will help build synergies between their livelihood sustenance and conservation. To cater to the needs of tourists, tourism infrastructure including connectivity, boarding and lodging, have developed around PAs harboring iconic species. Developing such facilities around other PAs would help cultivate peoples' interest in other species.

In addition to conservation of species that are unable to attract tourists given their narrow interest in charismatic mammals, the development of less-visited parks may help cultivate peoples' interest in wider diversity of wildlife and also help prevent or at least alleviate excessive tourist pressure on popular protected areas.

Hence, a conservation fund at the level of each State would help garner resources for all protected areas. In distributing money to PAs from the fund, the present funding arrangement under which PAs with tigers get a major share of the Central government funding could be taken in to account. Less visited PAs could, therefore, get priority in allocation of money from the fund.

4.4.3 Evolution of Eco-Tourism Guidelines

The Ministry of Environment, Forest and Climate Change, Government of India, had considered imposing a tax on tourism industry. The June 2011 Draft Eco-Tourism Guidelines read as follows:

'As part of the State-level Ecotourism Strategy, the State Government should levy a "local conservation cess" as a percentage of turn-over, on all privately-run tourist facilities within 5 km of the boundary of a Protected Area. The rate of cess should be determined by the State Government, and the monies thus collected should be earmarked to fund Protected Area management, conservation.

Guidelines for tourism in and around tiger reserves issued by NTCA (2012) provide for State Governments to charge a conservation fee from the tourism industry for eco-development and local community upliftment. The suggested fee structure is in the range of Rs.500 to 3000 per room per month depending on the facility's luxury category, number of rooms and period of operation during a year. The funds collected are to be placed at the disposal of the concerned tiger foundations. At present, according to NTCA, 34 such foundations have been formed. However, it has been gathered that no State Government has imposed such a conservation fee and the provision remains unimplemented.

However, in the 'Draft Eco-Tourism Policy' brought out by MoEFCC for comments on 14 May 2018, there is no specific mention of getting tourism industry to contribute to conservation of PAs. The policy states that there is a need to establish Foundations at the level of each PA or a group of PAs to channelize gate collections and other non-governmental contributions when they accrue for conservation and welfare of local communities.

4.4.4 Proposed Finance Solution

The proposal to levy a fee for conservation, eco-development and welfare of local communities is sound in principle and deserves to be re-visited. A wildlife conservation fund needs to be created at each State level. Conservation fee could be charged from all tourist accommodation facilities (except home stay) located within 5 KMs of a PA. The rate could be decided by the State Governments taking in to account NTCA guidelines of 2012. PAs and tiger reserves could retain all the gate collections. On the lines of tiger reserve foundations, the foundations need to be constituted for each PA and they could retain and administer gate collections. However, as the purpose of this finance solution is to supplement resources of PAs other than those that form part of tiger reserves, the revenues by way of conservation tax imposed on tourist accommodation facilities could be deposited in the State level Conservation Fund. The State Governments could work out modalities for allocation of resources from the conservation fund and make funds available to PA level Foundations including Tiger Reserves, if necessary.

The fund could be enabled to accept donations from corporate sector as well as philanthropic institutions. Such donations could be project specific in identified PAs.

The conservation fund could also prepare PA specific biodiversity conservation proposals for CSR funding.

Crowd funding could be another avenue to raise money for rehabilitation of endangered species located in a PA and well known locally. Anti-poaching, critical infrastructure gaps, etc are also suitable to attract crowd funding from local communities.

Also, in the interest of biodiversity conservation and to alleviate pressure on tiger reserves, there is a need to make eco-tourism more broad-based by creating awareness about lesser known endangered species and the need for their conservation in the interest of mankind. While addressing critical infrastructure gaps to attract tourists of all income classes is essential, a sustained awareness promotion campaign has to be mounted to broaden tourists' wildlife specific interests which, at the moment, is largely limited to charismatic mega fauna.

4.5 Mainstreaming Biodiversity in Public Finance

4.5.1 Rationale for Mainstreaming

The underlying rationale for mainstreaming biodiversity or broader environmental issues across public funded programs is the realization that the causes of a given problem in question could lie within the remit of policy domains or economic sectors beyond MoEF&CC. In the case of biodiversity, it is clear that a sole focus on conservation policies such as conservation (in-situ and ex-situ) will have only limited impact in reducing biodiversity loss. It is in sectors such as agriculture, mining, etc. in which activities take place that drive biodiversity loss and towards which measures need to be targeted, where it would be important to mainstream biodiversity concerns[21].

4.5.2 Case for Mainstreaming Biodiversity in Public Finance

Public finance in the form of grant funding from Central and State Governments has been the predominant source of finance for biodiversity conservation. From Table 3.3, it is seen that, annual average public finance consisting of biodiversity attributable funding from Central and all the State Governments put together is about Rs. 49,480 Crore and is expected to go up to Rs. 70,121 Crore by 2021-22. In comparison, CSR funding for biodiversity is relatively small at Rs.503 Crore at present and is projected to go up to Rs.642 Crore during 2017-18 to 2021-22. MoEFCC has an annual budget in the range of Rs.2000 to 3000 Crore It is therefore clear that, as compared to funding from MoEFCC as well as CSR sources, biodiversity attributable spending in other ministries put together is much larger. The significance of mainstreaming biodiversity across all ministries is clear.

Restoration of degraded ecosystems such as wetlands, rivers and forests have multiple objectives many of which lie in the domain of SDGs (human health, reducing infant mortality due to water-borne diseases, livelihood support, etc.) and Climate Change (carbon sequestration by forests and other ecosystems). The resources required for restoration are fairly large. Hence, the need to pool in resources from multiple sources, both public (several ministries dealing with subjects such as urban development, water resources, etc) and private.

Yet another area with urgency for mainstreaming is agro-biodiversity conservation. It is well recognized that, on-farm diversity of both plants and livestock is critically important for sustainability of agriculture and thereby ensure food security and end hunger. In fact, a proposal to be taken up under BIOFIN Phase II seeks to conserve agro-biodiversity by focusing on agro-biodiversity components of existing schemes of the Ministry of Agriculture and tweaking existing schemes/formulating new schemes in areas that have not received adequate attention over the years. The approach and methodology illustrated below could be adopted in other areas as well.

4.5.3 Mainstreaming Biodiversity in Agriculture

4.5.3.1 Agriculture-biodiversity linkages

Many of the benefits of biodiversity accrue to agriculture itself, and the term agro-biodiversity has been coined to describe this important subset of biodiversity. Although human management has often greatly modified natural ecosystems, agricultural activities still depend on many biological activities. The provision of genes for the development of improved crop varieties and livestock breeds is an important element, but far from the only one. Others include crop pollination, soil fertility services provided by microorganisms, and pest control services provided by insects and wildlife. Damage to biodiversity, therefore, often has important implications for agriculture itself. A reduction in agro-biodiversity would make farming communities vulnerable to future environmental changes and accentuate poverty. At the same time, there is substantial potential to utilise biodiversity to enhance agriculture.

[21] https://www.sciencedirect.com/science/article/pii/S0006320716305675

Although biodiversity provides a wide range of benefits to agriculture and other sectors, agricultural activities often reduce biodiversity. The expansion and intensification of agriculture have been major contributors to the loss of biodiversity worldwide[22].

As agricultural production continues to rise to meet the growing demands of India's population, it is critical to find ways to minimize conflicts and enhance complementarities between agriculture and biodiversity. This underlines the importance of mainstreaming biodiversity in agriculture by promoting identification of synergies between biodiversity conservation and agricultural development and building them in to programs and schemes.

4.5.3.2 Mainstreaming biodiversity in existing programs/schemes

At present, biodiversity conservation related components/activities are covered in different programs/schemes of Ministry of Agriculture briefly captured as follows:

State Governments to implement the scheme based on agro-climatic conditions. As a result, the level of focus and expenditure on biodiversity relevant components tend to vary across States. To start with, an analysis of component-wise expenditure at State level would throw light on how some States are making use of implementation flexibility under these programs, achieved considerable success in mainstreaming biodiversity measured in terms of expenditure on these components and results thereof. Such an analysis could bring out lessons and best practices which other States could benefit from. Given the need to synergize agricultural development and biodiversity conservation as a necessary condition for long term sustainability of agriculture and its growth, mainstreaming biodiversity in implementation of programs/schemes of the Central Government. at the State level, it is a priority across all States. Conservation, improvement and preservation of genetic resources of economic plants and their wild relatives, particularly in 22 Agro-biodiversity hotspots across 7 agro-geographical zones would be a key thrust area.

Table 4.5.3
Agriculture schemes with biodiversity related components

Biodiversity conservation related component/activity	Program/Scheme
Encourage conservation of landraces, traditional farmers' varieties	Scheme for protection of plant varieties and farmers' seeds; seed village program
Enhance bio-control agents/bio-pesticides use	Rashtriya Krishi Vikas Yojana
Promote organic cultivation	National Mission for Sustainable Agriculture, National Food Security Mission
Reclaim problem soils	National project on Management of Soil Health and Fertility
Integrated Pest Management	Strengthening and modernization of pest management approach in India

The programs/schemes above consist of a number of components/activities and only those that are biodiversity relevant have been captured above. Most of the program/scheme guidelines offer flexibility to the

4.5.4 Gap areas

Equally important is identification of areas which could contribute significantly to agro-biodiversity conservation but not receiving

[22] http://documents.worldbank.org/curated/en/994751468739243789/pdf/multi-page.pdf

adequate attention in present programs/ schemes. Based on the strategies identified by the Centre for Biodiversity Policy and Law, National Biodiversity Authority, some such areas of biodiversity conservation which lie in the domain of the Union Ministry of Agriculture and co-operation are listed below.

- As part of the strategy to conserve traditional seed varieties, a national database of traditional seed varieties needs to be developed. To ensure adequate availability of traditional seeds, seed banks can be set up in each agro-climatic zone/ village/block level, so that these valuable resources can be saved and utilized by the new generations of farmers.
- Equally important is developing a market for these varieties to provide sufficient incentive for their cultivation.
- Alien species, after becoming locally dominant, invade natural communities and become Invasive Alien Species (IAS). The impacts of exotic plants on community structure and ecosystem processes are poorly understood in India. A total 173 species in 117 genera are invasive alien plants, representing 1 % of the Indian flora. The agricultural economy in India is vulnerable to threat from exotic pests/ diseases. In India, 116 alien insect species mainly belong to the order Coleoptera and Lepidoptera. Over 300 alien fish species including 291 ornamental species, 31 aquaculture species and 2 larvicidal fishes have been recorded. Examining the ecology and genetic make-up of IAS is important for developing management strategies. Monitoring of invasion can be done through species inventory, phytosociological methods, mapping using ground-based methods, and remotely-sensed images.
- Further, in the context of managing invasive alien species which impact agro-biodiversity, the following needs to be noted.

The national integrated pest management (IPM) program is the mechanism to prevent and control the threat posed by IAS within the country. Current control methods are expensive, lengthy, and risky because total eradication is required to prevent re-establishment. Effective site-eradication procedures require multi-year treatments, continued monitoring, and follow-up treatments.

Development of a national strategy should be the first step in managing IAS including monitoring and control. The strategy would, amongst others, need to address the following:

- Mapping and Monitoring of invasive species identified as problematic based on criteria
- Promoting research on suitable and environment-friendly control measures
- Supporting projects based on landscape plans involving local communities who could participate in rehabilitation activity that could check biological invasion. These community based approaches can best be complemented with technologies such as biological control, which can provide a long term sustainable component to an overall management plan[23]

4.5.5 Role of Women in Agriculture

In India, about 74 percent of the entire female workforce is engaged in agricultural operations, but the nature and extent of women's involvement in agricultural operations vary greatly from region to region. In rural India, it is women who conserve biodiversity on farm as well as ex situ through various rituals. The role of women as custodians of agriculture and livestock cannot be ruled out. For farm women, biodiversity manifests in both farm plants and their wild relatives. Their extensive knowledge of wild plants, leaves, berries, nuts, seeds, spices, and condiments required for food preparation and preservation is exhaustive. Rituals and ceremonies in various parts of the country show this close relationship. Be it the Lohri (harvest festival) of Punjab in North India or Navadhanya puja (worship of nine cereals) in Southern India, both emphasize the role of women in biodiversity preservation.[24]

In spite of the sensitivity of researchers, and

[23] https://academicjournals.org/journal/IJBC/article-full-text-pdf/8D1013218266

extension of personnel to gender issues in agriculture, they often focus their attention on male members of the household. Women farmers need to be recognized as a constituency for agricultural research and their knowledge about indigenous varieties, multiple uses, and processing techniques should be recorded and used in research (Jiggins, 1986).

Gender-sensitive planning needs to take in to consideration the impact of policies and programs on women and be sympathetic to their needs including training and entrepreneurial skills.

The crucial role that women play in agriculture and, in particular, agro-biodiversity conservation would be a key focus area in the scheme-specific interventions to be suggested in the context of mainstreaming. The Mahila Kisan Sashaktikaran Pariyojana (MKSP) which, inter-alia, seeks to enhance the managerial capacities of women in agriculture for better management of biodiversity would be one of the schemes to focus on.

4.5.6 Role of Sustainable Development Goals (SDGs) in mainstreaming

The agenda of SDGs enjoy broad-based support as it touches upon the whole gamut of issues relating to poverty eradication, livelihoods and basic minimum needs in terms of drinking water, health, etc. The NITI Aayog has undertaken a detailed exercise to map centrally sponsored schemes with SDGs. In fact, specific scheme components which are directly linked to SDGs have also been identified. As such, evaluation of performance of schemes, allocation of funds, etc would also take in to account the role of programs/ schemes in contributing to meeting SDGs.

Considering that biodiversity conservation does not enjoy the same level of awareness and understanding of importance as that of SDGs at the level of policy makers in various central ministries, it is necessary to anchor the case for mainstreaming biodiversity in terms of their contribution to SDGs. For instance, major schemes in agriculture such as Rashtriya Krishi Vikas Yojana (RKVY), National Mission for Sustainable Agriculture (NMSA) and National Food Security Mission (NFSM) have been mapped against SDG 2 which, by 2030, seeks to end hunger, achieve food security and improved nutrition and promote sustainable agriculture. Hence, to convince policy makers, the case for enhancement of funds for these schemes as well as re-formulation of scheme components to emphasize on biodiversity conservation, it is necessary to bring out their expected contribution to be SDGs including sustainability of outcomes.

4.5.7 Estimating expected contribution

Mainstreaming in public finance needs to be focused on schemes/programs with relatively low biodiversity relevance. Such schemes/ programs with significant scope to enhance biodiversity attributable expenditure would include all schemes/programs except those that fall under 'direct' and 'indirect very high' categories of biodiversity relevance. As such, considering that Central Plan outlay has nearly doubled every five years, projected expenditure during 2017-18 to 2021-22 is expected to go up nearly 100% vis-à-vis 2012-13 to 2016-17 and considering that mainstreaming would enhance flow of funds to biodiversity relevant components of existing schemes, it is envisaged that annual average biodiversity attributable expenditure would go up by 150%.

Therefore, the estimated contribution (in terms of annual average biodiversity attributable expenditure) of this solution for the period up to 2021-22 is as follows:

[24] https://www.researchgate.net/publication/283044862_Role_of_Farm_Women_in_Agriculture_Lessons_Learned

Table 4.5.7.1
Estimated contribution of mainstreaming

Schemes/programs with attribution percentages below 82.5(period 2012-13 to 2016-17)	Expected expenditure up to 2021-22 with 150% enhancement	Additionality (50% of Rs.17,445 Crore) considering that public finance (Central Government) is projected to go up by 100% during 2017-18 to 2021-22 vis-à-vis 2012-13 to 2016-17	Remarks
Rs. 17,445 Crore	Rs. 43,613 Crore	Rs. 8,723 Crore	150% enhancement envisaged

Source: Derived from WII data

It may therefore be seen that, by way of mainstreaming, the additional annual average contribution in terms of biodiversity attributable expenditure against schemes/programs not falling under 'direct' and 'indirect' categories of biodiversity relevance would be Rs.8723 Crore., say, Rs.8700 Crore. during 2017-18 to 2021-22.

4.6 Public Private Partnership (PPP)

4.6.1 Evolution of PPP in India

Rapid urbanization, industrial growth and demand for basic infrastructure such as transport, water supply and sanitation coupled with constraints of public finance and public sector capacity led to emergence of PPP for infrastructure construction and delivery of services. PPPs not only provide finance for public infrastructure but also leverage private sector managerial efficiency, competency for operation and maintenance of the created assets. In the world, India ranks high in terms of operational maturity of PPP and creating an ideal environment for PPP projects. During 2006-07 to 2015-16, spread across sectors of roads, civil aviation, housing, ports, railways, sports and tourism, as many as 287 projects have been undertaken adopting PPP model involving a total investment of about Rs.3,27,000 Crore[25].

However, the experience has faced various difficulties causing delay in execution such as land acquisition delays, overlapping functions of regulatory authorities, financial issues due to stressed balance sheets and excessive leverage of the private sector partners, institutional capacity constraints, etc. In response to some of these issues, new financing instruments have evolved such as IDFs (Debt take out) and INVITs (equity take out). They help release project promoters' capital invested in operating assets for investment in fresh projects. Exit option is another financing instrument which helps free capital for new projects by allowing disinvestment of equity.

4.6.2 Case for PPP in biodiversity financing

As seen from Table 2.2.1, quantitative financial needs assessment for activities for which baseline and targets are available shows that, nearly all of them involve large resource requirements which cannot be met from government sources alone. Hence, there is a need to bring in private sector financing in a significant manner.

Considering that the gap between baseline and ultimate target is large in most cases, capacity, competence and financial strength of the private sector would need to be enlisted in order to achieve targets within the time spans envisaged.

[25] https://www.unescap.org/sites/default/files/Day%201%20-%20Session%202.2%20-%20India%20PPP.pdf

The rich experience across several sectors available in India along with the institutional capacity which has been built in would richly benefit PPP projects in other sectors as well.

4.6.3 Implementation Arrangements

The PPP mode of financing, as stated earlier, is well established in India in the infrastructure sector (roads, airports, etc). Exclusive private sector investment with or without debt finance based on private finance alone is a viable option in projects which are financially attractive in terms of returns. However, as in the case of the infrastructure sector, there might be a need to incentivize and attract private sector finance in other resource intensive areas as well.

In the infrastructure sector, several such incentives have been successfully tried out. In a simple yet successful version of the PPP model called Design, Build and Operate Model, the capital cost is fully borne by the Government/ Public Utility and annuity payments are guaranteed to the selected private bidder to cover O&M costs. When toll collections in a road project are attractive, the private sector comes forward to bear capital as well as O&M costs. In other cases, viability gap funding has been provided to cover a portion of capital costs.

The PPP mode of financing for a project, in general, presupposes availability of a revenue stream. Extending this model to the biodiversity sector would call for identifying projects which could help generate a sustainable revenue stream.

One such area where a variant of PPP is being attempted is under the National Mission for Clean Ganga (NMCG, a flagship program to rejuvenate river Ganga) by setting up wastewater treatment plants and sewerage infrastructure. The creation and maintenance of sewage treatment infrastructure under Hybrid Annuity based PPP model has taken off, with NMCG awarding work to private sector for construction and maintenance of Sewage Treatment Plants (STPs) in two major cities in Ganga river basin - Varanasi and Haridwar. While the work to construct, operate and maintain a 50 MLD STP in Varanasi has been awarded to a consortium led by an Indian infrastructure major - Essel Infra Projects Limited at an estimated cost of Rs 153.16 crore, HNB Engineers Private Ltd. has been awarded the work to develop, operate and maintain the total sewage treatment capacity of 82 MLD (68MLD in Jagjeetpur + 14MLD in Sarai) STPs in Haridwar at an estimated cost of Rs. 171.53 crore. The awarded projects would ensure that no untreated sewage waste water goes into river Ganga at these locations.

Since the inception of Hybrid Annuity-PPP model (HAM), many national and international players have shown interest in NMCG projects. The consultative meetings and conferences with market players attracted a large number of participants. More than 30 firms showed-up for pre-bid meetings of Varanasi and Haridwar projects. The selection of firms was based on lowest bid project cost for developing and operating the treatment infrastructure for a period of 15 years.

The Government of India had accorded Cabinet approval to Hybrid Annuity-PPP model in January 2016 with 100% central sector funding. Under this model, the development, operation and maintenance of the sewage treatment STPs will be undertaken by a Special Purpose Vehicle (SPV) to be created by the winning bidder at the local level. As per this model, 40% of the capital cost quoted would be paid on completion of construction while the remaining 60% of the capital cost along with interest charges and annual operation and maintenance costs will be paid over the life of the project as annuities.

One of the most important features of this model is that both the Annuity and O&M payments are linked to the performance of the STP. This will ensure continued satisfactory functioning of the assets created due to better accountability, ownership and optimal performance. Hybrid Annuity based PPP model has been adopted for the first time in the country in sewage management sector. Such a

model has earlier been adopted successfully in highway sector only.

A second set of sewage treatment projects under HAM are on the anvil. The upcoming projects which have already been sanctioned under HAM are STPs at Naini, Jhusi, and Phaphamau at Allahabad (72 MLD), STPs at Unnao, Shuklaganj, and Bithoor along with Kanpur (21.4 MLD), STPs at Digha and Kankarbagh in Bihar (150), STPs at Kolkata and Howrah (141 MLD) STPs at Farukhabad (30 MLD), STP at Bhagalpur (65 MLD). Tender documents for 10 of these projects are being prepared. NMCG has also appointed strategic consultants for PPP design and transaction advisory support for integration of sewage treatment infrastructure in Kanpur, Allahabad, Patna and Kolkata[26].

Given the large gap between domestic waste water generation, present installed treatment capacity and the consequent need for high capital investment of about Rs.200,000 Crore. as seen from Table 2.2.1. Successful implementation of the hybrid annuity model will help attract much needed private capital and capability for rejuvenation of rivers, especially those that receive huge organic load due to discharge of untreated/partially treated domestic waste water. Given public health impacts of polluted rivers, shortening the time horizon from 30 years as assumed above would be necessary and success of PPP model would facilitate this in a major way. Stress on recycling and re-use of treated waste water would not only help generate sustainable revenues but also reduce pollution load discharged in to water courses. The terms of involvement of the private sector in such projects are location specific since revenues from sale of treated water and user charges vary from place to place. The potential of PPP as a financial solution for rejuvenation of rivers would emerge based on performance of projects currently under implementation/in pipeline.

Let us now consider yet another potential area for PPP.

The Draft Forest Policy, 1988 observes as follows:

'Suitable location specific PPP models will be developed involving Forest Departments, Forest Development Corporations, Communities, Public limited companies, etc for achieving the target of increased forest & tree cover in the country'.

The Draft Policy rightly talks of the need to develop location specific PPP models to enhance FTC since potential revenues would vary significantly from place to place. The financial needs as seen from Table 2.2.1 amount to Rs.353,000 Crore. with a time horizon of 30 years. Shortage of public finance for afforestation was flagged earlier in section 4.3.1. In addition, given the INDC commitment to sequester 2.5 billion tons of CO2 equivalent by 2030 by enhancing FTC, success of PPP model in this sector would be crucial to meeting this voluntary commitment. Again, potential role of PPP in enhancing FTC could be assessed only when a few projects are successfully implemented based on location specific models.

[26] http://pib.nic.in/newsite/PrintRelease.aspx?relid=171600

4.7 Augmenting CSR finance, blending with other sources of finance

4.7.1 Expected CSR Funding based on Business as Usual Scenario

CSR has become mandatory since 2014, and corporates meeting specified turn-over, criteria are required to earmark and spend 2% of their average net profits over the last three years to discharge this responsibility. Eligible activities that could be funded under CSR span across, education, health, poverty alleviation, sports, livelihoods, environment, etc. CSR funds could be accessed by various societies, NGOs, educational institutions, trusts, community based organizations, or corporates could spend the money on their own on specified activities.

At present, based on assessments already carried out under BIOFIN, two estimates of biodiversity attributable expenditure of corporates in pursuance of CSR obligations are available. As stated in section 3.2.3, as per NIPFP estimates, biodiversity attributable expenditure amounts to 2.97% of total CSR funding based on data gathered from 20 large public sector companies. A similar estimate made by IORA for the private sector shows that only 2% of CSR expenditure is attributable to biodiversity. NIPFP has made projections on availability of CSR funds for biodiversity related projects taking in to account the present industrial growth rate. To recapitulate, projected CSR funding likely to be available for biodiversity is as follows:

Table 4.7.1
Projected CSR funding attributable to biodiversity

Year	Total CSR Expenditure	Biodiversity Attributable Expenditure
2018-19	20,344.61	604.24
2019-20	21,553.20	640.13
2020-21	22,833.58	678.16
2021-22	24,190.02	718.44

As seen in Table 3.2.3, taking in to account the expenditure during 2017-18 of about Rs. 570 Crore., the average annual CSR expenditure during 2017-18 to 2021-22 is projected to be approximately Rs. 642 Crore., say, Rs. 650 Crore.

4.7.2 Case for this finance solution

As stated above, biodiversity related projects account for a small fraction of CSR funding. In fact, if one were to go by IORA estimate of CSR sector-wise spending based on a sample of 150 large private sector companies, biodiversity accounts for only about 2% of the total CSR expenditure. Therefore, there is ample scope to attract CSR funds for biodiversity by formulating suitable proposals.

Conservatively, even if biodiversity attributable expenditure could be enhanced to 6% of total CSR expenditure, the annual CSR funds for biodiversity could go up to about R.1300 Crore. considering projections made by NIPFP. NBA could take the lead to sensitize the corporate sector on biodiversity conservation priorities in the context of India's National Biodiversity Action Plan and possible role of CSR.

4.7.3 Implementation modalities

Given that eligible activities under CSR span a wide range of sectors and there is no earmarking of funds for any sector, corporate sector tends to allocate money on a project by project basis even if it means ignoring some sectors. Due to paucity of suitable proposals, biodiversity has been ignored by corporates as evident from its dismal share. Hence, there is a need for an agency such as NBA to develop concept notes and make presentations on possible proposals in priority areas of NBAP to various industry associations. India Business and Biodiversity Initiative (IBBI) could be the industry focal point for coordination. Exposure visits could also be arranged for interested corporates covering existing biodiversity project sites as well as potential new locations.

4.7.3.1 Joint Funding, CSR could supplement other sources

Let us consider specific efforts made by NMCG to attract CSR funds. As stated inTable 2.2.1, to close the gap with regard to river rejuvenation by ensuring 100% treatment of wastewater, the total financial requirement is Rs.200,000 Crore Given limitations of public finance, PPP has been suggested as a possible mechanism to bring in private sector resources. Further, CSR could also play a role and this fact has been fully appreciated by NMCG. It has identified various locations along the Ganga river wherein CSR funds would be welcome. In this manner, a complementarity has been established between public finance and corporate CSR funds by way of earmarking river stretches along which investment in specified activities could be made by the corporate sector with CSR funds.

The NMCG has indicated that CSR funds are welcome in the following areas[27]:

- Bio-remediation
- Afforestation
- Ganga Gram
- IEAC
- Ghat modification/cleaning/extension
- River surface cleaning
- Solid waste management
- Crematoria

Taking a cue from this, in areas where major funding gap exists such as afforestation, managing IAS, river rejuvenation of rivers other than Ganga, etc, similar spade work is called for to identify project particulars along with locations, so that corporates know exactly what to fund under CSR in the domain of environment/biodiversity conservation.

Yet another core area of biodiversity facing shortage of public finance is conservation of endangered plant species. One of the proposals proposed to be taken up during BIOFIN Phase II seeks to take stock of the two government funded schemes on conservation of endangered plant species ('Assistance to Botanic Gardens' of MoEFCC and All India coordinated project on ' Preventing Extinction and Conservation of threatened plant species by applying bio-technology tools' of Department of Biotechnology (DBT)and leverage CSR funds for undertaking rehabilitation of endangered plant species and subsequent scaling up. To facilitate entry of corporate sector in this core biodiversity conservation area, it is proposed to demonstrate feasibility of conserving endangered species making use of BIOFIN funds.

Conservation of endangered species calls for specialized knowledge to identify species, protocols to conserve them in existing locations wherever feasible, identify suitable alternative locations where current locations are not suitable, etc. Such activities also involve working with government agencies such as the Botanical Survey of India as in the case of conservation of endangered plants. They take long to yield results and do not attract public attention. As a result, to start with, the primary source of finance has to be public finance with CSR playing a supplemental role. It would be easy to rope them in and also deepen their engagement once successful conservation efforts could be demonstrated with say public finance or ODA and public awareness created on significance of these efforts. In the initial project stages, the corporates could be involved without financial commitment with the option to take up financial involvement once their level of comfort goes up.

Further, as stated earlier, public finance for wetlands rehabilitation has been meager and the required resources are large as captured in Table 2.2. Hence, given the importance of wetlands in terms of the rich biodiversity they harbor and the ecosystem services that they provide, use of CSR funds to supplement public finance needs to be explored.

In this context, as part of BIOFIN Phase II, it is therefore proposed to take stock of approach and outcomes of efforts made in the past with regard to wetlands rehabilitation. For this stock taking, it is proposed to use BIOFIN Phase II funds and bring in CSR funds on a pilot basis for rehabilitation of an urban wetland. Given that wetlands rehabilitation is resource intensive, CSR funds could help supplement public finance in a big way as the CSR kitty is large and growing.

[27] https://nmcg.nic.in/csr/csrindex.aspx

4.7.3.2 Need to Earmark Funds under CSR

As compared its easy to build assets which help show-case outcomes in sectors such as water supply, infrastructure for education, rural roads, etc, the entire environment sector finds it difficult to come up with project proposals that corporates perceive as worthwhile to get mileage with local communities with regard to their community welfare credentials. As a result, environment sector as a whole has been less successful in accessing CSR funds. Project proposals in this sector such as on conservation of wetlands, afforestation, species recovery, conservation of endangered species, etc are of long gestation and the results of completed projects are not tangible as those in other sectors. Without getting in to inter-se merits of projects in different sectors, it is still clear that earmarking of funds for the environment sector would make the corporate sector seek projects in these sectors more aggressively.

In this regard, MoEFCC could engage with the Ministry of Corporate Affairs and advocate issuing of a directive to increase allocation of CSR funds towards environment sector projects. In particular, considering that within environment sector, biodiversity has attracted very little funding, MoEFCC could consider making out a special case for earmarking a certain percentage of CSR money to fund biodiversity related projects.

4.7.4 Expected Contribution from CSR

Under business as usual scenario, projection based on past trends shows that, during 2017-18 to 2021-22, annual average contribution from CSR in terms of funding to biodiversity domain projects is expected to be about Rs.642 Crore say Rs.650 Crore. Given competing demands on CSR funds from SDG agenda domains such as education, health, livelihoods, sanitation, etc, concerted efforts on the lines of NMCG to identify opportunities for suitable projects in biodiversity domain would be required to secure additional funds. It is envisaged that, with such efforts, contribution from biodiversity could go up by 100% and reach a level of about Rs.1300 Crore. per year in the period up to 2021-22.

4.8 Green Fund

4.8.1 Green Finance in India

Green finance covers the financing of investments that generate environmental benefits. The strategy for green finance has to form part of the larger strategy for sustainable development.

By and large, Green finance in India, is, at present, synonymous with renewable energy finance. This is because most projects in sectors other than wind and solar are not bankable. Even wind and solar suffer from challenging tariffs and off-take credit worthiness. Sectors such as forestry and agriculture are even short of viable business models without some form of government support.

Most of the experience with renewables has been in the form of project financing by domestic banks. Although India is among the top issuers of green bonds, the total issuances in 2017 stood at USD 6 billion and account for a fraction of what is needed considering that USD 125 billion is needed to achieve renewable energy targets by 2022 in addition to USD 667 billion for electric vehicles and about USD 1 trillion for affordable green housing.

The following need attention

- A national green finance strategy taking in to account preparedness of different sectors, public capital instruments to be deployed and recognition of incentives for sectors that need government assistance
- Standards and criteria for green financial products, mandatory disclosure norms of companies, etc.
- Innovative financing instruments including blended finance, drawing on

public institutional investment vehicles and integrating green finance in to foreign direct investment (Acharya, 2018).

4.8.2 Case for this Finance Solution

In view of India's huge financial requirements for renewables, electric transportation, etc, it is clear that public finance alone will not suffice. Considering that private green financing has been limited, a Green Fund has been suggested to scale up clean energy growth (Beinecke & Mathur, 2018). Such a fund would, unlike private banks, have a mission to expand clean energy, specialized underwriting experience in clean technology and access to public capital that could be strategically used to attract private capital.

And because green funds typically reinvest their income, effectively recycling public funds, they can create a bigger market impact than government subsidies or incentives alone.

Green Funds support private banks and other green investments through innovative financing interventions. Green fund investments demonstrate the viability of clean energy technologies or take some of the risk until the private sector is comfortable with the new technologies.

In addition to direct lending, a true green fund offers financial products that help make commercial banks more comfortable with financing clean energy projects. For example, the Connecticut Green Bank in the United States, extends a working capital line of credit to solar companies worth up to 50% of project costs, giving private lenders an extra boost of confidence to initiate these loans. Public institutions, such as IREDA, National Bank for Agricultural and Rural Development (NABARD), PTC Financial Services, among others, can maximize investments in green energy by developing green banking tools to leverage private capital.

Green funds are historically the trailblazers that allow private investors to become more comfortable with entering an emerging market. Green funds have successfully crowded private funding into clean energy projects in many countries and states around the world. For example, the UK Green Investment Bank was an early investor in offshore wind power in the country, which had a track record abroad but not domestically. Now the UK offshore wind market is the largest in the world, and the UK Green Investment Bank has been privatized after several successful financing of projects.

An Indian green fund could drive private investment from domestic banks as well as international sources of funding, such as the Green Climate Fund. Following on the success of rupee-denominated "masala" bonds, green banks can also issue green bonds, an attractive vehicle for long-term institutional investors, both domestic and international.

4.8.3 Expanding coverage of fund

Such a fund could, rather than limit itself to climate mitigation subjects such as renewable energy and green transportation, have a broader mandate to invest in green projects in sectors including forestry, river rejuvenation, etc. As observed earlier, projects in these sectors, are, in general, not bankable under prevailing terms and conditions of commercial lending.

As in the case of renewable energy, public finance alone would be grossly inadequate to bridge the gap between target and baseline within a reasonable time-frame in areas such as afforestation, reforestation of degraded forests, rejuvenation of rivers and wetlands.

This is clear from the magnitude of investments needed as projected in Table 2.2. As stated earlier, the timelines would also need to be shortened and hence the need to scout for other sources of finance.

The Green Fund for clean energy projects discussed above will, therefore, need to be re-structured to make its sources of funds more broad-based since terms of financing would need to be much softer for biodiversity related projects. In terms of sources of funds, the fund could access/make use of the following:

- Grant funding/concessional finance from bilateral and multi-lateral agencies.

- Public finance through annual budgetary allocations
- Proceeds from green bonds especially to attract long-term finance from institutional investors, both domestic and international.

To cater to the needs of sectors without substantial revenue stream such as afforestation, river rejuvenation, biodiversity conservation, etc, the fund would require flexibility to combine grant funding, public finance in the form of budgetary support and soft loans so that the project remains viable to service the loan component. The fund will have to develop multiple windows for project financing depending on strength of revenue streams.

4.8.3.1 Green Bonds could be a major source

The Green Bond Principles brought out by the International Capital Markets Association serve as a guide for several international funds to choose green projects to invest in[28]. The principles provide a wide array of green project categories which in addition to climate change related sectors such as renewable energy, energy efficiency and green transportation, also include the following:

- Environmentally sustainable management of living natural resources and land use (including environmentally sustainable agriculture; environmentally sustainable animal husbandry
- Environmentally-sustainable forestry, including afforestation or reforestation, and preservation or restoration of natural landscapes)
- Terrestrial and aquatic biodiversity conservation (including the protection of coastal, marine and watershed environments)
- Sustainable water and wastewater management (including sustainable infrastructure for clean and/or drinking water, wastewater treatment, sustainable urban drainage systems and river training and other forms of flooding mitigation)
- Pollution prevention and control (including reduction of air emissions, greenhouse gas control, soil remediation, waste prevention, waste reduction, waste recycling and energy/emission efficient waste to energy)

From the above, it is quite clear that the entire range of projects with large fund requirements as captured in Table 2.2 would be eligible for financing with the help of green bonds. The proposed 'Green Fund' could issue green bonds covering all the major resource intensive activities.

Green bond investing is a small but growing niche in asset management, as the importance of tackling climate change rises up investors' ideas.

The number of new funds dedicated to investing in green bonds "surged" during 2017, according to Fitch; expanding to about 40 during the year, with Euro 3.1 billion under management at the end of December[29].

Although the above data on green bonds is in the context of climate change, as stated earlier, all the major resource intensive areas captured in Table 2.2 are eligible for green bond financing. It may therefore be noted that, to implement NBAP in an integrated manner along with biodiversity relevant national policies, strategies, international commitments, etc, green bonds could be an important instrument that the proposed Green

[28] Green Bond Principles, Voluntary Process Guidelines for Issuing Green Bonds, ICMA. June, 2018

[29] https://www.fnlondon.com/articles/amundi-and-ifc-close-largest-green-bond-fund-at-1-4bn-20180316

Fund could make use of.

An assessment of the potential of Green Fund as a financial solution will have to await emergence of data from implementation.

4.9 Access and Benefit Sharing (ABS)

ABS refers to the way in which genetic resources may be accessed, and how the benefits that result from their use are shared between the people or countries using the resources (users) and the people or countries that provide them (providers).

The ABS provisions of the Convention on Biological Diversity (CBD) are designed to ensure that the physical access to genetic resources is facilitated and that the benefits obtained from their use are shared equitably with the providers. In some cases this also includes valuable traditional knowledge associated with genetic resources that comes from indigenous and local communities[30].

The benefits to be shared can be monetary, such as sharing royalties when the resources are used to create a commercial product, or non-monetary, such as the development of research skills and knowledge.

4.9.1 Regulated Access under the Biodiversity Act

India enacted the Biodiversity Act in 2002 (BD Act) and the Biodiversity Rules were notified in 2004. Under the Act, a three-tier implementing mechanism consisting of National Biodiversity Authority (NBA) at the national level, State Biodiversity Boards (SBBs) at the State level and Biodiversity Management Committees (BMCs) at the local level is provided for. With regard to regulating access to India's Bio-Resources (BR) and associated Traditional Knowledge (TK), their functions are non-overlapping and complementary.

The NBA regulates access to India's bio-resources (and associated traditional knowledge) for research and bio-survey & bio-utilization by foreign persons/entities as well as their further transfer to third party. For transfer of research results to foreign persons, Indian researchers require NBA's prior approval. Further, all persons seeking IPR on products developed by conducting research on bio-resources obtained from India are required to obtain prior approval of NBA u/s 6 of BD Act. Like-wise, access to bio-resources for commercial utilization, bio-survey and bio-utilization for commercial utilization by Indian citizens, corporates and associations are regulated by the SBBs.

4.9.2 Benefit Sharing Arrangements

The NBA notified 'Guidelines on Access to Bio-Resources and Associated Traditional Knowledge and Benefit Sharing Regulations, 2014'. These Regulations provide for monetary benefit sharing which could be summarized as follows:

Table 4.9.2.1
Monetary Benefit Sharing provided by the Guidelines on Access to Bio-Resources and Associated Traditional Knowledge and Benefit Sharing Regulations, 2014

Activity covered	ABS fee payable by	Amount of ABS Fee payable	To whom payable
Access to BR, TK for research or bio-survey and bio-utilization for research	Persons covered under section 3(2) of the BD Act [x]	Upfront payment mutually agreed between NBA and applicant	NBA

[30] https://www.cbd.int/abs/infokit/brochure-en.pdf

Access to BR for commercial utilization or bio-survey and bio-utilization for commercial utilization	Any person	Trader: 1 to 3% of the purchase price of BRs Manufacturer: 3 to 5% of the purchase price of BRs Option to pay based on annual turn-over of product minus govt. taxes Up to 1 Crore – 0.1% 1 to 3 Crore – 0.2% Above 3 Crore – 0.5%	NBA -Persons covered by sec 3(2) of the BD Act Others – SBB concerned
Transfer to section 3(2) persons of research results based on BR obtained from India	Any person	3 to 5% of the monetary consideration	NBA
Apply for IPR in India or elsewhere involving BR obtained from India	Any person	0.2 to 1% of annual product sales minus taxes when the applicant commercializes the process/product/innovation himself Otherwise, 3 to 5% of the license fee received plus 2 to 5% of the annual royalty received	NBA

[x]Non-Indian citizens, NRIs as well as corporates, associations or organizations not registered in India or with non-Indian participation in share capital or management

As seen from the foregoing, the roles of NBA and SBBs are non-overlapping with regard to regulating access and grant of access/approval. Hence, the scope for ABS as a biodiversity financial solution needs to be addressed separately for these two categories of statutory bodies.

4.9.3 Present status of ABS

ABS receipts of the National Biodiversity Authority, year-wise are as follows:

Table 4.9.3.1
Year-wise ABS receipts of the NBA

ABS fee category Year	ABS fee for Access of BRs by section 3(2) persons for commercial utilization	Upfront fees	Royalty
2008-09			7.8 lakhs
2009 -10			30.1 lakhs
2010 -11			3.49 lakhs
2011-12			1.99 lakhs
2012-13			1.12 lakhs
2013-14			
2014-15	15.50 Crore		0.05 lakhs
2015-16	17.43 Crore	1.40 Crore	0.002 lakhs
2016-17	12.45 Crore	0.035 Crore	
2017-18	18.14 Crore	0.65 Crore.	0.009 lakhs

Source: NBA

Details of significant ABS money collected by SBBs and deposited in the respective State Biodiversity Fund (SBF) during 2014 to 2017 are as follows:

Table 4.9.3.2
Details of ABS money collected by SBBs in State Biodiversity Fund (SBF)

State Biodiversity Board	Money deposited in State Biodiversity Fund
Andhra Pradesh	Rs. 1,14,91,168 (2015-16), Rs. 109900039 (2017-18)
Gujarat	Rs. 50,27,024 (2014-15), Rs. 42,28,110 (2015-16)
Telengana	Rs. 24,00,000 (2014-15), Rs. 72,00,000 (2015-16), Rs. 20,00,000 (2016-17), Rs. 8,00,000 (2017-18)
Tripura	Rs 4,16,902 (2016-17), Rs. 2,62,210 (2017-18)

4.9.4 Case for this Finance Solution

India is a front runner in implementation of ABS. In terms of facilitating access to bio-resources, India accounts for the bulk of Internationally Recognized Certificates of Compliance (IRCCs). Of the 195 IRCCs issued world-wide, India alone accounts for 123(Source: NBA).

However, there is still a long way to go in terms of bringing all current users of bio-resources within the ambit of ABS. A sample study carried out by the Uttarakhand State Biodiversity Board (SBB) to assess ABS potential in the State showed that a bulk of the business entities making commercial use of bio-resources obtained from the State are yet to apply for approval of the SBB. The finding applies to other States as well considering the small number of ABS agreements concluded.

Enhancing collection of ABS money at the level of NBA and SBBs is therefore urgently called for so that the money could be transferred to providers of bio-resources in the interest of biodiversity conservation and sustainable utilization. The goal should be to realize full potential of ABS as a financial solution.

As part of this exercise, it is necessary to identify and bring all current users of bio-resources within the fold of ABS. Unless this is taken up urgently and all users brought under ABS regulations, there is a real threat of unsustainable utilization leading to extinction of vulnerable bio-resources.

4.9.5 Implementation Arrangements

4.9.5.1 Assessment of ABS potential

As stated earlier, the roles of NBA and SBBs are clearly defined. Hence, the exercise to assess potential of ABS for the country as a whole need to be undertaken separately for NBA and the SBBs. The suggested methodology, in brief, is as follows:

As regards, NBA, applications in form I for access have shown a steadily increasing trend since 2014 when ABS rules came in to force. Hence, a linear projection of applications along with average upfront fee collected per application and applications cleared as a percentage of applications received would help assess future revenues from upfront fees payable for access. A similar projection could be made for ABS fee from commercial use. However, the projection would have to await availability of data since NBA has recently started considering applications in this category with the exception of Red Sanders. Income on account of Red Sanders cannot be expected to continue based on past trends. Income from no objections issued by NBA prior to filing for patents is not amenable to a simple methodology such as the above since ABS fee becomes payable only on successful commercialization of patents. Hence, NBA needs to keep track of no objections issued in terms of (a) successful patenting and (b) successful commercialization thereafter.

In the case of SBBs, the exercise has to be limited to states with a reasonable amount of experience in ABS and where list of traded bio-resources has been prepared. The percentage of bio-resource users that have applied to SBBs is still small. The first task, therefore, is to ascertain all those liable to apply. This

task would require going through databases available with the Industries department of registered industrial units, Department. of Food Safety, etc in addition to list of bio-resources users prepared recently under the UNDP-GEF project on ABS.

As a first estimate, once the turn-over details of those that are liable and have not applied have been ascertained, a simple proportionate assessment based on average ABS fee collected from approvals granted for commercial use could be made. However, given that, the bio-resources users fall under different sectors – pharmaceuticals, nutraceuticals, health and nutritional supplements, etc, and also since ABS fee payable is a function of turn-over, the projections could be refined based on stratified sampling.

It is necessary to take up the above exercise of assessing ABS potential on top priority basis so that ABS revenues could be enhanced for purposes of equitable benefit sharing with the providers of bio-resources. In the process, the full potential of ABS as a financial solution would emerge.

An approximate assessment of ABS potential carried out by SBB, Uttrakhand shows that annual ABS potential of this State is about Rs.100 Crore. (about USD 15 million). When extrapolated across all the 29 States and 7 Union Territories, this assessment would show that, when the full potential of ABS as a finance solution is unlocked, there would be a quantum jump in terms of resources available for biodiversity conservation. Based on the Uttarakhand exercise, it could be stated that potential annual ABS revenues for the country as a whole would at least be about Rs.1500 Crore.

Since forests harbor a lion's share (about 80% as per India's sixth National Report to CBD) of terrestrial biodiversity, simple extrapolation based on Uttarakhand's share of forest cover of 3.43% in the country would yield a revenue projection of about Rs.3000 Crore. However, given that developments in the field of bio-technology are likely to have an impact on demand for bio-resources, the estimate has been conservatively pegged at Rs.1500 Crore.

4.9.5.2 Gender Dimension in Biodiversity Management

By and large, the gender dimension in biodiversity management has been neglected in India. In almost all government-sponsored in situ and ex situ conservation efforts, gender considerations have yet to be integrated into the culture of management. Only in recent years has gender come to be acknowledged as an important variable in conservation and management.

In community conservation efforts, there are clearly defined gender roles, particularly in the areas of plant and seed selection and preservation. For example, in a temple at Along in Arunachal Pradesh, credit is given to a woman for domesticating rice. Women's role in biodiversity conservation has been overlooked, despite the fact which women have a profound knowledge of plants and animals in their environment. Although the natural resources of the environment provide the basis for both women's and men's livelihoods, women have traditionally used a variety of indigenous plants, trees and animals and so have a direct stake in their preservation. Loss of habitats and biodiversity ultimately affects the underprivileged, the majority of whom are women. This is why women have participated in large numbers in movements like the Chipko Andolan.

Although they possess knowledge about biodiversity conservation, poor women are often left with no choice but to exploit natural resources in order to survive. [31]

It is in this context that transfer of ABS money to providers of bio-resources/BMCs needs to be considered so that women are duly recognized for their role in biodiversity conservation and provided suitable livelihood opportunities to wean them away from excessive dependence on bio-resources.

4.9.5.3 Transfer of ABS money to providers of bio-resources

Even the resources collected by NBA and SBBs are yet to be passed on to the providers of bio-resources. In transferring ABS money collected to providers of bio-resources, difficulties have been faced in identifying the providers, particularly when such resources are available at multiple locations including community owned land. It is therefore necessary to undertake pilot projects to transfer ABS fee collected to providers of bio-resources and demonstrate a workable methodology as there has been hardly any progress in this regard. Biodiversity conservation would get a boost when the methodology gets widely adopted.

As part of BIOFIN Phase II, it is proposed to take up a proposal for enhancing ABS revenues and unlocking full potential of ABS as a financial solution on the lines indicated above. In addition, separately, pilot projects mentioned above on transfer of ABS money collected to providers of bio-resources would also be undertaken.

4.9.5.4 Early resolution of legal issues

The Ayurved industry majors have taken the plea that they are exempted from paying ABS fee under the BD Act. They the challenged validity of 2014 Regulations on ABS guidelines and have taken the matter to court. The matter has been pending in the High Court of Bombay (Nagpur Bench) and High Court of Uttarakhand. The court verdicts would have a major bearing on ABS implementation and of course, potential of ABS as a biodiversity financial solution. The Uttarakhand High Court has recently delivered a verdict upholding powers of SBBs to demand ABS fee for commercial utilization of bio-resources from Indian nationals and Indian entities. This judgement will help expedite settling a long standing issue on powers of SBBs with regard to ABS collection.

4.10 Environment Damages Fund (EDF)

4.10.1 The Canadian Fund

The EDF follows the Polluter Pays Principle to help ensure that those who cause environmental damage or harm to wildlife take responsibility for their actions. The EDF is a specified purpose account created in 1995, administered by Environment Canada, to provide a mechanism for directing funds received as a result of fines, court orders, and voluntary payments to priority projects that will benefit the natural environment. The majority of funds are directed to the EDF through statutory fines and court-ordered payments. Since 1995, the EDF has received over USD 4.5 million from 154 awards and has funded 149 projects across Canada. Priority funding is given to projects that restore the natural environment and conserve wildlife in the geographic region where the original incident occurred. To be eligible, projects must be delivered in a cost-effective, technically feasible and scientifically sound manner, and must address one or more of the following EDF categories: Restoration (highest funding priority); Environmental Quality Improvement; Research and Development; Education and Awareness[32].

Considering that restoring the natural environment and conservation of wildlife gets priority in resource allocation from the EDF, the relevance of the model in the Indian

[31] https://pdfs.semanticscholar.org/f686/4c5f621a5d98460c3f6857a8ee23ce9f2ab0.pdf

[32] https://www.cbd.int/financial/doc/compilation-innovative-financial-mechanisms-2011-09-en.pdf

context as a mechanism for biodiversity conservation is clear.

4.10.2 Case for this Finance Solution

In India, given the rapid economic growth and consequent anthropogenic pressure on the natural environment, setting up of a fund on similar lines is a priority.

This is clearly evident from cases such as the extensive ecological damage caused by iron ore mining in Goa, Odisha and Jharkhand which led to the setting up of the Shah Commission by the Central Government. Amongst other things, as earlier stated, the Shah Commission recommended that the Forest Conservation Act, 1980 should be amended to provide for adequate deterrence to prevent encroachment on forest land. It recommended a penal provision with imprisonment ranging from 6 months to 7 years along with liability to pay fine in proportion to amount of illegal mining.

In fact, again, as mentioned earlier, the Supreme Court in a judgement dated July 06, 2011, directed that, under section 3(3) of the Environment (Protection) Act, 1986, the Central Government should appoint a National Regulator for appraising projects, enforcing environmental conditions for approvals and to impose penalties on polluters.

There have been other such incidents as well involving major environmental damage which are well documented. For instance, untreated effluents from tanneries were causing severe environmental damage in the Palar river basin in Tamil Nadu. The impacts included polluting ground water, Palar river water, soil and land degradation which affected agriculture, etc. In 1996, by way of a landmark judgement, the Supreme Court ordered the polluting industries to pay a fine of Rs.10,000 each. This fine along with the compensation (to reverse damage caused to ecology and by way of compensation to affected individuals) was ordered to be deposited in an 'Environment Protection Fund'. This Fund was to be utilized by the Loss of Ecology Authority (which the court ordered to be set up) to undertake projects to reverse damage to ecology and pay compensation as determined by the Authority to affected persons.

While investigation of complaints, assessment of damage and determination of compensation, etc have to be done on a case by case basis through court proceedings, the proceeds in terms of fines, penalties, amount for restoration of damages, etc could be channelized through a centralized fund with pre-determined priorities in terms of projects to be financed by the Fund.

4.10.3 Implementation Arrangements

In addition to court ordered fines, penalties, compensation amount, etc the Fund could be given flexibility to accept the following:

- Voluntary contributions such as those from philanthropic institutions
- Amounts available with companies as part of their Corporate Social Responsibility under the Companies Act.
- Other avenues that may arise in future such as environment related surcharge on income tax, cess/levies imposed on polluting activities/activities involving hazardous substances, processing fee for environment and forest clearances, etc.
- As stated earlier, the Fund could be serviced by a secretariat with flexibility to hire specialists as needed to prepare detailed project reports, supervising execution which could be taken up by the polluter or an agency chosen by a competent court. The Court orders would take precedence in terms of resource allocation and, in respect of other monies collected, the Fund could follow its own charter to determine investment priorities.

The National Green Tribunal (NGT) Act, 2010 provides for award of compensation or relief on grounds of damage to the environment. The amount thereof is required to be credited to the Environment Relief Fund (ERF) set up under the Public Liability Insurance (PLI) Act, 1991 to be spent as per directions of NGT.

The purpose of ERF is to provide immediate relief to victims of chemical accidents. Hence, depositing compensation amount for restoration of environmental damages in ERF set up with a specific mandate could therefore be discontinued and, instead, the amount could be deposited in the proposed EDF. Of course, the NGT Act would need to be amended for the purpose.

4.11 Ecological Fiscal Transfers (EFTs)

4.11.1 Rationale to Compensate Local Governments

Environmental protection contributes to the well-being of people within and beyond municipal and regional boundaries. Associated opportunity and implementation costs, e.g. through land-use restrictions and enforcement of the restrictions, are often borne by states and municipalities that provide these environmental public goods (Gebara, Loft & Wong, 2016).

For example, forests provide a wide variety of services. These encompass, first and foremost, the class of regulatory services such as carbon sequestration; sediment control and soil conservation; ground water recharge; protection from extreme weather events and preservation of bio-diversity. These services, by their very nature, could accrue beyond the boundaries of the State in which the forest lies. Although there are benefits that do accrue exclusively to the State, from forest produce and recreational services yielded by standing forests, there are national restrictions on timber felling which impose the costs of having land under forests exclusively on the State in whose jurisdiction it lies.

4.11.2 Implementing experience in India

States had represented to the 12th Finance Commission that, due to financial constraints, they faced problems in maintaining forests as per working plans and that the forests had become a liability. They pleaded that separate grants should be provided to them for maintenance of forests. Therefore, the Commission, for maintenance of forests, recommended an additional grant of Rs.1000 Crore. for the States spread over the award period of 2005-10. The amount was distributed among States based on forest area. This marked the beginning of ETF in India.

This was further enhanced to Rs.5000 Crore. by the 13th Finance Commission. The grant was untied during the first two years. During the subsequent three years, 25% of the grant was earmarked for preservation of forests and the balance was available for development purposes. The commission took in to account the ecosystem services, as mentioned earlier, that forests provide. The formula adopted by the commission to determine State-wise entitlement took in to account the following:

- Total forest area of a State (highly dense, moderately dense and open forest categories) as a fraction of the country's total forest area
- Additional benefit for those States with percentage area under forests in excess of the national average
- Additional benefit for quality of forest (for moderately dense and highly dense forest)

The 14th Finance Commission observed that keeping areas under forests entails two major costs - the maintenance cost of keeping forests and the restoration cost required for improving the health of existing degraded forests. The Commission stated that a large forest cover provides huge ecological benefits. But, apart from the maintenance costs, there is also an opportunity cost in terms of the forest area not being available for revenue-yielding economic activity. Keeping in view the ecological benefits and the need to support States in shouldering the responsibility of managing the environment, the Commission decided to consider area covered by forests as one of the important criteria for horizontal devolution. The devolution formula, thus, captures both revenue and cost disability and also enables the States to consider forests as a national treasure that needs to be protected.

The 14th Finance Commission decided to assign 7.5% weight in devolution recognizing

that a large forest cover provides huge ecological benefits and that there is also an opportunity cost in terms of area not available for other economic activities which it treated as an important indicator of fiscal disability.

To determine inter-state distribution of the grant, the area under moderately dense and very dense forest cover of state in relation to total forest cover of the country in these two categories was adopted as the yardstick.

4.11.3 Significance of 14th Finance Commission Award

The recommendations of the 14th Finance Commission differed from those of its predecessors in three important respects. First, the 14th Finance Commission recommended a quantum of finance some 30 to 250 times larger: around USD 6-12 billion annually, compared to only around USD 227 million and around USD1 billion over five-year periods recommended by the 12th and 13th Finance Commissions respectively. Second, the release of three-quarters of the funds granted by the 13th Finance Commission was contingent on the preparation of working plans and other pre-conditions; in contrast the release of the EFTs was automatic with no pre-conditions. And third, grants from the 12th and 13th Finance Commissions (partly) had to be spent by states on forest-related budget items, whereas the EFTs operate as a pure transfer into states' general budgets—part of a broader pattern by the 14th Finance Commission of shifting center-to-state payments from earmarked grants to general purpose transfers (Busch & Mukherjee, 2017).

4.11.4 Need to institutionalize EFTs and estimated contribution

In order for the EFTs to operate as an incentive mechanism (i.e. to encourage states to increase their forest cover, in addition to merely compensating states for the "fiscal disability" of forgone revenue from converting forests to other land uses), State governments need to expect that future finance commissions will probably retain contemporary forest cover as a sizeable element of the tax revenue distribution formula. The persistence of many previous elements of the formula through time provides some level of confidence that forest cover may persist as well. Furthermore, though no official statement can prejudge the decisions of future finance commissions, India's 2015 national climate pledge (INDC) mentioned India's long-term goal of increasing forest cover from 24 percent in 2013 to 33 percent, and referred to the 14th Finance Commission's decision as a fiscal incentive that "has effectively given afforestation a massive boost", perhaps suggesting that forest cover may remain a long-term component of the formula.

As stated earlier, in addition to INDC, the Forest Policy, 1988 as well as the Draft Forest Policy, 2018 retain the long-term goal of reaching 33% forest and tree cover. Given that forest cover based fiscal transfer has been retained and enhanced over time by Finance Commissions, it would be reasonable to presume that significant devolution of resources to States would continue to be governed by forest cover.

The Government of India estimated in its 2015 INDC that, in accordance with the award of the 14th Finance Commission, between USD 6.9-12 billion per year will be transferred to states proportional to their forest cover.

This really dwarfs funds available under the Green India Mission or annual accruals under CAMPA.

Even if we presume that, though the transfers are untied, the States spend a portion of the EFT resources on (a) restoration of degraded forest land and

(b) afforestation in non-forest land, both in terms of improving quality of forest cover as well as enhancing FTC and moving towards the national goal of 33% FTC, the Finance Commission awards could become the largest source of finance for the forest sector. If the States spend about 10% of the award amount on above activities, assuming an annual average transfer to States under the 14th Finance Commission's award to be around USD 10 billion (about Rs.70,000 Crore.), the financial contribution to implementing BFP would be about Rs. 7,000 Crore.

4.11.5 Making EFTs more comprehensive

While forest cover is indeed an important ecological attribute for EFTs, there are other factors such as the following which need to be given consideration.

- Area under coastal ecosystems such as mangroves, salt marsh, sea grass, corals and mud-flats which enjoy protection under the E(P) Act through Coastal regulation Zone Rules; these harbor rich biodiversity and deliver a variety of ecosystem services including carbon sequestration and adaptation to climate change
- Areas declared as PAs under the Wildlife Act – national parks, sanctuaries, conservation reserves and community reserves
- Ecologically Sensitive Areas (ESAs) notified under the E(P) Act
- To encourage restoration of degraded forests, change from 'open' category to 'moderately dense ' category as well as from 'moderately dense' to 'dense' category needs to be taken in to account as an additional criterion given that improving quality of forest cover is resource intensive

Unlike forest land which could be diverted for non-forest use subject to prior approval, the areas at (a) to (c) above enjoy legal protection and are not available for any alternative use. Hence, these areas deserve to be accorded a higher 'disability factor' as compared to forests.

The PAs are notified and their extents are known. The same is true of ESAs as well. However, in the case of coastal ecosystems, except mangroves which get covered by the biennial forest survey of FSI, there is no regular monitoring in place; in order to protect these coastal ecosystems, it is necessary to put in place a mechanism for their regular monitoring with the help of satellite imageries supported by ground verification. There is, therefore, a strong case to include, along with forest cover, the above four categories of areas which are rich in biodiversity and deliver a variety of ecosystem of services, as part of the EFT scheme under future Finance Commission's awards.

4.12 Accessing Global Climate Change Funds, ODA including GEF, REDD+

4.12.1 Climate Change and Biodiversity

The Millennium Ecosystem Assessment observes that 'By the end of the century, climate change and its impacts may be the dominant direct drivers of biodiversity loss and the change in ecosystem services globally. This has been further corroborated by the Fifth Assessment Report (AR5) of IPCC (Report of Working Group II). The relevant observations of AR 5 include the following:

- The AR5 states clearly that, "a large fraction of terrestrial and freshwater species faces increased extinction risk under projected climate change during and beyond the 21st century".
- With regard to marine species and ecosystems, it observes that 'hypoxic areas' (dead zones) are increasing in number.
- With regards to terrestrial species, the AR5 outlines a broad risk of climate change impacts to terrestrial ecosystems,

and consequently, to ecosystem services.

- Taking the foregoing in to account, the AR5 concludes that 'If global average temperature increases reach 4°C, climate change will likely become the dominant driver of ecosystem changes and loss'.

4.12.2 Climate change mitigation/ adaptation actions

In the light of the above projections, AR5 presents a number of options to reduce the vulnerability of biodiversity to the negative impacts of climate change. These actions can be broadly classified as follows:

- Actions to help species and ecosystems adapt to specific climate change impacts and
- Ecosystem based approaches to adaptation

4.12.3 Case for this Solution

In terms of specific actions, the following which provide multiple benefits including biodiversity as well as climate change mitigation and adaptation clearly bring out the business case for accessing climate change funds including Green Climate Fund (GCF) and funds devoted to REDD +.

(i) Under REDD +, the following activities are eligible

- Reducing emissions from deforestation.
- Reducing emissions from forest degradation.
- Conservation of forest carbon stocks.
- Sustainable management of forests.
- Enhancement of forest carbon stocks

There is scope for afforestation, reforestation, improved forest management and avoided deforestation activities to be harmonized with biodiversity conservation benefits. Improved conservation of biodiversity can occur through reforestation and improved forest management. Of course, in the design of such projects, features to optimize conservation benefits, including the use of native species for planting, reduced impact logging to ensure minimal disturbance as well as establishment of biological corridors would need to be incorporated. It needs to be noted that plantations of native tree species will usually support more biodiversity than exotic species and plantations of mixed tree species will usually support more biodiversity than monocultures, but plantations of exotic species can contribute to biodiversity conservation when appropriately situated in the landscape[33].

(ii) **Ecosystem based Adaptation (EBA)** as an eco-friendly as well as cost-effective option to 'hard' measures which have till recently been the mainstay of coastal protection both against extreme events such as cyclones whose intensity is said to go up due to climate change as well as sea level rise. Meta-analyses of 69 studies, among five habitats world-wide (coral reefs, mangroves, salt-marshes, seagrass/kelp beds), show that these habitats reduce wave heights significantly and this reduction varies with the habitat and the site. Further, analyses of the costs and wave reduction of thirteen nature-based defence projects in mangroves and salt-marshes show that these projects can be several times cheaper than alternative submerged breakwaters for the same level of protection. Together with their ability to keep pace with sea-level rise, this suggests that nature-based defences can become increasingly viable on sheltered coastlines[34].

In addition to the above coastal protection benefits which lie in the domain of adaptation to climate change, these coastal ecosystems are important sources of carbon sequestration. The rich biodiversity that they harbor and the ecosystem services that they provide are also well documented.

[33] https://unfccc.int/sites/default/files/execsum.pdf

[34] https://www.cbd.int/financial/doc/global-costs-beneftis-coastal.pdf

As seen from the above, EbA as a cost effective option for coastal protection and climate mitigation through carbon sequestration, is a clear winner from the biodiversity as well as sustainable development perspectives given the wide variety of ecosystem services and livelihood support provided by them.

The GCF is focused on climate impact, but has a strong concern for biodiversity and the ecosystem services that it provides for addressing climate change. The resilience of ecosystems and ecosystem services is one of its eight strategic results areas, whilst its investment criteria include sustainable development, encompassing environmental co-benefits such as biodiversity[35]. It is against this background that biodiversity financing in India could significantly benefit from accessing GCF for projects which seek to deliver multiple benefits including climate change adaptation/mitigation, biodiversity conservation, ecosystem services and livelihood support. As stated below, REDD + and EbA are two high potential areas given India's commitment under INDC and its vast coastline prone to cyclones and of course, inundation due to sea level rise. Both REDD+ and EbA, given their biodiversity potential, could form part of the strategy to implement NBAP in an integrated manner. They have the potential to bring in substantial funding from GCF provided the pre-requisites to tap GCF resources are taken care of in project formulation.

4.12.4 Steps taken to access Climate Change Funds

With regard to REDD +, India has prepared a Draft National Policy and Strategy. This makes it clear that India's approach to REDD + is not guided by carbon services alone but includes biodiversity and ecosystem services that flow to local communities. The strategy covers national forest monitoring system as well as a framework including a national level authority for REDD + as well as supporting institutions.

In addition, the reference document for REDD + brought out by MoEFCC recognizes the need to construct Forest Reference Levels at National and State/Union territories Level in order to access climate change funds.

The GCF has issued detailed guidelines for accessing GCF resources for REDD + projects. In times to come, India could access GCF resources in a big way given its commitment to enhance Forest and Tree Cover from about 24% at present to one-third of the geographical area as well as the voluntary commitment as part of INDC to sequester 2.5 to 3 billion tons of CO2 equivalent by 2030.

The concept of EbA is well integrated in to India's approach to integrated coastal zone management and a component on mangrove plantation was part of the Word Bank funded project on ICZM. Further, India has recently secured approval of GCF for a USD 130.27 million project on 'Enhancing Climate Resilience of India's Coastal Communities.' This project adopts the EbA approach to coastal protection and envisages conservation as well as restoration of mangroves in vulnerable coastal stretches spread across three coastal States of Odisha, Andhra Pradesh and Maharashtra. In addition, restoration of corals, salt marsh and sea grass is also envisaged. Coastal ecosystems such as mangroves provide an array of provisioning, regulating, cultural and supporting services. These ecosystem services cover climate change benefits such as coastal protection and carbon sequestration as well as biodiversity benefits such as bird nesting. EbA, though primarily considered as a climate change adaptation strategy, provides a perfect case for securing biodiversity finance as well from GCF.

The GCF approved project, as stated above, is spread across three coastal states, namely, Andhra Pradesh, Odisha and Maharashtra. Given India's vast coastline of about 7500 KM, scope for replicating this EbA strategy in other coastal States and accessing funds from GCF would need to be explored.

Under UNFCCC, the Adaptation Fund was established to finance concrete adaptation projects and programs in developing countries that are Parties to the Kyoto Protocol and are particularly vulnerable to

[35] https://www.greenclimate.fund/-/biodiversity-and-climate-change-convention-on-biological-diversity-meets-with-gcf

the adverse effects of climate change. Since, 2010, the Adaptation Fund has committed USD 532 million, including supporting 80 concrete adaptation projects with about 5.8 million direct beneficiaries. India has got approved 2 projects with substantial biodiversity benefits in addition to climate change adaptation benefits. The details are given below.

Table 4.12.4.1
Approved Projects with substantial biodiversity benefits in addition to climate change adaptation benefits

Project	Grant amount (approx..)
Building Adaptive Capacities of communities, livelihoods and Ecological Security in the Kanha-Pench corridor of Madhya Pradesh	USD 2.6 million
Conservation and Management of Coastal Resources as a potential adaptation strategy for sea level rise	USD 0.7 million

It is therefore seen that, similar to EbA for coastal protection against erosion and sea level rise, climate change adaptation activities based on natural resources management for livelihood support to forest dependent communities also has the potential to bring in significant biodiversity conservation benefits. Hence, project selection for seeking external assistance for climate change adaptation could be guided by co-benefits to biodiversity also.

4.12.5 World Bank as a major source

The World Bank could be another important source to support coastal protection based on EbA approach in other States. The World Bank has funded a large project on ICZM in three coastal States of Odisha, West Bengal and Gujarat. Mangrove afforestation in Gujarat was one of the project components. Given its involvement in coastal zone management, the World Bank, as a source of finance, would also need to be explored to fund more projects on EbA based coastal protection.

The World Bank has a large ongoing project on river rejuvenation focused on Ganga, ' National Ganga River Basin Project' spread across the States of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal. Given the large requirement of funds on account of river conservation/rejuvenation as captured in Table 2.2, scope for accessing further funding for similar projects from the World Bank would need to be explored.

4.12.6 Other ODA Sources

Global Environment Facility (GEF) Trust Fund was established on the eve of the 1992 Rio Earth Summit to help tackle the most pressing environmental problems. GEF funds are available to developing countries and countries with economies in transition to meet the objectives of the international environmental conventions and agreements. GEF supports country priorities that are ultimately aimed at tackling the drivers of environmental degradation in an integrated fashion. At present, there are five focal areas (Biodiversity, Climate Change Mitigation, Land Degradation, International Waters and Chemicals and Waste).

The following projects in the focal area of biodiversity have been approved for GEF financial support[36].

[36] https://www.thegef.org/projects?f[]=field_country:77&f[]=field_p_focalareas:2205

Table 4.12.6.1
Projects in the focal area of biodiversity approved for GEF financial support

Project	Agency
Green-Ag: Transforming Indian Agriculture for Global Environmental Benefits and the Conservation of Critical Biodiversity and Forest Landscapes	FAO
Securing Livelihoods, Conservation, Sustainable Use and Restoration of High Range Himalayan Ecosystems (SECURE)Himalayas	UNDP
Mainstreaming Agrobiodiversity Conservation and Utilization in Agricultural Sector to Ensure Ecosystem Services and Reduce Vulnerability	UNEP
Integrated Management of Wetland Biodiversity and Ecosystems Services (IMWBES)	UNEP
India Ecosystems Service Improvement Project	The World Bank
Developing an Effective Multiple Use Management Framework for Conserving Biodiversity in the Mountain Landscape of the High Ranges, Western Ghats	UNDP
Strengthening the Enabling Environment for Bd Conservation and Management in India	GEF Secretariat
Fifth Operational Phase of the GEF Small Grants Programme in India	UNDP
IND-BD Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the Malvan Coast, Maharashtra State	UNDP
IND-BD Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the Godavari River Estuary in Andhra Pradesh State	UNDP
Strengthening the Implementation of the Biological Diversity Act and Rules with Focus on its Access and Benefit Sharing Provisions	UNEP
BS Capacity Building on Biosafety for Implementation of the Cartagena Protocol - Phase II under the Biosafety Program	UNEP
SLEM/CPP: Integrated Land Use Management to Combat Land Degradation in Madhya Pradesh	UNDP
SLEM/CPP: Sustainable Land Water and Biodiversity Conservation and Management for Improved Livelihoods in Uttarakhand Watershed Sector	The World Bank
SLEM/CPP: Sustainable Rural Livelihood Security through Innovations in Land and Ecosystem Management	The World Bank
SLEM/CPP: Sustainable Land Management in Shifting Cultivation Areas of Nagaland for Ecological and Livelihood Security	UNDP
Biodiversity Conservation and Rural Livelihoods Improvement	The World Bank
Capacity Building for Implementation of the Cartagena Protocol	The World Bank

Project	Agency
Mainstreaming Conservation and Sustainable Use of Medicinal Plant Diversity in Three Indian States	UNDP
Andaman and Nicobar Islands: Ecologically-Sustainable Island Development	UNDP
Conservation and Sustainable Use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity	UNDP
National Biodiversity Strategy and Action Plan	UNDP
First National Report to the CBD	UNDP
India Ecodevelopment	The World Bank

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

For over 60 years, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has been working jointly with partners in India for sustainable economic, ecological, and social development.

The thematic areas of GIZ in India are:

- Energy
- Environment, Climate Change and Biodiversity
- Sustainable Urban and Industrial Development
- Sustainable Economic Development

The following biodiversity related projects have been taken up so far (including those completed) with GIZ funding.

Table 4.12.6.2
Biodiversity related projects taken up so far (including those completed) with GIZ funding

Sl.no	Project
1	Human-Wildlife Conflict Mitigation in India
2	Conservation and Sustainable Use of Biodiversity
3	Protecting Biodiversity in Marine and Coastal Areas
4	Biodiversity and Ecosystem Services in Urban Landscapes
5	Gujarat Forestry Development Project
6	Preserving Biodiversity in the Kailash Region

Although there have been a number of GEF and GIZ supported projects in biodiversity domain, only one GEF funded project was related to wetlands. As stated earlier, public finance for wetlands rehabilitation has been meager and the required resources are large as captured in Table 2.2. Hence, given the importance of wetlands in terms of the rich biodiversity they harbor and the ecosystem services that they provide, ODA sources including GEF and GIZ need to be explored.

4.13 Payment for Ecosystem Services, Accessing CAMPA funds

4.13.1 Payment for Ecosystem Services (PES)

The diverse benefits that we derive from the natural environment are sometimes referred to as ecosystem services. Examples of these services, as earlier mentioned, include the supply of food, water and timber (provisioning services); the regulation of air quality, climate and flood risk (regulating services); opportunities for recreation, tourism and education (cultural services); and essential underlying functions such as soil formation and nutrient cycling (supporting services).

While some ecosystem services such as food and timber have a financial value in the marketplace, others like climate regulation and flood control that are nevertheless equally vital to our continued wellbeing, do not. However, in recent years, there have been significant advances in our understanding of the science of ecosystem services as well as our capacity to establish the values that people place on these services. Therefore, we are now in a stronger position to begin to reflect the value of all ecosystem services in decision-making. Market-based mechanisms enable these values to be reflected in decision-making through incentives and price signals. Examples of market-based mechanisms include trading systems in which damage in one place is compensated through improvements elsewhere (example, biodiversity offsetting) and certification schemes in which the value of ecosystem services is reflected in product pricing (example, eco-labeled products). PES is a further example of a market-based mechanism. While some ecosystem services may be generated and consumed locally (for example, the benefits of nutrient cycling may be felt by farmers at the field scale), the benefits of others may be felt at considerable distances from their point of origin (flood control benefits associated with plantation may be felt by downstream communities a significant distance away). PES schemes therefore have the potential to link up geographically disparate providers and beneficiaries[37].

4.13.2 Biodiversity Offsets versus PES

While good quality developments may incorporate biodiversity considerations within their design, they may still result in some biodiversity loss. One way to compensate for this loss is through biodiversity offsetting whereby the project developer secures compensatory habitat elsewhere. Biodiversity offsets may therefore be viewed as conservation activities designed to deliver biodiversity benefits in compensation for losses in a measurable way. Offsets can involve habitat expansion (creation) or restoration and offset providers must provide additional benefits: offsets cannot be designed simply to maintain current habitat extent or condition.

PES differs somewhat from biodiversity offsetting. PES can be distinguished by a particular focus on the 'beneficiary pays principle', whereby the beneficiaries of ecosystem services provide payment to the providers of ecosystem services. Conversely, biodiversity offsetting incorporates an element of the 'polluter pays principle', since developers pay for the provision of compensatory habitat expansion or restoration elsewhere[38].

[37] https://www.cbd.int/financial/pes/unitedkingdom-bestpractice.pdf

[38] https://www.cbd.int/financial/pes/unitedkingdom-bestpractice.pdf

4.13.3 Case for PES as a finance solution

The narrow definition of PES as a voluntary transaction negotiated among private contractors has been surpassed by the implementation of conceptually alike but broader schemes characterized by the intermediation of the Government between those who benefit and those who preserve the ecosystems' functioning.

This brings us to the Indian context with most of the forests (including mangroves) vested in the State. The State is therefore the custodian of forest wealth of the country. It has been estimated that about 250 million people live inside forests including their periphery. Of this, about 100 million are estimated to be Aadhivasis and tribals who are amongst the poorest sections of the population. The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA) has vested rights such as right to collect minor forest produce, fishing, grazing, etc in forest dwelling Scheduled Tribes and Traditional Forest Dwellers. When forests are diverted for non-forest use, the forest dwelling communities lose their livelihoods either partly or fully. Hence, it is incumbent on State, the Custodian of forest wealth to devise a mechanism whereby resources generated out of forest diversion are at least partially utilized for livelihood support of the poor and eradication of poverty. This leads us to India's regulatory regime for diversion of forest land for non-forest purposes.

4.13.4 Compensatory Afforestation Fund Management and Planning Authority (CAMPA).

In 2016, the Compensatory Afforestation Fund (CAF) Act was enacted to provide for creation of a National Compensatory Afforestation Fund and a National Compensatory Afforestation Fund Management and Planning Authority (CAMPA). The Act also provided for creation of a Fund and Authority for each State. Further, the Act provided for transfer to the National Fund of monies collected over the years for diversion of forest land for non-forest purposes on account of compensatory afforestation, penal compensatory afforestation, net present value, penal net present value, costs on account of wildlife management and catchment area treatment and interest accrued thereon. The amounts deposited could be utilized for forestry and wildlife management activities as specified in the Rules framed in 2018. The CAF Act has come in to force with effect from 30th September, 2018.

The accumulations under adhoc CAMPA (about Rs.40,000 Crore. in 2016 and further increased to about Rs.60, 000 Crore. in 2018) would be transferred to the National and State CAMPAs as under the CAF Act. Given that average annual accruals including interest to the adhoc CAMPA were about Rs.6000 Crore., it is clear that CAMPA funds would constitute a significant source of funding for the forestry sector in the years to come. However, money deposited in CAF is to undertake compensatory afforestation and other forest and wildlife sector activities. The purpose is to compensate for forest land diverted and along with that, the ecosystem services lost which take time to be recouped. Hence, investment from CAF cannot be treated as advancing the biodiversity agenda, rather, it is meant to mitigate the adverse impacts. Counting this as part of biodiversity finance would run counter to the assumption in quantitative target based financial needs assessment that baseline remains firm (does not slide) and the need assessed is money required to close the gap for a given target.

The Net Present Value (NPV) of diverted forest land is calculated taking in to account economic valuation of ecosystem services

provided. When forests are diverted, a whole lot of benefits derived from forests in the form of ecosystem services are lost. The benefits from compensatory afforestation increase slowly and the rationale for NPV collection is to balance the uncompensated benefits.

The NPV estimation of different types of forest land was determined in 2008 based on report of an expert committee chaired by Dr. Kanchan Chopra which considered the following seven ecosystem services. The NPV was calculated as present value of the net flows accruing over 20 years at 5% social rate of discount.

- Timber
- Carbon Storage
- Fuel wood and Fodder
- NTFP
- Eco-tourism
- Watershed benefits
- Biodiversity

The committee arrived at NPV rates for different categories of forest land as the present value of uncompensated net flows of ecosystem services foregone by forest diversion over 20 years adopting a social discount rate of 5%. The Central Empowered Committee (CEC) suggested some modifications to account for carbon sequestration rather than carbon storage and also value of flagship species and bio-prospecting. The CEC's recommendations based on a social discount rate of 4% for six eco-classes and three canopy densities were accepted by the Supreme Court in 2008. The Supreme Court also directed that the rates should be revised after three years.

The work on revision of NPV rates was assigned to the Indian Institute of Forest Management (IIFM) by MoEFCC. The IIFM re-worked NPV rates taking in to account the following ecosystem services. The IIFM arrived at NPV rates for fourteen forest type groups across four canopy densities. Economic valuation of the following 12 ecosystem services were taken in to account in arriving at NPV rates.

- Bamboo
- Fodder
- Timber
- NWFP (Non–Wood Forest Produce)
- Carbon sequestration
- Fuel wood
- Bio-prospecting and gene-pool protection
- Pollination and dispersal
- Water recharge
- Soil conservation
- Water Purification
- Carbon storage

The IIFM report which included four scenarios, recommended adopting NPV rates based on forest type group specific rotation rates, a social discount rate of 4% and total economic value based on adjusting for double counting and simultaneous delivery of ecosystem services.

Further, over the years, experience with collection of monies against forest diversion has shown that NPV accounts for the bulk of resources deposited with CAMPA. Considering that NPV estimation is based on a detailed economic assessment of ecosystem services foregone over the life time of forests diverted, the CAMPA collections may be treated as revenues attributable to PES.

After accounting for wholesale price index rise, the rates proposed by IIFM, across the fourteen forest type groups and different canopy densities, represent an increase (except in one case) ranging from 4% to 263%. It is also seen that the increases proposed are much larger in percentage terms for very dense and moderately dense forests. Given that dense forests harbor rich biodiversity, the proposed revisions, when accepted would send a clear signal to those seeking high quality forest land to look seriously for alternate land wherever possible. It is therefore necessary to take an early decision in the matter as revision of NPV rates is long overdue in terms of directions of the Supreme Court.

The Compensatory Afforestation Fund Rules, 2018 provide as follows:

Not less than eighty per cent of the monies referred to in sub-rule (1) shall be used for following activities for the forest and wildlife management in a State, namely,

- assisted natural regeneration;
- artificial regeneration;
- silvicultural operations in forests;
- protection of plantations and forests;
- pest and disease control in forest;
- forest fire prevention and control operations;
- soil and moisture conservation works in the forest;
- voluntary relocation of villages from protected areas;
- improvement of wildlife habitat as provided in the approved wildlife management plan or working plan;
- planting and rejuvenation of forest cover on non-forest land falling in wildlife corridors;
- establishment, operation and maintenance of animal rescue centre and veterinary treatment facilities for wild animals;
- supply of wood-saving cooking appliances and other forest produce saving devices in forest fringe villages as specified by the National Authority from time to time;
- management of biological diversity and biological resource.

As stated above, 80% of amount collected on account of NPV which accounts for the major share of CAMPA revenues is required to be spent on forestry and wildlife and management of biological diversity. As revenues on account of NPV are in the nature of PES, it is only appropriate that the earmarking of funds for specific activities as above is targeted at compensating the loss to forest, wildlife and biodiversity that forest diversion causes. Hence, as pointed out earlier, in addition to serving as a deterrent against diversion of high-quality forest land wherever alternative sites are available, an early decision on revision of NPV rates would help recoup loss on account of ecosystem services quickly and fully. Continued diversion of forest land at rates fixed in 2008 would cause loss by way of under recovery.

4.13.5 PES Experience

There is limited experience available world-wide for implementation of PES. The following form part of 'Collection of Submissions on Innovative Finance Mechanisms' as brought out by the Secretariat of the CBD[39].

Table 4.13.5.1 :
Submissions on Innovative Finance Mechanisms by some countries as brought out by the Secretariat of the CBD

Country	Brief particulars of PES
France	Vittel, a natural mineral water selling company made arrangements to pay farmers owning farm land in the catchment areas of springs that the company was using to adopt eco-friendly farming practices to control content of nitrates and ensure zero pesticides in bottled water.
Bolivia	Property owners situated upstream in the Los Negros watershed participated in a scheme to protect the watershed forest. In return for payment in kind, the farmers were contractually required to practice sustainable forest management practices including a ban on tree cutting, hunting, etc.

[39] https://www.cbd.int/financial/doc/compilation-innovative-financial-mechanisms-2011-09-en.pdf

Country	Brief particulars of PES
Mexico*	To guarantee availability of water for Mexico City, landowners were paid money to protect their forests. To guarantee the financing of the operation, the government of the State of Mexico set up a tax on state water distribution companies, which have to give 3.5 % of their turnover to contribute to the PES program.
Costa Rica	Based on four ecosystem services, namely, climate change mitigation, biodiversity conservation, the protection of watersheds, and the conservation of the landscapes, since 1997, the PES program pays compensatory payments to more than 4400 farmers and forest owners to improve afforestation, sustainable management and forests protection.
Columbia	EU is funding a program to prevent deforestation and conservation of Columbian Amazon. The project will help ensure the conservation of the Amazon and the well-being of its peoples, through strengthening indigenous authorities' role in the creation and governance of adequate mechanisms to ensure a fair system of payments for their contribution to the maintenance of key ecosystem services.

* On the lines of the Mexico City PES program, a similar program to ensure availability of water to residents of Kohima, Nagaland has been under discussion.

In the Indian context, the often cited example is that of Kuhan village in Kangra District of Himachal Pradesh. The village realized that a check dam on a 'nullah' (water course) which brought huge irrigation benefits got silted within a year of its construction. The silt was from grazing land located upstream in Ooch village. Ooch banned grazing for eight years on its four-hectare common land and planted saplings of fruit, fodder bearing trees as well as bamboo and elephant grass. In exchange, Kuhan paid for the saplings and even worked out an arrangement to sell irrigation water to Ooch as and when required. The silt load in the 'nullah' reduced.

This is an example in which payment is made to compensate for opportunity cost of lost income. There is a corollary benefit in terms of soil conservation as well[40].

In terms of institutional and technical issues that need to be addressed in order to enable widespread use of PES as a market mechanism in India, the need for a strong institutional framework along with clarity in terms of property rights needs to be flagged[41]. Equally important is the need to undertake economic valuation of ecosystem services provided by different ecosystems on the lines of detailed evaluation carried out by IIFM in the case of forests so that the terms of agreement between the buyer and seller of ecosystem services could be determined on sound ecological and economic considerations.

4.14 Leveraging Fiscal Policy Instruments and User Charges

4.14.1 Policy Instruments for Biodiversity Conservation and Sustainable Use

Policy instruments fall in to three distinct domains[42].

- Regulatory Approaches (Command & Control)
- Economic Instruments
- Information and Voluntary Approaches

[40] http://www.ceecec.net/case-studies/payment-for-ecosystem-services-pes-in-india-from-the-bottom-up/

[41] http://lib.icimod.org/record/28910/files/16HAR.pdf

[42] https://www.oecd.org/environment/resources/Economic%20incentives%20and%20perverse%20subsidies_%20Biodiversity%20Mainstreaming%20workshop_Mexico.pdf

Regulatory approaches (command & Control)	Economic instruments	Information and Voluntary apporches
Restrictions or prohibitions on use	Price-based instruments - taxes, charge/fees, subsidies	Eco-labelling & certification
Access restrictions or prohibitition (e.g. protected area)	Reform of environmentally harmful subsidies	Green public procurement
Permits & quotas (e.g. logging / fishing)	Payments for Ecosystem Services	Voluntary approaches (negotiated agreements)
Quality, quantity, and design standards	Biodiversity offsets	Corporate environment accounting
Spatial planning	Tradable permits (e.g. ITQs for fisheries)	
	Liability instruments	

As stated above, no single policy approach or instrument could attempt to address all biodiversity threats in any country. A mix of instruments would be required to meet the complex objectives of biodiversity conservation. In the selection of mix of incentive measures, regulatory controls, etc, a large number of variables come into play specific to the country, location, and particular biodiversity problem. The effectiveness of a given instrument in addressing biodiversity issues will depend on legal, political, economic and physical landscape in a country.

This brings us to the specific Indian context.

4.14.2 Guidance contained in National Environment Policy (NEP)

The NEP, 2006 offers useful guidance on use of fiscal instruments and user charges in arresting degradation of environmental resources and also brings out the role of degradation in causing loss of livelihood of the poor dependent on such resources. The NEP observes as follows:

'Environmental degradation is a major causal factor in enhancing and perpetuating poverty, particularly among the rural poor, when such degradation impacts soil fertility, quantity and quality of water, air quality, forests, wildlife and fisheries. The dependence of the rural poor, in particular, tribal societies, on their natural resources, especially biodiversity, is self-evident.

The poor are also more vulnerable to loss of resilience in ecosystems. Large reductions in resilience may mean that the ecosystems, on which livelihoods are based, break down, causing distress. The loss of the environmental resource base can result in certain groups of people being made destitute, even if overall,the economy shows strong growth.

The degradation of land, through soil erosion, alkali-salinization, water logging, pollution, and reduction in organic matter content has several proximate and underlying causes. The proximate causes include loss of forest and tree cover (leading to erosion by surface water run-off and winds), unsustainable grazing, excessive use of irrigation (in many cases without proper drainage, leading to leaching of sodium and potassium salts), improper use of agricultural chemicals (leading to accumulation of toxic chemicals in the soil), diversion of animal wastes for domestic fuel (leading to reduction in soil nitrogen and organic matter), and disposal of industrial and domestic wastes on productive land.

These proximate causes of land degradation in turn, are driven by implicit and explicit subsidies for water, power, fertilizer and pesticides. Grazing lands are usually common property resources, and insufficient

empowerment of local institutions for their management leads to overexploitation of the biomass base.

The direct causes of river degradation are, in turn, linked to several policies and regulatory regimes. *These include tariff policies for irrigation systems and industrial use, which, through inadequate cost recovery, provide incentives for overuse near the head works of irrigation systems, and drying up of irrigation systems at the tail-ends.* This results in excessive cultivation of water intensive crops near the head works, which may lead to inefficient water use, water logging and soil salinity and alkalinity. The irrigation tariffs also do not yield resources for proper maintenance of irrigation systems, leading to loss in their potential. In particular, resources are generally not available for lining irrigation canals to prevent seepage loss. These factors result in reduced flows in the rivers. *Pollution loads are similarly linked to pricing policies leading to inefficient use of agricultural chemicals, and municipal and industrial water use.* In particular, revenue yields for the latter two are insufficient to install and maintain sewage and effluent treatment plants, respectively.

The direct causes of groundwater depletion have their origin in the pricing policies for electricity and diesel. In the case of electricity, wherever individual metering is not practiced, a flat charge for electricity connections makes the marginal cost of electricity effectively zero. Subsidies for diesel also reduce the marginal cost of extraction to well below the efficient level.

Support prices for several water intensive crops with implicit price subsidies aggravate this outcome by strengthening incentives to take up these crops rather than less water intensive ones. In coastal areas, this overexploitation and inadequate recharge of ground water may also cause serious problem of saline ingress, leading to adverse health impacts and loss of land productivity.'

As seen from the above, environmental degradation by way of degradation of ecosystems such as land, groundwater and surface water resources, etc are often traceable to inadequate pricing of water and power through implicit subsidies which provide incentives for unsustainable use of these resources. Possible solutions would be examined subsequently taking cue from West Bengal's lead in pricing these inputs at near commercial levels.

4.14.3 Case for this Finance Solution

In general, prevention of biodiversity loss is likely to be more effective and less expensive than last minute cure via rehabilitation or reclamation. The NEP provides specific instances with regard to pricing of irrigation water, access to sanitation, rural electricity tariff and pricing of diesel used in pump sets to extract groundwater. These issues have received attention over the years, for example, in terms of reform requirements such as enhancing user changes, etc to be met to access funds from Central Government. programs such as Jawahar Lal Nehru National Urban Renewal Mission(JNNURM) or externally aided projects such as those funded by the World Bank. While the under recovery on supply of these inputs is very substantial and public utilities continue to incur losses, pricing issues are complex and not amenable to simplistic solutions given socio-political sensitivities involved. The following may be noted[43].

- The power sector subsidies exceed 1% of GDP in India whereas drinking water subsidies account for about 0.5% of GDP
- For water supply, average water metering was about 62% in large cities and 50% in smaller cities
- In terms of cross subsidies between customer classes, a study of 23 metropolitan cities found that industrial customers were charged 5.42 times the rate applicable to residential customers
- A study of domestic water supply in Dehradun found that 80% of the

[43] http://documents.worldbank.org/curated/en/606521468136796984/pdf/343340REPLACEM10082136342501PUBLIC1.pdf

customers were willing to pay more than the current tariff

Although the sensitivity of water and power pricing is well recognized, precarious situations call for bold decisions to save catastrophic outcomes. In this regard, the energy-irrigation nexus needs to be noted[44]. In India, during the last six decades, use of groundwater for irrigation has grown very rapidly and, as of 2009-10, accounted for more irrigated area than canal and tank irrigated areas put together. Arguably, the single most important factor behind this transition is the flat tariff and power subsidies provided to support groundwater use for irrigation. Given this energy-irrigation nexus, nine States, Haryana, Punjab, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, Maharashtra, Rajasthan and Tamil Nadu face a precarious groundwater situation. The situation is worsening every year as the number of electric pumps exceed the potential for such pumps except in Madhya Pradesh.

This clearly jeopardizes agriculture in these States and hence the need for bold pricing decisions.

An equally worrisome area is the failure of the Nutrient Based Subsidy (NBS) Policy introduced in 2010 to bring about balanced fertilization and thereby enhance agricultural productivity. The Comptroller and Auditor General (CAG) has criticized implementation of the policy[45]. The use of nitrogen-based fertilizers nearly doubled between 2009 and 2013, the CAG observed, adding that farmers preferred urea (containing nitrogen) because it was cheaper than phosphatic and potassic fertilizers.

The policy of freeing prices of phosphatic and potassic fertilizers, while retaining price control over urea, distorted the consumption equilibrium. While the price of urea increased by only 1% between 2010-11 and 2013-14, the price of phosphatic and potassic fertilizers increased between 104% and 251%, the CAG report said.

"It was natural for farmers to substitute urea for P and K fertilizers, which resulted in a skewed consumption. Such a practice had an adverse effect on soil fertility. Thus, NBS policy did not promote balanced fertilization," the CAG report noted.

Quit clearly, current pricing of urea which is heavily subsidized lies at the root of the problem. It is therefore essential that the NBS policy is reviewed to prevent further degradation of soil health by promoting balanced fertilization.

As of 2016-17, the fertilizer subsidy was about Rs.70,000 Crore. amounting to 0.51% of the GDP[46].

Considering that power sector (1%), drinking water (0.5%) and fertilizer (0.5%) subsidies account for about 2% of the GDP, the total financial outgo on account of these major subsidies with significant consequences for biodiversity is about Rs. 280,000 Crore.

4.14.4 The West Bengal Example

A distinctly different power regime is found in West Bengal which has metered all its tube wells and now charges farmers at near-commercial rates, and offers them good quality power round the clock. There is no subsidy on agricultural power in West Bengal. The West Bengal strategy is a textbook economics solution which it was able to apply due to three reasons unique to socio-ecology and polity of the state. First, it has a small number of electric tube wells and the owners were unable to organize themselves

[44] http://www.iwmi.cgiar.org/iwmi-tata/PDFs/2012_Highlight-36.pdf

[45] https://www.livemint.com/Politics/PWIOaRAX3aXtLVsjK9exsN/CAG-slams-nutrientbased-subsidy-policy-for-fertilizers.html

[46] https://www.researchgate.net/publication/326677482_Fertiliser_Subsidy_in_India_Issues_for_reforms

as a vote bank unlike in other States. Further, the tariffs were already high in West Bengal which made the transition to near commercial rates less difficult. Also, the State had the advantage of shallow groundwater aquifers which made diesel pumps a viable option in the face of high power tariffs. Applying the West Bengal strategy to all states of India would reduce farm power subsidies, and halt groundwater depletion. However, in the short run, the solution would impose serious collateral damage and it is unlikely to be politically acceptable. With regard to other States, it is therefore, necessary to suitably modify this approach in conjunction with other initiatives such as efficient irrigation technologies, community management of groundwater as in Andhra Pradesh and aquifer recharge, weaning farmers away from water intensive crops such as paddy through diversification, better on-farm management practices such as mulching, zero tillage, etc.

4.14.5 Goods and Services Tax (GST) as a consolidated tax

GST is a consolidated form of indirect tax and has subsumed a plethora of cesses levied at the Central and State levels. The subsumed taxes/cess/duties include the following levied by the Central Government which prior to introduction of GST had been a resource of revenue to fund various environment sector initiatives such as promoting renewable energy and pollution abatement including rejuvenation of river Ganga.

- The Water (Prevention and Control of Pollution) Cess Act 1977 – Cess levied on Water consumed by certain industries and by local authorities
- Clean Energy Cess
- Swachh Bharat Cess

Given that GST has successfully simplified the indirect tax regime at Central and State levels, it is not clear if there is any likelihood of these environment related taxes/cess being brought back either at the Central or State levels in some form. It is therefore deemed not necessary to dig further in to these erstwhile sources of finance as a means of biodiversity financing.

4.14.6 Gate Receipts of PAs

As observed earlier, tourist interest is primarily focused on iconic and charismatic mega fauna such as tiger, lion and rhino. PAs which harbor these animals have a distinct advantage over others in terms of tourist footfalls and gate collections. Data on gate collections of the most visited tiger reserves is given below.

Table 4.14.6
Five Year Average (up to 2016-17) Tourism figures for India's most highly visited Tiger Reserves

Tiger Reserve	Average no. of tourists	Average annual Revenue (Rs. Cr.)	Percentage of Foreign Tourists	Percentage of Domestic Tourists
Kanha	1,00,000	2.4	10	90
Corbett	1,90,000	4.5	7	93
Tadoba Andheri	75,000	1		
Ranthambore	2,60,000	6.2	50	50
Bandavgarh	1,20,000	2.9	40	60
Periyar	4,00,000	4	8	92

Source: Personal Communication from Sanjay Kumar, formerly with NTCA, based on data compiled by NTCA

It is therefore seen that, while gate receipts from eco-tourism for a few tiger reserves could be substantial, even for other tiger reserves, it is not so. In any case, it is difficult to imagine such receipts playing a role in developing eco-tourism related infrastructure including regional connectivity, accommodation to suit the not so rich tourists, etc. Further, PAs that do not harbor iconic species will have insignificant gate receipts. It is therefore necessary to get tourism industry to contribute to the development of eco-tourism including essential infrastructure and also to generate resources for management of all PAs, particularly, those do not attract tourists, as envisaged under 'Conservation Fund'.

4.15 Projected Resource Gap taking proposed Finance Solutions in to account

In future revisions of BFP, quantitative targets based assessment could be extended to more areas as more targets and baselines become available. Management of Protected Areas and Management of Invasive Alien Species are two important areas to work on urgently, as already stated.

Like-wise, quantification of likely contribution from identified finance solutions has not been possible in all cases due to data limitations. Data availability would improve as some of the identified solutions get underway. At his stage, it would be worthwhile to take stock of contribution from finance solutions wherever available, compare with resource gap between financial needs and public finance expected to be available for the period 2017-18 to 2021-22. This leads us to the following.

Table 4.15.1
Expected annual contribution from proposed Finance Solutions (Rs. Crore., appropriately rounded off)

Augmenting Public Finance	Mainstreaming	CSR	Ecological Fiscal Transfer	ABS	Total
1,300	8,700	1,300	7,000	1,500	19,800

It may be observed that, except, CSR, the rest fall under Public Finance.

Table 4.15.2 :
Annual average Financial Needs during 2017-18 to 2021-22 versus Availability (Public Finance plus proposed Finance Solutions) in Rs. Crore. (appropriately rounded off)

FNA	BER (Central)	BER (States)	Total Public Finance	Total expected funds from Finance Solutions	Total availability of funds	Gap in resources
1,15,970	39,200	30,900	70,100	19,800	89,900	26,070, say, 26,100

From Tables 4.15.1 and 4.15.2, it is clear that, both in terms of contribution by way of projected biodiversity attributable expenditure from Central and State Budgets as well as through the proposed Finance Solutions, Public Finance will continue to be the principal source of finance. The challenge is to get private sector play a significant role. Public Private Partnership, with a small role in biodiversity finance landscape at present, represents one major avenue which needs to be explored further.

4.16 Way Forward

The annual resource gap of about Rs. 26,100 Crore would get revised as more and more activities/areas get covered under quantitative needs assessment and contribution from the remaining seven finance solutions also becomes available. The way forward is to move towards activity specific resource gaps to plan further course of action. Needs assessment for specific activities based on quantitative targets and baselines is a step in this direction. Further, activity specific contribution from Public Finance at the Central and State levels would need to be assessed. Also, contribution from each of the finance solutions will need to be assessed activity-wise.

The Biodiversity Finance Plan, working document, therefore, needs to be treated as a living document. In fact, getting greater clarity on financial needs activity-wise and the corresponding activity specific contribution from projected public finance (Centre and States) as well as from finance solutions is as important as working on each of the finance solutions.

Annexes

1. IMPORTANT WEB LINKS

- https://www.cbd.int/doc/bioday/2008/ibd-2008-booklet-en.pdf
- https://www.researchgate.net/publication/239599293_Agro-biodiversity_The_future_of_India's_agriculture
- https://www.apn-gcr.org/resources/files/original/0ea8b42961e6a5efbede3b81e11793dd.pdf
- http://www.planningcommission.nic.in/reports/genrep/bkpap2020/24_bg2020.pdf
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- https://www.researchgate.net/publication/279558821_Eroding_traditional_crop_diversity_imperils_the_sustainability_of_agricultural_systems_in_Central_Himalaya
- https://ageconsearch.umn.edu/bitstream/230050/1/09-Alka%20Singh.pdf
- https://www.cbd.int/financial/fiscalenviron/g-fiscalincentivesagrobio-gtz.pdf
- https://www.researchgate.net/publication/319184135_Agrobiodiversity_in_India_Status_and_Concerns
- http://moef.gov.in/
- http://nbaindia.org/

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3. List of central line Ministries/Departments consulted on the Biodiversity Finance Plan-Working document

- Ministry of Agriculture & Farmers Welfare, Department of Animal Husbandry, Dairying and Fisheries,
- Ministry of Agriculture & Farmers' Welfare, Department of Agriculture Cooperation and Farmers Welfare
- Ministry of Agriculture& Farmers' Welfare, Department of Agricultural Research and Education,
- Ministry of AYUSH
- Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals
- Ministry of Coal
- Ministry of Commerce & Industry
- Ministry of Culture
- Ministry of Development of North Eastern Region
- Ministry of Drinking Water and Sanitation
- Ministry of Ministry of Earth Sciences
- Ministry of Electronics & Information Technology
- Ministry of Home Affairs, Department of Home
- Ministry of Housing and Urban Affairs
- Ministry of Human Resource Development, Department of Higher Education
- Ministry of New and Renewable Energy
- Ministry of Power
- Ministry of Rural Development
- Ministry of Tourism
- Ministry of Tribal Affairs
- Ministry of Water Resources, River Development and Ganga Rejuvenation
- National Institution for Transforming India (NITI Aayog)
- Department of Space
- Department of Science and Technology
- Department of Atomic Energy

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Glimpses of few key events and consultations –BIOFIN India

About MoEFCC

The Ministry of Environment, forest and Climate Change (MoEFCC, http://envfor.nic.in) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes. The primary concerns of the Ministry are implementation of policies and programmes relating to conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals, and the preservation and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being.

About NBA

The National Biodiversity Authority (NBA, www.nbaindia.org) was established in 2003 to implement India's Biological Diversity Act (2002). The NBA is a statutory, autonomous body and it performs facilitative, regulatory and advisory function for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.

About UNDP

UNDP (http://www.in.undp.org/) partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves everyone's quality of life. On the ground in nearly 170 countries and territories, UNDP offer global perspective and local insight to help empower lives and build resilient nations. The objective of UNDP's biodiversity work is maintaining and enhancing the beneficial services provided by natural ecosystems in order to secure livelihoods, health and food security and reduce vulnerability to climate change.

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