Mapping National and International Flow of Funds for Conservation of Biodiversity with Special Focus on Maharashtra Province in India

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List of Acronyms

AAAD	Aid Accounts and Audits Division
ACA	Additional Central Assistance
ATREE	Ashoka Trust for Research in Ecology and the Environment
BCSD	Business Council for Sustainable Development
BD	Biodiversity
BDA	Bilateral Development Assistance
BEAG	Bombay Environmental Action Group
BIA	Biodiversity Impact Assessment
BIOFIN	Biodiversity Finance Initiative
BNHS	Bombay Natural History Society
BOD	Biochemical Oxygen Demand
BRR	Business Responsibility Report
CAGR	Compound Annual Growth Rate
CAMPA	Compensatory Afforestation Management and Planning Authority
CBD	Convention on Biological Diversity
CBI	Central Bureau of Investigation
CDM	Clean Development Mechanism
CEA	Classification of Environmental Activities
CEPA	Classification of Environmental Protection Activities
CEPF	Critical Ecosystem Partnership Fund
CGWB	Central Ground Water Board
CIFRI	Central Inland Fisheries Research Institute
CII	Confederation of Indian Industries
CMZ	Coastal Management Zone
CPCB	Central Pollution Control Board
CPSE	Central Public Sector Undertakings
CR	Critically Endangered
CRS	Creditor Reporting System
CRZ	Coastal Regulation Zone
CS	Central Sector Schemes
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
CSS	Centrally Sponsored Schemes
CTARA - IITB	Centre for Technology Alternatives for Rural Areas - Indian Institute of Technology, Bombay
CWRA	Central Wetland Regulatory Authority
CZMA	Coastal Zone Management Authority
DAC	Development Assistance Committee
DAHDF	Department of Animal Husbandry Dairying & Fisheries
DD	Data deficient
DEA	Department of Economic Affairs

DM	District Magistrate
DoF	Department of Forests
DPC	District Planning Committee
DPE	Department of Public Enterprises
EAP	Externally Aided Projects
EBSAs	Ecologically or Biologically Significant Marine Areas
EEA	European Environment Agency
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EN	Endangered
ENVIS	Environmental Information System
EPA	Environmental Protection Agency
ESA	Ecologically sensitive Area
EW	Extinct in Wild
EX	Extinct
FC	Finance Commission
FCA	Forest (Conservation) Act, 1980
FDA	Forest Development Agency
FDCM	Forest Development Corporation of Maharashtra
FICCI	Federation of Indian Chambers of Commerce and Industry
FRA	Forest Rights Act, 2006
FSI	Forest Survey of India
FSI	Forest Survey of India
FY	Financial Year
GDP	Gross Domestic Product
GIB	Great Indian Bustards
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoI	Government of India
GRI	Global Reporting Initiative
GSDA	Groundwater Surveys Development Authority
GSDP	Gross State Domestic Product
HC	High Court
HTL	High Tide Line
ICFRE	Indian Council of Forestry Research and Education
ICMBAs	Important Coastal and Marine Biodiversity Areas
INR	Indian Rupee
ISFR	India State of Forest Report
IUCN	International Union for Conservation of Nature
IWMP	Integrated Watershed Management Plan
JFMC	Joint Forest Management Committee
LC	Least Concerned
LTL	Low Tide Line

MCA	Ministry of Corporate Affairs
MDF	Moderately Dense Forest
MEE	Management Effectiveness evaluation
MFD	Maharashtra Forest
MGREGA	Mahatma Gandhi National Rural Employment Generation Act
MLD	Million litres per Day
MMBCF	Mangrove & Marine Biodiversity Conservation Foundation
MMCU	Mumbai Mangrove Conservation Unit
MMFRA	Maharashtra Marine Fishing Regulation Act , 1981
MNRE	Ministry of New and Renewable Energy
MoDONER	Ministry of Development of North East Region
MoEF&CC	Ministry of Environment, Forests & Climate Change
MoF	Ministry of Finance
MoH&FW	Ministry of Health & Family Welfare
MoRD	Ministry of Rural Development
MoTA	Ministry of Tribal Affairs
MoUD	Ministry of Urban Development
MoWR	Ministry of Water Resources
MPCB	Maharashtra Pollution Control Board
MPDA	Maharashtra Prevention of Dangerous Activities Act, 1981
MSAAPCC	Maharashtra State Adaptation Action Plan on Climate Change
MSBB	Maharashtra State Biodiversity Board
MWRRA	Maharashtra Water Resources Regulatory Authority
NAEB	National Afforestation and Eco-Development Board (NAEB)
NAP	National Afforestation Program
NBA	National Biodiversity Authority
NBAP	National Biodiversity Action Plan
NBB	National Biodiversity Board
NCA	Normal Central Assistance
NGO	Non-Governmental Organizations
NGT	National Green Tribunal
NIPFP	National Institute of Public Finance & Policy
NLCP	National Lake Conservation Program
NPCA	National Program on Conservation of Aquatic Ecosystems
NPV	Net Present Value
NRCD	National River Conservation Directorate
NRHM	National Rural Health Mission
NRU	Natural Resource Use
NT	Near Threatened
NTFP	Non Timber Forest Products
NVG	National Voluntary Guidelines
NWCP	National Wetland Conservation Program

NWP	National Water Policy
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OF	Open Forest
PA	Protected Area
PBT	Profit Before Tax
PES	Payment for Ecosystem Services
PESA	Panchayat (Extension to Scheduled Areas) Act, 1996
PFMS	Public Finance Management Systems
PwC	PricewaterhouseCoopers
RBI	Reserve Bank of India
RE	Revised Estimate
RSPM	Respirable Suspended Particulate Matter
SACON	Salim Ali Centre for Ornithology and Natural History
SCA	Special Central Assistance
SCOPE	Standing Conference of Public Enterprises
SEBI	Securities and Exchange Board of India
SFD	Social Forestry Directorate
SSA	Sarva Shiksha Abhiyaan
TEEB	The Economics of Environment and Biodiversity
TERI	The Energy and Resources Institute
UNDP	United Nations Development Program
USD	United States Dollar
VDF	Very Dense Forest
VME	Vulnerable Marine Ecosystems
VU	Vulnerable
WII	Wildlife Institute of India

Chapter 1

Background, Objectives and Approach of the Study

1 Introduction

The decisions adopted by the Parties to the Convention on Biological Diversity (CBD) indicate that a significant gap remains in finance for biodiversity management, so as to achieve the 20 Aichi Targets defined in the CBD's Strategic Plan for 2011-2020. A preliminary assessment conducted by the High-level Panel on Global Assessment of Resources for Implementing the CBD Strategic Plan, estimated the global investment requirement to be ranging between 130 and 440 billion USD annually. While useful, this and similar other global estimates are based on extrapolations sensitive to the underlying assumptions.

To estimate biodiversity finance needs and gaps with greater precision and determine related challenges and opportunities for resource mobilization, the detailed national-level assessments are required. In this context, United Nations Development Program (UNDP) has launched the Biodiversity Finance Initiative (BIOFIN), as a new global partnership seeking to address the biodiversity finance challenge in a comprehensive manner[1]. Under this global program the India BIOFIN study is being conducted.

2 Objectives of the Study

In India BIOFIN is anchored at the Ministry of Environment, Forests & Climate Change (MoEF&CC) with project management support, among others, from UNDP. This study report is a part of the overall BIOFIN study in India. The main objectives of the study as per the terms of reference for the National Institute of Public Finance & Policy (NIPFP) are:

i. Appraisal of relevant programs at the state level corresponding to BIOFIN Workbook 1A and 1B in Maharashtra.
ii. Analysis of public expenditure on biodiversity conservation in the pilot state-Maharashtra.
iii. Assessment of expenditure on biodiversity conservation at the central level by central public sector enterprises.
iv. Assessment of expenditure on biodiversity conservation at the central level by civil society organizations.
v. Assessment of international funds flow in India for conservation of biodiversity.

[1] http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/projects_and_initiatives/biodiversity-finance-initiative.html July 16/2015

3 Approach and Methodology of the Study

While the approach and basic methodology for the India BIOFIN study, including this study, is inspired by the global BIOFIN approach and methodology (BIOFIN Workbook)[2], for basic concepts, definitions and scope of biodiversity conservation, management, restoration, and protection etc. we have followed CBD decisions and technical documents[3] and the National Biodiversity Action Plan (NBAP)[4] of India. Methodology and data sources pertaining to each objective of the study is discussed in detail in relevant chapters. However, it is important to mention here that as this assessment of expenditure on biodiversity conservation is the first exercise of its kind in India, generation of biodiversity-disaggregated data from the existing budgetary statistics and other sources itself posed a considerable challenge which, in turn, contributed a great deal in shaping the approach and methodology of this study.

[2] https://www.cbd.int/doc/meetings/fin/rmws-2014-02/other/rmws-2014-02-tbf-workbook-en.pdf and http://www.biodiversityfinance.net/sites/default/files/uploads/documents/biofin_workbook_final.pdf

[3] https://www.cbd.int/convention/text/

[4] https://www.cbd.int/doc/world/in/in-nbsap-v3-en.pdf

Chapter 2

Mapping Domestic Public Expenditure for Biodiversity Conservation in Maharashtra

1. Domestic public sources of funds for biodiversity conservation in Maharashtra

Domestic public sources of funds for biodiversity conservation in Maharashtra primarily comprise:

i. Funds from Central Government through its various Ministries and Institutions.

ii. Funds spent by Government of Maharashtra through its line departments and various institutions.

Other sources of public funds are grants from the Union Finance Commission and Compensatory Afforestation Fund Management and Planning Authority (CAMPA) Funds.

2. Methodology for determining biodiversity relevant flow of funds in Maharashtra

This can be approached in, at least, the following two ways:

a) Tracking flows through schemes, activities, and programs contributing to biodiversity conservation (hereafter referred to as, biodiversity relevant programs/activities/schemes);

b) Tracking flows through institutions specifically set up or principally involved in conservation of biodiversity.

In India, a preliminary exploration of available information shows that a large number of biodiversity relevant schemes and programs (e.g. promotion of organic agriculture, soil and water conservation, control of invasive species, etc.) are being implemented by the ministries and departments other than the key environment ministry, MoEF&CC, and related institutions. It was also seen that many schemes, although, not intended for biodiversity conservation have components promoting (directly or indirectly) biodiversity conservation. In view of this it was decided to map the flow of funds for biodiversity through schemes and programs focused on biodiversity conservation and also through those schemes/programs that have components of biodiversity conservation while keeping a track of the ministry/department implementing these (this can potentially provide important insights into the extent of sectoral contribution /sectoral mainstreaming of biodiversity).

2.1 Central Government Funds to Maharashtra

Step 1: Identifying biodiversity relevant schemes

Central Government funds flowing to Maharashtra can be in the form of Centrally Sponsored Schemes (CSS), Central Sector Schemes (CS), Normal Central Assistance (NCA), Additional Central Assistance (ACA), and Special Central Assistance (SCA) on the plan side and various non-plan grants from various central ministries. Some of these schemes could be fully funded by the Centre while others would require the State Government to contribute its share. The share of State Government is not uniform and varies across schemes. For a scheme the state share could change across years.

We reviewed the guidelines of each of these schemes in detail and identified schemes that had activities/components directly or indirectly relevant for biodiversity conservation.

Step 2: Compiling data on annual expenditure

Since data relating to expenditures by Maharashtra under central schemes is not readily available, we have used data on scheme wise releases by Central Government to Maharashtra as a proxy to expenditures. It is assumed that the funds once released by the Central Government will be spent by the State Government. If the state is not able to spend these funds releases of subsequent instalments will be adjusted/stopped. Thus releases in a way represent a close proxy of expenditures.

Further, since expenditure on central government schemes is not available disaggregated at the state level, the central Ministry of Finance (MoF) was approached for the data on releases to Maharashtra (only the share of Central Government) under the identified schemes for the period FY 2009-10 to 2015-16.

The relevant line departments of Government of Maharashtra were requested to vet the data received from MoF and also provide data pertaining to State Government's share in each of the identified schemes for the study period (2009-10 to 2015-16). This was done both through exchange of data sheets and holding in-person discussions with each of the relevant line department in Maharashtra.

2.2 Maharashtra State Funds

Step 1: Identifying biodiversity relevant schemes

In addition to the Central fund flows to Maharashtra, the State government has a number of schemes funded from the Consolidated Fund of the State. List of such schemes was obtained from the Annual Plan Document and Budget documents of the Government of Maharashtra. Using the scheme specific guidelines, which were obtained from various sources, we reviewed the entire list of schemes that are fully funded from the Consolidated Fund of Maharashtra and identified the schemes that had activities/components directly or indirectly relevant for biodiversity conservation.

Step 2: Compiling data on annual expenditure

Having identified the schemes, actual expenditure under the identified schemes was compiled from the Budget documents of Maharashtra for FY 2009-10 to 2014-15 and Revised Estimates (RE) for FY 2015-16.[5]. For each scheme, budget codes for the major head, sub-major head, and minor head along with the scheme code have been recorded for easy tracking of the scheme as well as sectoral and ministry-wise analysis of expenditure.

2.3 District[6] Level Funds Flow

District Planning Committee (DPC) is created, as per article 243ZD of the Constitution of India, at the district level for planning at the district and below. The DPC in each district prepares a development plan for the district by consolidating the plans prepared by the local bodies (both rural and urban) in the district.

The district development plan is financed by resources from different sources including District Plans of the State Government, CSS and other Central Government Schemes/ Programs such as Mahatma Gandhi National Rural Employment Generation Scheme (for employment generation and asset creation), Sarva Shiksha Abhiyaan (for elementary and primary education), Rural Health Mission (for health) etc. In addition to Central funds there are scheme specific State funds which are directed to districts.

In this study two districts were selected in Maharashtra namely, Ratnagiri and Chandrapur. For the selected districts, District Planning Department provided details of schemes operational in their respective districts. These schemes were District Plan Schemes and are in addition to the State and Central schemes in operation in the two districts. The biodiversity relevant schemes were identified in consultation with the district officials, using scheme specific guidelines. The expenditure data for district schemes are also for the FY 2009-10 to 2015-16 and follows the same format as in the case of Central and State Government schemes. District level data has been collected through published sources as well as through survey and in-person meetings with the relevant officials.

Besides mapping the biodiversity relevant expenditure at the district level, the district level analysis had two other objectives:

(i) To compile data on biodiversity conservation from own sources of revenue of the district.

[5] The Actual expenditure data are reported in the Budget with a lag of two years. The 2016-17 Budget provides actual data for 2014-15, revised estimates for 2015-16 and Budgeted or Budget Estimates for 2016-17. The Actual Expenditure for 2014-15 and Revised Estimate for 2015-16 was taken from the 2016-17 budget of Maharashtra which was presented in the State Legislature in March 2016.

[6] Districts are local administrative units. They form the tier of local government immediately below that of subnational states in India.

(ii) To get detailed information on component/activity-wise expenditure for various programs/schemes having multiple objectives. This information will be used in estimating the proportion of attributable expenditure towards biodiversity.

In selecting Central, State and District Schemes utmost care was taken to ensure that there is no double counting of expenditure under schemes. For example, if a Central/State scheme is operational in the selected districts we have not considered it in the district expenditure.

It is important to note that some Central government funds routed directly through its institutions (E.g. National Rainfed Authority) and not through State Budget of Maharashtra, are not captured in this study.

2.4 Grants from Union Finance Commissions[7]

Recognizing the special role of forest wealth, the 12th Finance Commission of India (recommendations covered five-year period from 1 April, 2005 to 31 March, 2010) for the first time provided a 'forest grant' of Rs. 1000 crore to states. This was distributed between states in accordance with the forest share (acreage) of the states in the country.

The 13th Finance Commission of India (recommendations covered five-year period from 1 April, 2010 to 31 March, 2015) recognizing that forests provide a wide variety of services, provided a Forest Grant of Rs. 5000 crore to states. The forest grant was calibrated to the extent of standing forest (stock) in each state. The Commission acknowledged in its report that there is a vital need to carry this grant forward.

The 14th Finance Commission has given states a great incentive to maintain forests. The Commission has included forest-based awards to states within the Central Government's divisible tax pool. A state's forest cover would be given a weight of 7.5 percent in the formula. This would ensure that the forest and thus the environment does not remain a peripheral issue. This forest-based award has been decided on the basis of a state's forest cover in 2013. Thus, unlike awards of the previous Finance Commissions which recommended Forest Grants, the current Finance Commission instead of recommending a separate Forest Grant included forests as one of the indicators while deriving horizontal distribution of its recommended transfers. It would be interesting to see how the State Governments would react to this innovative step of the Finance Commission. Will there be an increase in expenditure for forest conservation or otherwise?

Since the data on biodiversity relevant expenditures is for the period 2009-10 to 2015-16 we have, for 2009-10 taken Forest Grants data for Maharashtra as released by MoF on the recommendation of the 12th Finance Commission. For the years 2010-11 to

[7] The Union Finance Commission is constituted by the President under article 280 of the Constitution, mainly to give its recommendations on distribution of tax revenues between the central governments and the States and amongst the States themselves. http://fincomindia.nic.in/

2014-15 we have taken Forest Grants released as per the recommendations of the 13th Finance Commission. Since 14th Finance Commission did not provide Forest Grant, there were no releases for 2016-17.

2.5 Compensatory Afforestation Fund Management and Planning Authority (CAMPA) Funds

The Forest (Conservation) Act, 1980 (FCA) requires that when forest land is 'diverted' for non-forest use, the user agency must undertake compensatory afforestation[8] on non-forest land equal to the size of the forest being 'diverted'. The basic principle here is that since forests are an important natural resource and render a variety of ecological services, they must not be destroyed. However, when because of development or industrial requirements, forests are required to be diverted for non-forest purposes, non-forested land must be afforested in equal proportion.

However, since afforested land takes a long time to become a forest - to compensate for the loss in the interim, the law requires that the Net Present Value (NPV) of the diverted forest be calculated for a period of 50 years, and recovered from the user agency that is diverting the forests. An Expert Committee set up by the Central Government periodically calculates the NPV for various types of forest. Currently, the NPV ranges from Rs. 4.38 lakh per hectare in case of poor quality forests to Rs. 10.43 lakh/ha for very dense forests. The Expert Committee has recently recommended that the NPV be revised to Rs. 5.65 lakh and Rs. 55.55 lakh respectively.

These payments flow into a fund which is maintained and managed by the Compensatory Afforestation Fund Management and Planning Authority (CAMPA). There was until recently in place, an ad hoc CAMPA[9] which had been authorized to release about Rs. 100 crore annually to the respective states. The principle of allocation to states is in accordance with the jurisdiction in which the diversion of forest land took place. Releases to Maharashtra under CAMPA for FY 2009-10 to 2013-14 have been collected from the CAMPA website.[10] CAMPA data for Maharashtra is not available for FY 2014-15 and 2015-16.

2.6 Grants from National Biodiversity Authority (NBA) to Maharashtra State Biodiversity Board (MSBB)

[8] User agencies, which are often private parties, are not expected to undertake afforestation work themselves. This work has to be done by the state government. But the entire expenditure to be incurred on creating this new 'forest', including purchase of land for the purpose, has to be borne by the user. The state government eventually has to transfer this land to the forest department for maintenance and management.

[9] Compensatory Afforestation Fund (CAF) Bill has been passed by Indian Parliament in August 2016. The CAF Bill proposes to set up the CAMPA that will administer an accumulated corpus that has, over the years, collected money from several projects that have diverted forest land for infrastructure development projects. The money would be used to regenerate forest and specific conservation activities.

[10] Website for CAMPA funds received by states: http://egreenwatch.nic.in/

The Government of Maharashtra established the State Biodiversity Board (MSBB) for the conservation and regulation of biological resources in the state on 2 January, 2012. The MSBB receives grants from the National Biodiversity Authority (NBA) to carry out its mandate. From the information provided in MSBB's annual reports and based on discussions with them we find that these grants are spent for biodiversity related activities. We have considered these grants as part of total expenditures in Maharashtra.

3. Methodology for Determining Expenditure Attributable to Biodiversity Conservation in Maharashtra

Having mapped and collected data pertaining to releases of Central funds to Maharashtra and State's share in such funds, State scheme funds, and other fund flows to Maharashtra that have biodiversity relevant component, the next step is to determine the proportion of expenditure under each of the identified schemes/programs/sources which would be attributed to biodiversity conservation. This involves the following steps:

(i) The first step in determining biodiversity-relevant fund flows is to define the scope of biodiversity-related activities. While the definition and scope of biological diversity used here is as provided by the CBD, the scope of biodiversity related activities is inspired by the National Biodiversity Action Plan (NBAP) of India, BIOFIN Workbook, and the existing literature on classification of activities (e.g., Classification of Environmental Protection Activities and Expenditure (CEPA); the Classification of Environmental Activities (CEA); and BIOFIN classification) on this issue. The CBD defines biological diversity as "…the variability among living organisms and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems[11]."

(ii) The relevance or significance of the identified schemes with respect to their impact on biodiversity is not same; and may vary significantly. Some schemes may have a direct bearing on biodiversity while others may indirectly impact it. Conceptualization on schemes' relevance (in terms of impact on biodiversity conservation) in this study is guided by the existing methodologies (e.g., work of OECD on the Rio markers) and consultations with those involved in the design and implementation of schemes both at the national and sub-national levels in India including consultations with government officials at the state and district level.

We approach this issue by defining 'tiers' of relevance into Direct (where the 'primary' purpose of the scheme/activity is biodiversity conservation) and Indirect (when conservation of biodiversity is not primary but a 'significant' objective)[12]. The tier 'Indirect' comprises activities that are relevant for biodiversity but not as a primary purpose. A range of activities can be listed in this tier e.g. promotion of

[11] https://www.cbd.int/convention/text/

[12] This is consistent with the approach used in existing methodologies.

organic farming, sustainable fisheries, biodiversity and ecosystems related data management, pollution control, watershed management etc. However, contribution of all these activities to biodiversity is not the same. To reflect their varied levels of contribution the 'indirect' tier has been classified into: Indirect High, Indirect Medium, and Indirect Low (see Table 1).

(iii) While expenditure on schemes/activities classified as 'Direct' is conceptualized to be fully attributed to biodiversity, a system for attribution (coefficients/ proportion of expenditure attributable to biodiversity conservation) of expenditure of schemes/activities under the tier 'Indirect' would need to be established. This study uses 3 scenarios in computation of biodiversity attributable expenditures (see Table 1).

While scenarios 1 and 2 are self-explanatory, scenario 3 is conceptualized as follows. One of the key issues in determining the expenditure attributable to biodiversity is to minimize the error or improve the accuracy of the estimate. We propose to do this by (a) using activity-wise expenditure for some of the big ticket programs like Integrated Watershed Management Program (IWMP), Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGA) etc. and (b) compiling activity-wise expenditure for district level schemes in the pilot districts of Ratnagiri and Chandrapur.

In scenario 1, for schemes where the primary objective is biodiversity conservation and which have direct relevance to biodiversity we have considered their entire expenditure to be for biodiversity conservation or biodiversity related activities. For schemes whose relevance with respect to biodiversity is Indirect High, only 50 percent of expenditures under these schemes are considered towards biodiversity. Similarly, for schemes whose relevance is Indirect Medium and Indirect Low we consider only 25 percent and 2.5 percent of their expenditures, respectively, towards biodiversity.

Similarly, in Scenario 2 for schemes having Direct relevance for biodiversity we have taken their entire expenditure to be for biodiversity. While for schemes which have Indirect High relevance to biodiversity we have assumed that the percentage of their expenditure attributable for biodiversity would be in the range of 50-75 percent. Taking the midpoint of 50 and 75 percent we get 62.5 percent. Thus for schemes that have Indirect High relevance for biodiversity 62.5 percent of their expenditure is attributable for biodiversity under this scenario. For schemes having Indirect Medium relevance to biodiversity we have considered the attributable expenditure for biodiversity to be in the range of 25-50 percent or 37.5 percent (average of 25-50) and for Indirect Low schemes the attributable expenditure is 12.5 percent (average of the range 0-25 percent)

Table 1: Determining Attribution for Biodiversity Expenditures

Biodiversity Relevance	Criteria	Expenditure Attributable to Biodiversity Conservation		
		Scenario 1	Scenario 2	Scenario 3
Direct	Where primary purpose of the scheme is biodiversity conservation. Example: Tiger conservation, afforestation, protection of PA and sanctuaries, control of invasive species, protection of endangered species.	100 percent	100 percent	100 percent
Indirect High	Where conservation of biodiversity is a significant objective. Ex. Promotion of organic farming	50 Percent	Average of the range 50-75	Data on activity-wise actual expenditure is obtained for district level schemes and big ticket central govt. programs.
Indirect Medium	Where biodiversity is of the important objective and significant biodiversity relevant outcomes are expected. Ex. Water conservation, soil quality improvement	25 percent	Average of the range 25-50	Data on activity-wise actual expenditure is obtained for district level schemes and big ticket central govt. programs.
Indirect Low	Example: renewable energy, general awareness and training, climate mitigation activities	2.5 percent	Average of the range 0-25	Data on activity-wise actual expenditure is obtained for district level schemes and big ticket central govt. programs.

Source: Authors' construct

In scenario 3, like the previous two scenarios, for schemes having Direct relevance for biodiversity their entire expenditure is attributable to biodiversity. From all other schemes which fall in Indirect High, Medium and Low categories we have selected three big ticket schemes namely, National Horticultural Mission (NHM), Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and Integrated Watershed Management Program (IWMP). For each of the three national schemes we collected activity wise expenditures in Maharashtra and applied appropriate coefficients to each relevant activity to derive the attributable expenditures for biodiversity. In this way we expect to get more accurate estimates of expenditure on biodiversity. Table 2 shows the attributable coefficients used for the three schemes under different scenarios. The attributable coefficient under scenario-3 is close to the actual scenario and ideally this is the method that one should follow for all the other schemes in order to get an accurate estimate of biodiversity related expenditures. However, non-availability of activity-wise expenditure data for most of the schemes does not allow us to adopt this method.

Apart from classifying schemes into Direct and Indirect Biodiversity relevance, the identified schemes are also classified into CBD strategic goals which is consistent with BIOFIN Taxonomy as given in BIOFIN Workbook. These six themes are: (i) Sectoral Mainstreaming, (ii) Sustainable Use of Natural Resources, (iii) Biodiversity Protection, (iv) Biodiversity Restoration, (v) Access and Benefit Sharing, and (vi) Enhancing Implementation.

The next step is to align CBD strategic goals and BIOFIN thematic classification with NBAP targets and Aichi targets. This is illustrated in Table 3.

Table 2: Attributable Expenditure under Selected Programs & Different Scenarios (Rs. crore)

Schemes	Scenario-1							
	2009-10	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**Attribution Avg. (%)**
IWMP	100.70	175.23	230.43	289.32	101.60	109.95	350.25	50.00
Attribution (%)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
NHM	2.92	4.01	3.11	3.85	20.26	4.58	4.11	2.50
Attribution (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	
MGNRES	121.33	112.16	520.22	786.62	576.46	399.76	619.17	50.00
Attribution (%)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
Schemes	**Scenario-2**							
	2009-10	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**Attribution Avg. (%)**
IWMP	125.88	219.04	288.03	361.65	127.00	137.43	437.81	62.50
Attribution (%)	62.50	62.50	62.50	62.50	62.50	62.50	62.50	
NHM	14.58	20.05	15.56	19.25	101.31	22.88	20.56	12.50
Attribution (%)	12.50	12.50	12.50	12.50	12.50	12.50	12.50	
MGNREGS(	151.66	140.19	650.28	983.28	720.58	499.70	773.97	62.50
Attribution (%)	62.50	62.50	62.50	62.50	62.50	62.50	62.50	
Schemes	**Scenario-3**							
	2009-10	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**Attribution Avg. (%)**
IWMP	100.70	189.38	292.06	354.26	115.22	110.86	357.88	33.03
Attribution (%)	50.00	30.08	38.56	31.05	42.24	45.44	26.38	
NHM	10.84	30.42	19.00	9.45	76.48	16.94	0.00	10.53
Attribution (%)	9.30	18.97	15.26	6.14	9.44	9.25	0.00	
MGNREGS						523.73	770.98	41.21
Attribution (%)						34.63	44.10	

Source: Authors' calculations

Table 3: Classification of Projects & Programs: Guidance Documents

	Strategic Goal A	Strategic Goal B	Strategic Goal C	Strategic Goal D		Strategic Goal E
CBD Strategic Goal	Address underlying causes of biodiversity loss by mainstreaming biodiversity across	Reduce direct pressures on biodiversity and promote sustainable use	Improve the status of biodiversity by safeguarding ecosystems species and genetic diversity	Enhance the benefits to all from biodiversity and ecosystem services		Enhance implementation through participatory Planning, knowledge management and Capacity building
NBTs	NBTs (1,2,10)	NBTs (3,4,5, 6)	NBTs (6 & 7)	NBTs (3,8, 9)		NBTs (10,11, 12)
Aichi Targets	1,2,3&4	5,6,7,8,9 & 10	11,12 & 13	14,15 & 16		17,18,19 & 20
BIOFIN Taxonomy	Biodiversity Mainstreaming	Sustainable use of Resources except Prevention & Control of invasive species (Aichi Target 9 & NBT4) which are taken as Protection Strategies	Protection Strategies	Restoration strategies	ABS (Aichi Target 16 & NBT 9)	Implementation Strategies
Impact on Biodiversity	INDIRECT	INDIRECT in most cases, except Aichi Target 9 & NBT4	DIRECT	DIRECT in most cases except when it is a very small component	DIRECT	• INDIRECT • DIRECT: when implemented by MOEF&CC; There can be some deviations

Source: Authors' construct

4. Consultations at the State and District level

In addition to surveys through structured questionnaires and data formats, and follow up email and telephonic communications, we also held several in-person meetings and consultations with relevant state and district level officers. Detailed meetings were held with the State Government officials for a week wherein we met officials of the identified departments. Besides consulting them for expenditure data gaps; we also

held detailed discussions with them in respect of 'Program and Institutional Review[13]' and on 'estimation of attributable expenditure' in respect of identified schemes and programs of their respective departments.

Three days each were spent by the project team in the two districts and detailed discussions were held. In Chandrapur district, the key contact point was Deputy District Magistrate (DM). Meetings with officers of other key departments were held in their respective offices. In Ratnagiri the meeting was chaired by the DM which was attended by the deputy DM, Chairman of Zilla Parishad and the key officers of various departments. These meetings, among others, focused on compilation of activity/component-wise expenditure of the programs/ schemes.

5. Analysis of Findings and Results

5.1 Central Government Releases to Maharashtra (inclusive of State Shares)

A snap shot of flow of scheme based central funds during 2009-10 to 2015-16 to the state of Maharashtra is presented in Table 4. The number of schemes of Central Government to Maharashtra which were 300 in numbers in 2010-11 has been declining gradually and their numbers stood at 262 in 2015-16. With the Central Government pursuing the policy of rationalizing central schemes their number is expected to further decline. However, not all of the central schemes were relevant for biodiversity conservation.

The number of schemes that had biodiversity relevant activities varied between 42 and 52 during the study period and accounted for about 25-39 per cent of total expenditure under central schemes for Maharashtra (Table 4). As noted earlier, significance of the biodiversity relevant schemes with respect to their impact on biodiversity is not same and varies significantly across schemes. Some schemes may have a direct bearing on biodiversity while others may indirectly influence biodiversity. To address this issue, as discussed in the preceding section, we have classified the relevant schemes into Direct, Indirect High, Indirect Medium and Indirect Low impact schemes depending upon their significance or relevance with respect to their impact on biodiversity and have assigned attribution coefficients accordingly. For assigning coefficients to schemes we have considered 3 different scenarios as discussed in the previous section. Applying the coefficients under the different scenarios considered in the study, the total biodiversity attributable expenditure under the central government schemes to Maharashtra accounted for about 14-24 per cent of the expenditure under the biodiversity relevant schemes in Scenario-1, 25-35 per cent under scenario-2 during the study period. However, their share in expenditure of all central schemes for Maharashtra varied in the range of 4.3-7.5 per cent under scenario-1 and 7-11.4 percent under scenario-2 during the same period (Table 4).

[13] See Chapters 6, 7 and 8.

Table 4: Central Scheme Funds for Maharashtra (Summary)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
No. of Central Schemes to Maharashtra	294	300	294	276	288	266	262
No. of Biodiversity Relevant Schemes	53	50	49	45	44	42	52
Central Scheme funds to Maharashtra (Rs. Crore)	17513.5	19298.4	26183.5	22094.7	21829.5	21556.9	20518.6
Expenditure under Biodiversity Relevant Schemes (Rs. Crore)	5650.1	6736.3	10094.5	7752.2	7023.8	5340.6	5717.6
Attributable Expenditure (Rs. Crore)							
Scenario-1	894.7	953.4	1662.3	1659.3	1314.7	927.1	1374.1
Scenario-2	1514.9	1684.4	2766.3	2521.9	2082.2	1501.5	2009.9
Expenditure under biodiversity relevant schemes as % of all schemes	32.26	34.91	38.55	35.09	32.18	24.77	27.87
Attributable expenditure as % of expenditure under Biodiversity Relevant schemes							
Scenario-1	**15.83**	**14.15**	**16.47**	**21.40**	**18.72**	**17.36**	**24.03**
Scenario-2	**26.81**	**25.00**	**27.40**	**32.53**	**29.64**	**28.11**	**35.15**
Attributable Expenditure as % of Expenditure under all Schemes							
Scenario-1	**5.11**	**4.94**	**6.35**	**7.51**	**6.02**	**4.30**	**6.70**
Scenario-2	**8.65**	**8.73**	**10.57**	**11.41**	**9.54**	**6.97**	**9.80**

Source: Authors' calculations

Table 5 presents the distribution of biodiversity relevant schemes based on their relevance with respect to their impact on biodiversity. Most of the identified (or biodiversity relevant) schemes fall under Indirect Low relevance category. However, due to their low relevance for biodiversity, their coefficient is very small. As a result their contribution/share in the total attributable expenditures is low as is evident from Table 6. The schemes with Indirect Medium relevance to biodiversity account for most of the total attributable expenditure followed by Schemes with Indirect High relevance during the period 2009-10 to 2015-16 under scenario-1. However, under scenario-2, the share of schemes with Indirect High relevance is the highest. The share of schemes which have direct relevance for biodiversity in the total attributable

expenditure is low under both the scenarios. Under scenario-2 their shares varied between 0.91-5.44 percent in the total attributable expenditures during the period of the study period.

Table 5: Direct and Indirect Impact-wise Analysis of Center's Biodiversity Relevant Schemes

Number of Schemes having	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct impact	14	12	12	10	9	8	9
Indirect High impact	7	7	8	8	6	5	6
Indirect Medium impact	8	9	8	5	7	8	9
Indirect Low impact	24	22	21	22	22	21	28
Total	**53**	**50**	**49**	**45**	**44**	**42**	**52**

Source: Authors' calculations

Classification of biodiversity relevant schemes into BIOFIN thematic areas is presented in Table 7. Most of the biodiversity relevant Central schemes are for Sectoral Mainstreaming and Enhancing Implementation during the seven year period. However, if one were to consider the share of schemes in the total attributable expenditure, the share of schemes for Sectoral Mainstreaming is the highest under both the scenarios followed by schemes that address issues of Natural Resource (Table 8). Although the number of schemes for Enhancing Implementation is high, their contribution in the attributable expenditure is low as is evident from their shares in attributable expenditure (see Table 8). Most of the attributable expenditure under the identified schemes are for Sectoral Mainstreaming (ranging between 51-71 percent) and for Natural resources.

Table 6: Attributable Expenditure in Center's schemes under Direct and Indirect Impact Classification

(Rs. Crore)

Scenario-1	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	57.39	70.27	81.50	22.84	68.94	82.98	69.47
(% of Total)	6.41	7.37	4.90	1.38	5.24	8.95	5.06
Indirect High	297.19	420.75	903.23	1275.02	840.10	527.60	1026.72
(% of Total)	33.22	44.13	54.34	76.84	63.90	56.91	74.72
Indirect Medium	461.25	351.99	524.89	257.73	304.16	234.98	208.97
(% of Total)	51.56	36.92	31.58	15.53	23.14	25.35	15.21
Indirect Low	78.83	110.41	152.68	103.71	101.45	81.56	68.97
(% of Total)	8.81	11.58	9.18	6.25	7.72	8.80	5.02
Total	**894.66**	**953.43**	**1662.29**	**1659.30**	**1314.65**	**927.12**	**1374.13**

Scenario-2	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	57.39	78.39	86.52	23.00	68.60	81.66	68.20
(% of Total)	3.79	4.65	3.13	0.91	3.29	5.44	3.39
Indirect High	371.48	525.94	1129.03	1593.78	1050.13	659.49	1283.40
(% of Total)	24.52	31.22	40.81	63.20	50.43	43.92	63.85
Indirect Medium	691.87	527.99	787.34	386.60	456.24	352.47	313.46
(% of Total)	45.67	31.35	28.46	15.33	21.91	23.48	15.60
Indirect Low	394.17	552.07	763.38	518.55	507.25	407.82	344.86
(% of Total)	26.02	32.78	27.60	20.56	24.36	27.16	17.16
Total	**1514.91**	**1684.38**	**2766.27**	**2521.93**	**2082.21**	**1501.45**	**2009.91**

Source: Authors' calculations

Table 7: Analysis of Center's Schemes by BIOFIN thematic classification

Number of Schemes for	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	18	16	16	17	16	17	23
Natural Resources Protection	7	8	7	8	8	7	11
Restoration	6	5	5	4	4	3	4
Access & Benefit Sharing	2	1	1	0	0	1	1
Enhancing Implementation	3	3	3	3	4	2	2
Total	**53**	**50**	**49**	**45**	**44**	**42**	**52**

Source: Authors' calculations

Table 8: Attributable Expenditure in Center's schemes by BIOFIN Classification

(Rs. Crore)

Scenario-1	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	605.08	487.90	1074.79	1177.26	977.92	605.40	888.77
(% of Total)	67.63	51.17	64.66	70.95	74.39	65.30	64.68
Sustainable use of Natural Resources	206.40	362.45	473.64	427.81	243.44	214.97	403.78
(% of Total)	23.07	38.02	28.49	25.78	18.52	23.19	29.38
Protection	18.57	46.70	40.28	13.83	57.47	40.27	48.85
(% of Total)	2.08	4.90	2.42	0.83	4.37	4.34	3.56
Restoration	27.76	16.17	28.51	0.00	0.00	37.28	19.38
(% of Total)	3.10	1.70	1.72	0.00	0.00	4.02	1.41
Access & Benefit Sharing	16.99	18.24	19.34	28.83	19.13	19.64	10.26
(% of Total)	1.90	1.91	1.16	1.74	1.46	2.12	0.75
Enhancing Implementation	19.86	21.97	25.74	11.57	16.69	9.56	3.09
(% of Total)	2.22	2.30	1.55	0.70	1.27	1.03	0.23
Total	**894.66**	**953.43**	**1662.29**	**1659.30**	**1314.65**	**927.12**	**1374.13**

Scenario-2	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	907.68	750.72	1527.00	1583.82	1344.94	847.08	1220.70
(% of Total)	59.92	44.57	55.20	62.80	64.59	56.42	60.73
Sustainable use of Natural Resources	451.15	737.65	1035.73	766.48	561.40	462.64	668.92
(% of Total)	29.78	43.79	37.44	30.39	26.96	30.81	33.28
Protection	18.57	54.82	45.30	13.99	57.13	38.95	47.58
(% of Total)	1.23	3.25	1.64	0.55	2.74	2.59	2.37
Restoration	27.76	16.17	28.51	0.00	0.00	37.28	19.38
(% of Total)	1.83	0.96	1.03	0.00	0.00	2.48	0.96
Access & Benefit Sharing	83.04	90.43	92.16	136.36	89.88	95.12	44.34
(% of Total)	5.48	5.37	3.33	5.41	4.32	6.34	2.21
Enhancing Implementation	26.72	34.59	37.57	21.28	28.86	20.38	9.00
(% of Total)	1.76	2.05	1.36	0.84	1.39	1.36	0.45
Total	**1514.91**	**1684.38**	**2766.27**	**2521.93**	**2082.21**	**1501.45**	**2009.91**

Source: Authors' calculations

Table 9: Central Ministry-wise Attributable Expenditure (%)

	Ministry	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	Agriculture	0.78	0.00	0.00	0.88	0.17	0.00	0.00
	Environment & Forests	73.76	82.70	99.83	76.93	67.30	100.00	92.82
	Finance	12.60	0.00	0.00	0.00	0.00	0.00	0.00
	Water Resources	12.86	17.30	0.17	22.20	32.52	0.00	7.18
Indirect High	Agriculture	18.01	26.43	13.83	5.96	8.63	0.00	0.00
	Environment & Forests	0.49	0.21	0.12	0.03	0.01	0.11	5.34
	Finance	6.50	4.79	2.42	1.72	1.96	3.12	0.15
	Rural Development	74.71	68.30	83.58	92.28	89.40	96.61	94.49
	Water Resources	0.28	0.26	0.06	0.01	0.00	0.16	0.02
Indirect Medium	Agriculture	0.18	0.06	0.01	0.30	0.31	24.31	5.02
	Culture	0.20	0.35	0.04	0.00	0.25	0.21	0.10
	Earth sciences	1.36	2.85	1.88	0.02	0.01	0.09	0.00
	Economic Affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Health and Family Welfare	0.12	0.24	0.40	0.86	1.10	0.37	0.95
	Rural Development	0.00	0.00	0.00	0.00	0.00	26.21	67.89
	Urban Development & Poverty Alleviation	98.14	96.51	97.66	98.82	98.33	48.81	26.05
Indirect Low	Agriculture	20.29	22.39	17.03	35.86	51.98	43.07	33.25
	Environment & Forests	0.00	0.00	0.00	0.76	0.82	0.00	0.00
	External affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Health & Family Welfare	0.14	0.15	0.04	0.00	0.03	0.34	0.56
	Home Affairs	0.00	0.00	0.00	0.04	0.00	0.00	0.18
	New & Renewable Energy	1.59	3.19	3.19	4.41	4.11	7.49	9.69
	Rural Development	31.46	23.50	15.57	33.37	20.55	22.96	11.99
	Science and Technology	0.02	0.02	0.01	0.00	0.00	0.00	0.00
	Tribal Affairs	0.97	3.71	2.98	0.76	5.20	7.53	9.89
	Water Resources	45.33	46.85	61.09	24.66	17.14	18.24	31.71
	Ministry of Power	0.00	0.00	0.00	0.00	0.00	0.00	2.38
	Youth Affairs & Sports	0.19	0.19	0.09	0.14	0.16	0.36	0.34

Source: Authors' calculations

If one were to look at the role of different ministries of Government of India in terms of their contribution for biodiversity conservation related expenditures we see that expenditures through schemes that have direct relevance for biodiversity are, as expected, mainly from the MoEF&CC followed by Ministry of Water Resources (see Table 9). For expenditure in schemes that have indirect high relevance for biodiversity, Ministry of Rural Development account for the most, with its share ranging between 68.3-94.5 percent during 2009-10 and 2015-16. Ministry of Urban development account for majority of the expenditures that have indirect medium relevance, but in the last two years (i.e., 2014-15 and 2015-16) its share has declined considerably and the share of Ministry of Rural Development increased to 67 percent in 2015-16. Schemes under Ministries of Agriculture, Rural Development and Water Resources account for almost all the expenditure that have indirect low relevance for biodiversity (see Table 9).

Table 10 shows the contribution of schemes of different ministries based on BIOFIN classification during the period 2009-10 to 2015-16. Most of the expenditures under Protection, Enhancing Implementation and Restoration are from schemes of Ministry of Environment and Forest. Similarly, large percentage of expenditures under the theme of Natural Resource Use and Access and Benefit Sharing is from Ministry of Rural Development.

Table 10: Central Ministry-wise Attributable Expenditure - BIOFIN Classification (%)

	Ministry	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	Agriculture	0.02	0.01	0.00	0.00	0.05	0.04	0.10
	Environment & Forests	0.24	0.18	0.10	0.03	0.01	0.09	6.17
	Finance	3.19	4.13	2.03	1.86	1.68	2.72	0.17
	Health and Family Welfare	0.02	0.04	0.01	0.00	0.00	0.05	0.04
	New & Renewable Energy	0.15	0.56	0.41	0.35	0.38	0.94	0.73
	Rural Development	21.44	24.62	49.34	76.05	66.78	76.21	85.70
	Tribal Affairs	0.12	0.83	0.42	0.06	0.52	1.01	0.77
	Urban Development & Poverty Alleviation	74.81	69.63	47.69	21.63	30.58	18.94	6.12
	Ministry of Power	0.00	0.00	0.00	0.00	0.00	0.00	0.18
Natural Resource Use	Agriculture	33.90	37.38	31.66	26.39	51.12	41.93	7.84
	Economic Affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Rural Development	48.79	48.35	48.65	67.63	41.74	51.14	86.74
	Water Resources	17.31	14.27	19.69	5.98	7.14	6.92	5.42
Protection	Agriculture	2.42	0.00	0.00	1.45	0.21	0.00	0.00
	Environment & Forests	57.84	73.96	99.65	61.89	60.78	100.00	89.79
	Water Resources	39.74	26.04	0.35	36.66	39.01	0.00	10.21
Restoration	Environment & Forests	73.96	100.00	100.00	0.00		0.00	100.00
	Finance	26.04	0.00	0.00	0.00		0.00	0.00
Access & Benefit Sharing	Health & Family Welfare	3.18	1.23	6.71	7.73	8.65	4.48	19.36
	Rural Development	96.57	98.45	92.86	92.06	90.19	95.35	80.64
	Tribal Affairs	0.25	0.32	0.43	0.21	1.17	0.17	0.00
Enhancing Implementation	Agriculture	1.37	2.57	3.70	8.86	7.46	19.28	29.59
	Culture	4.53	5.55	0.91	0.00	4.49	5.23	6.72
	Earth sciences	31.68	45.63	38.44	0.39	0.18	2.17	0.00
	Environment & Forests	55.69	33.69	49.38	84.69	73.72	56.82	40.07
	External affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Health & Family Welfare	0.00	2.77	3.18	0.00	10.22	0.00	0.00
	Home Affairs	0.01	0.00	0.02	0.33	0.00	0.00	3.93
	New & Renewable Energy	1.62	3.67	1.75	3.60	2.96	4.44	5.23
	Science & Technology	0.06	0.10	0.05	0.00	0.00	0.00	0.00
	Water Resources	4.25	5.05	2.04	0.86	0.00	8.95	6.79
	Youth Affairs & Sports	0.77	0.97	0.53	1.27	0.97	3.11	7.67

Source: Authors' calculations

5.2 Maharashtra State Schemes

Summary of the Maharashtra State scheme funds during the study period is presented in Table 11. The number of biodiversity relevant state schemes funded entirely from the consolidated fund of Maharashtra declined to 167 in 2015-16 from 227 in 2014-15. Further, biodiversity relevant expenditure as a percentage of total expenditure of Government of Maharashtra has been extremely low ranging from 1.10 to 2.36 per cent during the study period (Table 11). Applying appropriate coefficients to the

relevant schemes we derive biodiversity attributable expenditure under the two different scenarios (Table 11). The expenditures attributable to biodiversity conservation was 0.54-0.76 and 0.66-1.04 of total expenditures of Maharashtra under scenario-1 and percent under scenario-2 respectively. Their share in total revenue receipts of Maharashtra varied between 0.51-1.25. As a percentage of GSDP of Maharashtra their share is negligible varying between 0.06-0.11 percent (see Table 11).

Table 12 presents the distribution of biodiversity relevant schemes based on their relevance with respect to their impact on biodiversity. A large number of biodiversity relevant schemes fall under Direct, Indirect High and Indirect Medium relevance categories. However, if one were to look at the contribution of these schemes to the total attributable expenditure one can see from Table 13 that schemes that are of Indirect High relevance account for a sizeable proportion of the attributable expenditure during this period. It is only in 2014-15 that schemes having Indirect Medium relevance have a higher contribution in attributable expenditure under both the scenarios.

Table 11: Maharashtra State Schemes (Summary)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
No. of Biodiversity Relevant State Schemes	100	209	214	191	225	227	167
Total Expenditure (Rs. Crore)	113605.7	125381.8	142270.0	157549.9	176568.0	198217.1	237327.4
Total Revenues (Rs. Crore)	86910.3	105867.8	121286.1	142947.2	149821.8	165415.5	198320.9
GSDP (Rs. Crore)	855750	1049150	1170121	1322222	1510132	1686694	1969184
Expenditure under Biodiversity relevant schemes (Rs. Crore)	1245.59	1488.73	2427.59	2586.51	2306.89	4677.18	3765.71
Attributable Expenditure (Rs. Crore)							
Scenario-1	609.76	661.60	1075.15	1074.68	1063.60	1514.91	1590.45
Scenario-2	744.88	824.10	1343.16	1350.39	1305.71	2070.10	1964.16
Biodiversity relevant expenditure as % of total expenditure of Maharashtra	1.10	1.19	1.71	1.64	1.31	2.36	1.59
Attributable expenditure as % of total expenditure of Maharashtra							
Scenario-1	**0.54**	**0.53**	**0.76**	**0.68**	**0.60**	**0.76**	**0.67**
Scenario-2	**0.66**	**0.66**	**0.94**	**0.86**	**0.74**	**1.04**	**0.83**
Attributable Expenditure as % of Total Revenue Receipts of Maharashtra							
Scenario-1	**0.57**	**0.51**	**0.73**	**0.62**	**0.59**	**0.75**	**0.63**
Scenario-2	**0.86**	**0.78**	**1.11**	**0.94**	**0.87**	**1.25**	**0.99**
Attributable Expenditure as % GSDP of Maharashtra							
Scenario-1	**0.07**	**0.06**	**0.09**	**0.08**	**0.07**	**0.09**	**0.08**
Scenario-2	**0.09**	**0.08**	**0.11**	**0.10**	**0.09**	**0.12**	**0.10**

Source: Authors' calculations

Table 12: Direct and Indirect Relevance-wise Analysis of Biodiversity Relevant State Schemes

Number of Schemes having	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct impact	33	57	54	52	60	58	42
Indirect High impact	30	56	58	51	66	64	46
Indirect Medium impact	26	65	70	56	65	74	60
Indirect Low impact	11	31	32	32	34	31	19
Total	**100**	**209**	**214**	**191**	**225**	**227**	**167**

Source: Authors' calculations

Table 13: Attributable Expenditure under Direct and Indirect Classification (State Schemes)

(Rs. Crore)

Scenario-1	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct	156.86	153.08	217.05	268.03	306.20	146.67	578.88
(% of Total)	*12.59*	*10.28*	*8.94*	*10.36*	*13.27*	*3.14*	*15.37*
Indirect High	757.88	858.80	1520.87	1415.87	1315.97	1343.00	1746.75
(% of Total)	*60.85*	*57.69*	*62.65*	*54.74*	*57.05*	*28.71*	*46.39*
Indirect Medium	291.93	298.64	357.45	338.45	365.76	2742.47	454.18
(% of Total)	*23.44*	*20.06*	*14.72*	*13.09*	*15.86*	*58.64*	*12.06*
Indirect Low	38.92	178.21	332.23	564.15	318.96	445.05	985.89
(% of Total)	*3.12*	*11.97*	*13.69*	*21.81*	*13.83*	*9.52*	*26.18*
Total	**1245.59**	**1488.73**	**2427.59**	**2586.51**	**2306.89**	**4677.18**	**3765.71**
Scenario-2	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct impact	156.86	153.08	217.05	268.03	306.20	146.67	578.88
(% of Total)	*21.06*	*18.58*	*16.16*	*19.85*	*23.45*	*7.08*	*29.47*
Indirect High	473.68	536.75	950.54	884.92	822.48	839.37	1091.72
(% of Total)	*63.59*	*65.13*	*70.77*	*65.53*	*62.99*	*40.55*	*55.58*
Indirect Medium	109.47	111.99	134.04	126.92	137.16	1028.43	170.32
(% of Total)	*14.70*	*13.59*	*9.98*	*9.40*	*10.50*	*49.68*	*8.67*
Indirect Low	4.86	22.28	41.53	70.52	39.87	55.63	123.24
(% of Total)	*0.65*	*2.70*	*3.09*	*5.22*	*3.05*	*2.69*	*6.27*
Total	**744.88**	**824.10**	**1343.16**	**1350.39**	**1305.71**	**2070.10**	**1964.16**

Source: Authors' calculations

Table 14 shows the biodiversity relevant schemes based on BIOFIN thematic classification. Most of the biodiversity relevant state government schemes fall under the category Natural Resources, and Enhancing Implementation. However, if one were to consider the share of schemes in the attributable expenditure, the share of schemes under Natural Resources is the highest under both the scenarios during 2009-10 and 2015-16 (Table 15).

Table 14: BIOFIN Classification wise Analysis of Biodiversity Relevant State Schemes

Number of Schemes for	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Sectoral Mainstreaming	13	34	33	28	30	32	24
Natural Resources	38	69	76	66	81	84	67
Protection	16	28	27	25	29	40	23
Restoration	10	24	23	18	24	16	15
Access & Benefit Sharing	0	1	1	1	1	2	1
Enhancing Implementation	23	53	54	53	60	53	37
Total	**100**	**209**	**214**	**191**	**225**	**227**	**167**

Source: Authors' calculations

Table 15: Attributable Expenditure under BIOFIN Classification (State Schemes)

(Rs. Crore)

Scenario-1	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Sectoral Mainstreaming	246.10	151.86	334.81	260.11	202.69	143.70	223.94
(% of Total)	40.36	22.95	31.14	24.20	19.06	9.49	14.08
Natural Resources	308.49	290.72	493.88	480.56	476.66	615.55	843.70
(% of Total)	50.59	43.94	45.94	44.72	44.82	40.63	53.05
Protection	23.77	33.48	34.62	64.72	65.97	72.41	138.57
(% of Total)	3.90	5.06	3.22	6.02	6.20	4.78	8.71
Restoration	14.80	161.69	161.55	212.06	245.04	48.90	141.57
(% of Total)	2.43	24.44	15.03	19.73	23.04	3.23	8.90
Access & Benefit Sharing	0.00	11.50	26.43	21.00	28.60	35.00	30.00
(% of Total)	0.00	1.74	2.46	1.95	2.69	2.31	1.89
Enhancing Implementation	16.60	12.35	23.86	36.23	44.65	599.35	212.67
(% of Total)	2.72	1.87	2.22	3.37	4.20	39.56	13.37

Total	**609.76**	**661.60**	**1075.15**	**1074.68**	**1063.60**	**1514.91**	**1590.45**
Scenario-2	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Sectoral Mainstreaming	293.18	215.06	450.99	360.57	288.52	205.37	280.48
(% of Total)	39.36	26.10	33.58	26.70	22.10	9.92	14.28
Natural Resources	390.24	365.93	619.85	605.33	602.07	771.90	1065.98
(% of Total)	52.39	44.40	46.15	44.83	46.11	37.29	54.27
Protection	23.91	35.75	37.88	91.37	71.13	114.02	188.32
(% of Total)	3.21	4.34	2.82	6.77	5.45	5.51	9.59
Restoration	14.87	179.19	176.66	229.86	265.30	51.35	161.42
(% of Total)	2.00	21.74	13.15	17.02	20.32	2.48	8.22
Access & Benefit Sharing	0.00	11.50	26.43	21.00	28.60	35.00	30.00
(% of Total)	0.00	1.40	1.97	1.56	2.19	1.69	1.53
Enhancing Implementation	22.68	16.66	31.35	42.26	50.10	892.45	237.95
(% of Total)	3.04	2.02	2.33	3.13	3.84	43.11	12.11
Total	**744.88**	**824.10**	**1343.16**	**1350.39**	**1305.71**	**2070.10**	**1964.16**

Source: Authors' calculations

Table 16 presents department-wise contribution for biodiversity conservation related expenditures of Maharashtra Government. Expenditures through schemes that have Direct relevance for biodiversity are, as expected, from the Forest Department. For scheme expenditures that have Indirect High relevance, Planning Department accounts for the most, its share ranging between 40-64 percent. Water Resources Department accounts for most of the expenditures that have Indirect Medium relevance while schemes under Department of Agriculture, and Water Resources account for almost all the expenditure that have Indirect Low relevance (see Table 16).

Table 16: State Government Department-wise Attributable Expenditure (%)

	Ministry	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	Environment	1.28	2.40	3.13	2.23	1.96	2.53	0.86
	Forest	31.18	85.65	90.86	94.16	95.63	88.88	97.41
	Planning - EGS	0.00	0.00	1.61	1.58	1.31	2.20	0.00
	Tourism & Cultural Affairs	66.94	0.00	0.00	0.00	0.00	0.00	0.00
	Water Conservation	0.61	11.95	4.40	2.04	1.10	4.40	0.00
	Water Resource	0.00	0.00	0.00	0.00	0.00	1.99	1.73
Indirect High	Agriculture	2.92	11.49	8.86	11.30	19.96	26.74	16.57
	ADF	0.00	0.72	0.08	0.23	0.34	0.00	0.00
	Energy	0.00	0.00	3.37	8.10	9.04	1.95	3.37
	Environment	0.04	0.04	0.15	0.14	0.07	0.09	0.02
	Forest	0.05	0.18	0.30	0.63	0.69	0.00	1.40
	Home - Transport	0.13	0.00	0.11	0.04	0.01	0.00	0.00
	Planning - EGS	64.29	39.74	45.68	46.27	43.68	46.55	41.43
	Rural Development	19.71	17.92	25.64	16.15	9.12	7.54	3.93
	Water Conservation	10.09	26.71	13.89	14.95	15.13	14.51	31.83
	Water Resources	2.77	1.74	1.93	2.19	1.98	2.62	1.46
Indirect Medium	Agriculture	0.32	0.43	0.30	23.84	26.21	4.09	8.15
	ADF	1.71	3.77	0.35	1.69	1.58	0.00	0.83
	CADA	3.40	8.29	6.23	5.20	3.29	0.69	4.54
	Energy	0.00	3.96	4.99	10.21	18.54	1.08	10.11
	Environment	1.23	0.02	0.01	0.25	0.24	0.02	0.55
	Forest	8.98	0.57	4.97	3.32	1.24	0.85	22.29
	Industry	0.43	0.72	0.47	0.00	0.00	0.00	0.00
	Planning - EGS	0.00	0.00	0.00	0.00	0.44	0.00	0.00
	Urban Development	57.99	35.53	29.69	0.00	0.00	0.00	0.00
	Water Conservation	25.70	40.75	51.39	50.16	42.16	89.17	39.19
	Water Resources	0.23	5.98	1.59	5.32	6.31	4.10	14.35
Indirect Low	Agriculture	54.74	6.18	10.31	3.31	1.98	0.13	1.18
	ADF	0.00	1.96	2.56	8.88	21.83	0.34	0.18
	Energy	0.00	5.20	0.02	0.00	0.00	0.00	0.00
	Forest	0.55	0.27	0.00	0.00	0.00	0.00	0.00
	Home - Transport	0.00	0.51	6.38	7.05	7.78	2.49	0.25
	Rural Development	0.00	5.05	2.56	3.64	10.67	0.00	4.59

	Tourism	0.00	64.67	65.48	37.43	50.83	34.39	18.82
	Urban Development	0.00	0.00	0.00	0.00	0.00	0.00	15.21
	Water Conservation	43.92	16.17	12.68	39.69	6.91	62.66	59.78
	Water Resources	0.79	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors' calculations

Table 17 shows the contribution of schemes of different ministries based on BIOFIN classification during the period 2009-10 to 2015-16.

Table 17: State Government Department-wise Attributable Expenditure - BIOFIN Classification (%)

	Ministry	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	Agriculture	0.04	0.13	0.05	7.71	11.77	19.52	3.91
	ADF	0.12	1.03	0.11	0.55	0.75	0.00	0.42
	Energy	0.00	1.98	8.98	25.36	36.50	11.42	14.22
	Environment	0.06	0.10	0.34	0.38	0.22	0.42	0.07
	Forest	3.88	4.88	9.46	4.33	0.87	10.42	61.48
	Rural Development	30.35	50.82	58.29	44.04	29.73	35.23	15.32
	Tourism & Cultural Affairs	42.67	6.01	1.62	2.03	2.00	2.66	2.07
	Urban Development	17.20	17.47	7.92	0.00	0.00	0.00	1.67
	Water Conservation	5.68	17.57	13.23	15.60	18.16	20.33	0.84
Natural Resource Use	Agriculture	3.51	17.03	13.76	16.52	27.59	29.13	17.07
	ADF	0.31	1.51	0.14	0.57	0.76	0.00	0.00
	CADA	0.80	2.13	1.13	0.92	0.63	0.77	0.61
	Forest	2.50	1.70	2.56	3.70	3.55	1.04	6.47
	Planning - EGS	78.97	58.70	70.34	68.16	60.38	50.78	42.88
	Industry	0.10	0.18	0.09	0.00	0.00	0.00	0.00
	Rural Development	0.00	0.00	0.00	0.07	0.13	0.00	0.13
	Water Conservation	10.41	16.27	9.03	6.85	4.24	15.43	31.31

	Water Resources	3.40	2.48	2.97	3.23	2.73	2.86	1.52
Protection	Agriculture	0.00	0.00	0.00	1.41	0.00	0.00	0.00
	Energy	0.00	0.53	0.00	0.00	0.00	0.00	0.00
	Environment	0.00	0.00	0.00	0.00	0.00	0.00	0.35
	Forest	99.29	86.71	84.99	76.20	84.62	47.49	80.93
	Home - Transport	0.00	0.00	11.46	8.06	6.85	4.72	0.00
	Water Conservation	0.00	0.00	0.00	7.70	0.12	9.25	7.22
	Water Resources	0.71	12.76	3.55	6.63	8.41	38.54	11.50
Restoration	Agriculture	0.00	0.00	0.00	0.00	0.00	0.35	0.00
	Energy	0.00	0.00	0.00	0.00	1.00	8.48	6.38
	Environment	13.51	2.27	4.21	2.82	2.45	7.58	3.15
	Forest	79.55	43.38	53.11	61.06	64.72	70.22	58.64
	Home - Transport	0.00	0.01	0.04	0.00	0.04	0.17	0.04
	Water Conservation	6.94	54.34	42.64	36.12	31.79	13.19	31.78
Access & Benefit	Forest	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Enhancing Implementation	Agriculture	5.45	1.87	1.48	0.81	0.19	0.02	0.69
	ADF	0.00	0.34	0.52	0.52	0.57	0.01	0.01
	Environment	5.42	0.10	0.04	0.59	0.48	0.03	0.30
	Forest	18.28	75.16	75.18	85.01	82.39	1.85	86.54
	Home - Transport	3.01	0.00	3.50	0.77	0.18	0.00	0.00
	Water Conservation	67.84	18.79	18.48	11.72	15.70	97.58	7.59
	Water Resources	0.00	3.74	0.80	0.58	0.49	0.52	4.87

Source: Authors' calculations

5.3 Schemes in Selected Districts of Maharashtra

1. Ratnagiri

The two selected districts in Maharashtra are Ratnagiri (a coastal district located in the South West part of Maharashtra); and Chandrapur located in the Eastern part of Maharashtra. The number of biodiversity relevant schemes in Ratnagiri has gradually increased from 12 in 2009-10 to 19 in 2015-16. Tables 18 and 20 give the distribution

of these schemes based on their Direct and Indirect relevance for biodiversity and on the basis of BIOFIN thematic classification respectively. Tables 19 and 21 provide information on the distribution of attributable expenditure for these classifications for the two scenarios.

Table 18: Number of Biodiversity Relevant Schemes in Ratnagiri - Direct and Indirect Relevance

Number of Schemes having	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct impact	1	1	3	3	3	3	4
Indirect-High impact	5	5	5	6	5	5	5
Indirect-Medium impact	5	4	5	5	5	6	5
Indirect-Low impact	1	2	3	3	4	5	5
Relevant Schemes	**12**	**12**	**16**	**17**	**17**	**19**	**19**

Source: Authors' calculations

Table 19: Attributable Expenditure for Ratnagiri under Direct and Indirect Classification

(Rs. Crore)

Scenario-1	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct	0.04	0.25	0.75	0.32	0.45	0.48	0.45
(% of Total)	*1.47*	*10.13*	*21.58*	*10.99*	*9.67*	*8.42*	*7.55*
Indirect-High	0.97	0.93	1.36	0.99	2.47	1.49	1.86
(% of Total)	*35.64*	*37.84*	*39.00*	*33.45*	*52.70*	*26.01*	*30.96*
Indirect-Medium	1.70	1.28	1.37	1.63	1.74	3.73	3.67
(% of Total)	*62.76*	*51.77*	*39.06*	*55.13*	*37.25*	*65.27*	*61.17*
Indirect-Low	0.00	0.01	0.01	0.01	0.02	0.02	0.02
(% of Total)	*0.12*	*0.26*	*0.36*	*0.44*	*0.39*	*0.31*	*0.32*
Total	**2.71**	**2.47**	**3.50**	**2.96**	**4.68**	**5.72**	**6.00**
Scenario-2	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct	0.04	0.25	0.75	0.32	0.45	0.48	0.45
(% of Total)	1.05	7.43	16.51	7.98	7.25	6.00	5.41
Indirect High	1.21	1.17	1.70	1.24	3.08	1.86	2.32
(% of Total)	31.65	34.69	37.29	30.37	49.40	23.16	27.73
Indirect Medium	2.55	1.92	2.05	2.44	2.62	5.60	5.50
(% of Total)	66.87	56.94	44.82	60.06	41.90	69.75	65.72
Indirect Low	0.02	0.03	0.06	0.07	0.09	0.09	0.10
(% of Total)	0.44	0.95	1.37	1.60	1.45	1.09	1.15
Total	**3.81**	**3.37**	**4.57**	**4.07**	**6.24**	**8.03**	**8.38**

Source: Authors' calculations

Table 20: Number of Biodiversity Relevant Schemes in Ratnagiri – BIOFIN Classification

Number of Schemes for	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	4	4	4	6	5	5	5
Natural Resources	3	3	4	4	4	4	4
Protection	1	1	2	2	2	3	2
Restoration	2	1	2	2	2	2	2
Access & Benefit Sharing	0	0	0	0	0	0	0
Enhancing Implementation	2	3	4	3	4	5	6
Total	**12**	**12**	**16**	**17**	**17**	**19**	**19**

Source: Authors' calculations

Table 21: Attributable Expenditure for Ratnagiri under BIOFIN Classification

(Rs. Crore)

Scenario-1	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	1.41	1.09	1.44	1.44	1.19	3.01	2.79
(% of Total)	52.22	44.23	41.15	48.61	25.46	52.65	46.46
Natural Resources	0.27	0.40	0.46	0.47	0.81	1.06	1.16
(% of Total)	9.89	16.31	13.07	15.95	17.21	18.61	19.27
protection	0.02	0.03	0.04	0.06	0.09	0.17	0.12
(% of Total)	0.84	1.01	1.25	2.03	1.92	2.90	2.00
Restoration schemes	0.82	0.82	1.26	0.78	2.42	1.34	1.72
(% of Total)	30.29	33.12	35.91	26.27	51.78	23.51	28.67
Access & Benefit Sharing	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% of Total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enhancing Implementation	0.18	0.13	0.30	0.21	0.17	0.13	0.22
(% of Total)	6.77	5.32	8.61	7.14	3.64	2.33	3.60
Total	**2.71**	**2.47**	**3.50**	**2.96**	**4.68**	**5.72**	**6.00**
Scenario-2	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Sectoral Mainstreaming	2.09	1.49	1.78	1.97	1.63	4.31	4.01
(% of Total)	54.70	44.25	38.96	48.46	26.19	53.65	47.89
Natural Resources	0.40	0.60	0.69	0.71	1.23	1.61	1.74
(% of Total)	10.42	17.94	15.13	17.35	19.70	20.00	20.81
protection	0.03	0.03	0.05	0.07	0.10	0.22	0.15
(% of Total)	0.74	0.93	1.10	1.78	1.64	2.69	1.73
Restoration	1.02	1.02	1.56	0.96	2.98	1.65	2.12
(% of Total)	26.63	30.36	34.13	23.68	47.78	20.56	25.35
Access & Benefit Sharing	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% of Total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Enhancing Implementation	0.29	0.22	0.49	0.36	0.29	0.25	0.35
(% of Total)	7.51	6.52	10.69	8.72	4.69	3.10	4.22
Total	**3.81**	**3.37**	**4.57**	**4.07**	**6.24**	**8.03**	**8.38**

Source: Authors' calculations

2. Chandrapur

The number of biodiversity relevant schemes in Chandrapur has also gradually increased from 16 in 2009-10 to 20 in 2015-16. Tables 22 and 24 gives the distribution of these schemes based on their Direct and Indirect relevance for biodiversity and on the basis of BIOFIN classification respectively. Tables 23 and 25 provide details on the distribution of attributable expenditure across the two types of classifications for the two scenarios.

Table 22: Number of Biodiversity Relevant Schemes in Chandrapur - Direct & Indirect Relevance

Number of Schemes having	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct impact	4	3	3	4	5	5	5
Indirect-High impact	3	5	3	6	7	7	7
Indirect-Medium impact	7	7	8	6	7	5	7
Indirect-Low impact	2	1	1	0	1	1	1
Relevant Schemes	**16**	**16**	**15**	**16**	**20**	**18**	**20**

Source: Authors' calculations

Table 23: Attributable Expenditure for Chandrapur under Direct and Indirect Classification

(Rs. Crore)

Scenario-1	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct	0.21	1.56	1.90	2.32	3.69	7.79	13.85
(% of Total)	*11.01*	*41.24*	*47.60*	*36.95*	*54.44*	*68.86*	*72.27*
Indirect-High	1.10	1.41	1.27	1.80	1.34	2.29	1.51
(% of Total)	*58.57*	*37.12*	*31.84*	*28.64*	*19.74*	*20.20*	*7.86*
Indirect-Medium	0.57	0.82	0.82	2.16	1.75	1.23	3.80
(% of Total)	*30.34*	*21.64*	*20.54*	*34.41*	*25.79*	*10.92*	*19.86*
Indirect-Low	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% of Total)	*0.08*	*0.01*	*0.02*	*0.00*	*0.04*	*0.02*	*0.02*
Total	**1.89**	**3.79**	**3.99**	**6.28**	**6.78**	**11.31**	**19.16**
Scenario-2	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Direct impact	0.21	1.56	1.90	2.32	3.69	7.79	13.85

(% of Total)	8.46	34.35	40.23	30.08	46.95	62.36	64.62
Indirect High	1.38	1.76	1.59	2.15	1.54	2.84	1.85
(% of Total)	56.26	38.59	33.64	27.91	19.54	22.71	8.65
Indirect Medium	0.86	1.23	1.23	3.24	2.62	1.85	5.71
(% of Total)	34.97	27.04	26.05	42.02	33.36	14.83	26.64
Indirect Low	0.01	0.00	0.00	0.00	0.01	0.01	0.02
(% of Total)	0.32	0.03	0.08	0.00	0.16	0.10	0.09
Total	**2.45**	**4.55**	**4.72**	**7.72**	**7.87**	**12.49**	**21.43**

Source: Authors' calculations

Table 24: Number of Biodiversity Relevant Schemes in Chandrapur – BIOFIN Classification

Number of Schemes for	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Sectoral Mainstreaming	4	4	4	6	5	5	5
Natural Resources	3	3	4	4	4	4	4
Protection	1	1	2	2	2	3	2
Restoration	2	1	2	2	2	2	2
Access & Benefit Sharing	0	0	0	0	0	0	0
Enhancing Implementation	2	3	4	3	4	5	6
Total	**12**	**12**	**16**	**17**	**17**	**19**	**19**

Source: Authors' calculations

Table 25: Attributable Expenditure for Chandrapur under BIOFIN Classification

(Rs. Crore)

Scenario-1	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Sectoral Mainstreaming	0.13	0.77	0.28	1.08	1.20	0.47	3.12
(% of Total)	6.98	20.21	6.91	17.17	17.71	4.13	16.27
Natural Resources	0.07	0.12	0.14	0.22	0.07	0.08	0.10
(% of Total)	3.77	3.30	3.38	3.50	1.07	0.73	0.51
Protection	0.04	0.26	0.09	0.45	0.93	2.82	6.04
(% of Total)	1.89	6.89	2.32	7.18	13.76	24.91	31.52
Restoration schemes	1.22	2.27	2.96	3.41	3.82	6.78	8.67
(% of Total)	64.89	59.92	74.09	54.26	56.27	59.97	45.26
Access & Benefit Sharing	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% of Total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enhancing Implementation	0.42	0.37	0.53	1.12	0.76	1.16	1.23
(% of Total)	22.47	9.67	13.29	17.89	11.19	10.25	6.43
Total	**1.89**	**3.79**	**3.99**	**6.28**	**6.78**	**11.31**	**19.16**

Scenario-2	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.19	0.87	0.36	1.35	1.45	0.45	4.24
(% of Total)	7.91	19.04	7.72	17.49	18.48	3.62	19.80
Natural Resources	0.10	0.16	0.18	0.30	0.11	0.12	0.15
(% of Total)	3.87	3.57	3.71	3.89	1.35	0.98	0.68
Protection	0.04	0.39	0.14	0.58	1.05	2.82	6.14
(% of Total)	1.50	8.55	2.91	7.48	13.32	22.58	28.65
Restoration	1.49	2.58	3.24	3.80	4.11	7.35	9.04
(% of Total)	60.60	56.73	68.75	49.30	52.26	58.82	42.18
Access & Benefit Sharing	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% of Total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enhancing Implementation	0.64	0.55	0.80	1.69	1.15	1.75	1.86
(% of Total)	26.11	12.11	16.91	21.84	14.59	14.00	8.69
Total	**2.45**	**4.55**	**4.72**	**7.72**	**7.87**	**12.49**	**21.43**

Source: Authors' calculations

5.4 Total Expenditure on Biodiversity Conservation in Maharashtra

On aggregating the expenditure attributable to biodiversity conservation in Maharashtra from various sources namely, Central scheme funds (inclusive of state shares), State schemes funds, district schemes funds aggregating over all the 34 districts (as described in an earlier section), Finance Commission grants for forests and CAMPA funds for Maharashtra, we get the total public expenditure on biodiversity conservation in the state of Maharashtra.

Table 26 provides a snapshot of the estimated total public expenditure on biodiversity conservation in Maharashtra during the period 2009-10 to 2015-16. The estimates of expenditure are presented for the two scenarios discussed earlier in the chapter.

The attributable expenditure to biodiversity in Maharashtra accounted for about 1.49 to 2.18 percent of total expenditure of Government of Maharashtra as per scenario-1 during 2009-10 to 2015-16 as can be seen from table 26. The corresponding figures under scenario-2 were 1.93 to 3.19 percent. When expressed as a percentage of GDP of Maharashtra, attributable expenditures ranged between 0.17 to 0.26 percent under scenario-1 during 2009-10 to 2015-16 and 0.23 to 0.39 percent under scenario-2 during the same period. In other words less than 0.40 percent of the state's GSDP is being spent on biodiversity conservation.

Table 26: Expenditures Attributed towards Biodiversity Conservation in Maharashtra – Summary

(Rs. Crore)

Attributable Expenditure (Scenario-1)	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
1. Central Schemes	894.66	953.43	1662.29	1659.30	1314.65	927.12	1374.13
2. State Schemes	609.76	661.60	1075.15	1074.68	1063.60	1514.91	1590.45
3. Chandrapur District	1.89	3.79	3.99	6.28	6.78	11.31	19.16
4. Ratnagiri District	2.71	2.47	3.50	2.96	4.68	5.72	6.00
5. 32 Districts @	146.17	202.74	238.43	300.38	381.55	424.37	481.21
6. FC Forest Grants	14.00	38.70	38.70	77.40	77.40	77.40	0.00
7.National Biodiversity Authority Grants	0.00	0.00	0.01	0.00	0.02	1.15	0.12
8. CAMPA releases to Maharashtra	89.35	85.49	82.63	78.21	78.00	0.00	0.00
Total Attributable Expenditure (Scenario-1) (items 1-8)	1758.53	1948.21	3104.70	3199.21	2926.70	2961.99	3471.08
GSDP of Maharashtra	855751	1049151	1170121	1322222	1510132	1686695	1969184
Total Expenditure of Maharashtra	113606	125382	142270	157550	176568	198217	237327
Attributable expenditure as % of GSDP	**0.21**	**0.19**	**0.27**	**0.24**	**0.19**	**0.18**	**0.18**
Attributable expenditure as % of total Expenditure	**1.54**	**1.55**	**2.18**	**2.03**	**1.66**	**1.49**	**1.46**

Attributable Expenditure (Scenario-2)	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
1. Central Schemes	1514.91	1684.38	2766.27	2521.93	2082.21	1501.45	2009.91
2. State Schemes	744.88	824.10	1343.16	1350.39	1305.71	2070.10	1964.16
3. Chandrapur District	2.45	4.55	4.72	7.72	7.87	12.49	21.43
4. Ratnagiri District	3.81	3.37	4.57	4.07	6.24	8.03	8.38
5. 32 Districts @	199.40	256.44	295.89	383.27	469.55	521.05	587.76
6. FC Forest Grants	14.00	38.70	38.70	77.40	77.40	77.40	0.00
7.National Biodiversity Authority Grants	0.00	0.00	0.01	0.00	0.02	1.15	0.12
8. CAMPA releases to Maharashtra	89.35	85.49	82.63	78.21	78.00	0.00	0.00
Total Attributable Expenditure (Scenario-2) (items 1-8)	2568.81	2897.02	4535.96	4422.99	4027.01	4191.66	4591.75
Attributable expenditure as % of GSDP	**0.30**	**0.28**	**0.39**	**0.33**	**0.27**	**0.25**	**0.23**
Attributable expenditure as % of total Expenditure	**2.26**	**2.31**	**3.19**	**2.81**	**2.28**	**2.11**	**1.93**

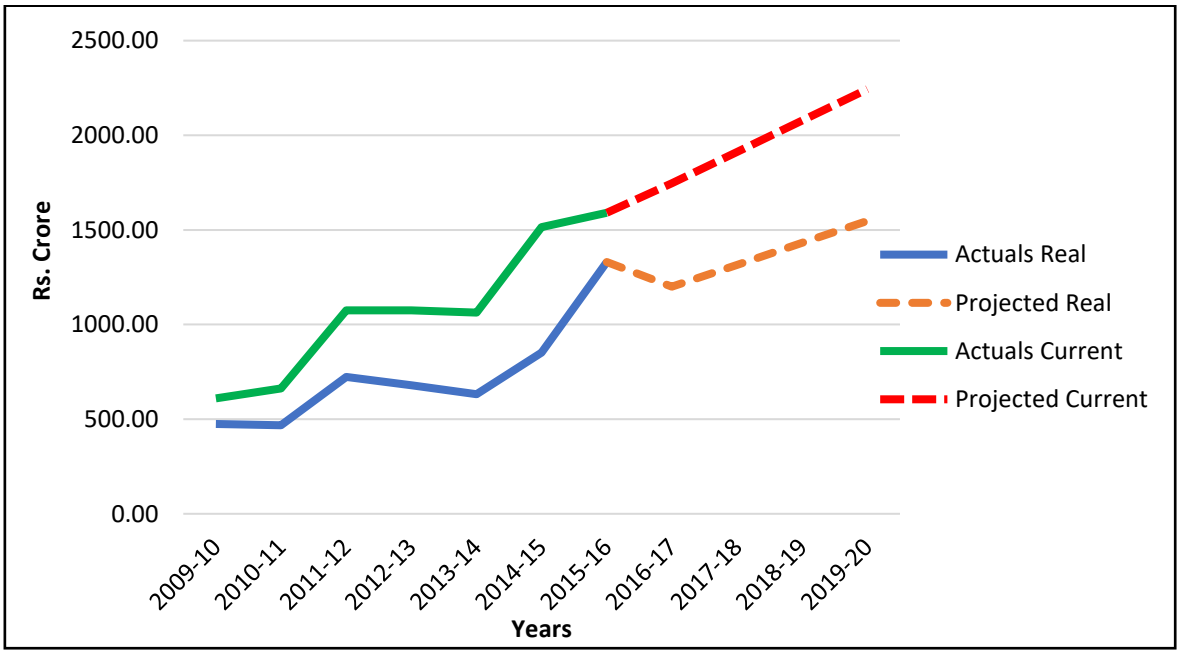
Note: 1 crore = 10 Million; @ Maharashtra has 34 districts. For each year we calculate the average attributable expenditure of the two selected districts (Chandrapur and Ratnagiri) as percentage of their average District Domestic product (DDP). Applying the average attributable expenditure ratio thus obtained to DDP of the remaining 32 districts we get for each districts the total attributable expenditure for that year. Summing across the attributable expenditures for each of the 32 districts we get the total expenditure attributable towards biodiversity for the 32 districts for that year

Source: Authors' calculations; Total Expenditure from Budget Documents, GSDP and DDP data from Economic Survey of Maharashtra (various years).

6. Projections

Using the principle of Least Square Methods which assumes a linear trend we project both the nominal attributable expenditure and real attributable expenditure [14] for biodiversity in Maharashtra separately for (i) Maharashtra state schemes (ii) for Central schemes to the state of Maharashtra, and (iii) all flows to Maharashtra. The projections are made for Scenario-1 and Scenario-2. We have actual data on expenditures for seven years from 2009-10 to 2015-16. The projections or the forecast is made for the next 4 years starting from 2016-17 till 2019-20. The projections for State schemes are presented in Figure-1a (for Scenario-1, both in real and nominal terms) and Figure-1b (for Scenario-2, both in real and nominal terms). Projections for central scheme funds are shown in Figure-2a (for Scenario-1, both in real and nominal terms) and Figure-2b (for Scenario-2, both in real and nominal terms); and for all funds to Maharashtra in Figure-3a (for Scenario-1, both in real and nominal terms) and Figure-3b (for Scenario-2, both in real and nominal terms) presents the projections.

Figure 1a: Projections of Expenditure on Biodiversity Conservation: Maharashtra State Schemes – Scenario-1



[14] The real attributable expenditures are at 2004-05 prices.

Figure 1b: Projections of Expenditure on Biodiversity Conservation: Maharashtra State Schemes – Scenario-2

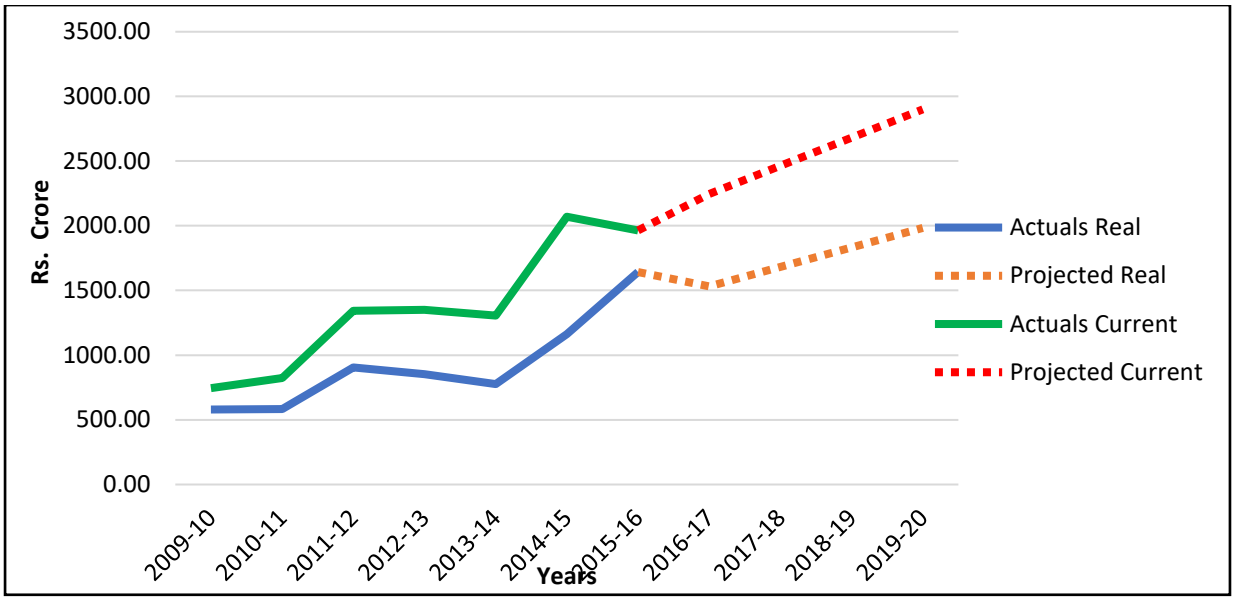


Figure 2a: Projections of Expenditure on Biodiversity Conservation: Central Schemes in Maharashtra – Scenario-1

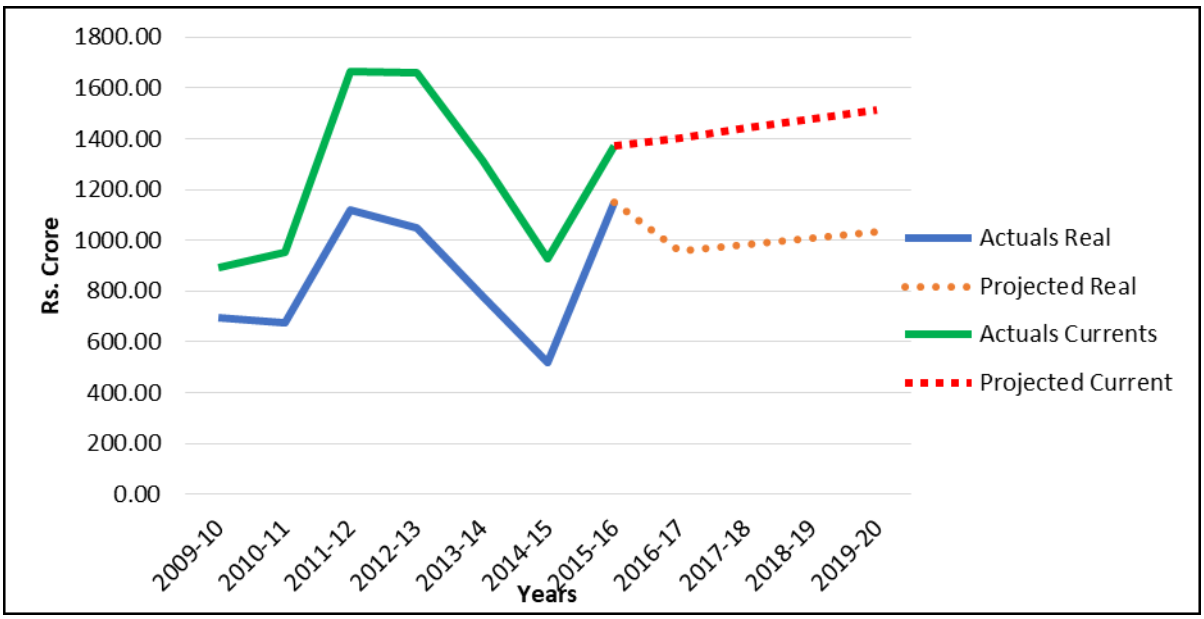


Figure 2b: Projections of Expenditure on Biodiversity Conservation: Central Schemes in Maharashtra – Scenario- 2

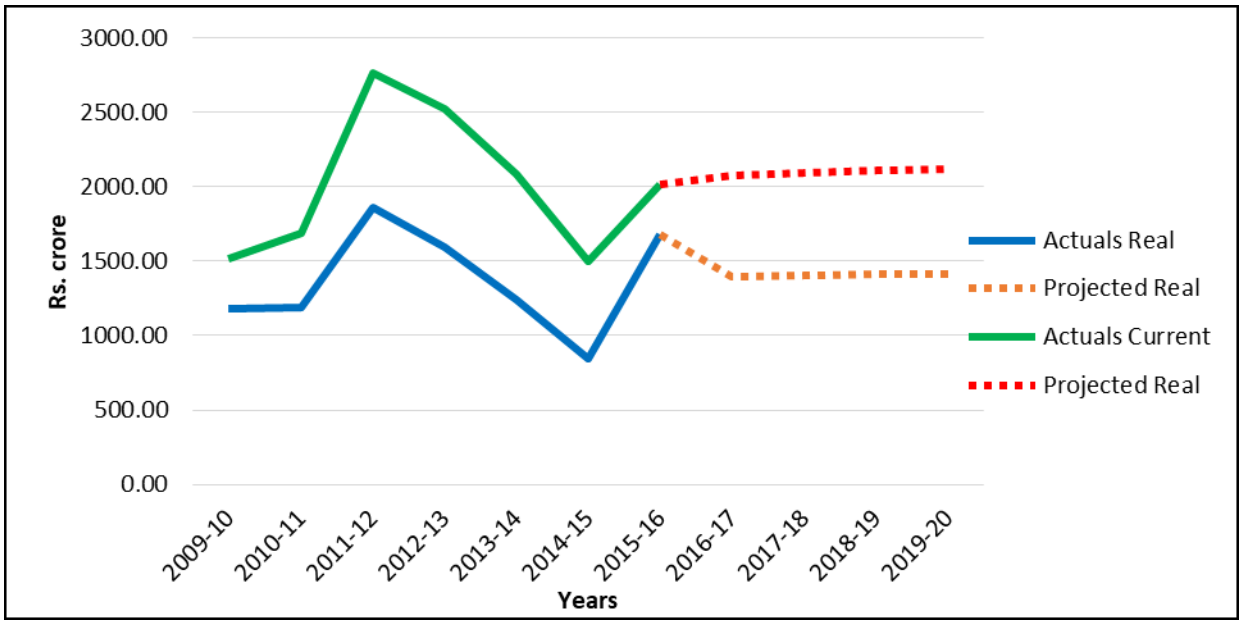


Figure 3a: Projections of Total Expenditure on Biodiversity Conservation in Maharashtra – Scenario-1

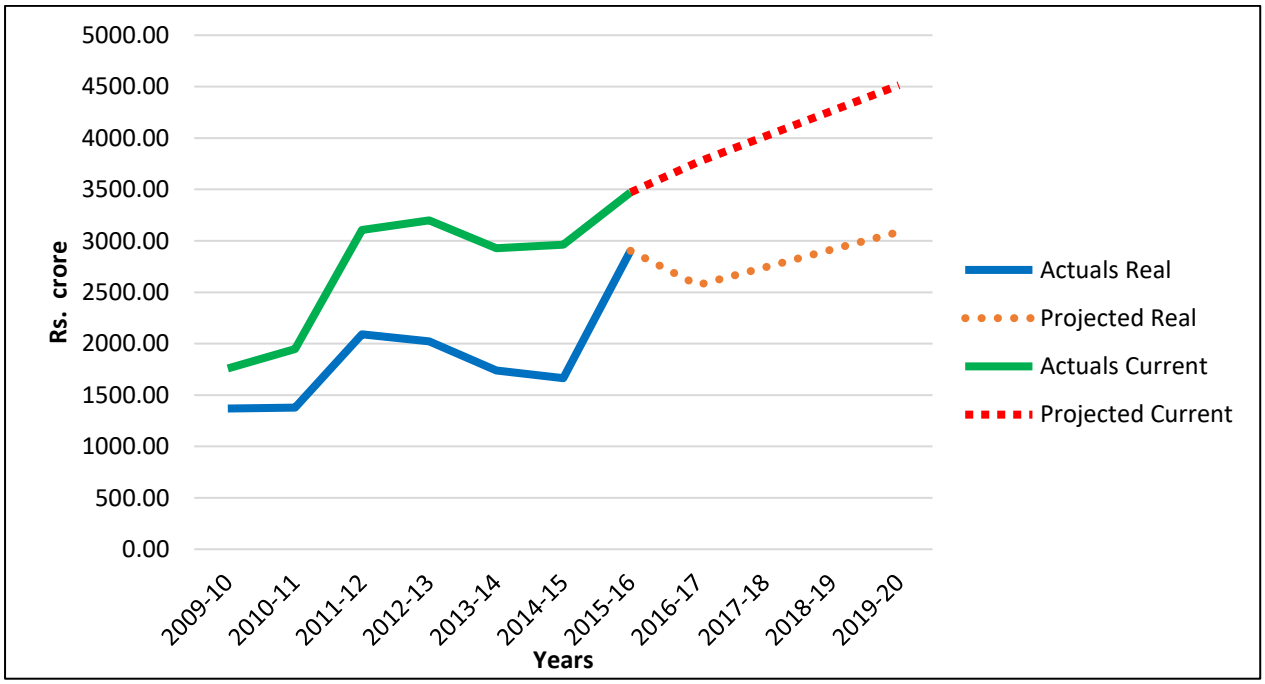
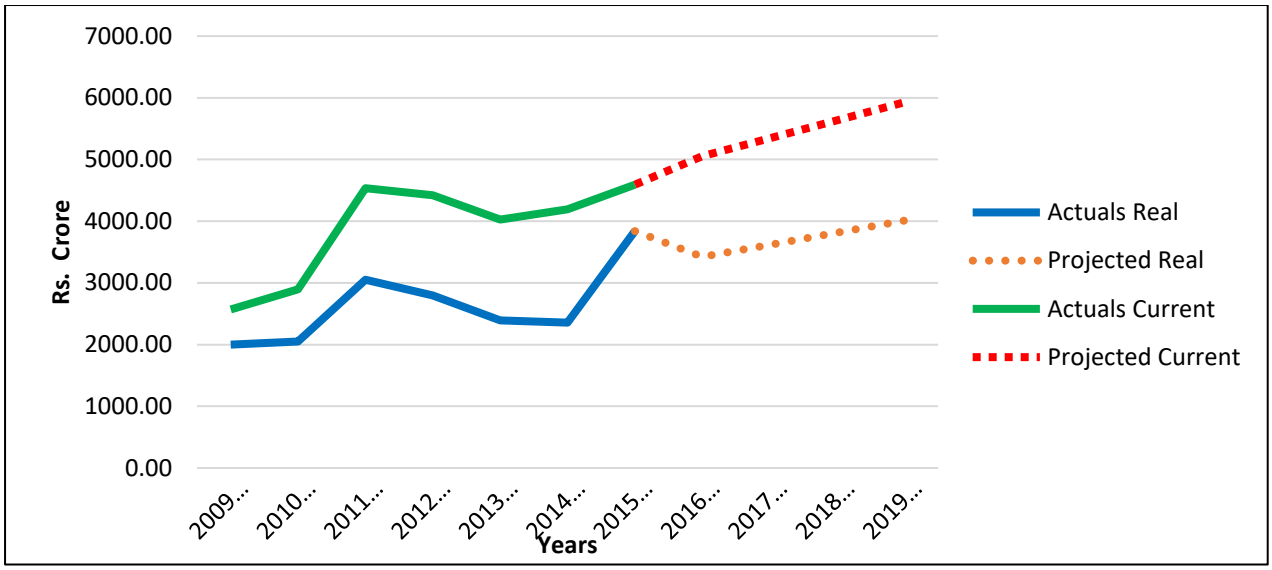


Figure 3b: Projections of Total Expenditure on Biodiversity Conservation in Maharashtra – Scenario-2



7. Summing-up

As noted earlier, for analysis in this chapter the data and results are compiled and arranged in a number of useful frameworks i.e. by impact on biodiversity and by BIOFIN Taxonomy, by state government ministry/department, by central government ministry, and by districts. The main observations are:

(a) Biodiversity attributable expenditure in Maharashtra ranged between 1.49 to 2.18 percent of total expenditure of Government of Maharashtra as per scenario-1 during the period 2009-10 to 2015-16. The corresponding figures under scenario-2 were 1.93 to 3.19 percent (Table 26).

As a percentage of GSDP of Maharashtra, the total expenditure attributable to biodiversity conservation ranged between 0.18 to 0.27 per cent under scenario-1 and between 0.23 to 0.39 percent under scenario-2. In other words, less that 0.40 percent of state's income is spent on biodiversity related activities (Table 26).

(b) If we consider the flow of funds only through various central schemes to Maharashtra we find that a large percentage of expenditures are through schemes that have Indirect-Medium and Indirect-High relevance for biodiversity; and a significant amount of this is spent on Sectoral Mainstreaming and Sustainable use of Natural Resources (Tables 8 and 9).

Analysis of expenditure on biodiversity conservation by the key central government ministries shows that MoEF&CC and Ministry of Water Resources, as expected, have more focus on schemes having direct relevance for biodiversity. The other important ministries are Ministry of Rural Development, Ministry of Urban development and

Ministry of Agriculture which implement schemes with Indirect-High, Medium or Low relevance for biodiversity (Table 10).

(c) As regards State's own funds are concerned expenditure attributable to biodiversity conservation and related activities accounted for a very small proportion of total expenditure of Maharashtra varying between 0.54-0.76 percent under scenario-1 and between 0.66-1.04 percent under scenario-2 during the period under consideration. Their share in total revenue receipts of Maharashtra varied between 0.51-1.25 (Table 11).

State schemes which are of indirect high relevance account for a sizeable proportion of the attributable expenditures in most years during the period of the study. Expenditure through schemes that have direct relevance for biodiversity are from the Forest Department. The other important state government departments are Planning Department, Water Resources Department and Department of Agriculture (Tables 15, 16 and 17)).

(d) The district level estimates of expenditure on biodiversity conservation are along the expected line. For instance, in Chandrapur, a highly forested district, expenditure in biodiversity conservation is significantly higher compared to Ratnagiri a coastal district (Table 11). Further, while in Chandrapur a significant expenditure on conservation activities are undertaken by the forest department through direct schemes of restoration and protection of biodiversity (Tables 23 and 25); in Ratnagiri since there in no separate coastal conservation department , most of the conservation is through indirect medium and indirect high relevance schemes being implemented through fisheries and agriculture department for restoration and protection of coastal biodiversity (Tables 19 and 21). Ratnagiri is doing better in terms of sectoral mainstreaming of biodiversity conservation than Chandrapur which could be owing to less opportunities for mainstreaming due to presence of a strong forest department in the latter.

(e) Expenditures on biodiversity conservation in Maharashtra show an increase between FY 2010-11 and 2011-12, decline thereafter and look up again in 2015-16. This trend is not easy to explain due to some key policy and institutional reforms during this period: one, implementation of the Fourteenth Finance Commission's (FFC) recommendations and subsequent restructuring of grants by the Central Government in FY 2015-16[15]; and two, scrapping of the system of Five Year Plans in India[16].

[15] Post FFC award there has been an increase in untied fiscal space of states in aggregate. Analyses of how states have adjusted to these changes and what are the likely impact of these on finances of different state governments is yet to come.

[16] The current financial year, 2016-17, is the last year of the 12th five-year plan. The process for formulating a 13th five-year plan has not been initiated, as a consequence of which the era of five-year plans is set to end in India this year.

Breaking the study period into Five Year Plan periods we find that the expenditure on biodiversity shows a decline in the Twelfth Plan period (2012-17) initially, though moves up in 2015-16 (Figure 3b). While the former can be attributed to the debate and perception in the country that the planning process needed to undergo change which may have also driven poor servicing of the 12th Plan; the latter can, to a large extent, be explained by the moving away from the system of releasing grants directly to the executing agency to a system where grants are routed through state budgets, and enhanced devolution due to FFC recommendations and subsequent restructuring of the central grants in FY 2015-16[17].

Credible evidence on the impact of recommendations of the FFC on state finances in Maharashtra and its implications for expenditures of the state, especially biodiversity expenditures however will have to wait until 2-3 years data on actual expenditure becomes available. So far we have Revised Estimates (RE) for FY 2015-16 and Budget Estimates (BE) for 2016-17 first and second years of implementation of FFC recommendations, respectively. Thus the projected expenditures should be seen with these in background.

8. Policy Suggestions

8.1 Mainstreaming Biodiversity

Based on the analysis in this chapter and our detailed consultations with various stakeholders the broad sense we get is that at present there is no conscious strategy or effort to either integrating biodiversity concerns into development planning or working towards/improving departmental coordination for better biodiversity outcomes from implementation of current sectoral and cross sectoral (excepting MGNAREGA) programs and schemes.

Mainstreaming characteristics and considerations reported in the literature include: integration/ internalization/inclusion of biodiversity goals in development models, policies and programs; and modifying human behavior to increase sustainability.

Though mainstreaming has been referred to as "integrating" biodiversity into development, often it would involve changing the focus of development policies and interventions towards the values of biodiversity so as to achieve positive biodiversity and development outcomes. Even integrating biodiversity hinges upon 'the true value of biodiversity'.

Strong and detailed science-based biophysical and socio-economic data and knowledge at appropriate spatial scales is required to support successful mainstreaming interventions. A substantial progress has been made in this direction by undertaking investment in

[17] Post-FFC award there has been an increase in untied fiscal space of states in aggregate.

generating such foundational knowledge yet a long way to cover especially in developing countries.

In view of this we feel that the cross sectoral policies like poverty reduction, sustainable development, employment generation which invariably have environmental and biodiversity conservation/enhancement components can provide good entry points in this context.

Simple and practical steps towards better coordination between relevant departments have the potential to improve biodiversity focus thereby improving outcomes of government expenditure in general and biodiversity outcomes in particular (For further discussion on this in the context of Maharashtra state see Chapter 9).

The efforts towards improvement in departmental coordination resulting in better dividends from implementation of programs and schemes would also constitute the first initial steps towards integration of biodiversity.

8.2 CAMPA Funds

- With the passage of CAMPA Bill 2016, CAMPA funds will potentially see significant growth. It is important that a medium to long term finance plan is put in place along with quantifiable targets for effective utilization of these funds.
- Effective utilization of CAMPA funds would require planning, capacity & accountability.

8.3 Finance Commission Grants

- Twelfth and Thirteenth Finance Commissions had given tied grants for meeting targets which have had both direct and indirect positive implications for BD conservation. Now that the Fourteenth Finance Commission has built the forest cover into the devolution formula the State Biodiversity Boards under the leadership of NBA and MoEF&CC should ask for increase in allocation for BD conservation, which should be backed by a solid plan.

- Although Maharashtra Biodiversity Strategy and Action Plan is in the making, review of issues, policy and institutions around biodiversity in Maharashtra in this report (see chapters 6-8) brings out important suggestions to help get started. Many of these suggestions relate to strengthening implementation and enforcement of existing programs, policies and laws.

8.4 Other Potential Sources of Funds

- Can potentially leverage more funding if BD conservation is presented to policy makers to have strong links with SDGs.
- According to Maharashtra SFP, 2008, a green fund was to be created by the State's forest department to support investments on conservation, wasteland development, eco-restoration, and watershed development. The fund is to be serviced from

CAMPA, corpus of forest development tax and resources mobilized from levy of 2 % green cess on Municipal Corporations using water from forest areas. Funds available from Clean Development Mechanism (CDM) and other similar schemes are also to be a part of this fund. But no Green Fund has been created so far.

- Sufficient and timely funding is important for conservation activities. Recognizing this National Forest Commission, 2006 recommended 2.5 % of total plan outlay to forestry sector. However, the total outlay of forestry sector in state of Maharashtra during 2010-15 ranged between 0.64 to 1.10 % amounting to a gap of as much as 51 per cent.

8.5 Institutional Coordination

- BD conservation through a single ministry/department is not a viable strategy. It is important that systematic steps are taken to develop synergies across relevant policy sectors.
- In order to develop the effective strategies, institutional coordination and cooperation are important. Co-production of scientific knowledge in decision making is crucial.
- For BD conservation to be effective in urban contexts there is need for a holistic ecology-sensitive institutional approach in urban areas …smart cities, urban planning.
- Recent initiatives of the central government in improving coordination among relevant ministries in the context of SDGs is worth exploring in detail.

8.6 Suggestions towards Policy Preparedness

- Clarity on what is needed to be done
- The goal should be to choose locations where conservation has the greatest payoff
- Scientific knowledge, economic considerations and social justice are key elements of an efficient conservation plan
- Need to prioritize and go in mission mode. Some examples:
    - Improving biodiversity Governance
    - Improving Biodiversity Data and Policy Evaluation
    - Role of timely funding support and not as an afterthought.

8.7 Periodic Evaluation and Course Correction

- Feedback is important in improving productivity of investments. We need tools for evaluating the effectiveness of specific policies, such as protected areas and landscape approach which are already in use
- However, due to lack of guidance on new techniques and solutions effectiveness of such investments is limited. Impact evaluation studies are rare for any feedback.
- Even CAMPA and FC grants for conservation have underperformed due to lack of clear strategy, capacity & accountability (CAG).

Chapter 3

Mapping Expenditure for Biodiversity Conservation through External Assistance (Grants and Loans)

1. Introduction

Government of India (GoI), through bilateral, and multilateral agreements, receives external assistance by way of loans / grants. The assistance/aid may be for the program/projects implemented directly by the Central/ State Government or for non-government bodies where GoI acts as a guarantor. As per the policy on Bilateral Development Cooperation, bilateral development assistance is accepted from all G-8 countries[18] and the European Union. Non G-8 EU countries can also provide such assistance, provided they commit to a minimum annual development package of USD 25 million[19].

External Assistance can be broadly categorized into:

a. Loans[20] and Grants[21]
b. Government (directly to GOI) and Non-government (directly to non-government agencies with GOI as guarantor)
c. Multilateral and Bilateral assistance

For loans to qualify as Official Development Assistance, they must have a concessionality[22] of 25%.

2. Identification of Relevant Sources of Data

Mapping of fund flows for biodiversity conservation through external assistance would require project/program/activity-wise data. Our desk research and consultations with experts pointed us to the Department of Economic Affairs (DEA), Ministry of Finance (MoF).

The DEA is the nodal department for all external loans, credits and grants from foreign countries, multilateral agencies, non-government agencies[23] and foundations, etc. The Aid Accounts and Audit Division (AAAD) is responsible for arranging draw-down of funds against

[18] France, Germany, Italy, United Kingdom, Japan, United States of America, Canada and Russia
[19] Handbook on Bilateral Development Assistance, Department of Economic Affairs, Ministry of Finance, Government of India
[20] The borrower has the obligations to repay the principal, interest and any other charges agreed between the external agencies and the borrowers.
[21] Grants are transfers made in cash, goods or services without any obligation to repay.
[22] Concessionality is a measure of the 'softness' of a loan, reflecting the benefit to the borrower compared to a loan at market rate.
[23] The flow of external aid to NGOs and autonomous institutions is governed by the FCRA, 1976. The recipient organization fills a prescribed pro forma which is attached to the proposal of the donor and is sent to the DEA for further processing. Once accepted by the DEA, the donor may directly transfer funds to the accounts of the recipient organizations, and make their own arrangements for monitoring the physical and financial progress of these projects. See, Policy on Development Cooperation, Ministry of Finance, Government of India, December 7th, 2015. http://finmin.nic.in/the_ministry/dept_eco_affairs/pmu/GuidelineBDC.pdf

all Loans and Grant Agreements concluded by Credit Divisions with various multi-lateral and bilateral agencies.

The role of AAAD can be summarized as:

I. Acting as an interface between the funding agencies and various Ministries of GOI/ the beneficiaries/project implementing agencies.

II. Debt recording and management, among others, covering:

- Maintaining and recording loan agreements
- Handling disbursements
- Debt servicing of Government loans
- Advising Plan Finance-I Division under Department of Expenditure for Release of funds to State Governments in relation of projects related with external funding
- Debt reporting to international funding and monitoring agencies
- Preparation of sovereign external assistance receipt and debt service budget for inclusion in GoI budget document.
- Web-publication of sovereign external debt portfolio

The AAAD maintains a platform www.aaad.nic.in which hosts information in real time on external assistance received by the Government of India. The department is still in the process of digitization of data; however, with active cooperation of the officers we were able to get access to the data site. As expected, we faced some issues in sorting the desired information on the website and it took us longer than it should once the digitization is completed. However, we were able to overcome the difficulties with assistance from the staff.

There are 4 types of Bilateral Development Programs:

a) **Project Finance:** used for the procurement of facilities, equipment and services or for implementing civil works and other related works.

b) **Sector Program Finance:** to support development policies and institutional reforms in a specific prioritized sector such as education. Usually disbursed in ‘tranches’ as milestones are achieved and conditions are fulfilled.

c) **Financial Intermediary Loans (Lines of Credit):** Provided to financial institutions such as SIDBI, NABARD etc. for the implementation of selected activities.

d) **Technical Cooperation:** for enhancing the abilities of individuals, groups, institutions and organizations through capacity development, including advisory and technical expertise services and trainings.

3. Compilation of Data

The AAAD classifies all Externally Aided Projects (EAPs) under 4 broad headlines: Ministry Wise, Sector Wise, Donor Wise, and State Wise. For each grant/loan the following information is available: Project Grant; Revised Estimate; Utilization in the Previous Year; Utilization in the Present Year; Cumulative Disbursement; and Undrawn Balance.

For this study we first identified the projects/activities which had biodiversity relevant components. For the identified projects/programs the data has been compiled in respect of utilization in the current year, for the period FY 2009-10 to 2015-16[24].

4. Analysis and Results

The data was compiled and arranged in a framework i.e. by impact on biodiversity and by BIOFIN Taxonomy (see Chapter 2). This data was used to compute biodiversity attributable expenditures through EAP. Main observations can be summarized as below:

i. Biodiversity attributable expenditure ranged between 3.5% - 6% of the total fund flows (both grant and loan) under EAPs during the study period. In terms of magnitude of expenditure to biodiversity conservation, EAPs flows ranged from about Rs. 1230 cr. in 2009-10 to Rs. 1650 cr. in 2014-15 (Table 1). Of this, Biodiversity attributable grants (from now on grants) formed insignificant 0.8-7 per cent. Further, while grants show a declining trend, loans show a steady increase during the study period[25] (Figure 1).

ii. As would be expected, MoEF&CC leads in receiving/implementing EAPs (with 50-75% of the biodiversity attributable external flows) followed by Ministry of Agriculture (MoA) and Ministry of New and Renewable Energy (MNRE) (Table 2). Detailed tables for ministry wise analysis are available in Annexure I (Tables A1-A9 for grants, and Tables A10-A21 for EAP Loans).

iii. Analysis of fund flows under EAPs through the lens of BIOFIN taxonomy shows that while grants focused on Natural Resource Use (NRU) related projects; loans show a mixed pattern with a bias towards NRU, restoration, and protection activities (Table 3). Access and Benefit Sharing is yet to receive attention of EAPs.

Table 1: Expenditure Attributable to Biodiversity Conservation under EAP[26]

(Rs. Crore)

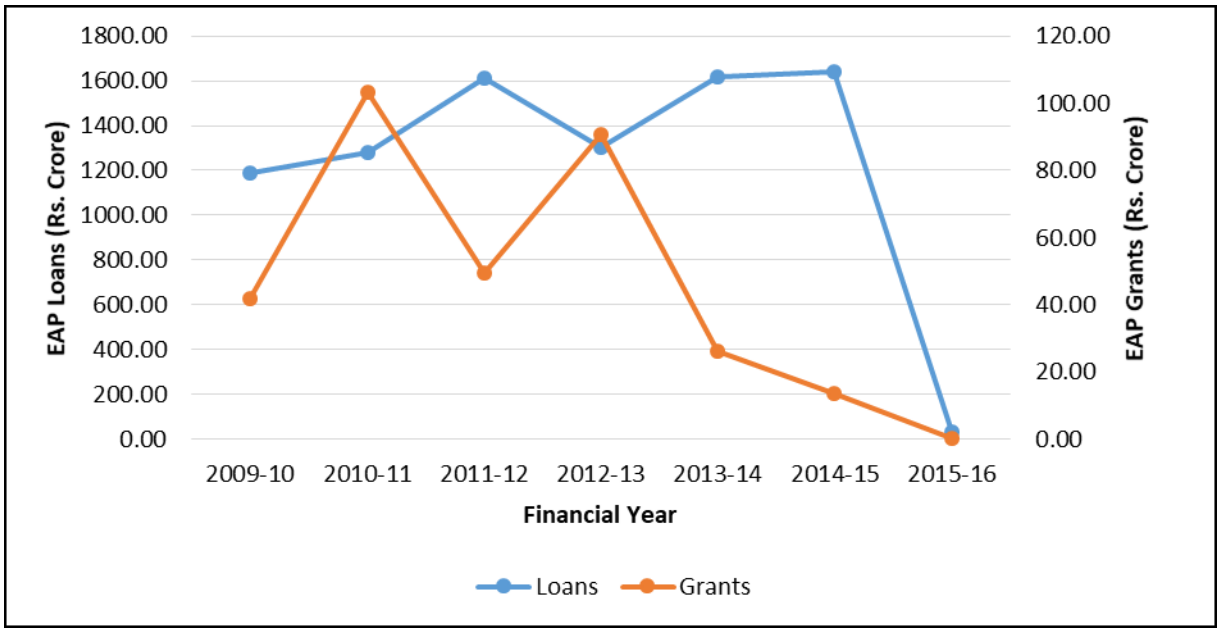
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Loans	1186.91	1279.29	1609.13	1301.85	1616.15	1639.03	30.78
Grants	41.82	103.38	49.45	90.60	26.15	13.43	0.39

[24] While the data has been collected for the latest available year, the information for 2015-16 is incomplete. As the chapter progresses, these estimates for 2015-16 have been included in the analysis, but have not been included in the projections estimation to ensure a more accurate projection.
[25] Refers to years 2009-10 to 2014-15 as data for 2015-16 is not complete.
[26] AAAD Data accessed on August 1st, 2016

Total	**1228.73**	**1382.67**	**1658.58**	**1392.45**	**1642.30**	**1652.46**	**31.16**
Grants as a % of Total	3.40	7.48	2.98	6.51	1.59	0.81	1.24

Source: Authors' calculations

Figure 1: Expenditure Attributable to Biodiversity under EAP



Source: Authors' calculations

Table 2: Ministry, Sector and Donor wise Attributable Expenditure under EAP

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EAP Grants							
MoA	9.90	89.50	24.86	12.91	5.54	6.58	0.00
MoEF&CC	2.54	2.66	4.37	66.84	2.33	2.47	0.35
MoSPI	1.78	0.52	1.51	0.00	0.40	0.00	0.00
MoF	0.00	0.01	0.08	0.00	0.09	0.01	0.00
MoP	0.30	0.03	0.03	0.79	0.12	0.64	0.00
MoUD	0.01	0.24	0.08	0.14	0.29	0.00	0.04
MoRD	25.48	0.70	11.82	3.28	12.44	0.36	0.00
MoWR	1.63	9.72	6.71	6.65	4.97	3.37	0.00
MoNRE	0.18	0.00	0.00	0.00	0.00	0.00	0.00
EAP Loans							
MoA	80.88	141.08	161.41	131.74	253.23	238.98	-
MoEF&CC	814.93	753.02	797.90	797.90	820.04	889.90	22.72
MoF	-	39.11	18.39	0.23	60.50	151.64	-
MoT	3.22	5.24	2.14	2.37	3.55	1.49	-
MoP	2.99	11.27	29.50	29.64	152.09	71.91	-
MoHA	0.07	-	-	-	-	-	-
MNRE	-	22.47	302.17	104.44	50.50	85.40	-
Infrastructure Development	2.82	3.19	3.46	0.46	77.72	41.78	-
Rural Development	8.22	15.13	17.97	15.17	16.87	20.95	1.56
Social Sector	23.79	5.78	14.38	13.19	14.96	20.28	0.79
Water Resources Sector	110.06	187.48	185.22	125.51	94.69	63.18	5.71
Asian Development Bank	139.94	95.53	76.59	81.22	72.00	53.53	-
Total (Loans & Grants)	1228.73	1382.67	1658.58	1392.45	1642.34	1652.46	31.16

Source: Authors' calculations

Table 3: Expenditure Attributable to Biodiversity Conservation under BIOFIN Taxonomy

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EAP Grants							
Sectoral Mainstreaming	0.78	0.29	0.34	64.72	0.94	1.20	0.04
(% Total)	1.88	0.28	0.70	71.43	3.61	8.93	9.44
Natural Resource Use	34.845	89.224	40.02	14.84	20.97	6.39	0.35
(% Total)	83.33	86.31	80.92	16.39	80.21	47.61	90.56
Protection	2.31	2.54	0.41	1.85	0.00	0.00	0.00
(% Total)	5.52	2.46	0.83	2.04	-	-	-
Restoration	0.00	4.56	2.17	2.54	2.73	5.25	0.00
(% Total)	0.00	4.41	4.39	2.81	10.44	39.13	-
ABS	0.510	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	1.22	-	-	-	-	-	-
Enhancing Implementation	3.368	6.758	6.509	6.642	1.502	0.580	0.00
(% Total)	8.05	6.54	13.16	7.33	5.74	4.32	-
Total Grants	**41.82**	**103.38**	**49.45**	**90.60**	**26.15**	**13.43**	**0.39**
EAP Loans							
Sectoral Mainstreaming	93.50	108.88	387.91	332.70	335.52	366.93	0.00
(% Total)	7.88	8.51	24.11	25.56	20.76	22.39	-
Natural Resource Use	555.63	718.93	670.50	511.02	623.76	558.30	13.20
(% Total)	46.81	56.20	41.67	39.25	38.60	34.06	42.88
Protection	162.78	179.98	102.12	179.10	245.20	260.71	17.34
(% Total)	13.71	14.07	6.35	13.76	15.17	15.91	56.34
Restoration	355.48	180.54	360.95	150.02	266.58	315.37	0.04
(% Total)	29.95	14.11	22.43	11.52	16.49	19.24	0.13
Enhancing Implementation	19.53	90.97	87.65	129.02	145.10	137.72	0.20
(% Total)	1.65	7.11	5.45	9.91	8.98	8.40	0.65
Total Loans	**1186.91**	**1279.29**	**1609.13**	**1301.85**	**1616.15**	**1639.03**	**30.78**
Total (Loans & Grants)	**1228.73**	**1382.67**	**1658.58**	**1392.45**	**1642.34**	**1652.46**	**31.16**

Source: Authors' calculations

Table 4: Number of EAP by BIOFIN Taxonomy

Themes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EAP Grants							
Sectoral Mainstreaming	15	24	23	25	26	23	16
Natural Resource Use	14	16	19	16	17	17	15
Protection	2	2	2	1	1	1	1
Restoration	1	1	2	1	1	1	2
Access & Benefit Sharing	1	1	-	-	-	-	-
Enhancing Implementation	7	8	8	9	9	9	9
EAP Loans							
Sectoral Mainstreaming	14	20	30	35	35	36	18
Natural Resource Use	31	35	37	39	34	38	33
Protection	4	6	5	5	5	5	5
Restoration	7	9	11	10	9	8	6
Access & Benefit Sharing	-	-	-	-	-	-	-
Enhancing Implementation	4	7	5	5	5	5	4
Total EAP	100	129	142	146	142	143	109

Source: Authors' calculations

Table 5: Expenditure Attributable to Biodiversity Conservation by Impact Classification

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EAP Grants							
Direct	1.83	7.06	5.30	3.87	0.99	1.92	0.35
(% Total)	4.38	6.83	10.72	4.27	3.79	14.30	90.56
Indirect High	1.65	84.64	27.96	81.54	23.50	9.89	0.00
(% Total)	3.95	81.88	56.53	89.99	89.88	73.65	
Indirect Medium	38.02	11.28	15.99	4.64	0.94	1.16	0.00
(% Total)	90.91	10.91	32.32	5.12	3.58	8.62	
Indirect Low	0.32	0.39	0.21	0.55	0.72	0.46	0.04
(% Total)	0.77	0.38	0.43	0.61	2.76	3.43	9.44
Total	**41.82**	**103.38**	**49.45**	**90.60**	**26.15**	**13.43**	**0.39**
EAP Loans							
Direct	823.85	815.62	868.23	706.51	1062.61	1073.58	22.72
(% Total)	69.41	63.76	53.96	54.27	65.75	65.50	73.83
Indirect High	255.57	333.95	327.27	240.11	194.42	163.25	7.27
(% Total)	21.53	26.10	20.34	18.44	12.03	9.96	23.61
Indirect Medium	101.68	111.20	380.67	322.89	298.50	372.44	0.79
(% Total)	8.57	8.69	23.66	24.80	18.47	22.72	2.57
Indirect Low	5.81	18.52	32.97	32.34	60.63	29.76	0.00
(% Total)	0.49	1.45	2.05	2.48	3.75	1.82	
Total	**1186.91**	**1279.29**	**1609.13**	**1301.85**	**1616.15**	**1639.03**	**30.78**

Source: Authors' calculations

4.1 Comparison with CRS data

The OECD Development Assistance Committee (DAC) collects aid flows at activity level through the Creditor Reporting System (CRS)[27]. The data collection is based on a standard

[27] Data is available online at http://www.oecd.org/dac/stats/crs

methodology and agreed definitions. Purpose of this data is to analyze trends and compare the efforts of donors.

Data is collected through a network of correspondents in donors' headquarters. CRS data comes from the donors including the 22 member countries of the DAC, the European Commission and other international organizations.

The data are part of DAC members' official statistical reporting to the OECD. (Non-DAC donors' reporting takes place on a voluntary basis.) A network of statistical correspondents collects data from aid agencies and government departments (central, state and local) on an ongoing basis.

Bilateral aid and multilateral aid are demarcated so as to avoid the reporting of the same activity by both a bilateral donor and a multilateral donor. Bilateral ODA refers to activities undertaken by bilateral donors directly with an aid recipient or with national and international NGOs. Projects executed by multilateral institutions or NGOs on behalf of bilateral donors are also classified as bilateral aid (since it is the donor country that effectively controls the use of the funds.

Aid activities financed from the multilateral institutions' regular budgets are referred to as "multilateral outflows". The CRS database includes those of the World Bank, the regional development banks and some UN agencies.

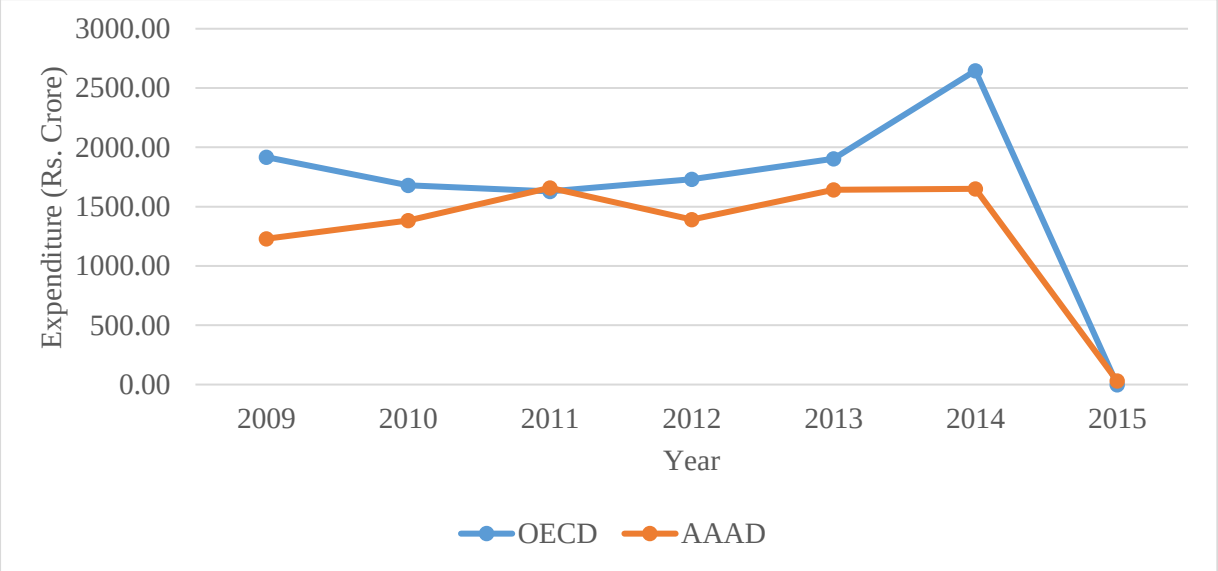
The OECD collects information on both commitments made by donors and gross disbursements. In this study data on disbursements has been compiled. The disbursements for both the OECD and the AAAD are in Table 6.

Table 6: Biodiversity Attributable Disbursements under EAP from OECD[28] and AAAD (Rs. Crore)

		2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
OECD[29]	Bilateral Flows	287.96	278.94	272.63	199.65	218.46	336.08	-
	Multilateral Flows	1.37	0.16	0.57	5.98	5.46	1.15	-
	Other Official Flows	106.65	88.20	75.78	118.18	101.11	96.47	-
	OECD Total	**1916.74**	**1679.57**	**1628.77**	**1730.33**	**1904.59**	**2646.81**	**-**
AAAD	**Total**	**1228.73**	**1382.67**	**1658.58**	**1392.45**	**1642.30**	**1650.76**	**31.16**

Source: Authors' calculations

Figure 2: Attributable Disbursements under EAP from OECD and AAAD



Source: Authors' calculations

The difference between the OECD and AAAD estimates of disbursements can be attributed to the following:

[28] OECD Data accessed on November 7, 2016.

[29] The OECD information was converted into INR Cr. Using the Annual Average Exchange Rate by the Reserve Bank of India available in Table 147 of the Handbook of Statistics on the Indian Economy, Reserve Bank of India, Sept, 16, 2015

i. The OECD database estimates flows on the basis of a Calendar Year (1st January to 31st December), whereas the Government of India follows a Financial Year (1st April – 31st March).

ii. Given that the OECD publishes data in USD million, the annual average exchange rates were used to convert the OECD numbers in INR cr. As mentioned previously, the AAAD figures are based on real time conversions. Therefore, the difference between the two estimates, (OECD and AAAD) can partly be attributed to the exchange rate. An example of this is, in 2011 we see that the AAAD numbers are marginally higher than that of the OECD, this is potentially due to the fact that the Indian currency had depreciated in 2011 i.e. 1 USD converted into more INR.

iii. Lastly, the difference between the figures can also be due to the difference in methodology for attribution used by OECD and the methodology used by NIPFP.

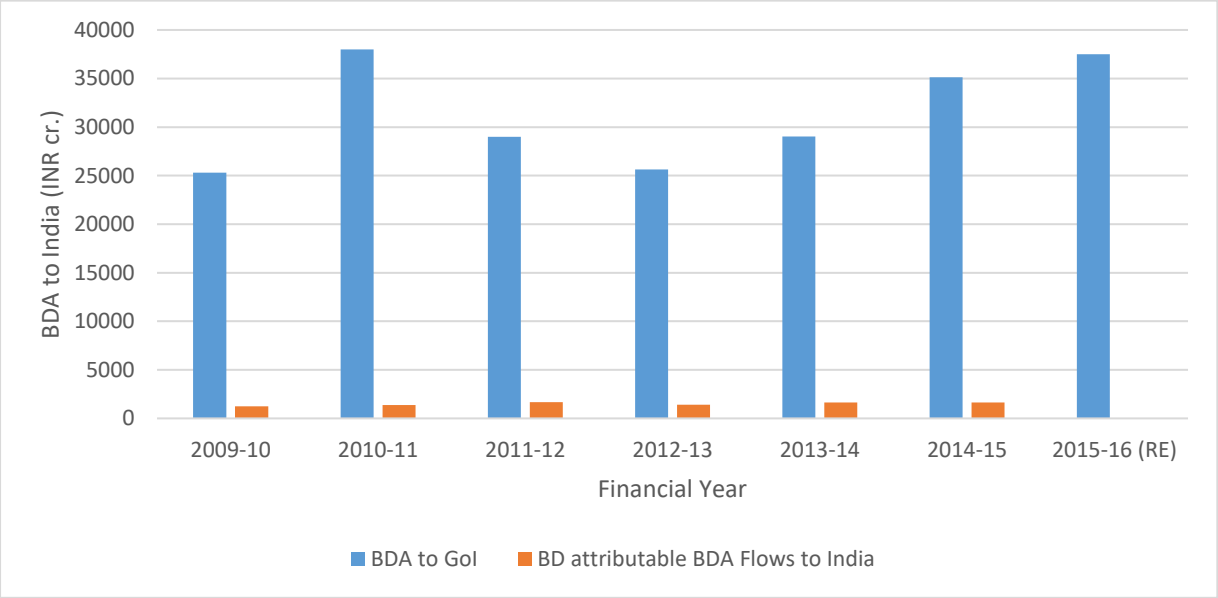
Table 7: Biodiversity Attributable EAP as Percentage of Total EAP to India

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (RE)
EAP to GoI	25318.7	38002.9	28996.7	25619.6	29034.3	35133.8	37517.4
BD attributable EAP Flows to India	1228.73	1382.67	1658.58	1392.45	1642.3	1650.76	31.16
BD attributable EAP as a % of total EAP	4.85	3.64	5.72	5.44	5.66	4.7	-

Source: Authors' calculations

Figure 3: Biodiversity Attributable EAP as Percentage of Total EAP to India



Source: Authors' calculations

5. Projections

Estimated expenditure for biodiversity conservation through EAPs have been used to project future flows for the years 2015-16 to 2018-19 (Table 8). This has been done for both the Nominal and Real Values using the GDP deflator base year of 2004-05.

As can be seen Figure 4, there is an increase in the projected nominal numbers, and a marginal decrease in the projected real numbers. New series of GDP deflator may give relatively more robust estimates.

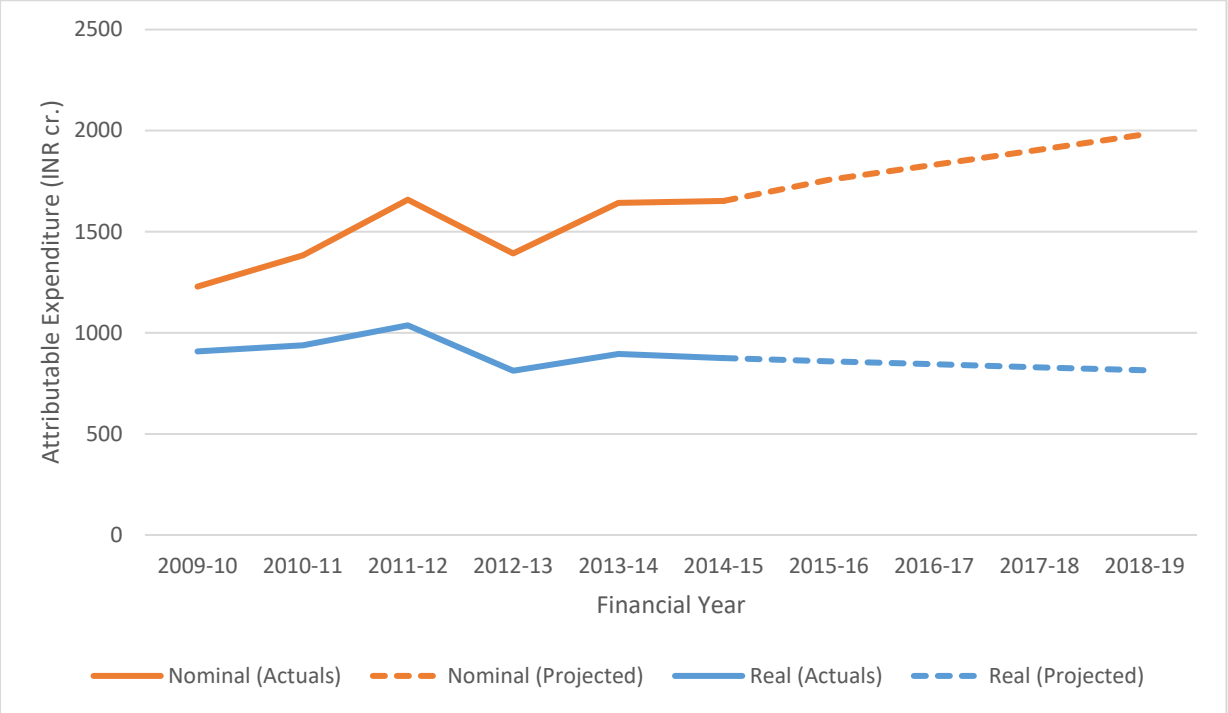
Table 8: Projected Expenditure on Biodiversity Conservation through EAP

(Rs. Crore)

Financial Year	Nominal	Real
2009-10	1228.73	908.74
2010-11	1382.67	938.29
2011-12	1658.58	1036.98
2012-13	1392.45	812.32
2013-14	1642.30	896.11
2014-15	1652.46	875.13
2015-16	1756.01	859.33
2016-17	1831.20	844.50
2017-18	1906.38	829.66
2018-19	1981.56	814.83

Source: Authors' calculations

Figure 4: Projected Expenditure on Biodiversity Conservation through EAP



Source: Authors' calculations

6. Summarizing

i. Biodiversity attributable flows (grants and debt) through external sources range from Rs. 1228 cr. to Rs. 1658 cr. during the study period. As a percentage of the total EAP this works out to 3.6% - 5.7% (Table 7).

ii. Share of grants was 1-2 per cent in total EAP with the exception of 2010-11 when it was higher at 7.48 per cent.

iii. Total external aid as well as biodiversity attributable aid has shown a steady trend except in 2011-12. This is also reflected in the projections of flows for the years 2015-16 to 2018-19.

iv. MoEF&CC and MoA are the main recipients of the aid which has largely been used for NRU and sectoral mainstreaming.

v. It is important to note that according to OECD estimates, India is one of the largest recipients of biodiversity related ODA among the developing countries (6% of bilateral biodiversity related ODA over 2010-12 is received by India[30]).

vi. Total external aid as well as biodiversity attributable aid has shown a steady trend except in 2011-12. This is also reflected in the projections of flows for the years 2015-16 to 2018-19.

[30] OECD DAC Statistics Aid to Biodiversity http://www.oecd.org/dac/environment-development/Biodiversity-related%20aid%20Flyer%20-%20October%202014%20FINAL.pdf

7. Policy Suggestions

i. Better integration of biodiversity issues in social sector projects can potentially increase the share of biodiversity conservation in EAP in India.

ii. Protection and Restoration activities require significant amounts of funds as well as technical knowhow. Given that there are significant positive global externalities of protection and restoration activities, there appears to be a strong case for international support for these. There is merit in raising this issue in international forums like the CBD. It implies that this should be built into the biodiversity finance plan of India.

iii. It would help if AAAD could compile EAP fund flows by activities in a project/program.

Annexure – I: Ministry Wise EAP by BIOFIN Taxonomy

Table A1: Ministry of Environment, Forests and Climate Change (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.29	0.02	0.16	63.79	0.48	0.55	0.00
(% Total)	11.53	0.63	3.55	95.43	20.58	22.03	-
Natural Resource Use	0.00	0.09	3.75	0.26	1.84	1.35	0.35
(% Total)	-	3.53	85.72	0.39	78.90	54.52	100.00
Protection	2.31	2.54	0.41	1.85	0.00	0.00	0.00
(% Total)	91.02	95.46	9.38	2.77	-	-	-
Restoration	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	-	-	-	-	-	-	-
ABS	0.51	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	20.09	-	-	-	-	-	-
Enhancing Implementation	-0.57	0.01	0.06	0.94	0.01	0.58	0.00
(% Total)	-22.65	0.38	1.35	1.41	0.51	23.45	-
Total	2.54	2.66	4.37	66.84	2.33	2.47	0.35

Table A2: Ministry of Agriculture (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Natural Resource Use	9.90	84.93	22.68	10.37	2.82	1.33	0.00
(% Total)	100.00	94.89	91.24	80.29	50.81	20.14	-
Restoration	0.00	4.56	2.17	2.55	2.73	5.26	0.00
(% Total)	-	5.09	8.73	19.71	49.19	79.86	-
Enhancing Implementation	0.00	0.02	0.01	0.00	0.00	0.00	0.00
(% Total)	-	0.02	0.03	-	-	-	-
Total	9.90	89.50	24.86	12.91	5.54	6.58	0.00

Table A3: Ministry of Statistics and Planning (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Natural Resource Use	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	-	-	-	-	-	-	-
Enhancing Implementation	1.78	0.52	1.51	0.00	0.40	0.00	0.00
(% Total)	100.00	100.00	100.00	-	100.00	-	-
Total	1.78	0.52	1.51	0.00	0.40	0.00	0.00

Table A4: Ministry of Finance (EAP Grants)

(Rs. Crore)

(INR Cr.)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	0.01	0.08	0.00	0.09	0.01	0.00
(% Total)	-	100.00	100.00	-	100.00	100.00	-
Enhancing Implementation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	-	-	-	-	-	-	-
Total	0.00	0.01	0.08	0.00	0.09	0.01	0.00

Table A5: Ministry of Power (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.30	0.03	0.03	0.79	0.12	0.64	0.00
(% Total)	100.00	100.00	100.00	-	-	-	-
Total	0.30	0.03	0.03	0.79	0.12	0.64	0.00

Table A6: Ministry of Urban Development (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.01	0.24	0.08	0.14	0.25	0.00	0.04
(% Total)	100.00	100.00	100.00	-	-	-	-
Total	0.01	0.24	0.08	0.14	0.25	0.00	0.04

Table A7: Ministry of Rural Development (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Natural Resource Use	0.53	0.70	0.43	0.16	0.00	0.00	0.00
(% Total)	2.09	100.00	3.64	4.96	-	-	-
Enhancing Implementation	24.95	0.00	11.39	3.11	12.44	0.36	0.00
(% Total)	97.91	-	96.36	95.04	100.00	100.00	-
Total	25.48	0.70	11.82	3.28	12.44	0.36	0.00

Table A8: Ministry of Water Resources (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Natural Resource Use	0.00	4.21	2.21	1.11	3.88	3.37	0.00
(% Total)	-	43.26	32.89	16.70	78.07	100.00	-
Enhancing Implementation	1.63	5.52	4.50	5.54	1.09	0.00	0.00
(% Total)	100.00	56.74	67.11	83.30	21.93	-	-
Total	1.63	9.72	6.71	6.65	4.97	3.37	0.00

Table A9: Ministry of New and Renewable Energy (EAP Grants)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.18	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	100.00	-	-	-	-	-	-
Total	0.18	0.00	0.00	0.00	0.00	0.00	0.00

Table A10: Ministry of Environment, Forests and Climate Change (EAP Loans)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	0.00	0.00	139.65	5.14	0.00	0.00
(% Total)		-	-	17.50	0.63	-	-
Natural Resource Use	326.10	368.68	342.55	311.83	378.72	386.26	5.14
(% Total)	40.02	48.96	42.93	39.08	46.18	43.41	22.62
Protection	131.93	179.98	99.14	171.90	230.74	219.61	17.34
(% Total)	16.19	23.90	12.43	21.54	28.14	24.68	76.32
Restoration	337.44	113.40	268.56	45.50	60.35	146.31	0.04
(% Total)	41.41	15.06	33.66	5.70	7.36	16.44	0.18
Enhancing Implementation	19.46	90.97	87.65	129.02	145.10	137.72	0.20
(% Total)	2.39	12.08	10.99	16.17	17.69	15.48	0.88
Total	814.93	753.02	797.90	797.90	820.04	889.90	22.72

Table A11: Ministry of Agriculture (EAP Loans)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	-	-	-	-	-	-	-
Natural Resource Use	66.06	79.18	71.16	29.59	50.55	71.41	0.00
(% Total)	81.68	56.12	44.09	22.46	19.96	29.88	-
Restoration	14.82	61.90	90.25	102.15	202.68	167.57	0.00
(% Total)	18.32	43.88	55.91	77.54	80.04	70.12	-
Total	80.88	141.08	161.41	131.74	253.23	238.98	0.00

Table A12: Ministry of Finance (EAP Loans)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	4.05	0.00	0.23	3.91	151.64	0.00
(% Total)	-	10.36	-	100.00	6.47	100.00	-
Natural Resource Use	0.00	35.06	18.39	0.00	56.59	0.00	0.00
(% Total)	-	89.64	100.00	-	93.53	-	-
Total	0.00	39.11	18.39	0.23	60.50	151.64	0.00

Table A13: Ministry of Tourism (EAP Loans)

(Rs. Crore)

(INR cr.)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Restoration	3.22	5.24	2.14	2.37	3.55	1.49	0.00
(% Total)	100	100	100	100	100	100	-
Total	3.22	5.24	2.14	2.37	3.55	1.49	0.00

Table A14: Ministry of Power (EAP Loans)

(Rs. Crore)

(INR cr.)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	2.99	11.27	29.50	29.64	152.09	71.91	0.00
(% Total)	100	100	100	100	100	100	-
Total	2.99	11.27	29.50	29.64	152.09	71.91	0.00

Table A15: Ministry of Home Affairs (EAP Loans)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Enhancing Implementation	0.07	0.00	0.00	0.00	0.00	0.00	0.00
(% Total)	100	-	-	-	-	-	-
Total	0.07	0.00	0.00	0.00	0.00	0.00	0.00

Table A16: Ministry of New and Renewable Energy (EAP Loans)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	22.47	302.17	104.44	50.50	85.40	0.00
(% Total)	-	100	100	100	100	100	-
Total	0.00	22.47	302.17	104.44	50.50	85.40	0.00

Table A17: Infrastructure Development Sector (EAP Loans)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	2.82	3.19	3.46	0.46	77.72	41.78	0.00
(% Total)	100	100	100	100	100	100	-
Total	2.82	3.19	3.46	0.46	77.72	41.78	0.00

Table A18: Rural Development Sector (EAP Loans)

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	0.00	0.00	0.00	0.00	12.32	0.00
(% Total)	-	-	-	-	-	58.80	-
Natural Resource Use	8.22	15.13	17.97	15.17	16.87	8.63	1.56
(% Total)	-	100	100	100	100	41.20	100
Total	8.22	15.13	17.97	15.17	16.87	20.95	1.56

Table A19: Social Sector (EAP Loans)

(Rs. Crore)

(INR cr.)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Natural Resource Use	23.79	5.78	14.38	13.19	14.96	20.28	0.79
(% Total)	100	100	100	100	100	100	100
Total	23.79	5.78	14.38	13.19	14.96	20.28	0.79

Table A20: Water Resources Sector (EAP Loans)

(Rs. Crore)

(INR cr.)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	0.00	-1.44	0.00	0.00	0.00	0.00	0.00
(% Total)	-	-0.77	-	-	-	-	-
Natural Resource Use	110.06	188.92	185.22	125.51	94.69	63.18	5.71
(% Total)	-	100.77	100	100	100	100	100
Total	110.06	187.48	185.22	125.51	94.69	63.18	5.71

Table A21: Asian Development Bank (EAP Loans)

(Rs. Crore)

(INR cr.)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	87.69	69.33	52.78	58.28	46.15	3.89	0.00
(% Total)	62.66	72.58	68.91	71.75	64.10	7.26	-
Natural Resource Use	21.40	26.20	20.83	15.75	11.39	8.54	0.00
(% Total)	15.29	27.42	27.20	19.39	15.82	15.96	-
Restoration	30.85	0.00	2.98	7.20	14.46	41.10	0.00
(% Total)	22.05	-	3.89	8.86	20.08	76.79	-
Total	139.94	95.53	76.59	81.22	72.00	53.53	0.00

Chapter 4

Mapping Expenditure on Biodiversity Conservation through Corporate Social Responsibility: Status, Potential, Challenges and Imperatives

1. Corporate Social Responsibility in India

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 both in partnership with the governments, through civil society organizations, trusts and private foundations. A snapshot of how these initiatives of the corporate sector in India have evolved into the concept of Corporate Social Responsibility (CSR) and from being a voluntary activity by businesses to a 'statutory obligation' under the Companies Act, 2013, is in Box 1-2.

1.1 CSR: Formal notifications and guidelines[31]

In an effort to systematically encourage the corporate sector to incorporate environmental sustainability in its operations, various government institutions have issued notifications and guidelines. Key interventions in this context include:

Box 1: Key CSR Policy Interventions

a. In 2007-08 RBI issued a circular to all scheduled banks regarding the role of banks in CSR, sustainable development and non-financial reporting.
b. The Central Ministry of Corporate Affairs (MCA) followed this up with 'Voluntary Guidelines on CSR' in December, 2009. These guidelines for the first time included 'Respect for Environment' as one of the core elements of CSR thus enlarging the scope of CSR.
c. Subsequently in 2011, National Voluntary Guidelines (NVGs) were issued which listed out social, environmental and economic responsibilities of businesses in India. But the NVGs were largely advisory in nature than mandatory[32].

1.2 CSR: Statutory obligation

It was with the Companies Act, 2013[33], that CSR spending was made a statutory obligation for companies incorporated under the Act (Section 135 of the Act). Key provisions of the Act are:

[31]Notifications and General Circulars issued during 2009-15 to mainstream the concept of sustainability in corporate sector (Annexure- 1)
[32]http://www.mca.gov.in/Ministry/latestnews/National_Voluntary_Guidelines_2011_12jul2011.pdf
[33]The Companies act was notified on 30th August 2013 and provisions of CSR in the Act became effective from 1st April'2014. http://www.mca.gov.in/SearchableActs/Section135.htm

Box 2: Key features of Companies Act, 2013 on CSR

a. The Act requires companies meeting certain thresholds[34] to spend at least 2% of its average net profit (PBT) for the immediately preceding three financial years on CSR activities.
b. Environmental sustainability, biodiversity conservation, education and skills, healthcare, gender equality and rural development are among activities enumerated in Schedule VII of the Act.
c. The Companies (Corporate Social Responsibility Policy) Rules, 2014 (notified on 27th February 2014) prescribe the manner in which companies can comply with CSR provisions of the Act.

1.3 CSR: Performance under Statutory Obligation

1.3.1 A recent study (Majumdar, Rana, and Sanan, 2015)[35] which examined CSR spending (based on secondary data) for a sample of 214 companies (165 private companies and 49 public sector companies) provides important insights.

Box 3: Main findings of the study by IIM Udaipur

a. Consistent data on CSR was available only for 147 companies (indicating poor and/or lack of reporting) hence 67 companies were excluded from the sample.
b. CSR spend of these 147 companies is Rs 42.81 billion during 2013-14.
c. Only 27 companies spent 2% or more in 2013-14; the average CSR spend as a percentage of PAT for 147 companies was 1.28%.
d. Manufacturing spent relatively more than the service sector in terms of both absolute amounts and the spread.
e. The CSR lifecycle for manufacturing sector typically starts with local community driven innovations.
f. As make in India sets in motion the CSR will see a surge; trained CSR managers to support improved CSR disclosure and CSR governance will be in demand.

1.3.2 According to an estimate by Indian Institute of Corporate Affairs (IICA), about 6,000 Indian companies will come under the CSR net with many companies undertaking these initiatives for the first time. CSR spend from these companies is estimated to be as much as Rs. 200 billion every year. This has the potential to address the country's chronic problems in the near future.

[34]Companies with market cap of more than Rs. 5 billion or a turnover of Rs. 10 billion or net profit of Rs. 50 million or more are mandated to spend at least 2% of its average net profit for the immediately preceding three financial years on CSR activities. Sick or loss making companies or those having a negative Net Worth are not mandated to earmark specific funds for CSR activities.

[35]India's Top Companies for CSR and Sustainability, IIM Udaipur, 2015. Top 200 companies were taken from the ET-500 list. The sample comprised 143 companies from the manufacturing sector and 71 from the service sector.

1.3.3 A PwC and CII study[36], conducted on a sample (secondary data) of companies for 2014-15 paints a very encouraging picture on the amount of funds that can be mobilized through CSR, although there are concerns about the sectoral and geographical distribution of CSR funds.

Box 4: Main findings of a Study by PwC & CII

a. In **2014-15,** Rs. 55.63 billion was spent under CSR. Further, out of a total of 250 Bombay Stock Exchange-listed companies, over 100 firms spent either more than the prescribed CSR or exactly as prescribed.
b. The sectoral distribution of CSR spend shows that healthcare (about one third) and education (29 per cent) received a large share. Environment sustainability, rural development and gender equality were among other targeted areas.
c. Geographical distribution of CSR spend was skewed. Industrialized states Maharashtra, Karnataka, Tamil Nadu, Gujarat and Uttar Pradesh benefitted the most in terms of the number of projects. This can be attributed to the fact that most businesses have their presence in industrialized cities and software hubs where it is easier for them to implement and monitor the projects. There is need to chalk out a strategy to address this anomaly.

1.3.4 According to a study by the MCA[37] performance of private corporate sector on CSR has been somewhat better than the public corporate sector.

Box 5: Main findings of a Study by MCA

a. During 2014-15, Corporate Social Responsibility (CSR) expenditure of 460 listed companies, which have placed their annual reports on their websites, indicates that 51 Public Sector Undertakings (PSUs) and 409 private sector companies together spent about Rs. 6337 crores on CSR.
b. The PSUs have utilized about 71% of their mandated CSR fund against 79 % utilization by private sector companies

2. CSR under BIOFIN India

2.1 Objectives

- To map CSR spend of Central Public Sector Enterprises (CPSEs), incorporated under the Companies Act, on conservation of biodiversity.
- Based on the results make projections for future expenditure attributable to biodiversity.

[36]Handbook on Corporate Social Responsibility in India, Pwc and CII. https://www.pwc.in/assets/pdfs/publications/2013/handbook-on-corporate-social-responsibility-in-india.pdf

[37]http://www.mca.gov.in/Ministry/pdf/rajya_unstarred_ques_510_01032016.pdf. Study done to answer Rajya Sabha unstarred question no. 510 on Tuesday, the 1st March, 2016.

The process involved identifying biodiversity relevant projects/activities by companies under CSR and estimating the expenditure which can be attributed to biodiversity conservation/protection[38]. This has been done for a selected sample of CPSEs.

2.2 Methodology

Published data on CSR is mostly reported as an aggregate number and in some cases by identified themes (such as health, education, energy, environment) on which CSR activities are undertaken. This however is not a standardized list and varies across CPSEs.

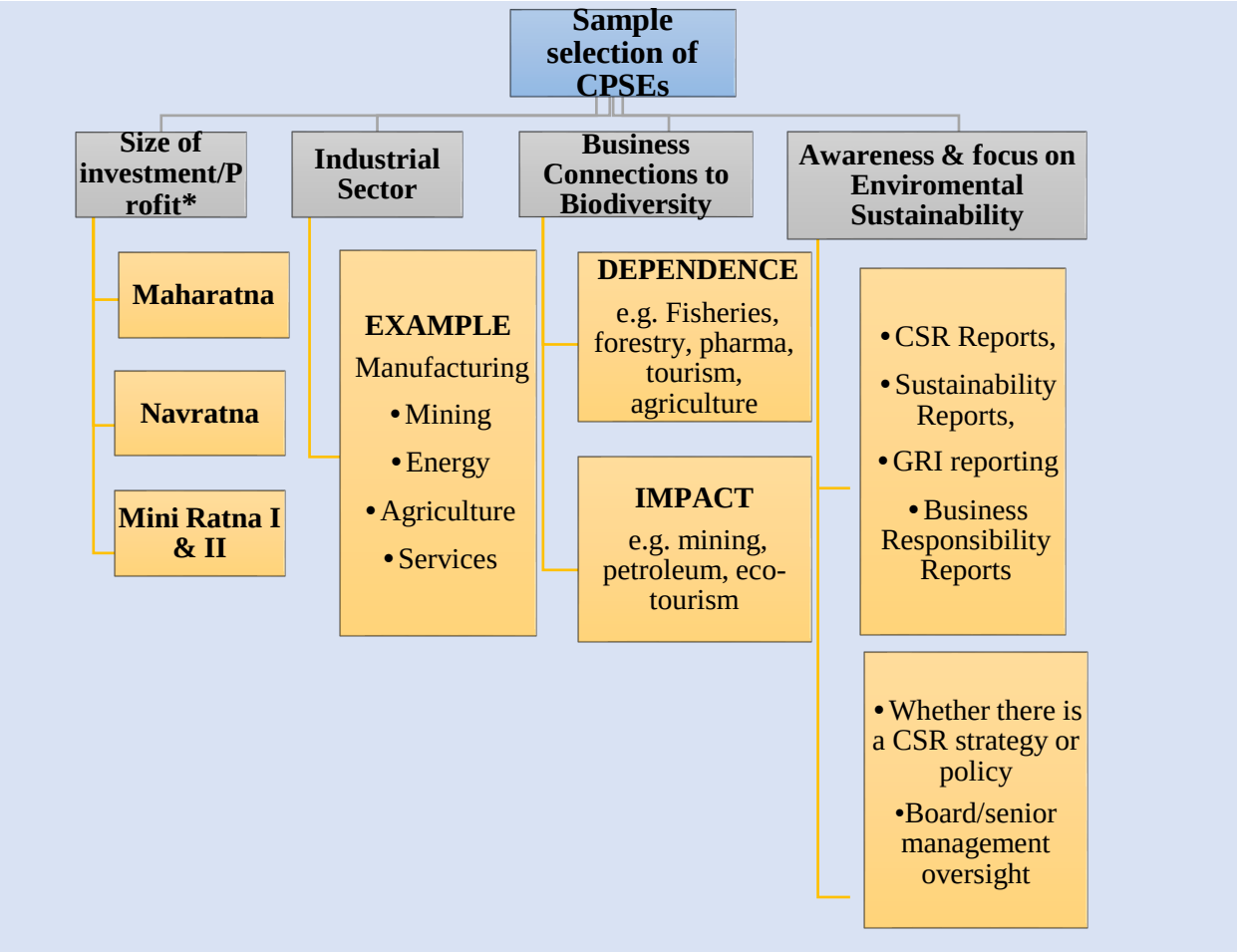
As the objective of this study is to estimate expenditure on biodiversity under CSR we require detailed activity - wise expenditure data which is not available from published data in the public domain. In view of this, the study attempts to access activity-wise CSR data by undertaking a survey of companies. The methodology can be divided into three main steps as follows:

Step 1: Selection of Sample

As on 31.3.2015[39], there were 298 CPSEs in India (excluding 7 Insurance Companies, Banks and newly set up CPSEs). Of these, the government has delegated enhanced financial powers to 97 CPSEs which have achieved Maharatna, Navratna and Miniratna status. In total, there are 7 Maharatna, 17 Navratna, and 73 Miniratna CPSEs (further divided into Category-I (56 units) and Category-II (17 units). 60 companies out of these 97 were selected for the study based on: investment size, sector of operation, impact/dependence on biodiversity, and awareness and focus on environmental and ecological sustainability (Figure 1). List of sample companies is in Annexure 2.

[38]For definition and scope of biodiversity conservation related activities see Chapter 1.
[39]Annual Report on the performance of Central Public Sector Enterprises- Public Enterprises Survey 2014-2015 by DPE

Figure 1: Criteria for Sample Selection of CPSES



Source: Authors' construct

Step 2: Compilation of data: Designing survey and consultations

As mentioned before, for this study, activity/project – wise CSR expenditure data is required. This is because first we need to identify biodiversity relevant activities/projects; classify these activities in a framework (see Chapter 2); and then estimate the proportions of the total expenditure attributable to biodiversity conservation.

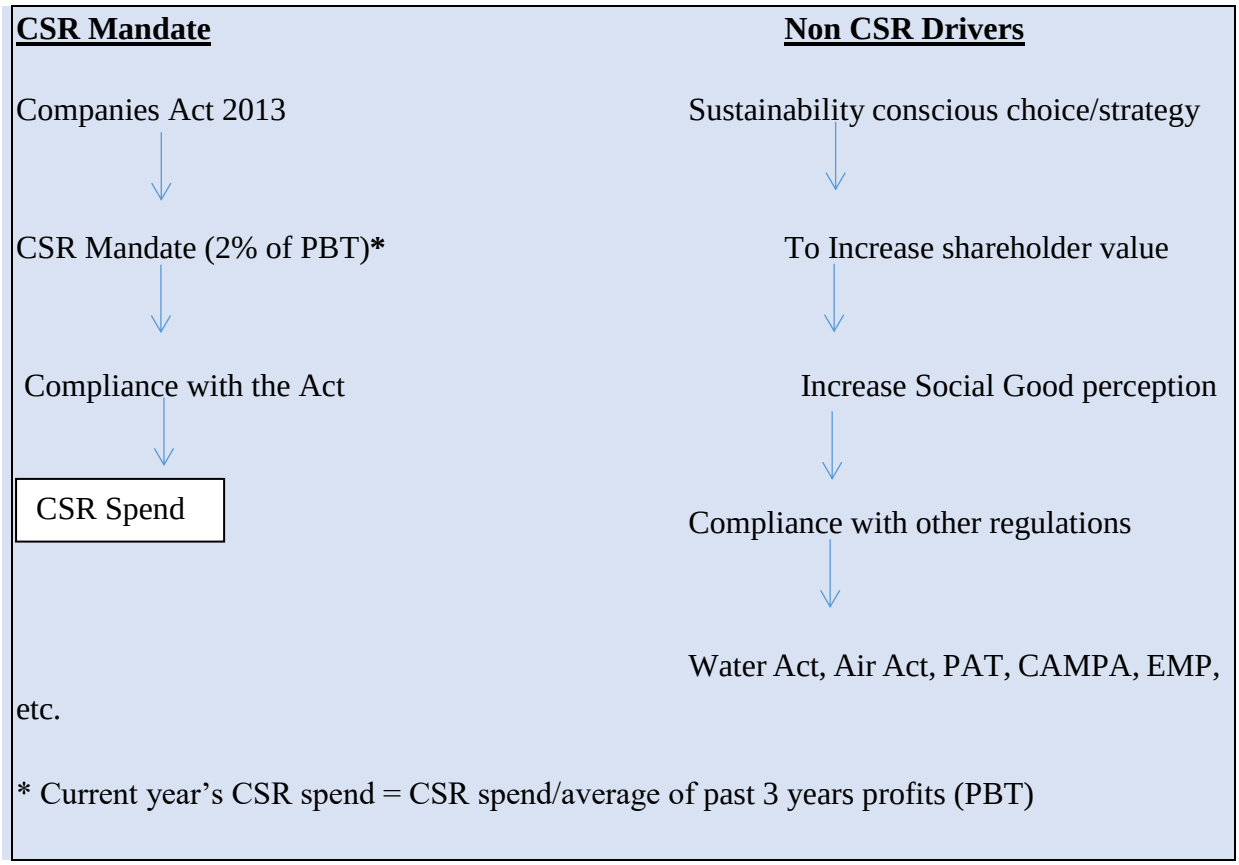
For this, Annual reports, CSR reports, sustainability reports (GRI, BRR and other reports), and information available online was examined under the biodiversity lens. A detailed examination of the company reports revealed the following:

- Activity/project-wise data on CSR spend was not available for almost all companies in the documents in public domain, implying that a survey of companies was necessary[40].

[40] During the course of the study we found that some companies are reporting activity-wise CSR data in 2015-16 Annual Report.

- Companies undertake a number of activities outside CSR which have positive implications for biodiversity conservation as depicted in Figure 2.

Figure 2: CSR Mandate and Non – CSR Drivers of Biodiversity Conservation



Source: Authors' construct

In view of this, we made an attempt to compile biodiversity relevant non-CSR spend as well although our mandate was to examine only the CSR spend. A questionnaire (Annexure 3) was prepared and sent out to 60 sample companies. The Questionnaire included questions about biodiversity initiatives of the company, expenditure made on biodiversity relevant activities, and some qualitative questions to get an understanding of companies' awareness, focus, policy and strategy, and challenges for biodiversity conservation. The guidelines which are specifically relevant to biodiversity are explained in the questionnaire for ready reference of companies. Further, biodiversity relevant initiatives of companies were grouped into the following themes:

- Environment Resource Management/ Optimization
- Biodiversity Conservation
- Environmental/Biodiversity Research, training, and education
- Others

The expenditure data was sought for each of these themes further classified into CSR and Non CSR (which included both compliance with Non-CSR regulations and Business Investment)

(Figure 3). This categorization is expected to throw light on non-CSR drivers of biodiversity conservation for companies.

Interviews and consultations were conducted with more than 50 senior executives of the sample companies (constituted either CSR or Sustainability heads of the company) both to follow up on the survey as well as to get insights into companies' CSR approach and plans. Detailed consultations were also held with officers at the Standing Conference of Public Enterprises (SCOPE)[41], DPE, MCA, and TERI (BCSD) to seek their assistance in getting responses to our survey and to get insights into any challenges and limitations/gaps in CSR Rules in respect of reporting of data. The 'Workshop on CSR for CPSEs', 11th July, 2016 at the SCOPE Convention Centre was also very useful in this context[42].

Step 3: ***Compilation of Data: Review of Published Reports of Companies***

Review of Sustainability Reports, Annual Reports, Business Responsibility Reports, and CSR Reports was carried out simultaneous to survey of companies. From the desk review we were able to compile data on aggregate CSR for a number of sample companies, aggregate data on CSR expenditure was used to supplement the survey data. This desk exercise also helped in improving our understanding of the challenges in reporting CSR data and provided useful insights into ways to address these (Box 7).

3. Analysis of Results and Main Findings

3.1 Analysis of Quantitative Data: Of the 60 CPSEs approached, we received desired data in respect of 20 sample[43] companies (Annexure 4).

[41]SCOPE is an apex professional organization representing the Central Government Public Enterprises in India.

[42]The workshop was attended by 13 CPSEs including Maharatna, Navratna and Miniratna, Mr. Madhukar Gupta, Addl. Secretary, DPE, Shri Ameising Luikham, Secretary, DPE, Mr. U.D Choubey, DG, SCOPE and Ms. Sibani Swain, Economic advisor to MCA. In this workshop, CPSEs shared their CSR project selection and implementation methodology and the major challenges faced by them in CSR space.

[43]Category wise distribution: Maharatna (4), Navratna (6), and Miniratna (7), Miniratna Category-II (2), and from 4th category (1). Sector wise Distribution (according to DPE): Electricity (3), Service (7), and Manufacturing (9).

Box 6: Total and Biodiversity Attributable expenditure under CSR

i.	Our sample CPSEs (20 companies) on an average spent Rs. 460.56 crore per year during the study period on different CSR activities. Per CPSE this works out to Rs. 23.03 crore per year (Annexure 5).
ii.	Of this, Rs. 13.66 crore (2.97 %) is computed to be attributable to Biodiversity conservation per year. Per CPSE basis this works out to **Rs. 68 lakh**. (Annexure 5).
iii.	Applying this proportion (2.97 %) to estimated average annual CSR for 97 CPSEs (Rs. 2758.26 cr.), biodiversity attributable expenditure works out to **Rs. 81.92 crore** per year or **Rs. 0.84 crore** (average annual per CPSE) (Annexure 6).

Source: Authors' calculations

Box 7: Biodiversity Attributable expenditure under Non-CSR activities

i.	Our sample CPSEs (20 companies) on an average spent **Rs. 563.51** crore per year during the study period on **biodiversity relevant** activities and programs under Non CSR. (Annexure 7)
ii.	Of this, **Rs. 205.15 cr**. is computed to be attributable to biodiversity per year on an average. **CAMPA** is a major proportion of this (84%). Per CPSE basis this works out to **Rs. 10.26 crore** (Annexure 7).
iii.	It is significant to note that over **95 percent** of Biodiversity attributable expenditure represents expenditure made on programs which **directly impact** biodiversity conservation and the rest from activities indirectly related to biodiversity (rural development, health, energy, climate change, education) (Table 2)
iv.	Analysing the results from the lens of **BIOFIN classification**, focus areas of CPSEs are biodiversity restoration, protection, and natural resource management (Table 3)

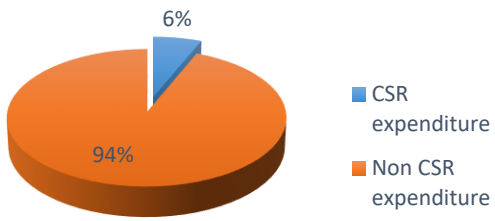
Source: Authors' calculations

Table 1: Biodiversity attributable CSR and Non-CSR Expenditure (2009-10 to 2015-16)

S. No.	Category of Expenditure	Rs. Crore annual average	%
1	Biodiversity attributable CSR expenditure	13.66	6.2
2	Biodiversity attributable Non CSR expenditure	205.15	93.8
3	**Total**	**218.80**	**100**

Source: Computed based on data from NIPFP survey

Figure 3: Biodiversity attributable expenditure for sample CPSEs (%)



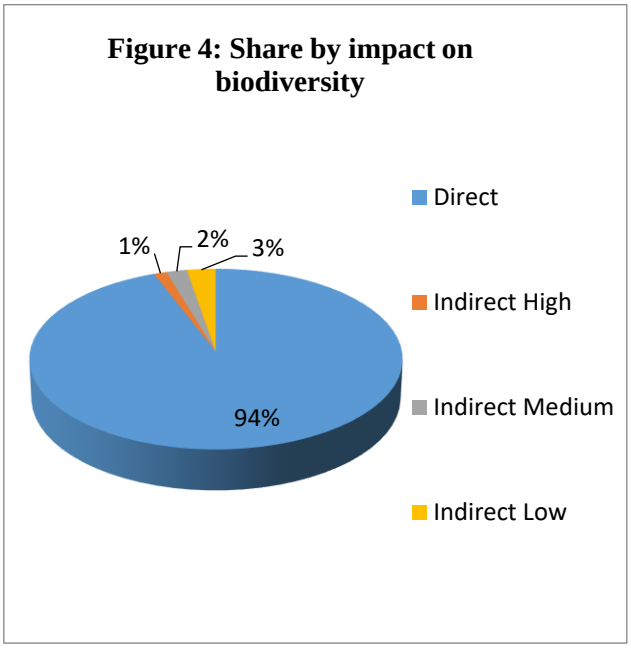
Source: Computed based on data from NIPFP survey

Table 2: CSR and Non-CSR Expenditure Attributable to Biodiversity by impact on Biodiversity

Impact on Biodiversity	Expenditure attributable to Biodiversity (Rs. Crore)	Percent
Direct	1442.39	94
Indirect High	18.23	1
Indirect Medium	29.83	2
Indirect Low	41.19	3
Total	**1531.64**	**100**

Source: Computed based on data from NIPFP survey

Figure 4: Share by impact on biodiversity



Source: Computed based on data from NIPFP survey

Table 3: Distribution of Biodiversity attributable expenditure by BIOFIN Classification

(Rs. Crore)

Sectoral Mainstreaming	Natural Resource use	Protection	Restoration	Access & Benefit Sharing	Enhancing Implementation	Total
0.00	81.95	187.11	1257.69	0.00	4.89	1531.64

Source: Computed based on data from NIPFP survey

3.2 Projection Methodology

To do projections for biodiversity attributable CSR expenditure for 97 CPSEs for FY 2016-17 to 2019-20, the following steps were taken:

1. The Linear projection of CSR (2% of PBT) for 97 CPSEs from the year 2016-17 to 2019-20 is done using CSR spend for FY 2009-10 to FY 2015-16[44] (See Chapter 2).

[44]The PBT data for the 97 CPSE was sourced from Annual reports of 97CPSEs.

CSR spend (Y_n) = Sum of 2% of average of Net Profits[45] in 3 year Y_{n-1}, Y_{n-2} and Y_{n-3}
Where Y_n is the year of calculation

2. Proportion of biodiversity attributable expenditure to total CSR (2.97%) has been used from the sample to get biodiversity attributable CSR for this period.

The solid line and dotted lines in the Figure 5, 6 & 7 represent actual values & projected values, respectively, for 97 CPSEs.

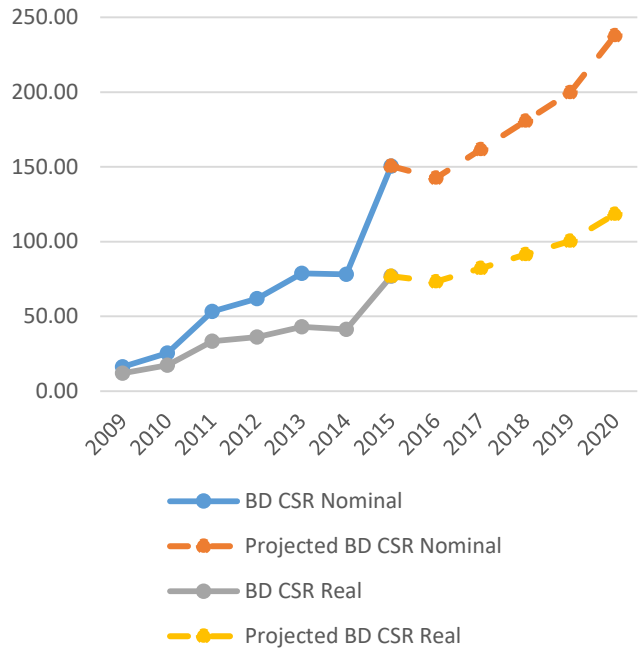
3. 3 Projections from sample data

Results are presented in Table 4 and Figure 5

Table 4: Projected Annual Biodiversity Expenditure for 97 CPSEs (Nominal and Real)

Year	Biodiversity attributable expenditure (Nominal)	Biodiversity attributable expenditure (Real)
2009	16.10	11.91
2010	25.32	17.18
2011	53.20	33.26
2012	61.84	36.07
2013	78.67	42.92
2014	77.99	41.30
2015	150.54	76.86
2016	142.54	73.19
2017	161.62	82.22
2018	180.69	91.25
2019	199.77	100.28
2020	237.92	118.34

Figure 5: Projection of Annual Biodiversity Attributable Expenditure



[45]Frequently Asked Questions (FAQ) with regard to Corporate Social Responsibility under section 135 of the Companies Act, 2013. http://www.mca.gov.in/Ministry/pdf/FAQ_CSR.pdf

3.4 Projections from Secondary Data

Results are presented in Tables 5 & 6 and Figures 6 & 7

Table 5: Projected Annual CSR & Biodiversity Attributable CSR Expenditure for 97 CPSEs (Nominal)

Year	CSR expenditure (Rs. Crore)	BD attributable expenditure (Rs. Crore)
2009	2209.80	65.63
2010	2328.78	69.16
2011	2451.62	72.81
2012	2639.93	78.41
2013	3017.69	89.63
2014	3228.80	95.90
2015	3431.23	101.91
2016	3619.75	107.51
2017	3835.12	113.90
2018	4050.49	120.30
2019	4265.86	126.70
2020	4696.61	139.49

Table 6: Projected Annual CSR & Biodiversity Attributable CSR Expenditure for 97 CPSEs (Real)

Year	CSR expenditure (Rs. Crore)	BD attributable expenditure (Rs. Crore)
2009	1634.32	48.54
2010	1580.34	46.94
2011	1532.80	45.52
2012	1540.07	45.74
2013	1646.59	48.90
2014	1709.94	50.79
2015	1751.85	52.03
2016	1731.64	51.43
2017	1757.56	52.20
2018	1783.47	52.97
2019	1809.39	53.74
2020	1861.22	55.28

Figure 6: Projections of Annual CSR expenditure by 97 CPSEs (Nominal & Real)

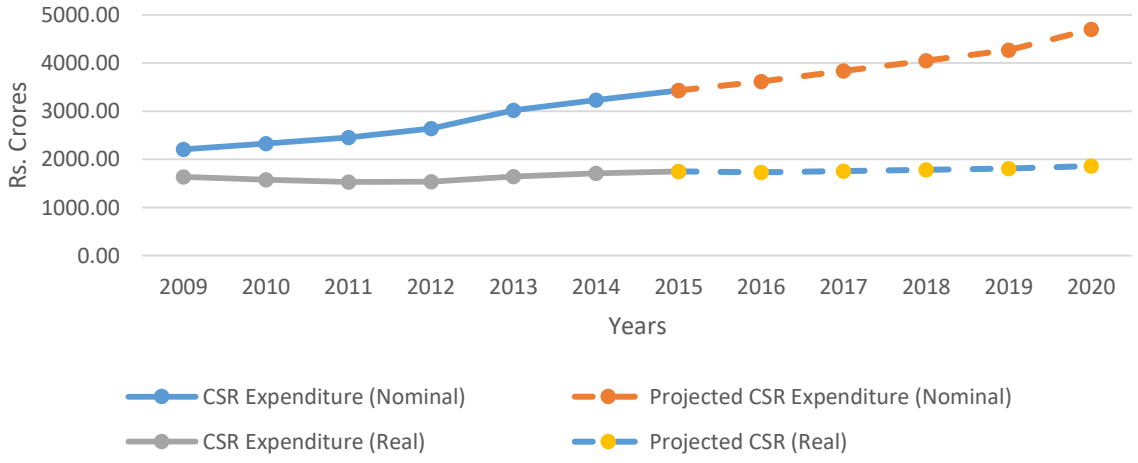
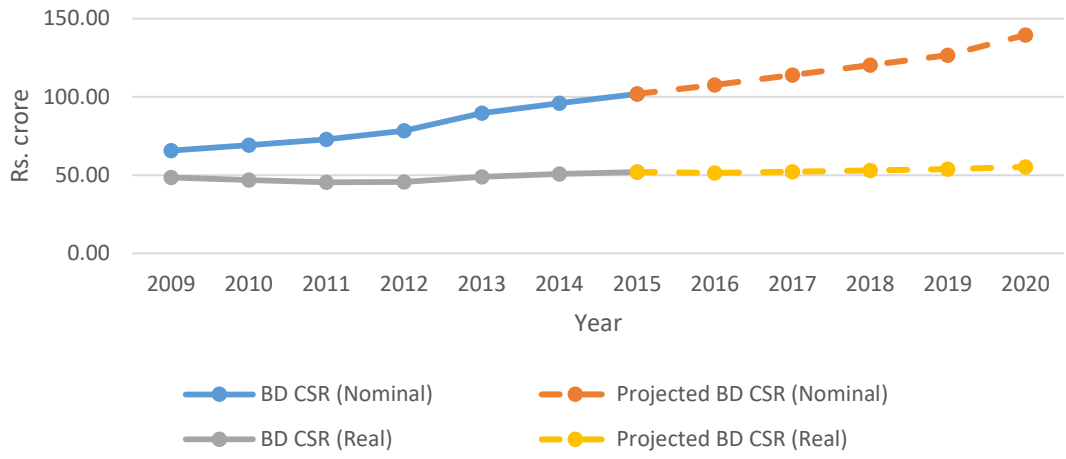


Figure 7: Projections of Annual Biodiversity Attributable CSR expenditure by 97 CPSEs (Nominal & Real)



3.5 Analysis of Qualitative data

Box 8: Main Findings from Qualitative Analysis

Questions	Responses
A. Whether the Company is following sustainability guidelines? • SEBI NVG Guidelines • GRI • UNGC Global Compact • TERI BCSD • Biodiversity specific guidelines/ initiatives (IBBI, FICCI Pledge on Biodiversity, IUCN)	70-75 % CPSEs (Mandatory for top 100 BSE and NSE listed companies) 60-70 % CPSEs 50-55% CPSEs 20-25% CPSEs 0-1% Companies do not follow biodiversity related specific guidelines or declaration. Biodiversity as a component is a part of either SD or Environment policy of the Company.
B. Do CSR and other regulations encourage your company to adopt environmental and biodiversity conservation strategies?	More than 80% CPSEs responded that CSR and regulatory compliances encourage them to adopt environmental and biodiversity conservation strategies
C. Is brand value creation or an important criteria to adopt environmental and biodiversity conservation strategies?	Only 5 % CPSEs adopt environmental and biodiversity conservation strategies to enhance their brand value.

D. Awareness on impact of business activities (including those of supply chain) on biodiversity in protected areas and areas of high biodiversity value outside protected areas	60 % CPSEs responded that they were not aware as to what extent their business activities (including those of supply chain) impact biodiversity in protected areas and areas of high biodiversity value outside protected areas. Around 35-40 % companies (mostly from Energy & Manufacturing sector) said their impact on biodiversity varies from negligible to less than 50 % Service sector CPSEs said that they had negligible or no impact in such areas
E. Training & awareness programs conducted to spearhead pro-biodiversity practices or for sustainable use of natural resources to reduce impact?	Over 50 % CPSEs agreed that biodiversity conservation related training and awareness programs are not conducted as a part of their capacity building measure, however general awareness building around sustainability, energy efficiency, Health & safety, fire fighting, human rights is conducted more often.
F. Is there need for specific guidelines for earmarking funds for biodiversity conservation under CSR?	85% CPSEs responded that there is a need to establish specific set of guidelines for companies so that they can understand the priority issues in Biodiversity and take action in that direction.
G. Is there a need to standardise reporting of CSR and make it activity wise so that contributions to various sectors is mapped?	More than 90 % CPSEs responded 'Somewhat yes'. Though activity wise reporting is a tedious process and would require additional resources for data management & reporting. It is preferred that CSR accounting and reporting is mainstreamed as part of companies' financial reporting process.

Box 9: Some key biodiversity conservation case studies of CPSEs

Case Study1: ONGC-Eastern Swamp Deer Conservation Project in Kaziranga National Park

ONGC along with the Wildlife Trust of India (WTI) is supporting the conservation of the species of the Eastern Swamp Deer in Assam. They are far lesser in number than the Royal Bengal tiger or the greater one-horned rhinoceros and their population is restricted to the flood-prone Kaziranga National Park in Assam. In 2014, 19 Eastern swamp deer were captured in Kaziranga NP and relocated to Manas National Park (NP) for augmentation. The animals were released in a specially prepared boma in Manas NP which is secured by a two-line power fence installed over a bombax barrier to deter leopards from entering the enclosure. The boma was also flooded and short grass was brought from nearby areas for transplantation to ensure the well-being of the herd.

Case Study 2: IOCL- Creation of Eco Parks near Oil Refineries

Development of green belts/ecological parks has been a significant feature of Indian Oil's operations. The Eco-park is usually created in one corner of the refinery complex close to the Effluent Treatment Plant, the Eco-Parks consist of large water bodies around which gardens, medicinal plant and tree nurseries are developed. The treated effluent coming out of these refineries is stored in these water bodies as well as used to water the plants that grow in these parks. This is done scientifically with guidance from eminent Botanists. These parks serve the dual roles of botanical education extension centres along with nurseries to regenerate useful plant species. The annual flower and plant shows that are done in these Eco-Parks are extremely popular events that people living around the complexes look forward to. Surveys by reputed organizations like the Bombay Natural History Society and other have shown that at least 300 species of resident and migratory birds thrive in these Eco-Parks, while over 285 species of native and exotic plants and trees are growing there. Some of the birds found in Indian Oil Eco-Parks are Barn Owl, Black Headed Gull, Black Kite, Booted Eagle, Egyptian Vulture, Great Tit, India Tree Pie, Jack Snipe, to name a few.

Case Study 3: SAIL- Damayanthi Bird Sanctuary at Salem Steel Plant

SAIL has one of its units known as Salem Steel Plant at Salem, Tamil Nadu. In order to maintain the ecological balance in the operational region of Salem Steel Plant, SAIL has developed a bird sanctuary using the vast land of almost 5 hectares adjacent to the plant's cold rolling mills. During the industrialization process, the regional biosphere lost many native species which is very difficult to restore in the same place. Therefore, SAIL made an attempt to do so by converting the local unused land into an artificial water tank with a depth of 1 metre. This water reservoir has now become a habitat for more than 75 bird species out of which 30 are water birds, 7 species of fish and amphibians, 16 species of reptiles and 5 species of mammals confirmed by the Salim Ali Centre for Ornithology and Natural History, Coimbatore. SAIL is also considering the recommendations by the Salim Ali Centre to improve the bird habitat in the sanctuary by incorporating additional varieties of trees, mounds etc. in a phased manner without disturbing the birds.

4. Insights from Survey responses, consultations and interviews

Exploration of qualitative responses in survey and consultations with relevant stakeholders provided the following important insights:

- ***CSR reporting:*** While a comprehensive format for annual reporting on CSR activities is given in the CSR Rules, 2014 of the Companies Act, 2013 (Annexure -5) it is not mandatory and therefore, not widely used. The reported CSR spend in most cases is an aggregate number. This information is sometimes supplemented with the list of CSR activities or thrust areas without mentioning the expenditure incurred for each activity/theme. Thus, compiling data from various published reports of most companies will not lead us to accurate estimates of expenditure on biodiversity until the time CSR is reported activity-wise.

- ***CSR has multiple operational units:*** CSR and sustainability activities can be housed in one or more of the following departments in a company: Sustainability department, energy efficiency department, CSR, Health and Safety, Environmental Sustainability department. As implementation is carried out at decentralized level i.e. around operational units, plants, mining sites or factories, data is maintained separately by different operational units and collated at the corporate office where the aggregated CSR is reported. In the absence of a standardized monitoring & recording format, data is not comparable across units.

- ***Lack of clarity on what can constitute CSR:*** A large part of non-CSR expenditure (excepting for regulatory compliance related) for environmental and ecological conservation can potentially be reclassified as CSR; because CSR and sustainability are treated complimentary to each other, as per revised DPE guidelines[46]. Therefore, all

[46]F.No.15 (13)/2013-DPE (GM) Guidelines on Corporate Social Responsibility and Sustainability for

expenditure under CSR may not be additional. Theoretically the likelihood of this happening is more in the case of private sector vis-à-vis CPSEs[47]. This is because while DPE has issued additional guidelines for CPSEs clarifying what would and would not constitute CSR expenditure; MCA has not issued any guidance on this.

- **Incorporating CSR as a mandatory field in Annual e-filing**: MCA has mandated an annual e-filing of balance sheet for all companies in the AOC 4 form under the Companies Act, 2013. This is an electronic form in XBRL format wherein the respondent cannot submit the form without filling details in all the mandatory fields. However, CSR is not a mandatory field in this form. If the CSR reporting is made mandatory in this form along with unspent budget, the MCA can have a large pool of data on CSR at a common platform. Earlier this form only required 10 projects to be disclosed, however now it is recommended that an external document export mechanism be created where CPSEs can directly submit their standard data sheets (prepared in the suggested format).

- **Recognizing biodiversity conservation by spreading mass awareness**
  During consultation with the CPSEs, it was found that socio-economic challenges are not linked with environmental issues and therefore subjugated at the time of selection of CSR project and fund allocation. Lack of information about importance of biodiversity conservation in public domain is directly linked to this lack of awareness. Our survey also revealed that awareness about biodiversity and ongoing initiatives such as India Business Biodiversity Initiative (IBBI) is poor. Therefore, it is important that national and state level awareness campaigns are taken up to encourage corporate action towards biodiversity conservation is India.

CPSES to supplement CSR Rules (under the Companies Act, 2013).

[47]In addition to the CSR provisions of the Companies Act and the CSR Rules, additional Guidelines on CSR and Sustainability formulated by DPE, for annual MoU evaluation, are applicable to CPSEs. These guidelines (revised 2014) clarify that environmental sustainability taken for improving business operations like producing goods and services which are safe and healthy for the consumers and the environment, resource efficient, consumer friendly, and environmentally sustainable throughout their life cycles i.e. from the stage of raw material extraction to production, use / consumption, and final disposal, etc. should not be considered as CSR activities.

Box 10: Example of Biodiversity Stewardship

What is Biodiversity Stewardship?

Biodiversity stewardship is an approach to entering into agreements with Private and communal landowners to protect and manage land in biodiversity

Priority areas, led by conservation authorities. Biodiversity stewardship is implemented on sites that have been identified as important for biodiversity

and ecosystem services, based on best available science.

Case Study on Biodiversity Stewardship: Mountain Zebra Wilderness Corridor Project

An opportunity existed to consolidate and expand the protected area estate around the existing Mountain Zebra National Park and the Camdeboo National Park in South Africa. The Mountain Zebra Wilderness Corridor project focused on a broad area of 530 000 ha surrounding and linking the two existing reserves. The land is largely privately owned, with a mix of privately run game farms and commercial agriculture. The Wilderness Foundation entered into discussion with these landowners to establish a Protected Environment in the region. The biggest achievement of the project is that 69 landowners have been directly involved in the corridor project, an overwhelming endorsement for the project concept.

5. Summarizing

i. CSR in India has potential to mobilize significant resources up to Rs. 20,000 crore Available estimates on size of CSR pool and actual CSR spend in its two years of operation are summarized below (Box 10; Rows 1-4).

ii. Box 10 below also summarizes NIPFP estimates of biodiversity attributable spend under CSR. Our sample CPSEs (20 companies) on an average spent Rs. 460.56 crore per year during the study period on different CSR activities. Per CPSE this works out to Rs. 23.03 crore per year.

iii. Of this, Rs. 13.66 crore (2.97 %) is computed to be attributable to Biodiversity conservation per year. Per CPSE basis this works out to Rs. 68 lakh.

iv. Applying this proportion (2.97 %) to estimated average annual CSR for 97 CPSEs (Rs. 2758.26 cr.), biodiversity attributable expenditure works out to Rs. 81.92 crore per year or Rs. 84 lakh (average annual per CPSE), (Row 6).

v. Our sample CPSEs (20 companies) on an average spent Rs. 205.15 cr. on biodiversity per year under Non- CSR. CAMPA is a major proportion of this (84%). Most of it was on programs which directly impact biodiversity.

Box 11: Summary of Results: Estimates of CSR Pool, Actual CSR Spend and NIPFP Estimates of CSR Spend on Biodiversity Conservation

S. No	Study	Year	Sample Size	Estimates of potential CSR (Rs Cr.)	Estimates of actual CSR spend (Rs Cr.)
1	Indian Institute of Company Affairs	2014-15	• 6000 companies expected to be under CSR • Secondary Data	Rs. 20,000	
2	PwC and CII	2014-15	• 250 BSE listed companies • Secondary Data	--	5563
3	Majundar, Rana and Sanan	2013-14	147 companies (both private and public)	--	4281
4	Ministry of Corporate Affairs	2014-15	460 listed Companies (both private and public)	--	6337
5	NIPFP	2009-10 To 2015-16	• **Average annual attributable to BD** • 20 CPSEs • Primary survey data	--	13.66
6	NIPFP	2009-10 To 2015-16	• **Average annual attributable to BD** • Extrapolated for 97 CPSEs • Primary & Secondary Data	--	81.92
7	NIPFP	2016-17 To 2019-2020	• **Annual average projected BD attributable expenditure for 97 CPSEs**	--	121.57

6. Policy Suggestions

- ***Recognizing the potential of CSR:*** In view of the dependence of the companies on biodiversity and ecosystems, directly and indirectly, and dependence of well- being of its workforce on biodiversity and ecosystem services; CSR in India presents significant opportunity for leveraging funding for conservation of biodiversity.

According to Institutional Investor Advisory Services (IiAS) top 100 listed companies have not only increased CSR spend in FY 2016 but have also taken it more seriously by institutionalizing the CSR[48].

CSR is estimated to potentially generate INR 200 billion per year. Leveraging this source would require careful integration of BD conservation strategies with social sector development strategies. A transparent & workable model is required.

- ***Encouraging Biodiversity relevant non-CSR expenditure:*** It would be seen from Table 1 that biodiversity attributable non-CSR expenditure is about 94 per cent of the total expenditure. Of this a substantial share is from CAMPA. Non CAMPA Non-CSR expenditure is about 15 percent. There may be an opportunity to incentivize companies towards biodiversity conservation; through:
  i. Designing regulatory targets for minimizing pressure/impacts on biodiversity (along the lines of energy efficiency targets under PAT scheme; Actors: State Governments, Local Governments);
  ii. Spreading awareness among companies about measures/practices that will help reduce risks and thus costs in the long-term (insurance companies will need to be innovative here);
  iii. Presenting companies with workable ideas and models that improve the impact of their expenditure (Actors: Local Governments, CSR Consultants, and Academia).

- ***Capacity building:*** Biodiversity conservation is not only a new entry in the CSR list it is interlinked in nature and thus complex to address. Even with the best intent companies are likely to go slow due to lack of technical knowledge and would require some capacity building/hand holding initially. Trained CSR managers to support improved CSR disclosure and CSR governance in general and biodiversity focused programs in particular will be required.

- ***Need for a common CSR reporting system:*** It is important to streamline and standardize reporting of CSR expenditure. Currently CSR is reported in different formats and through several reports such as Annual reports, GRI Sustainability reports, standalone CSR reports, online documents which makes it difficult to compare information. This will help in:

  a) Effective monitoring of compliance and identification of challenges if any
  b) Identifying strategies to synchronize CSR with varied priorities in different geographic locations.

[48] Economic Times, March 16, 2017. http://economictimes.indiatimes.com/news/companies-a-z/corporate-trends/top-100-listed-companies-increase-their-csr-spend-by-25-iias/articleshow/57664941.cms

c) Identifying opportunities for pooling of resources and scaling up of efforts in priority areas.
d) Harnessing the market forces to improve CSR performance of companies.
e) Interesting lessons can be drawn from individual CPSEs and private corporates which are developing data monitoring mechanisms for maintaining CSR data. *For instance, Coal India Limited is developing an online project monitoring platform where all implementing agencies seeking assistance under CSR can submit their project proposals online. They are also planning to report project-wise data and also upload real pictures of progress of their work at different sites through this online platform.*

- ***CSR monitoring via single platform*:** By making it mandatory for companies to submit information online through a common portal in a standard format will help:
  a) Archive and track the reporting of data.
  b) Impart efficiency to CSR monitoring and analysis.
  c) Potentially keep a check on duplication of interventions in a particular geography.
  d) Work as portal for sharing best practices and flag challenges.
  e) This portal can also have a mapping and rating option for consultants, implementing agencies, and domain experts such as: research institutes, university, NGO, social research organization, technology solution networks, community networks and others. As there is no central list of recommended implementing agency, such a platform will be first of its kind initiative which will help companies.

- ***Identifying thrust areas for directing CSR***

  Top down approach: In flagship schemes such as Swatch Bharat, Sanitation campaign, Drinking water scheme where companies were given targets, many companies have participated. Substantial funds and technology has been mobilised to create assets. For these assets to be effectively used these will need to be maintained. Companies may not be the best choice for this. It is thus important that the partnership link between the companies and the local communities, elected governments etc. be established even at the planning stage such that the responsibilities of each party is clearly identified in order to get the maximum out of CSR.

  Bottom up approach: Top down approach though convenient but often fails to reflect local needs, and thus lacks flexibility to customize companies' CSR policy/vision to suit the needs of the company and the priorities of the region where it is an important stakeholder. Identification of thrust areas in a consultative process is a more efficient way of selecting CSR thrust areas as is also recommended by MCA and DPE. Here again an institutional framework to bring together important stakeholders is required.

- ***District level CSR Committees:*** Our consultations at the District level stakeholders clearly bring out two important challenges:

a) Schemes/programs sponsored by higher levels of governments often provide little or no technical guidance which is essential in achieving the desired outcome through implementation of a scheme.
b) Many schemes provide insufficient funds than what would be needed if an effective strategy were to be followed to address the issue.
c) Lack capacity in general, and subject knowledge and domain expertise in particular.

Clause 135 of the Companies Act, 2013, requires companies to set up CSR Committees to formulate a CSR plan, prepare budget and monitor CSR policy regularly. Along the same lines district level committees can be set up to formulate a plan to leverage CSR funds for biodiversity conservation.

- ***Consolidation of thinly spread CSR Initiatives***

The Maharashtra government announced a public-private partnership model[49] for the development of 1,000 most backward, tribal-dominated villages in the state. It involves the government, corporate sector and NGOs coming together under a trust, pooling in finances, resources, knowledge and technology.
An institutional mechanism will be evolved for the trust, which will have its own corpus and be listed under the Companies Act. Half the villages will be shortlisted by the government and the rest by the corporate sector.
The state will provide 50 per cent of the funds while the remaining will come from the corporate sector.
Elaborating on the scheme, he said, "Each village would be provided better livelihood opportunities, health and education facilities. It would have adequate infrastructure complete with mainstream communication, to ensure it no longer remains isolated from the overall state growth."
Acknowledging that corporate sectors and NGOs have been working in various fields, Mr. Fadnavis said, "Our emphasis on convergence is to avoid the thin-spreading of resources. Instead, we have decided to pool all our resources and make transformation of villages a common goal."

- ***Opportunities to leverage CSR funds to design and/ or test:***

a) Ecosystem based PES
b) State level Biodiversity Conservation Fund
c) Promoting Green and Native species/local varieties
d) Biodiversity stewardship

[49] India Express, August 26, 2016; http://indianexpress.com/article/india/india-news-india/maharashtra-govt-ropes-in-corporates-ngos-to-transform-1000-villages-2996604/

Annexure 1: Notifications and General Circulars issued during 2009-15 by DPE and MCA[50],[51]

Notifications and General Circulars issued during 2009-15 under the by DPE and MCA under Companies Act, 1956 and the Companies Act, 2013			
SL. No.	Notification Number	Date	Subject
DPE	OM No. 2(1)94-GM	29.11.1994	Social Obligations of Central Public Enterprises
MCA		12.2009	Voluntary Guidelines, for Corporate Governance &corporate social responsibility Voluntary guidelines 2009
DPE	OM F.No.15(3)/2007 - DPE(GM)-GL-99	09.04.2010	Guidelines on Corporate Social Responsibility for CPSES.
DPE	OM No. 18(8)/2005-GM	14.05.2010	Guidelines on Corporate Governance for PSU
MCA	Print Release (Press Information Bureau, GOI)	08.07.2011	National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business
DPE	OM No. 15(3)/2007-DPE(GM)-GL-100	04.02.2011	Revised Guidelines on Corporate Social Responsibility for CPSES laying slabs of CSR expenditure for CPSES for every financial year, based on their Net Profit of the previous year and contribution to National Corporate Social Responsibility Hub (NCSR Hub)
DPE	OM No. 15(3)/2007-DPE(GM)-GL-101	21.06.2011	Revised Guidelines on Corporate Social Responsibility for CPSES for including expenditure incurred on participation in the CSR training programs and workshops organized by TISS.
DPE	OM No. 3(9)/2010-DPE (MoU)	23.9.2011	Guidelines on Sustainable Development Research and Development; and Human Resource Management for CPSES
DPE	OM No. 15(3)/2007-DPE(GM)-GL-101	01.11.2011	Revised Guidelines on Corporate Social Responsibility for CPSES on: • Synergizing CSR initiatives taken by the CPSES with initiatives of Central, State, district& Local Administration. • Avoiding duplication of CSR activities

50 Annual Report, On the Working & Administration of the Companies Act, 1956

[51]Guidelines for Administrative Ministries/Departments and Public Sector Enterprises Chapter XII- Miscellaneous: DPE/Guidelines/XII/14-Social Obligations of Central Public Enterprises:http://dpe.nic.in/important_links/dpe_guidelines/CSRandSustainability Chapter XII- Corporate Social Responsibility and sustainability http://dpe.nic.in/important_links/dpe_guidelines/CSRandSustainability

			undertaken by the CPSES with that of programs run by Central, State and Local Governments • In Annexure–I of DPE Guidelines "Health and Family Welfare" is listed as one of the areas/activities that can be taken up by a CPSE for CSR work
MCA		2012	Publication of Voluntary Guidelines for Companies for providing general information on their websites about the company, to promote good corporate governance and to enhance investors' awareness
DPE	OM No. 15 (9)/2013-DPE (GM)	19.09.2012	Voluntary Contribution towards Prime Minister's Fund for Jammu & Kashmir Floods excluding those contributions flowing out of budgetary profits or from balance sheets of CPSEs
DPE	OM No. 15 (7)/2012-DPE (GM)-GL-104	12.04.2013	New 'Guidelines on Corporate Social Responsibility and Sustainability for CPSES (come into effect form 1.4.2013)
DPE	OM No. 15 (9)/2013- DPE (GM)	24.06.2013	CPEs under administrative control of Ministries/ Departments directed to take up relief and rehabilitation activities in the flood affected area of Uttarakhand under the New CSR & Sustainability guidelines
DPE	OM No. 15 (9)/2013- DPE (GM)	19.09.2013 (19.9.2014)	Contributing flowing out of budgetary sources, profits or from Balance sheets of PSEs are not accepted in PMNRF (only voluntary contribution)
DPE	OM No. 15 (9)/2013- DPE (GM)	28.10.2013	CPEs under administrative control of Ministries/ Departments directed to take up relief and rehabilitation activities in the cyclone affected areas of Andhra Pradesh ,Odisha and Bihar under the new CSR & Sustainability guidelines
MCA	S.O. 582(E)	27.02.2014	Commencement of Section 135 and Schedule-Vll of the said Act w.e.f. 01.04.2014
MCA	G.S.R 129 (E)	27.02.2014	The Companies (Corporate Social Responsibility Policy) Rules, 2014
MCA	G.S.R. 130 (E)	27.02.2014	Substitution of Schedule VII of Companies Act, 2013. This notification shall come into force with effect from 01.04.2014.
MCA	G.S.R. 261 (E)	31.03.2014	Amendment to Schedule VII of the Companies Act, 2013
MCA	No. 21/2014	18.06.2014	Clarification with regard to provisions contained in Section 135 of the Companies Act and Rules that the activities undertaken in pursuance of the CSR policy must be relatable to schedule VII of the Companies Act, 2013. The entries in the Schedule –VII must be interpreted liberally so as to capture the essence of the subjects enumerated in the said Schedule VII

DPE	OM No. 15(13)/2013-DPE (GM)-Pt-2-Part(2)	02.07.2014	Clarification that long term projects undertaken by CPEs in pursuance of DPE Guidelines on CSR and Sustainability (2013-14) would be considered valid under the CSR Rules and can be covered under any items in schedule-VII of the Companies Act,2013
MCA	S.O.1913(e)	06.08.2014	Amendment in schedule VII of companies Act, 2013 **:** inclusion of **'** Slum Area Development', in Schedule VII
MCA	General Circular No. 36/2014	17.09.2014	Clarification with regards to provisions of Corporate Social Responsibility (CSR) under section 135 of the Companies Act, 2013
DPE	F. No. 15 (13)/2013-DPE (GM)	21.10.2014	Guidelines on Corporate Social Responsibility and Sustainability for CPSES to supplement CSR Rules (under Companies Act, 2013 (to supersede CSR and SD guidelines issued on 12th April 2013 by DPE)
MCA	G.S.R.741(E)	24.10.2014	Notification dated 24.10.14- Amendment in Schedule VII of the Companies Act, 2013
DPE	F. No. 15 (13)/2013-DPE (GM)	20.11.2014	Referring to DPE Guidelines Corporate Social Responsibility and Sustainability CPSES issued on 21.10.2014 that contribution towards Swachh Bharat Kosh set up by the Central Government for promotion of sanitation and to clean Ganga Fund set up by the Central Govt. for the rejuvenation of the River Ganga shall be considered under CSR.
MCA	General Circular No.01/2015	03.02.2015	Constitution of a High Level Committee to suggest measures for improved monitoring of the implementation of Corporate Social Responsibility policies by the companies under section 135 of the Companies Act, 2013

Annexure 2: List of Sample CPSEs for expenditure review

Sr. no	CPSES Name	Type	DPE Sector	Impact Category	Ministry
1	Coal India Limited	Maharatna	Mining	I	Ministry of Coal
2	Bharat Heavy Electricals Limited	Maharatna	Manufacturing	II	Ministry Of Heavy Industries & Public Enterprises
3	Gail(India) Limited	Maharatna	Manufacturing	II	Ministry Of Petroleum & Natural Gas
4	Indian Oil Corporation Limited	Maharatna	Manufacturing	II	Ministry Of Petroleum & Natural Gas
5	NTPC Limited	Maharatna	Electricity	I	Ministry Of Power
6	Oil & Natural Gas Corporation Limited	Maharatna	Mining	I	Ministry Of Petroleum & Natural Gas
7	Steel Authority of India Limited	Maharatna	Manufacturing	II	Ministry Of Steel
8	Hindustan Aeronautics Ltd	Navratna	Manufacturing	II	Ministry Of Defence
9	Bharat Electronics Limited	Navratna	Manufacturing	II	Ministry Of Defence
10	NALCO	Navratna	Mining	I	Ministry Of Mines
11	Engineers India Limited	Navratna	Services	III	Ministry Of Petroleum & Natural Gas
12	Rural Electrification Corporation Ltd	Navratna	Services	III	Ministry Of Power
13	Hindustan Petroleum Corporation Limited	Navratna	Manufacturing	II	Ministry Of Petroleum & Natural Gas
14	Rashtriya Ispat Nigam Ltd.	Navratna	Manufacturing	II	Ministry Of Steel
15	Oil India Limited	Navratna	Mining	I	Ministry Of Petroleum & Natural Gas
16	Fertilizer Corporation Of India Ltd.	Miniratna-II	Manufacturing	II	Ministry Of Chemicals & Fertilizers
17	Container Corporation of India Ltd.	Navratna	Services	III	Ministry Of Railways
18	Power Finance Corporation Ltd.	Navratna	Services	III	Ministry Of Power
19	Bharat Petroleum Corporation Limited	Navratna	Manufacturing	II	Ministry Of Petroleum & Natural Gas

20	National Buildings Construction Corporation Limited	Navratna	Services	III	Ministry of Urban Development
21	IRCTC Limited	Miniratna-I	Services	III	Ministry Of Railways
22	India Trade Promotion Organization	Miniratna-I	Services	III	Ministry Of Commerce & Industry
23	Rail Vikas Nigam Limited	Miniratna-I	Services	III	Ministry Of Railways
24	MMTC Limited	Miniratna-I	Services	III	Ministry Of Commerce & Industry
25	Indian Renewable Energy Development Agency Limited	Miniratna-I	Services	III	Ministry Of New And Renewable Energy
26	Projects & Development India Limited	Miniratna-I	Services	III	Ministry Of Chemicals & Fertilizers
27	India Tourism Development Corporation Ltd.	Miniratna-I	Services	III	Ministry Of Tourism
28	National Fertilizers Ltd.	Miniratna-I	Manufacturing	II	Ministry Of Chemicals & Fertilizers
29	State Trading Corporation of India Limited	Miniratna-I	Services	III	Ministry Of Commerce & Industry
30	Rajasthan Electronics &Instruments Ltd	Miniratna-I	Manufacturing	II	Ministry Of Heavy Industries & Public Enterprises
31	Rashtriya Chemicals& Fertilizers Limited	Miniratna-I	Manufacturing	II	Ministry Of Chemicals & Fertilizers
32	Central Mine Planning& Design Institute Limited	Miniratna-I	Services	III	Ministry Of Coal
33	Bharat Coking Coal Limited	Miniratna-I	Mining	I	Ministry Of coal
34	Airport Authority of India	Miniratna-I	Services	III	Ministry of civil aviation
35	Goa Shipyard Limited	Miniratna-I	Manufacturing	II	Ministry Of shipping
36	Telecommunications Consultants India Limited	Miniratna-I	Services	III	Ministry Of Communications & Information Technology
37	Hindustan Copper Limited	Miniratna-I	Mining	I	Ministry Of Mines
38	Mineral Exploration Corporation Limited	Miniratna-I	Services	III	Ministry Of Mines
39	Central Warehousing Corp.	Miniratna-I	Services	III	Ministry Of Consumer Affairs

40	Balmer & Lawrie	Miniratna-I	Services	III	Ministry Of Petroleum & Natural Gas
41	North Eastern Electric Power Corporation Limited (NEEPCO)	Miniratna-I	Electricity	I	Ministry Of Power
42	National Seeds corporation Ltd., Department of Agriculture Corporation	Miniratna-I	Agriculture	II	Ministry Of Agriculture
43	WAPCOS	Miniratna-I	Services	III	Ministry of Water Resources
44	Mangalore Refinery& Petrochemical Limited(MRPL)	Miniratna-I	Manufacturing	II	Ministry Of Petroleum & Natural Gas
45	KIOCL Limited	Miniratna-I	Mining	I	Ministry Of Steel
46	Mahanadi Coalfields Limited	Miniratna-I	Mining	I	Ministry of Coal
47	Northern Coalfields Limited	Miniratna-I	Mining	I	Ministry of Coal
48	Chennai Petroleum Corporation Limited	Miniratna-I	Manufacturing	II	Ministry Of Petroleum & Natural Gas
49	Engineering Projects (India) Limited	Miniratna-II	Services	III	Ministry Of Heavy Industries & Public Enterprises
50	P E C Limited	Miniratna-II	Services	III	Ministry Of Commerce & Industry
51	Ferro Scrap Nigam Limited	Miniratna-II	Manufacturing	II	Ministry Of Steel
52	Mumbai Railway Vikas Corporation (MRVC)	4th Category	Services	III	Ministry Of Railways
53	Andaman & Nicobar Island Forest & Plantation Development Corporation Ltd	4th Category	Agriculture	II	Ministry of Environment Forests Climate change
54	Rajasthan Drugs & Pharmaceuticals Limited	4th Category	Manufacturing	II	Ministry Of Chemicals & Fertilizers
55	The Fertilizer Corporation of India Limited	4th Category	Manufacturing	II	Ministry Of Chemicals & Fertilizers
56	H.S.C.C. (India) Ltd.	4th Category	Services	III	Ministry of Health & Family Welfare

Annexure 3: BIOFIN India Questionnaire for assessment of Public Sector investment for Biodiversity Conservation in India

RESPONDENT DETAILS

Name of company	
Name of respondent	
Position of respondent in the company	
Contact details of the respondent (Address, Contact Number and Email)	

I GENERAL INFORMATION (choose relevant option/s)

1. Does your company have any "biodiversity declaration", "action policies" or "guidelines"?	Already in place In planning / under development No action taken yet Need guidance
2. Which of the following encourages your company to adopt environmental and biodiversity conservation strategies?	Ethical motivation of top management (Voluntary commitment) CSR Regulatory Compliance Competitive advantage/ Brand value creation Establishment of financial institutions investing pro-biodiversity actions/ Stock exchange listing requirements Other(please mention below)

II INFORMATION RELATED TO YOUR BUSINESS OPERATIONS

3. Does your company conduct training & awareness programs: • To spearhead pro-biodiversity practices? • For sustainable use of natural resources in your units or nearby plant site?	Yes No
If yes, please mention the yearly target for these training and awareness campaigns from 2010 onwards.	

4. Is your company located in whole or in part within 5 km radius from the boundary of protected areas notified under Wildlife Protection Act, 1972 or eco-sensitive area or from areas of high biodiversity value outside protected areas?	☐ Yes ☐ No
5. If yes, please mention the details of the measures adopted for conservation or restoration of flora& fauna found within 5 km radius of the plant site.	☐ ☐
6. To what extent do you think your business activities (including if those of supply chain) impact biodiversity in protected areas and areas of high biodiversity value outside protected areas?	Almost 100% More than 50% Less than 50% Not known
7. Are there any IUCN Red List species and national conservation list species affected by the operations of your business activities?	Critically endangered Vulnerable Near threatened Least concern Not aware
8. In your opinion, do you believe there is a need to establish specific set of guidelines for companies to ensure that a particular amount of CSR funding flows exclusively for biodiversity conservation?	☐ Yes ☐ No
Comments, if any.	
9. What other documents or key information sources do you suggest for better understanding of your investments and activities towards biodiversity management for the period 2009-10 to 2015-16? *(Feel free to attach documents or insert links)*	☐ Yes
10. To what extent do you think an activity based reporting (see below) should be included in the Business Responsibility Report (BRR) guidelines to ensure accounting of corporate contributions to biodiversity?	Strongly Agree Somewhat Agree Disagree

III. Kindly tick the years if your company is following any of the mentioned guidelines for sustainability initiatives or reporting purpose:

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
National Voluntary Guidelines on Social, Environmental and Economic							
Global Reporting Initiative(GRI)							
Charter on Corporate Responsibility for Environmental Protection(CREP), 2003							
UN Global Compact Rules							
India Business & Biodiversity Initiative							
FICCI Pledge on Biodiversity							
IUCN- Leaders for Nature							
TERI Business Council for Sustainable Development (Teri BCSD)							
Any other guidelines							

IV Project wise expenditures for the period of 2009-10 to 2015-16 for Biodiversity relevant projects as part of CSR and Non CSR activities.

Sr. No.	Sector	Themes under each Sector	Name of Project	Name of Implementing /Partner Agency	Type of Project (Please tick)			Total Project Expenditure in Fiscal Year						
					CSR	**Non CSR** Regulator y Requirement	**Non CSR** Business Investment	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1	Energy Access, assurance and Efficiency	>Wind, hydro, Biomass, Solar energy deployment in rural or urban areas (off grid, decentralized) >Energy savings through energy efficient appliances, etc.												

2	Environment Resource Management Optimization	>Optimizing use natural resources(water, fossil fuels, wood, medicinal or high value plants) > Waste Reuse or Recycling-water harvesting, solid municipal, electronic, wastewater... >Improving Agricultural Practices-water and soil conservation > Water and Carbon foot printing and optimization-operations and supply chain													

4	Afforestation & Ecological Development	>Planting and raising seedling >Silvi culture and regenerating degraded forests >Agroforestry > Green Belt Development														
5	Biodiversity & Habitat Conservation	>Protection/Conservation of ecosystems and habitats with rich genetic, species and community or Ecosystem diversity (protected and un protected) >Natural Habitat Restoration (Forests, wetlands, flood plains, etc.) >Wildlife Conservation >Sustainable Tourism														
6	Environmental Research, training and	>Community Mobilization, awareness and capacity building >Enhancing or														

	education	incentivizing Public participation for conservation >Supporting environment related research programs, fellowships and studies													
7	Other Relevant Projects	Please mention if your project is not covered under any of the heads listed above.													

Annexure 4: List of 20 sample CPSEs which responded with desired data

S.no.	CPSE Name	Type	DPE Sector	Relevant Ministry	Impact Category
1	Indian Oil Corporation Limited	Maharatna	Manufacturing	Ministry Of Petroleum & Natural Gas	II
2	Steel Authority of India Limited	Maharatna	Manufacturing	Ministry of steel	II
3	Bharat Heavy Electricals Limited	Maharatna	Manufacturing	Ministry Of Heavy Industries & Public Enterprises	II
4	Gail(India) Limited	Maharatna	Manufacturing	Ministry Of Petroleum & Natural Gas	II
5	Rural Electrification Corporation Ltd	Navratna	Services	Ministry Of Power	III
7	Power Grid Corporation of India Limited	Navratna	Electricity	Ministry Of Power	I
8	Hindustan Petroleum Corporation Limited (HPCL)	Navratna	Manufacturing	Ministry Of Petroleum & Natural Gas	II
9	Bharat Petroleum Corporation Limited (BPCL)	Navratna	Manufacturing	Ministry Of Petroleum & Natural Gas	II
10	Bharat Electronics Limited	Navratna	Manufacturing	Ministry of Defence	II
11	Mangalore Refinery & Petrochemical Limited (MRPL)	Miniratna Category - I	Manufacturing	Ministry Of Petroleum & Natural Gas	II
12	MMTC Limited	Miniratna Category - I	Services	Ministry Of Commerce & Industry	III
13	Balmer & Lawrie	Miniratna Category - I	Services	Ministry Of Petroleum & Natural Gas	III
14	NHPC Limited	Miniratna Category - I	Electricity	Ministry Of Power	I
15	North Eastern Electric Power Corporation Limited (NEEPCO)	Miniratna Category - I	Electricity	Ministry Of Power	I
16	Indian Renewable Energy Development Agency Limited	Miniratna Category - I	Services	Ministry of New & Renewable Energy	III
17	Chennai Petroleum Corporation Limited (CPCL)	Miniratna Category - I	Manufacturing	Ministry Of Petroleum & Natural Gas	II

18	Engineering Projects (India) Limited	Miniratna Category-II	Services	Ministry Of Heavy Industries & Public Enterprises	III
19	Mineral Exploration Corporation Limited (MECL)	Miniratna Category - II	Services	Ministry Of Mines	III
20	Mumbai Railway Vikas Corporation (MRVC)	4th Category	Services	Ministry Of Railways	III

Annexure 5: CSR Expenditure details for sample CPSEs

S.no	Total expenditure (Rs. Crores)	Biodiversity Relevant expenditure Rs. crores	Biodiversity attributable expenditure Rs. crores
1	**Expenditure for a period of 7 years (2009-10 to 2015-16)**		
	3223.94	319.97	95.62
2	**Expenditure (Annual Averages)**		
	460.56	45.71	13.66
3	**Average Annual expenditure per CPSE**		
	23.03	2.29	0.68

Annexure 6: Extrapolation of sample values for 97 CPSEs (CSR)

Formula's Used	Values obtained
$(\frac{Total\ CSR}{BD\ Attributable\ CSR}) \times 100$ = *BD attributable Proportion*	**0.0297 (Sample)**
$BD\ attributable\ Proportion \times Annual\ CSR\ expenditure$ = Average annual BD attributable expenditure for 97 CPSEs	**81.92 Rs. crore (Secondary CSR data)**
$\frac{\text{Average annual BD attributable expenditure}}{\text{Total No. of CPSEs}}$ = Average Annual BD attributable expenditure per CPSE	**0.84 Rs. Crore (Secondary CSR Data)**

Annexure7: Non-CSR expenditure for sample CPSEs

S.no	Biodiversity Relevant expenditure Rs. crores	Biodiversity attributable expenditure Rs. crores
1	**Expenditure for a period of 7 years (2009-10 to 2015-16)**	
	3944.57	1436.02
2	**Expenditure (Annual Averages)**	
	563.51	205.15
3	**Average Annual expenditure per CPSE**	
	28.17	10.26

Annexure 8: Extrapolation of sample values for 97 CPSEs (Non –CSR)

Formula's Used	Values obtained
$\boldsymbol{Avergae\ annual\ Non\ CSR\ BD\ attributable\ expenditure\ for\ 97\ CPSE = Non\ CSR\ BD\ attributable\ expenditure\ per\ CPSE \times Total\ no.\ of\ CPSEs\ targetted}$	**Rs 995.22 crore**

Annexure 9: Format for the Annual Report on CSR Activities to be Included in the Board's Report

1. A brief outline of the company's CSR policy, including overview of projects or programs proposed to be undertaken and a reference to the web-link to the CSR policy and projects or programs.

2. The Composition of the CSR Committee:

3. Average net profit of the company for last three financial years:

4. Prescribed CSR Expenditure (two per cent. of the amount as in item 3above)

5. Details of CSR spent during the financial year.

1. Total amount to be spent for the financial year

2. Amount unspent, if any-

3. Manner in which the amount spent during the financial year is detailed below

Sr. No	CSR project or activity identified	Sector in which the Project is covered	Projects or programs (1) Local area or other (2) Specify the State and district where projects or programs	Amount outlay (budget) project or programs wise	Amount spent on the projects or programs Sub-heads: (1) Direct expenditure on projects or programs. (2)	Cumulative expenditure unto to the reporting period.	Amount spent: Direct or through implementing agency
1							
2							
3							
	TOTAL						

*Give details of implementing agency

6. In case the company has failed to spend the two per cent of the average net profit of the last three financial years or any part thereof, the company shall provide the reasons for not spending the amount in its Board report.

7. A responsibility statement of the CSR Committee that the implementation and monitoring of CSR Policy, is in compliance with CSR objectives and Policy of the company:

Sd/- (Chief Executive Officer or Managing Director or Director)	Sd/- (Chairman CSR Committee)	Sd/- (Person specified under clause 4. of sub-section (1) of section 380 of the Act) (wherever applicable)

Annexure 10: Note on Projection Methodology

The annual biodiversity attributable CSR estimated from the total CSR expenditure for the period of 2009 -2015 for a sample of 20 CPSEs is used to derive the biodiversity attributable of 2.97 %. By extrapolating the annual biodiversity attributable expenditure per CPSE for 97 CPSEs, the annual biodiversity for 97 CPSEs is estimated. Calculations are depicted in Annexure 6 and the trend is depicted in Figure 5.

To project biodiversity attributable CSR expenditure of 97 CPSEs for a period of 2016-2020, the proportion of 2.97 % is then applied to CSR estimates of 97 CPSEs derived from their actual PBTs for a period of 2009-15. The projected values so obtained are shown in Figure 6 & 7 in both nominal & real terms.

Annexure 11: List of Officials Consulted/Interviewed

S. No.	Company	Concerned CSR/ Sustainability Head/ Corporate Communication	Month of meeting/ Telephonic Conversation (2016)
1	Indian Oil Corporation Limited	Mr. S.K Awasthi	July
2		Mr Subodh Kumar	July
3		Mr. Vibhuti Pradhan	July
4		Mr. Surjeet Basu	July
5	Steel Authority of India Limited	Mr Sunil Singhal	July
6		Mr R.K Prasad	July
7		Mr Anoop Lodhi	July
8	Bharat Heavy Electricals Limited	Dr.BalvirTalwar	July
9	Gail(India) Limited	Mr. Anand Acharya	July
10		Mr Anoop Gupta	June
11	NTPC Limited	Mr. G. Sridhar	July
12		Mr. Dinesh Aggarwal	July
13	Rural Electrification Corporation Ltd	Mr T. Sridhar	July
14		Mr. Sahab Narain	July
15			
16	Mangalore Refinery & Petrochemical Limited (MRPL)	Mr Sanjay Varma	June
17	Hindustan Petroleum Corporation Limited (HPCL)	Mr Keshav Singhal	June
18	Bharat Petroleum Corporation Limited (BPCL)	Mr. VSN Rao	June
19	MMTC Limited	Ms Venita Solomon	July
20			July
21	Balmer& Lawrie		June
22	NHPC Limited		May
23	North Eastern Electric Power Corporation Limited (NEEPCO)	Mr N.K Mao	May
24	Chennai Petroleum Corporation Limited (CPCL)	Mr K Ravichandran	May
25	Engineering Projects (India) Limited	Mrs Sudha Venkata Varadhan	June
26		Mr. Salil Kumar	
27	Mineral Exploration Corporation Limited (MECL)	Dr CS Murthy	June
28	Mumbai Railway Vikas Corporation (MRVC)	Mrs Smruti Jacob	May
29	Container Corporation of India Ltd.	Mr Vinod Rai	July
30		Mr. Anurag Mathur	July
31	Power Finance Corporation Ltd.	Sankalp Singh	July
32		Mr. Amit Mishra	July

33	Indian Railway Catering & Tourism Corporation Limited	Mr. P.C Bihari	July
34		Mr. DJ Prasad	July
35	Oil & Natural Gas Corporation Limited	Mrs Alka Mittal	July
36	Engineers India Limited	Mr J. K Joshi	July
37	ITDC	Mr Afzal Ahmad	June
38		Mrs Aarti Diwan	
39	Indian Renewable Energy Development Agency Limited (IREDA)	Mr K.P Philip	July
40		Mr. Bhimesh Saroha	July
41	Projects & Development India Limited	Mr Sanjay Sinha	July
42	Central Warehousing Corporation	Mr P.C Rai	June
43	Balmer & Lawrie	Mr. Dilip Das	August
44	Bharat Electronics Limited	Mr. Ashish Kansal	August
45	NALCO	Mr. Sanjay Mishra	August
46	MECL	Mr. CS Murthy	June
47	MRVC	Ms. Smruti Jacob	July
48	MECON Limited	Mr Balmichu	July
49	Hindustan Aeronautics Ltd	Mr Magendra Kumar	July
50	Power Grid Corporation of India Limited	Mr Atul Trivedi	July
51	Department of Public Enterprises	Mr M. M Gupta	July
52	SCOPE New Delhi	Mr U.D Choubey	July
53		Mr S.K Sihna	June-September
54		Mr Zaman Khan	June-September
55	Ministry of Corporate Affairs	Smt.Sibani Swain	July
56		Smt. Seema Rath	July

Chapter 5

Mapping Flow of Funds for Biodiversity Conservation through CSOs

1. Introduction

Civil Society Organizations (CSOs), or Non-Government Organizations (NGOs) form an intrinsic part of the development agenda and process in many countries. CSOs in India also have been an active stakeholder in nation building (have been involved in carrying out a wide range of activities for the benefit of underprivileged people and the society at large ─ formulation of various policies as well as raising awareness among people on social and environmental issues and implementation of public and private sector programs and projects).

It is important to mention here that documentation of the crucial role played by CSOs in India is rather poor. There is no single agency which maintains even basic information (location, sectoral focus, size, nature etc.) in respect of CSOs, leave aside actively tracking their fund flows, contribution, and performance and so on. Therefore, it is imperative that a comprehensive and reliable data base is developed which can enable better assessment of the contributions of CSOs and thus make the entire ecosystem more broad-based, accountable, and efficient.

At the instance of the Supreme Court of India, the CBI undertook the first-ever exercise of mapping registered NGOs. It has been reported (as per an affidavit filed in the Supreme Court) that in 2015 there are at least 31 lakh NGOs registered under the Societies Registration Act across 26 states[52] and more than 82,000 NGOs are registered in 7 Union Territories. However, this information is yet to be digitized and made available in the public domain.

2. Objectives

The objective of this chapter is to undertake an assessment of public expenditure at the central government level on biodiversity conservation through CSOs. That is an assessment of the fund flows from Ministries/Departments of the Government of India to CSOs, across India and Maharashtra in particular, for conservation of biodiversity.

3. Scope of the Chapter and Source of Funds to CSOs

CSOs typically receive funds from the following sources:

i. Government
ii. Philanthropy organizations (both domestic and international)
iii. Individuals
iv. International/External aid (bilateral, multilateral institutions, governments, special purpose funds)
v. Corporate sector

[52] The CBI had been directed by the Supreme Court to collect information about NGOs and inform whether these NGOs have filed balance sheets, including income-expenditure statements, to ascertain compliance with accountability norms.
India has 31 lakh NGOs, more than double the number of schools: The Indian Express, Aug 1, 2015

Before we further discuss each of the above mentioned source of funding it is important to flag two considerations that have gone in identifying which of the above source should be included/not included in the analysis in this chapter (to avoid double counting) and what should be the scope of data for each of these sources.

a. Since the scope of this study is limited to the central level, accordingly we focus only on central level institutions for each of the above funding source.
b. Further, as per the ToR of the study (Chapter 1) corporate sector (v above) and International fund flows (iv above) are dealt as separate components in the report, grants from the corporate sector and external aid are covered in expenditure mapping of these components. In order to avoid double counting, analysis in this chapter is confined to i-iii as above.

4. Methodology

4.1 Compilation of Data

4.1.1 Grants from Central government: The data on grants (funds released) by central ministries and departments to CSOs has been obtained from Public Finance Management System (PFMS) maintained at the Ministry of Finance, Government of India. To receive grants from any Ministry/Department, the CSO must register itself with PFMS first, following which, the respective Ministry/Department releases funds to the bank account of the CSO.

The data received from PFMS contains details on: the name of the CSO, name of the concerned Ministry/Agency, State in which the CSO is operating, the scheme/program under which this grant has been made (allocation of funds), grant amount released for financial years 2009-2015.

A total of 38 Ministries/Departments had been identified as having biodiversity relevant schemes (Annex 1). A detailed examination of the data revealed that only the following 8 Ministries have engaged with CSOs for activities relevant for biodiversity conservation and releasing grants to them.

i. Ministry of Environment, Forests and Climate Change (MoEF&CC)
ii. Ministry of Agriculture (MoA)
iii. Ministry of New and Renewable Energy (MoNRE)
iv. Ministry of Rural Development (MoRD)
v. Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR)
vi. Ministry of Tribal Affairs (MoTA)
vii. Ministry of Health and Family Welfare[53] (MoH&FW)
viii. Ministry of Development of North Eastern Region (MoDoNER)

The data received from PFMS is in respect of funds released to individual CSOs. Since the CSOs do not receive the next instalment of the grant until a utilization certificate has been

[53] This Ministry is relevant because of the ancient Indian plant and ecology based healing and wellness practices. The Ministry of Health housed the Department of AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy) until FY 2013-14. AYUSH is an independent central ministry since FY 2014-15.

submitted and approved by the concerned ministry, this data closely corresponds to the expenditure made by the CSOs[54].

As the grants are made directly to these organizations by the Central Government, these are not counted under the grants made to different States, therefore there is no double counting of these grants in state budget data.[55]

4.1.2 Grants from Philanthropy organizations and individuals: These can be from domestic sources as well as from external sources.

To receive grants from external sources, CSOs must register under the Foreign Contribution (Regulation) Act, 2010 (FCRA)[56]. Repeated requests for such data to the Ministry of Home Affairs bore no results. It appears that this information is not being tracked systematically and has not been digitized so far.

There is no systemic recording, tracking and monitoring of grants by domestic philanthropy institution to CSOs. Moreover, domestic Philanthropy efforts have shown a new trend in recent years. A number of large businesses now have their own foundations for execution of their projects and programs.

In order to capture philanthropy contributions to CSOs for conservation of biodiversity; we conducted a survey of CSOs registered in Maharashtra (Annexure II). A sample of 270 CSOs was drawn from the list of CSOs registered with the Maharashtra State Biodiversity Board (MSBB) and some other CSOs were added to this list (see Section 5.2). In the survey, we asked for information on expenditures by CSOs and their source of funding, for the year 2013-14, 2014-15, and 2015-16. Sample CSOs were contacted through email, post mail and telephone.

We received information on grants and expenditure from 32 CSOs. The response was below our expectations. This can partly be explained by the fact that not all sample CSOs undertook biodiversity related activities in recent years. Activities undertaken by these CSOs are categorized under the following themes:

i. Agriculture, Soil and Water: Organic Farming, conservation of soil and water harvesting etc.
ii. Awareness, Disaster Relief, Monitoring and Evaluation: Environmental Awareness campaigns, Vasundhara Festival, Disaster response and relief, monitoring and evaluation of Government Schemes
iii. Forestry: afforestation activities, tree surveys, medicinal tree plantations.
iv. Maharashtra State Biodiversity Board: The MSBB is the primary organization in Maharashtra working on biodiversity and related activities. It is pertinent to segregate the grants made by the MSBB from the other sources, as it may lead to double counting

[54] The details of these UCs are uploaded to the PFMS website, following which the next instalment is approved.
[55] Schemes were restructured in 2014-15 for this purpose to ensure that the grants are routed through State Budget.
[56] The Foreign Contributions (Regulation) Act, 2010

4.2 Computation of Biodiversity Attributable Expenditure by CSOs

Step 1: We compiled PFMS data on grants for the years 2009-10 to 2015-16. Data on grants is obtained project-wise. From a detailed desk review of this data biodiversity relevant projects were identified.

Step 2: Using the methodology developed and explained in Chapter 2; projects were classified by their impact of biodiversity, and the taxonomy of biodiversity.

Step 3: Biodiversity attributable expenditures were calculated for each project by applying appropriate coefficients/factors to different projects.

5. Analysis and Main Results

5.1 PFMS Data: All India

i. No clear trend is seen in either the number of grants (Figure 1) or the amounts released during the study period (Figure 2). However, breaking the study period into Five Year Plan periods we find that both the number of grants and the amounts released show a decline in the Twelfth Plan period (2012-17), the only exception being FY 2013-14 when the grant amounts almost doubled compared to the previous year (Figure 2). While the former can be attributed to the restructuring of the central grants in the Twelfth Plan period[57]; the latter can, to a large extent, be explained by the fact that FY 2013-14 was the year leading up to the national election in April 2014 and a surge in grants to CSOs might have happened due to the perceived political gains of working through CSOs.

ii. It is interesting to note, that while the amount of grants released under biodiversity relevant schemes has nearly doubled from 2012-13 to 2013-14, the increase in expenditure attributable to biodiversity (Figure 3) has been less steep.

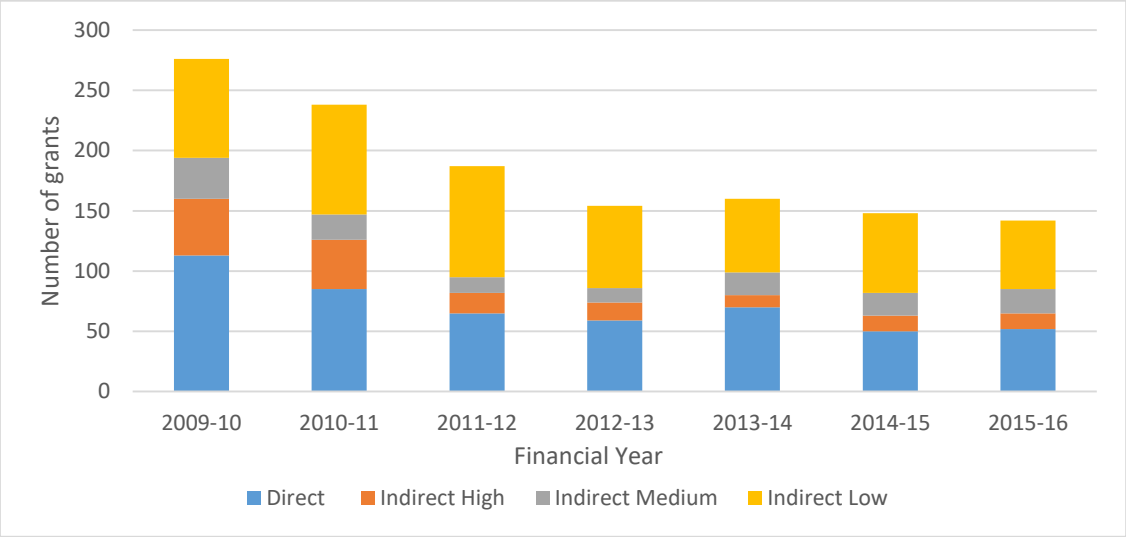
iii. The two ministries which contributed to this sharp increase in grants are MoA followed by MoEF&CC. During the period of the study MoEFCC is seen as the largest grantor followed by MoA. This implies that the direct biodiversity impact category projects have received large share relatively. This is also corroborated by the results in Figure 4

iv. As much as 82 per cent to 92 per cent of the grants to CSOs has been for enhancing implementation (activities to support scientific research and data, designing appropriate policies and creating institutions, awareness generation, capacity building for implementation and enforcement of laws and specific policies and programs at all levels etc.) Figure 5.

v. The observation at iv above implies that while central government has taken upon itself to support broad based research, the state government institutions are seen to be better placed to engage with CSOs and monitor their work on activities such as on the ground conservation and restoration works.

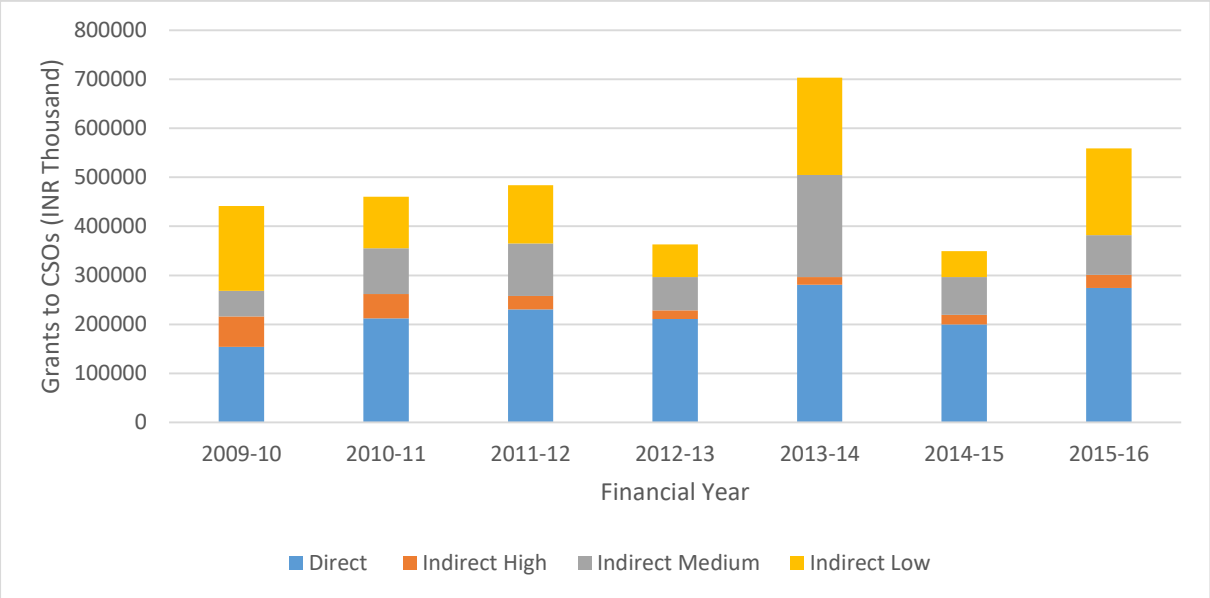
[57] There was an increasing recognition to move away from the Five Year Planning process and restructure the central government grants in general, and also move away from the system of releasing grants directly to the executing agency, to a system where grants are routed through state budgets.

Figure 1: Number of Biodiversity Relevant Grants released to CSOs (All India)



Source: Authors' calculations

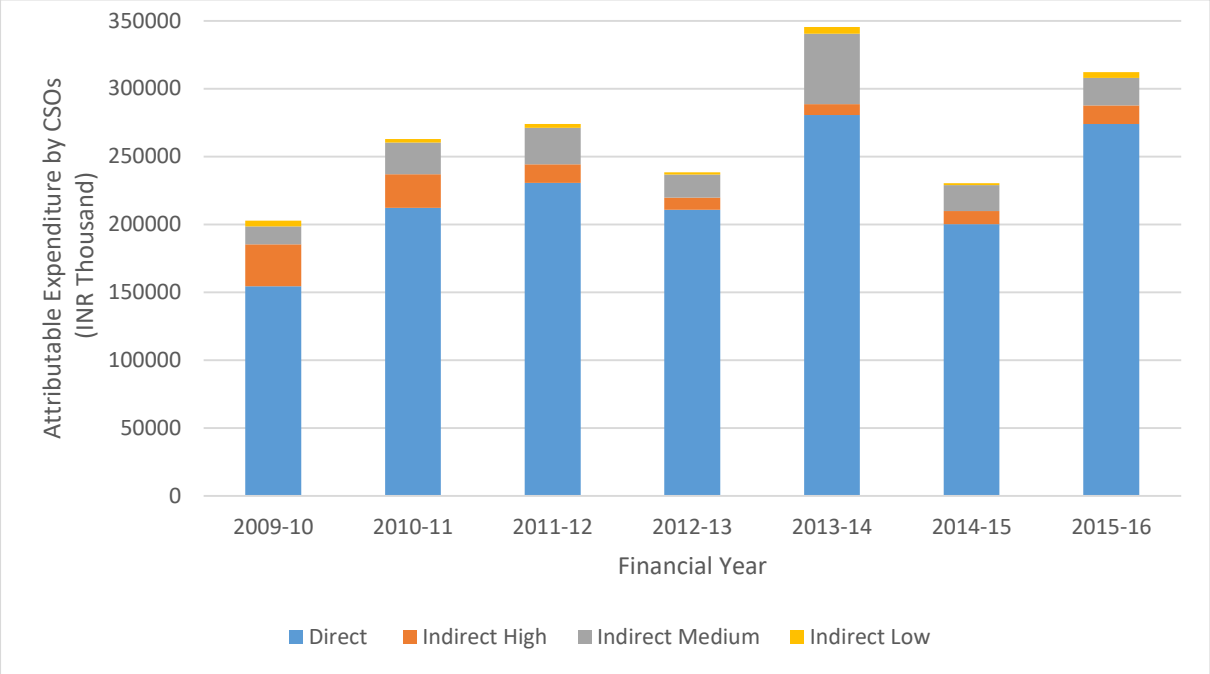
Figure 2: Amounts of Grants released to CSOs through Biodiversity Relevant Schemes (All India)



Source: Authors' calculations

Note: Corresponding Table A1, Annexure – 2

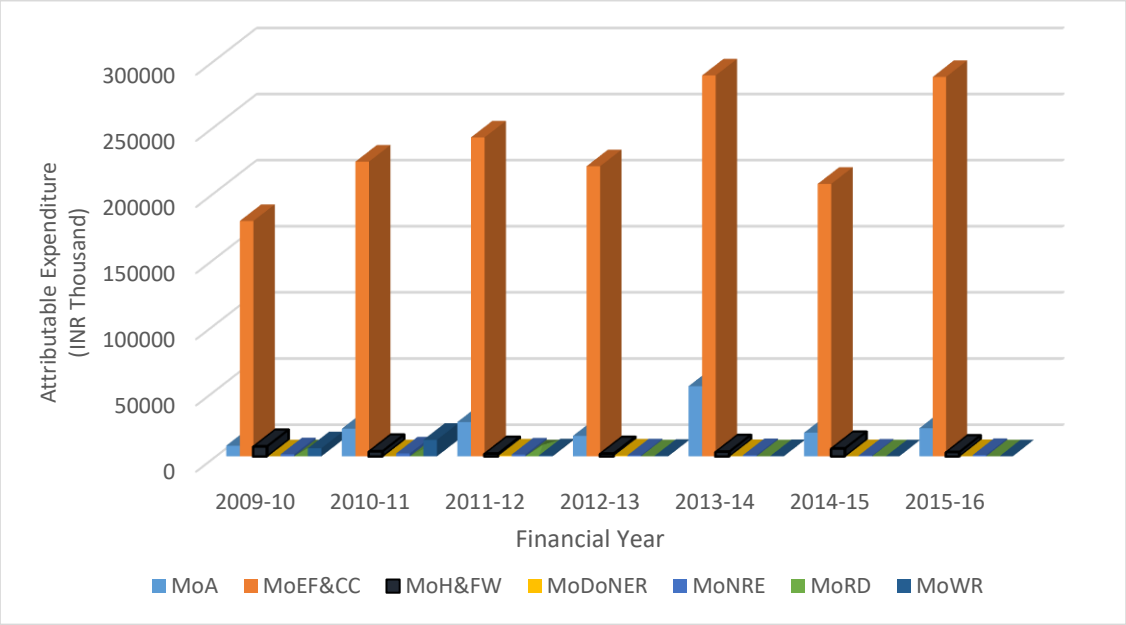
Figure 3: CSOs Expenditure Attributable to Biodiversity by Direct and Indirect Impact Classification (All India)



Source: Authors' calculations

Note: Corresponding Table A2, Annexure – 2

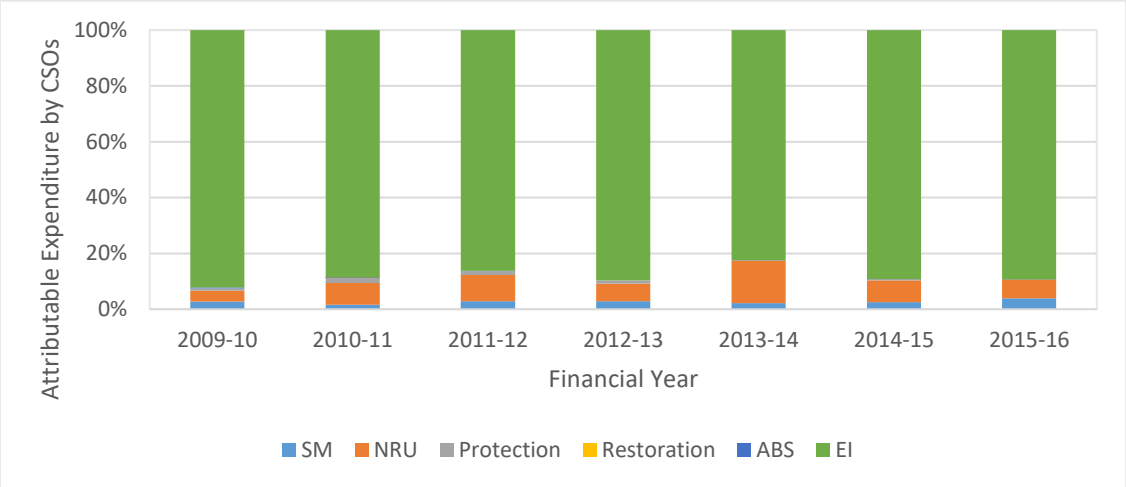
Figure 4: Ministry Wise Trends in Attributable Expenditure to Biodiversity (All India)



Source: Authors' calculations

Note: Corresponding Table A3, Annexure – 2

Figure 5: Attributable Expenditure by CSOs by BIOFIN Taxonomy (All India)



Source: Authors' calculations

Notes: Corresponding Table A4, Annexure – 2

5.2 Analysis and Main Results: Maharashtra

5.2.1 PFMS Data

i. The data and results for Maharashtra follow trends similar to all India (Section 5.1) in terms of distribution of grants by impact on biodiversity or when classified according to BIOFIN Taxonomy. Further, MoEF&CC has significantly engaged with CSOs in the state and over 90% of the total grants to Maharashtra fall under direct impact category. Focus of the grants has been on Sectoral Mainstreaming and Enhancing Implementation (Figures 6-8).

ii. Sectoral distribution of activities: After segregating the responses into BIOFIN categories, it was seen that most work undertaken by the CSOs falls under Enhancing Implementation with emphasis on capacity building (Figure 9).

5.2.2 Survey Data

iii. Analysis of CSO survey results in Maharashtra shows that modest amounts ranging from Rs. 58 lakh in 2013-14 to Rs. 2.7 cr. has been spent on biodiversity conservation by 32 CSOs for which we have received the desired data. Of this, grants/donations by individuals and private trusts is insignificant amount (approximately 1%). The remaining grants are largely covered under other components of the study (Annexure II Table A7).

iv. In the last two years (2014-15 and 2015-16), there has been significant inflow of funds from the corporate sector for activities particularly emphasizing upon Water Harvesting and Management works. This is possibly due to drought situation in Maharashtra for the last few years (Table 1).

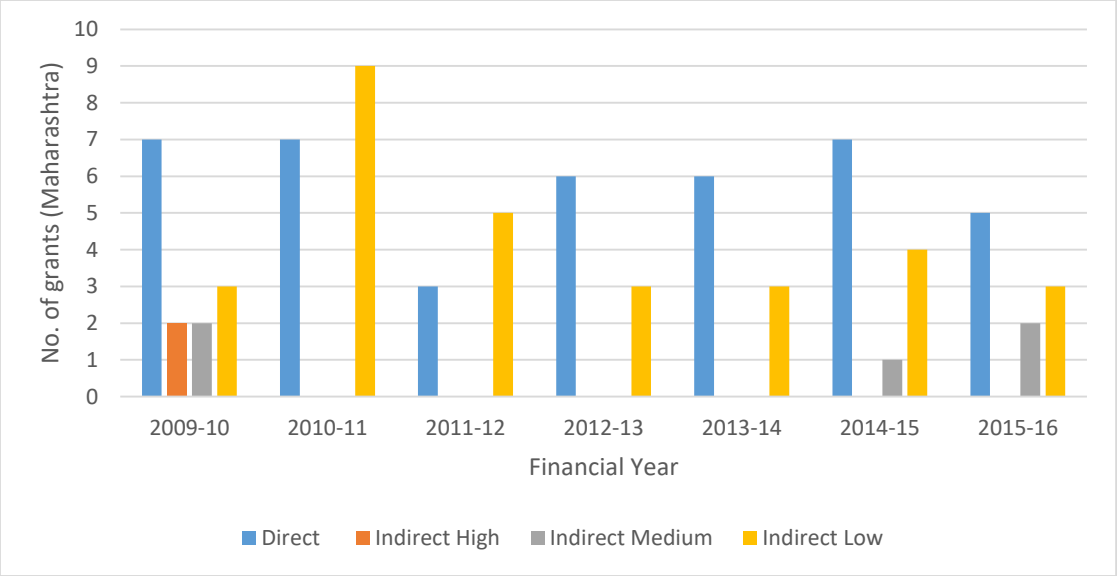
v. It is seen that the activities that CSOs have generally undertaken constituted awareness and capacity building. Due to the drought conditions for the last two years, there has

been a special emphasis on water conservation, rainwater harvesting projects, awareness campaigns and festivals, and disaster relief & management (Table 2). The focus of disaster relief and management activities is in drought affected districts of Maharashtra.

vi. While the expenditure in the forestry sector is surprisingly low, given the emphasis of the Government agencies towards afforestation, an increasing trend is observed. The increasing trend of funds from individuals and trusts, in also very encouraging, as it indicates greater awareness among people. (Table 3)

vii. The MSBB is actively engaging with CSOs across Maharashtra for instituting the Biodiversity Management Committees (BMC) since 2014-15(Table 4)[58]. The MSBB is also engaging CSOs to spread awareness on Biodiversity and for preparation of People's Biodiversity Register (PBR).

Figure 6: Number of Biodiversity Relevant Grants released to CSOs (Maharashtra)

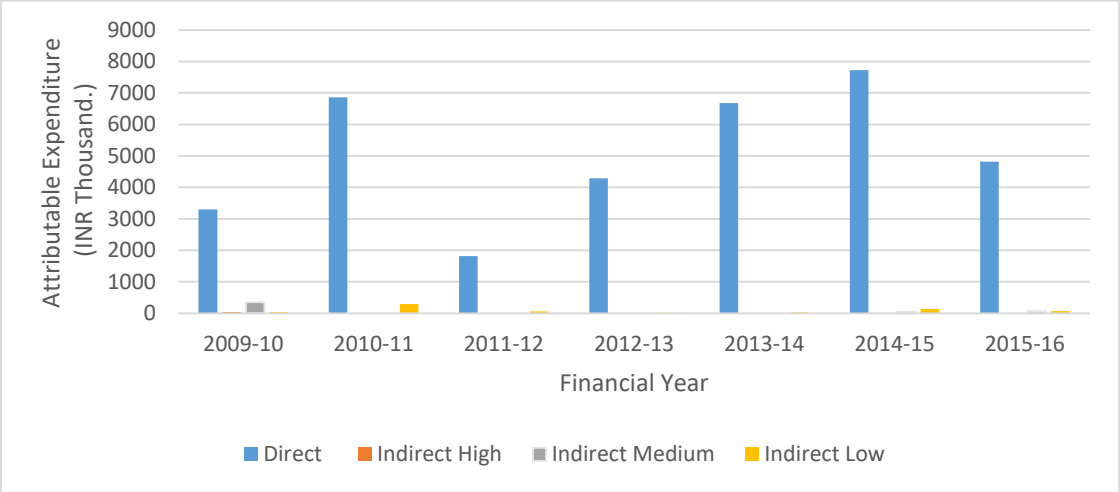


Source: Authors' calculations

6. Policy Suggestions

[58] The MSBB identifies the CSOs based on their area of work etc. and enters into a contract with them for establishing a particular number of BMCs, as per the guidelines. In most cases the payment is on reimbursement basis to the CSO, after the verification of the work done.

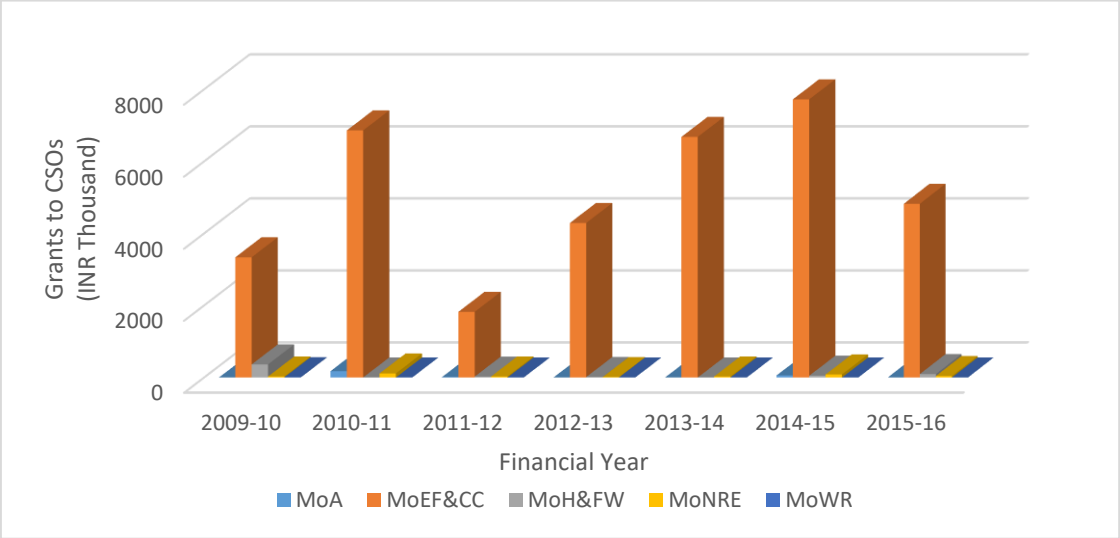
Figure 7: CSOs Expenditure Attributable to Biodiversity by Impact (Maharashtra)



Source: Authors' calculations

Notes: Corresponding Table A5, Annexure – 2

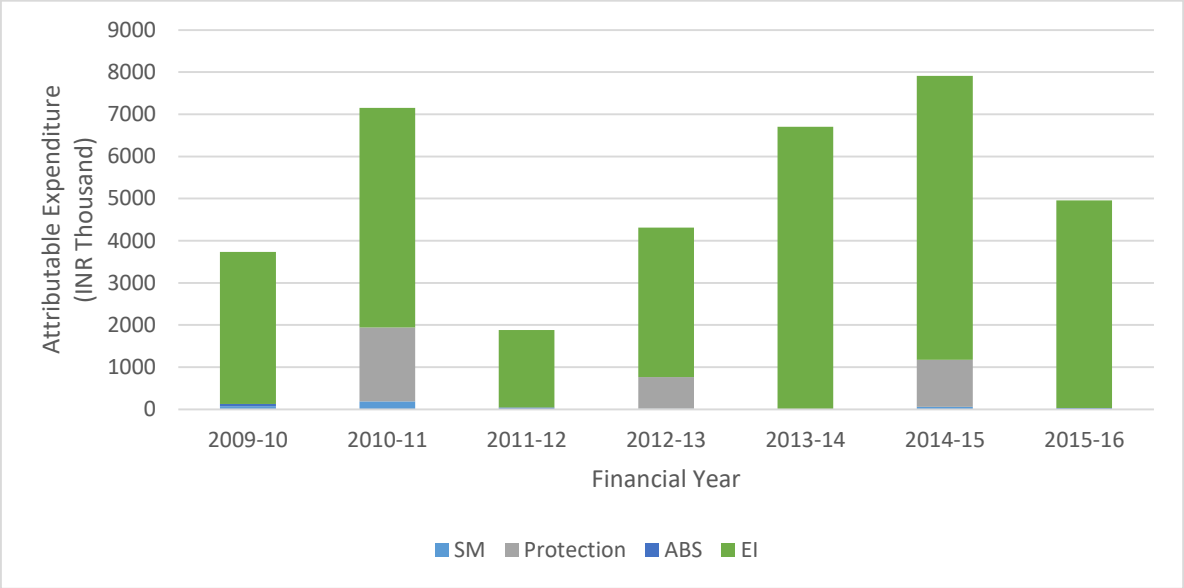
Figure 8: Ministry wise biodiversity attributable expenditure (Maharashtra)



Source: Authors' calculations

Notes: Corresponding Table A6, Annexure – 2

Figure 9: Attributable Expenditure by CSOs by BIOFIN Taxonomy (Maharashtra)



Source: Authors' calculations

Notes: Corresponding Table A7, Annexure – 2

Table 1: Agriculture, Soil and Water (NIPFP survey data)

Finance Actor	2013-14	2014-15	2015-16
Central Government	₹ 5,26,326	₹ 4,88,500	₹ 10,63,986
State Government	₹ 20,30,500	₹ 44,55,600	₹ 21,75,523
District Administration	-	₹ 22,000	-
Corporate (Private/Public)		₹ 53,91,000	₹ 61,60,800
Individuals/Trusts/Donations	₹ 8,000	₹ 44,100	₹ 6,88,400
Total	₹ 25,64,826	₹ 104,01,200	₹ 100,88,709

Source: Authors' calculations

Table 2: Awareness, Monitoring and Evaluation (NIPFP survey data)

Finance Actor	2013-14	2014-15	2015-16
Central Government	₹ 46,000	₹ 2,20,000	₹ 86,900
State Government	-	-	₹ 60,408
District Administration	₹ 18,000	-	-
Individuals/Trusts/Donations	₹ 3,900	₹ 29,750	₹ 79,025
Total	₹ 67,900	₹ 2,49,750	₹ 2,26,333

Source: Authors' calculations

Table 3: Forestry (NIPFP survey data)

Finance Actor	2013-14	2014-15	2015-16
Central Government	₹ 3,32,975	₹ 2,60,700	₹ 5,200
State Government	₹ 18,40,500	₹ 41,73,300	₹ 50,200
District Administration	₹ 19,600	-	-
Urban Local Body	-	₹ 10,000	-
Corporate (Private/Public)	₹ 10,00,000	₹ 17,50,000	₹ 172,50,000
Individuals/Trusts/Donations	₹ 29,600	₹ 1,63,400	₹ 1,79,200
Externally Aided Projects	-	₹ 2,05,000	-
Total	₹ 32,22,675	₹ 65,62,400	₹ 174,84,600

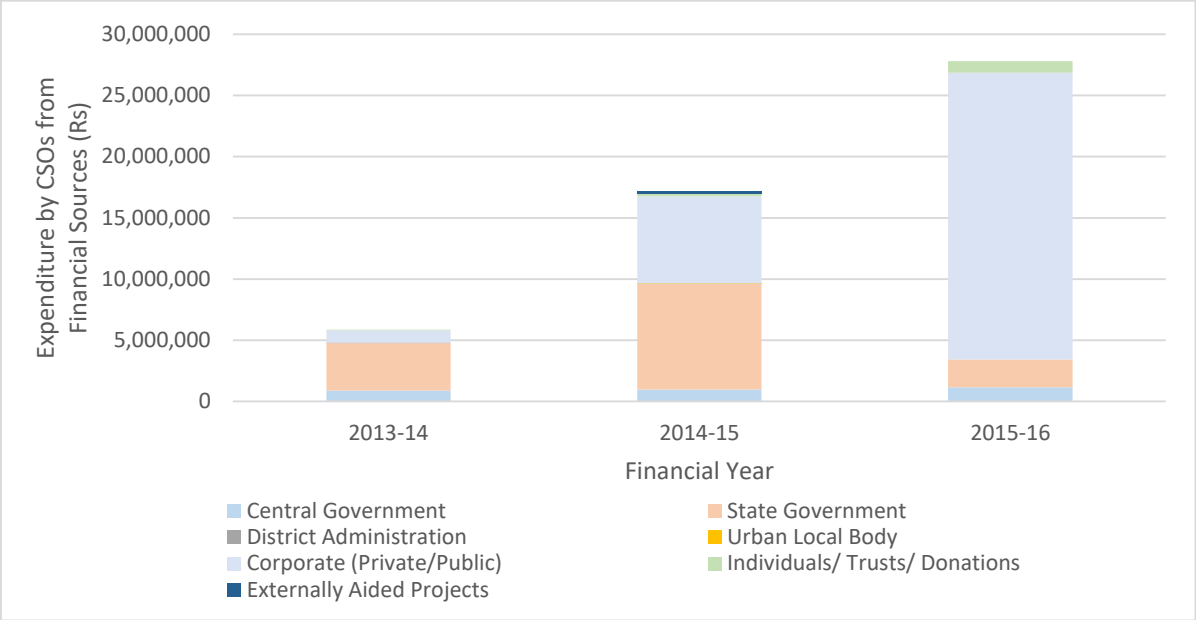
Source: Authors' calculations

Table 4: Maharashtra State Biodiversity Board (NIPFP survey data)

Finance Actor	2013-14	2014-15	2015-16
Biodiversity Management Committees	-	₹ 18,74,920	₹ 9,43,315
Awareness Programs	-	₹ 0	₹ 3,62,525
Total	-	₹ 18,74,920	₹ 13,05,840

Source: Authors' calculations

Figure 10: Actual Expenditure by CSOs by Source of Grants (NIPFP survey data)



Source: Authors' calculations

Notes: Corresponding Table A8, Annexure – 2

Annexure - 1: List of Biodiversity Relevant Ministries/ Departments of Government of India

Sr. No.	Name of the Ministries
1	Ministry of Agriculture
2	Ministry of Science and Technology
3	Ministry of Coal
4	Ministry of Chemical and Fertilizers
5	Ministry of Commerce and Industries
6	Ministry of Drinking Water and Sanitation
7	Ministry of Health and Family Welfare (All Departments)
8	Ministry of AYUSH (Estd. Nov, 2014)
9	Ministry of New and Renewable Energy
10	Ministry of Petroleum and Natural Gas
11	Ministry of Rural Development
12	Ministry of Shipping
13	Ministry of Tribal Affairs
14	Ministry of Water and Resources
15	Department of Space, PMO
16	Ministry of Earth Sciences
17	Ministry of Urban Development
18	Ministry of Human Resource and Development
19	Ministry of Tourism
20	Ministry of Power
21	Ministry of Culture
22	Ministry of Development of North Eastern Region
23	Ministry of Environment and Climate Change
24	Ministry of Finance
25	Ministry of Food Processing Industries
26	Ministry of Heavy Industries and Public Enterprises (All Departments)
27	Ministry of Housing and Urban Poverty Alleviation
28	Ministry of Labour and Employment

29	Ministry of Micro, Small and Medium Enterprises
30	Ministry of Mines
31	Ministry of Road, Transport and Highways
32	Ministry of Steel
33	Ministry of Textiles

Annexure – 2: Data Tables for Civil Society Organizations

Table A1: Grants Released to CSOs through Biodiversity Relevant Schemes (All India)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	154359.97	212078.44	230600.45	210696.23	280629.94	200070.28	274069.84
(% Total)	34.97	46.05	47.68	58.05	39.92	57.32	49.06
Indirect High	61833.57	49607.24	27498.29	17896.48	15859.47	19259.55	27125.98
(% Total)	14.01	10.77	5.69	4.93	2.26	5.52	4.86
Indirect Medium	52438.21	93520.79	106832.55	67954.46	207940.31	76987.91	80915.60
(% Total)	11.88	20.31	22.09	18.72	29.58	22.06	14.48
Indirect Low	172824.61	105307.48	118667.76	66420.32	198587.37	52746.28	176541.77
(% Total)	39.15	22.87	24.54	18.30	28.25	15.11	31.60
Total	441456.35	460513.95	483599.04	362967.48	703017.10	349064.02	558653.20

Source: Computed by NIPFP

Table A2: CSOs Expenditure Attributable to Biodiversity by Impact (All India)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	154359.97	212078.44	230600.45	210696.23	280629.94	200070.28	274069.84
(% Total)	76.15	80.67	84.15	88.42	81.22	86.89	87.77
Indirect High	30916.78	24803.62	13749.14	8948.24	7929.74	9629.77	13562.99
(% Total)	15.25	9.43	5.02	3.76	2.30	4.18	4.34
Indirect Medium	13109.55	23380.20	26708.14	16988.61	51985.08	19246.98	20228.90
(% Total)	6.47	8.89	9.75	7.13	15.05	8.36	6.48
Indirect Low	4320.62	2632.69	2966.69	1660.51	4964.68	1318.66	4413.54
(% Total)	2.13	1.00	1.08	0.70	1.44	0.57	1.41
Total	202706.92	262894.94	274024.42	238293.59	345509.44	230265.68	312275.28

Source: Computed by NIPFP

Table A3: Ministry-wise releases attributable to biodiversity (All India)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
MoA	8027.35	20849.85	25864.90	15392.28	52920.33	17824.30	21180.59
MoEF&CC	177824.72	222695.90	241034.90	219221.02	287917.40	205900.05	286732.84
MoH&FW	7500.11	3824.55	2069.25	2082.61	3527.25	5955.63	3257.53
MoDoNER	-	-	594.73	583.07	144.88	41.48	141.60
MoNRE	1506.71	2163.96	1345.95	691.16	847.30	544.22	962.73
MoRD	1771.00	915.45	2441.20	-	-	-	-
MoWR	6077.03	12445.23	673.49	323.45	152.28	-	-

Source: Computed by NIPFP

Table A4: Releases to CSOs classified into BIOFIN Taxonomy (All India)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
SM	5695.39	4334.14	7971.05	6830.40	7651.33	6002.72	12181.97
(% Total)	2.81	1.65	2.91	2.87	2.21	2.61	3.90
NRU	7914.85	20424.38	25695.63	15235.98	52829.64	17767.83	21118.09
(% Total)	3.90	7.77	9.38	6.39	15.29	7.72	6.76
Protection	1627.45	4778.78	3776.29	2732.15	-	1119.60	-
(% Total)	0.80	1.82	1.38	1.15	0.00	0.49	0.00
Restoration	-	150.48	-	-	-	-	-
(% Total)	0.00	0.06	0.00	0.00	0.00	0.00	0.00
ABS	683.98	495.24	210.61	-	74.93	105.03	75.38
(% Total)	0.34	0.19	0.08	0.00	0.02	0.05	0.02
EI	186785.25	232711.93	236370.83	213495.07	284953.54	205270.50	278899.85
(% Total)	92.15	88.52	86.26	89.59	82.47	89.15	89.31
Total	202706.92	262894.94	274024.42	238293.59	345509.44	230265.68	312275.28

Source: Computed by NIPFP

Table A5: Grants Attributable to Biodiversity by Direct and Indirect Impact Classification (Maharashtra)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Direct	3300.01	6860.39	1821.90	4289.96	6679.00	7722.57	4821.51
(% Total)	88.37	95.95	96.66	99.48	99.59	97.60	97.29
Indirect High	43.13	-	-	-	-	-	-
(% Total)	1.16	0.00	0.00	0.00	0.00	0.00	0.00
Indirect Medium	351.11	-	-	-	-	50.00	70.00
(% Total)	9.40	0.00	0.00	0.00	0.00	0.63	1.41
Indirect Low	40.00	289.34	63.02	22.50	27.50	140.23	64.40
(% Total)	1.07	4.05	3.34	0.52	0.41	1.77	1.30
Total	3734.25	7149.72	1884.92	4312.46	6706.50	7912.80	4955.92

Source: Computed by NIPFP

Table A6: Ministry-wise releases attributable to biodiversity (Maharashtra)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
MoA	-	175.00	11.15	-	-	56.48	-
MoEF&CC	3337.14	6860.39	1821.90	4289.96	6679.00	7722.57	4821.51
MoH&FW	363.61	2.25	25.00	12.50	-	50.00	94.40
MoNRE	27.50	112.09	26.87	10.00	27.50	83.75	40.00
MoWR	6.00	-	-	-	-	-	-
Total	3734.25	7149.72	1884.92	4312.46	6706.50	7912.80	4955.92

Source: Computed by NIPFP

Table A7: Attributable Expenditure by CSOs as per BIOFIN Taxonomy (Maharashtra)

(Rs. Thousand)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
SM	77.13	189.75	16.15	17.50	5.00	58.98	2.50
(% Total)	2.07	2.65	0.86	0.41	0.07	0.75	0.05
Protection	-	1755.00	-	750.00	-	1119.60	-
(% Total)		24.55	0.00	17.39	0.00	14.15	0.00
ABS	51.11	-	25.00	-	-	-	24.40
(% Total)	1.37	0.00	1.33	0.00	0.00	0.00	0.49
EI	3606.01	5204.97	1843.77	3544.96	6701.50	6734.22	4929.01
(% Total)	96.57	72.80	97.82	82.20	99.93	85.11	99.46
Total	3734.25	7149.72	1884.92	4312.46	6706.50	7912.80	4955.92

Source: Computed by NIPFP

Table A8: Source of Funding wise (Maharashtra)

Finance Actor	2013-14 (INR)	2014-15 (INR)	2015-16 (INR)
Central Government	₹ 9,05,301	₹ 9,69,200	₹ 11,56,086
State Government	₹ 38,71,000	₹ 86,28,900	₹ 22,86,131
District Administration	₹ 37,600	₹ 22,000	-
Urban Local Body	-	₹ 10,000	-
Corporate (Private/Public)	₹ 10,00,000	₹ 71,41,000	₹ 234,10,800
Individuals/Trusts/Donations	₹ 41,500	₹ 2,37,250	₹ 9,46,625
Externally Aided Projects	-	₹ 2,05,000	-
Total Expenditure	₹ 58,55,401	₹ 172,13,350	₹ 277,99,642

Source: Computed by NIPFP

Annexure - 3: Survey Questionnaire for Civil Society Organizations of Maharashtra

The survey was designed in a manner to ensure the respondent differentiates between the sources of funding, among the Central Government, State Government, Corporate (Public and Private), and Individuals, Trusts and other Donors.

BIOFIN in India

A Biodiversity Expenditure Review of Civil Society Organizations (CSOs)

National Institute of
Public Finance and Policy

18/2, Satsang Vihar Marg, Qutab Institutional Area,
New Delhi, Delhi 110067 New Delhi

Section I: Respondent Details

Name of Civil Society Organization	
Name of Respondent	
Designation of Respondent	
Address for Communication	
Phone Number/ Mobile Number / Fax	
Email Address	
Alternate Email Address	

Section II: Details of Grants received from Central Government

Sr. No	Name of Scheme/ Project/ Program	Grant Received from Central Ministry (Rs. Thousand)	Activities in the Project/ Program Undertaken by the CSO	Expenditure per Activity incurred by the CSO (Rs. Thousand)		
				2013-14	2014-15	2015-16
1						
2						
3						

4						
5						

Section III: Details of Grants received from State Government

Sr. No	Name of Scheme/ Project/ Program	Grant Received from State Department (Rs. Thousand)	Activities in the Project/ Program Undertaken by the CSO	Expenditure per Activity incurred by the CSO (Rs. Thousand)		
				2013-14	2014-15	2015-16
1						

2						
3						
4						
5						

Section IV: Details of Funds received from Corporate (Public & Private)

Sr. No	Name of Corporation/ Company	Grant Received from Corporates (Rs. Thousand)	Activities in the Project/ Program Undertaken by the CSO	Expenditure per Activity incurred by the CSO (Rs. Thousand)		
				2013-14	2014-15	2015-16
1						
2						
3						

4						
5						

Section V: Details of Funds/Donations received from Individuals/ Trusts/ International Agencies

Sr. No	Name of Trust / International Agency	Grant Received from Individuals/ Trusts/ International Agencies (Rs. Thousand)	Activities in a project/program Undertaken by the CSO	Expenditure per Activity incurred by the CSO (Rs. Thousand)		
				2013-14	2014-15	2015-16

Chapter 6

Coastal and Marine Ecosystems in Maharashtra: A Policy and Institutional Review

1. Introduction

The Convention on Biological Diversity defines Marine Ecosystems as complex habitats characterized by a wide range of physical, chemical and geological variations that are found in the sea. Habitats range from highly productive near-shore regions to the deep sea floor inhabited by highly specialized organisms.[59]

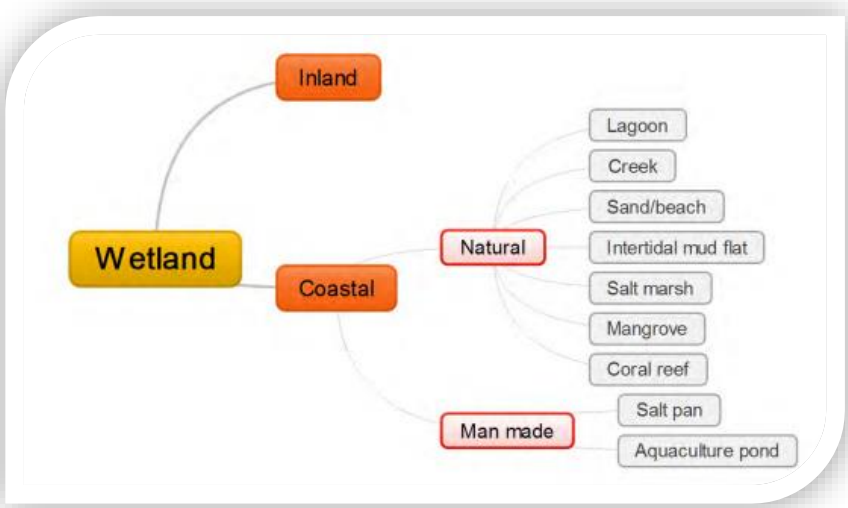
Coastal and Marine ecosystems include sand dune areas, where freshwater and seawater mix, near shore coastal areas and open-ocean marine areas. While coastal area stretches from the coastline to depths less than 50 m, marine areas extend from the 50 m depth to the high seas.[60]

Some examples of Coastal and Marine habitats include[61]: Mangrove Forests, Coral Reefs, Sea Grass Beds, Hydrothermal Vents, Estuaries, Lagoons, Backwaters, Salt Marshes, Rocky Coasts, Mudflats, Sandy stretches all of which are characterized by unique biotic and abiotic properties and processes.[62]

India with its large geographical spread supports diverse wetlands some of which are unique. Wetlands, estimated to be occupying 1-5% of geographical area of the country, support about a fifth of the known biodiversity. India is a signatory to the Ramsar Convention on management of wetlands which ensures conservation of biodiversity and sustainable use of a wide variety of habitats including rivers and lakes, coastal lagoons, mangroves, peat-lands, coral reefs (Figure 1)[63].

[59] *10 Messages for 2010 Marine Ecosystems*: European Environment Agency
[60] *Coastal and Marine Protected Areas in India: Challenges and Way Forward*: ENVIS Bulletin, Vol 15, 2012-13 Wildlife Institute of India
[61] *What is Marine and Coastal Biodiversity*: Convention on Biological Diversity
[62] *Coastal and Marine Protected Areas in India: Challenges and Way Forward*: ENVIS Bulletin, Vol 15, 2012-13 Wildlife Institute of India
[63] National Wetland Atlas: Maharashtra (2010), Indian Space Research Organization. Sponsored by MOEF&CC

Figure 1: Classification of Wetlands in India[64]



Source: National Centre for Sustainable Coastal Management

Maharashtra is among the top 5 states in India considering overall species diversity and natural resources. The coastal region, referred to as Konkan, is approximately 720 km long and 30-50 km wide. The shoreline is indented by numerous west flowing river mouths, creeks and bays. There are about 18 prominent creeks/estuaries along the coast, many of which harbor mangrove habitats.[65] The Maharashtra coast is characterized by three types of habitats: Rocky shore, sandy shore, and muddy and mangrove shore. Coral has also been found along the coastline in small patches (Figure 2).[66]

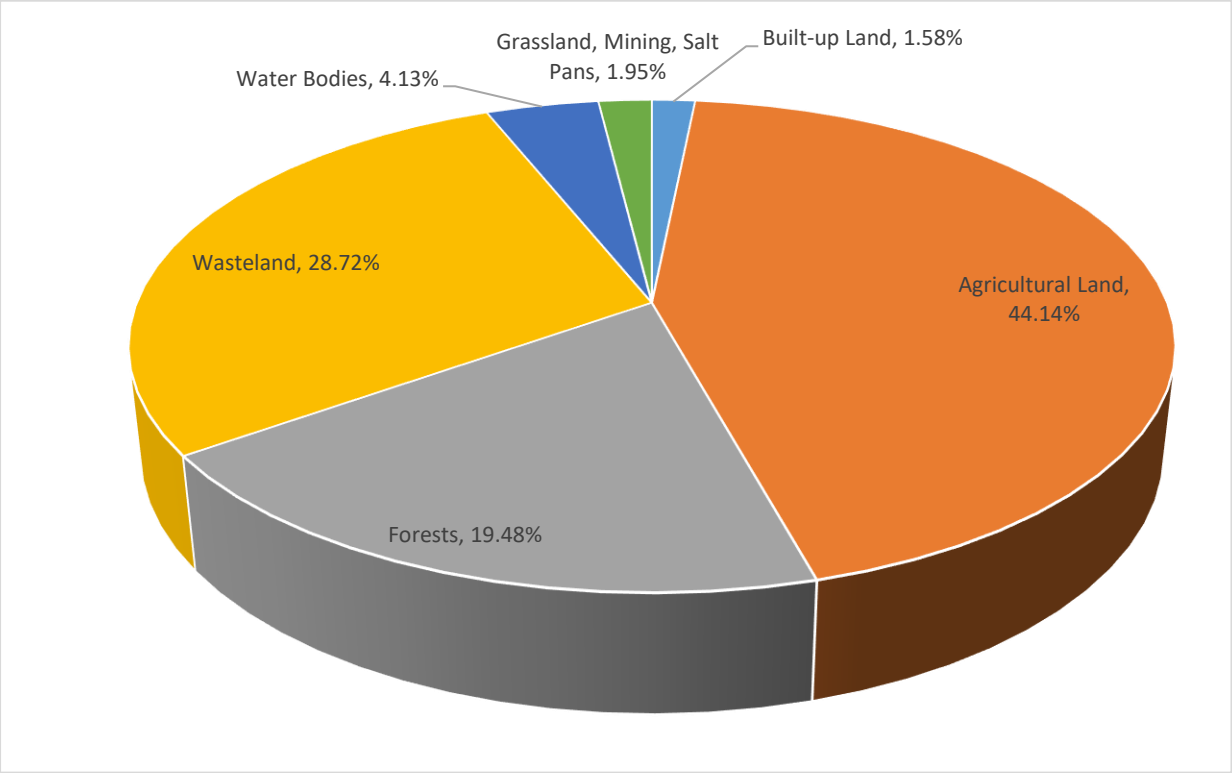
Broadly speaking, the ecosystem of west coast India is highly disturbed and threatened due to intense unsustainable human activity facing problems such as pollution, siltation and erosion, flooding, saltwater intrusion, storm surges and other hazards.[67]

Ecologically important sites are identified on the basis of the following characteristics:[68]

- Occurrence of specialized ecosystems or habitats such as mangroves, coral reefs etc.
- Occurrence of breading or nesting sites of marine animals such turtles.
- Occurrence of uninhabited and unexplored islands.
- Occurrence of endemic or endangered marine fauna or flora.

[64] *Lagoons, Lives and Livelihoods*, Special Publication, National Centre for Sustainable Coastal Management
[65] *Monitoring of Coastal Marine and Estuarine Ecology of Maharashtra* (Phase I): National Institute of Oceanography (2007-2008)
[66] *Diversity of Coastal Ecosystems of Maharashtra* – Ecologically Sensitive Coastal Areas of Ratnagiri and Sindhudurg, Bombay Natural History Society
[67] A Note on the Mangrove Cell: Initiatives to conserve mangroves and coastal biodiversity in Maharashtra: Mangrove Cell, Forest Department, Government of Maharashtra
[68] *Ecologically Important Areas of Maharashtra Coast*: Anna University, Tamil Nadu

Figure 2: Land Use in Coastal Maharashtra[69] (%)



Source: ENVIS Centre, Wildlife Institute of India

[69] *Coastal and Marine Protected Areas in India: Challenges and Way Forward*: ENVIS Bulletin, Vol 15, 2012-13 Wildlife Institute of India

Table 1: List of Identified Important Coastal and Marine Biodiversity Areas (ICMBAs) in Maharashtra and suggested conservation category[70]

Sr. No	District	Identified Sites	Area (km^2)	Suggested Category
1	Thane	Vaiterna Creek	132.4	Conservation/Community Reserve
2	Thane	Bassein/ Vasai Creek	150	Conservation/ Community Reserve
3	Thane	Thane Creek	152	Conservation Reserve
4	Raigad	Dharamtar	340	Conservation/ Community Reserve
5	Raigad	Kundalika	98	Conservation/ Community Reserve
6	Raigad	Murud/ Janjira/ Mhasala	141.7	Conservation/ Community Reserve
7	Raigad	Shrivardhan	9.6	Conservation/ Community Reserve
8	Ratnagiri	Harihareshwar - Savitri	21.77	Conservation/ Community Reserve
9	Ratnagiri	Dabhol/ Vasishti	23	Conservation/ Community Reserve
10	Ratnagiri	Jaigad	40.75	Conservation/ Community Reserve
11	Ratnagiri	Purnagad	9.4	Conservation/ Community Reserve
12	Ratnagiri	Vijayadurgh	48.45	Conservation/ Community Reserve
13	Sindhudurg	Devgad	14.4	Conservation/ Community Reserve
14	Sindhudurg	Angaria Bank	400	Conservation Reserve
15	Sindhudurg	Achra - Malvan	62.74	Conservation/ Community Reserve
16	Sindhudurg	Terekhol	7.5	Conservation/ Community Reserve

Source: ENVIS Centre, Wildlife Institute of India

2. Mangroves

Mangroves are salt tolerant forest ecosystems in the tropical and subtropical intertidal regions of the world. These ecosystems are reservoirs of species (plants and animals) associated over a long evolutionary time, and are still not fully understood. During the course of evolution, mangroves have adapted themselves to the characteristic features of the habitat – seasonal

[70] *Coastal and Marine Protected Areas in India: Challenges and Way Forward*: ENVIS Bulletin, Vol 15, 2012-13 Wildlife Institute of India

fluctuations in salinity in estuaries and creeks and diurnal fluctuations in water levels caused by tidal movements at the lower parts of the plants. [71]

It is a well-established fact that mangroves play a key role in ecology, socio-economics and in some cases the culture of the region. Preventing soil erosion through anchorage, providing a mechanical barrier of the coast in case of cyclones/storms, healthy breeding grounds for marine animals are some of the better known ecosystem services provided by a mangrove.

There are 5 types of Mangroves found in Maharashtra

- River dominated estuarine mangroves
- Mangroves along the tidal estuaries and creeks
- Backwaters, bays or very small tidal inlets
- Mangroves on rocky/sandy substratum
- Island vegetation

The list of Mangrove Species found in Maharashtra[72]

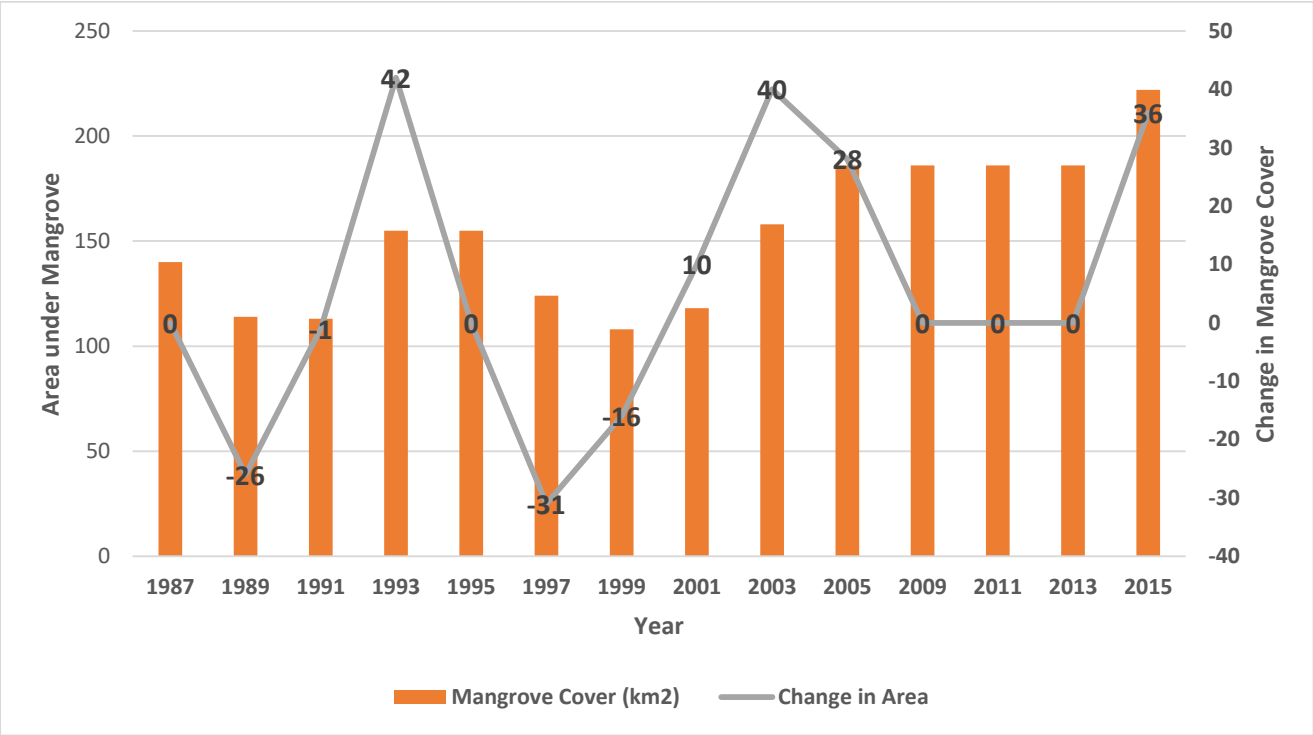
2.1.Key Biodiversity Trends

Mangrove Ecosystems are recognized as a separate category of forests. Figure 3 shows the area under Mangroves in Maharashtra as well as the change in area under Mangroves over the years. It would be seen that while 90s saw sharp changes in mangrove area (increase in 1993 (42 km^2) and a sharp decline is seen in 1997 (-31 km^2)) there has been steady increase since 2005. District level data (Table 2) shows that the districts of Raigarh and Thane have the maximum Mangrove cover in Maharashtra.

[71] Status of Mangroves in Maharashtra SB Chaphekar and Sanjay Deshmukh, Journal of Ecological Society

[72] Field Guide to Mangroves of Maharashtra, Mangrove Cell, Forest Department, Government of Maharashtra. See Annexure 1.

Figure 3: Trend in Mangrove Cover in Maharashtra (km^2)



Source: Forest Survey of India, Ministry of Environment, Forests & Climate Change

Table 2: Trend in Mangrove Cover by Districts (km^2)

Sr. No.	District	2001	2003	2005	2009	2011	2013	2015
1	Mumbai City	1	1	2	2	2	2	2
2	Mumbai Suburb	26	31	40	43	43	43	48
3	Raigarh	34	38	47	62	62	62	77
4	Ratnagiri	9	14	21	23	23	23	29
5	Sindhudurg	1	2	1	3	3	3	7
6	Thane	47	30	47	53	53	53	59
	Total	118	116	158	186	186	186	222

Source: Forest Survey of India, Ministry of Environment, Forests & Climate Change

2.2. Key Drivers

a) Negative Drivers:

i. Illegal dumping of waste across Maharashtra (particularly Mumbai) (BIOFIN Taxonomy: Sectoral Mainstreaming)

ii. Land Use Change: Encroachments, Livelihood, Agriculture (BIOFIN Taxonomy: Natural Resource Use)

b) Positive Drivers:

i. Reclassification of Mangrove from Revenue land to Reserve Forest: Restoration, monitoring, judicial intervention (BIOFIN Taxonomy: Protection, Restoration, Enhancing Implementation)
ii. Aquaculture: (BIOFIN Taxonomy: Natural Resource Use, Access & Benefits Sharing, Enhancing Implementation)

c) Natural & Global Phenomena:

i. Pest Infestation: (BIOFIN Taxonomy: Natural Resource Use)
ii. Climate Change: (BIOFIN Taxonomy: Others)

2.3. Key Sectoral Practices

a) Biggest drivers of mangrove loss are waste dumping and encroachments, reclamation by land mafia[73]

b) Incidents of waste dumping, both by government agencies such as the municipal corporation[74] and illegal[75] waste are the primary threats to Mangrove survival in the State. The pressure on the Mangrove Ecosystem is most intense in the urban districts of Mumbai, Mumbai Suburban and Thane.

c) Sampling stations along the Thane Creek show high values of industrial and domestic solid waste accumulation in the mangrove swamps. Discharge of untreated industrial effluents has led to accumulation and bio-magnification of pollutants and heavy metals in mangroves[76]

d) Creation of bunds for the purposed of farming and kharland development are also threats to Mangroves[77] [78]

e) Encroachment by slum dwellers is the second biggest threat to the survival of mangroves.[79]

[73] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[74] Bombay HC slams BMC for 'flouting' Mangrove Order: Indian Express 21st April, 2016
[75] Illegal dumping killing Mulund Mangroves: Mid-Day, 6th June, 2014
[76] K. Sivakumar (Ed.) 2013. Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS
Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India.
[77] Killer Bunds: Mangroves under assault
[78] Walls Choke Mangroves in Navi Mumbai wetlands: Times of India, 13th May, 2014
[79] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra

2.4. Policy And Policy Factors

a) In response to the acute felling of Mangroves and reclamation of land for development purposes, the Bombay Environmental Action Group (BEAG) an NGO filed a Public Interest Litigation (PIL) in the Bombay High Court (HC) in 2005.[80] The Bombay HC[81] [82] had then ordered the state government to conduct:
   - A satellite mapping of the coast to identify mangrove areas
   - All activities relating to hacking and dumping in mangroves be stopped
   - All mangrove plots to be declared as protected forests

b) Recognising the importance[83] of Coastal Ecosystems for the sustenance and livelihood of local communities, the Government of Maharashtra established the Mangrove Cell in January, 2012.

c) In 2013, in compliance with the High Court orders, Maharashtra Government *notified all Mangrove land as Reserve Forest, under the Indian Forest Act*. [84] Prior to this, all Mangrove land was categorised as Revenue Land, following this order, it is being transferred to the Maharashtra Forest Department and will be under the protection of the Mangrove Cell.

d) The CAG Report for 2014-15 has observed that the process of handing over Mangroves from Revenue to Forest Department is still being undertaken and has not yet been completed. [85]

e) As per the details offered by the Mangrove Cell, 14609 Ha of Mangrove area has been notified as Reserve Forest, and a further 406 Ha will be declared in the following weeks.[86]

f) In September 2015, the Government of Maharashtra also notified the establishment of the ***Mangrove and Marine Biodiversity Conservation Foundation***[87]. This is being done to allow the state government to leverage private funding towards biodiversity/mangrove conservation, from private entities through CSR and other greening plans.

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[80] 5800 Hectares of Mangrove line city: Times of India, 16th December, 2011
[81] Bombay Environment Action Group vs State of Maharashtra: India Kanoon, accessed on 18th May, 2016
[82] Bombay High Court bans non-forest activities in Mangroves: Times of India, 28th January, 2010
[83] Mumbai's Mangrove Forests saved city millions of dollars: Triple Pundit, 23rd December, 2011
[84] Mangroves on public land in Maharashtra will be reserved forests: Down To Earth, 29th June, 2013
[85] 51% of Mangrove cover yet to get protected forest tag, says CAG report: Times of India, 15th April, 2016
[86] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[87] Establishment of the Mangrove & Marine Biodiversity Conservation Foundation, Government Resolution No. S-30/2015/CR 219/F-3 23rd September, 2015, Revenue and Forest Department, Government of Maharashtra

g) However, incidents of illegal dumping are still common[88]. The involvement and vigilance of Civil Society Organizations[89] and Community Initiatives such as the Link Road Residents Welfare Association[90] are crucial if protection and conservation of mangroves is to be ensured.

h) The Green Mud Crab farming[91] [92] project sponsored by the UNDP-GEF under Mainstreaming Coastal & Marine Biodiversity into Production Sectors in Sindhudurg Coast is an excellent example of promotion of livelihood opportunities that align with conservation and restoration goals. Following the first round of success of this effort, the Maharashtra State Forest Department is considering a formal policy to further exploit this avenue. [93] [94]

i) Earlier this year, the Mangrove Cell with the assistance of the BMC undertook a demolition drive to remove 3000 hutments from Mangrove land[95]

2.5. Other Drivers

a) **Pests/Infestation:** Mangroves in and around Mumbai and Thane have been infested by a moth species Hyblaea puera resulting in total leaf loss. In 2002 more than 4000 ha of mangroves were affected by this moth infestation. The Mangrove Cell investigated the cause of this occurrence and found it to be a natural process and not because of any human activity. Given this, a decision was taken to not interfere in the natural process.[96]

b) **Climate Change:** As Climate Change is a global phenomenon, no particular activity by the State can be attributed to this. In the course of GIS mapping undertaken by the Mangrove Cell with the help of the Maharashtra Remote Sensing Authority, it was observed that a particular coastal village had seen the appearance of New Mangroves. This is due to a substantial rise in sea level as land that was till now free of sea water has been inundated and is conducive to the growth of a new Mangrove ecosystem.[97] Maharashtra's State Action Plan for Climate Change in 2014 lays emphasis on the importance of Mangroves as natural barriers to the disastrous effects of climate change. [98]

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[88] Mumbai: 4500 Mangrove trees destroyed in 2 months, no FIRs filed: Hindustan Times, 15th July, 2015
[89] Solid Waste dumped on wetland, NGO cries foul: Times of India, 19th December, 2011
[90] Victory for Residents as BMC & Police clear illegal parking, save wetland: Times of India, 6th February, 2016
[91] A Note on the Mangrove Cell: Initiatives to conserve mangroves and coastal biodiversity in Maharashtra: Mangrove Cell, Forest Department, Government of Maharashtra
[92] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[93] Sindhudurg Green Crab Cultivation yields rich harvest: Indian Express, 23rd August, 2015
[94] Devendra Fadnavis backs draft policy on crab farming in Mangrove Forests: Indian Express, 3rd Feb, 2015
[95] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[96] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[97] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[98] State Action Plan on Climate Change: Maharashtra. The Energy and Resources Institute (2014)

c) **Impact of Khar Land Development on Mangrove:** During high tide, sea water ingresses occur over shallow areas impacting the adjoining agricultural lands due to concentration of salts. Such areas are popularly known as Khar lands. However, in government documents khar lands are such tidal land that is made cultivable or otherwise beneficial in any matter whatsoever by protecting it, by means of an embankment, from sea or tidal river, and includes all such land in whatever manner described whether as Khar, Khajan, Kharepat, gazni or otherwise.[99] Constructing a bund/dyke higher than the high tide has restricted the flow of sea water imperative for the survival of Mangroves.

2.6. Summing Up

The Mangrove Cell established by Government of Maharashtra is a one-of-its-kind initiative in India, no other coastal state so far has taken this step. The role of the Mangrove Cell is to provide technical guidance. However, for efficient functioning of the Cell there is a need to strengthen its infrastructure and manpower resource.

- At present there are 100 forest guards employed for monitoring
- The Cell has only 1 boat at its disposal for patrolling

3. Coastal Fisheries[100]

The Indian Coast is 8118 km long with an Exclusive Economic Zone of 2.02 million km^2.

Maharashtra is the 4th largest fish producing state in the county. The annual marine fishery potential of the state in the Exclusive Economic Zone is estimated at 6.5 lakh tons. The annual landings valued at about Rs. 2322 Cr contributed 0.5% to the GDP of the state.

The marine fishery along the coast of Maharashtra is multi-species, supported by tropical marine biodiversity which are smaller in size, fast growing with rapid turnovers. Owing to the multi-species nature of the fishery resources, the marine fisheries of the state are typically recognized by the gears rather than species, excepting for Bombay duck which is characteristic of the northwest coast of the state.

Small mechanized boats of 9-10m were introduced in 1960s and in 2013 it was estimated that around 53000 such boats were operating in the inshore area, engaged mostly in bottom trawling, gill netting and purse seining. During the 1970s, purse seining was introduced for pelagic shoaling fishes like mackerel and sardines. The need to safeguard the interests of the traditional fisherman was realized as early as 1976 in the 10th Meeting of the Central Board of Fisheries, wherein questions on delimiting areas for fishing of different types of boats, and a model Maritime Fisheries Regulation Bill were raised.[101]

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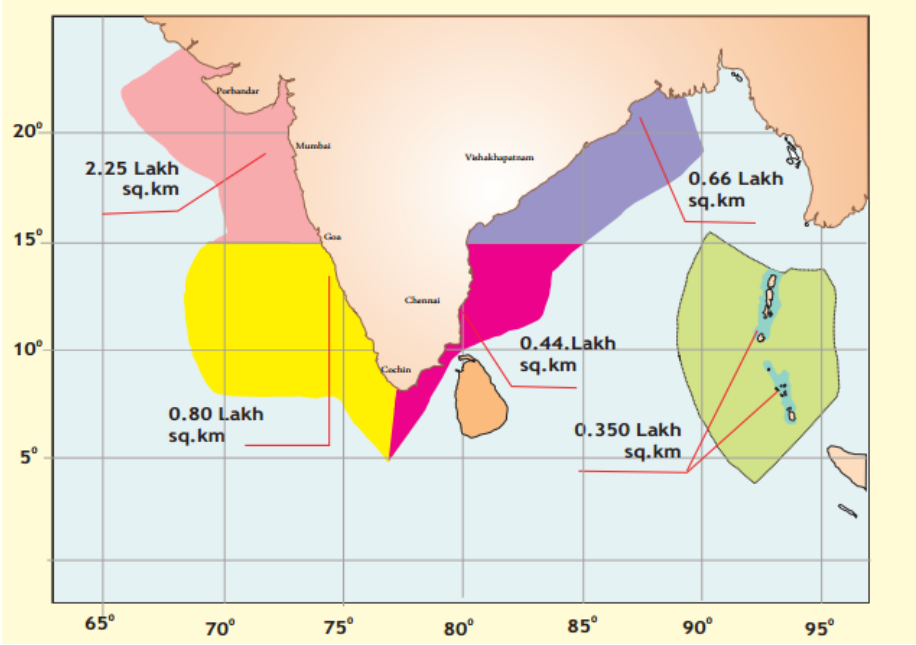
[99] Killer Bunds: Mangroves under assault

[100] "Responsible Marine Fisheries: Reflections from Maharashtra" by VD Deshmukh, Mumbai Research Centre Central Marine Fisheries Research Institute

[101] "Fisheries Legislation in India" (2013) by Rajesh K.M. Central Marine Fisheries Research Institute, Mangalore Research Centre

Figure 4: Exclusive Economic Zone for the Indian Coastline



Source: Fisheries Survey of India[102]

In the case of Maharashtra, the dependence on fisheries as a livelihood option is very great. A few statistics are laid down in Table 3.

Table 3: An Overview of Coastal Fisheries in Maharashtra[103]

Sr. No.	Description	
1.	Fishing Villages	456
2.	Landing Centres	152
3.	Fishermen Families	3,86,259
4.	BPL Households	15,509
5.	Education	
i.	Primary Education	29%
ii.	Secondary Education	34%
iii.	Higher Secondary Education	6%
iv.	Unschooled	31%
6.	Active Fishermen	76,345
i.	Fulltime Fishermen	62,614

[102] "Indian Fisheries at a Glance" Fisheries Survey of India Mumbai
[103] Marine Fisheries Census, 2010: Centre for Marine Fisheries Research Institute, Kochi

ii.	Part-Time Fishermen	11,414
iii.	Fish Seed Collection	2,317
7.	Allied Activities	1,11,276
i.	Marketing	45623 (41%)
ii.	Labourers	28931 (26%)
iii.	Making/Repairing Net	14465 (13%)
iv.	Curing/Processing	10014 (9%)
v.	Peeling	6676 (6%)
8.	Fishing Fleet (No. of Vessels) [104]	17000
i.	Mechanised	12750 (75%)
ii.	Motorised	1530 (9%)
iii.	Non-Mechanised	2720 (16%)

Source: Centre for Marine Fisheries Research Institute

3.1. Key Biodiversity Trends

a) The rank of Maharashtra in the total fish production slipped from 2nd to 5th in the country in 2012. [105]

b) The contribution of the state to total marine fish landings of India declined from 19.6% in 1971-80 to 12.6% during 2001-10 [106]

c) Time-series trend in landings of marine fisheries shows considerable variation through the period 1950-2010. These changes are:[107]
   i. Increase in number of species harvested/caught
   ii. Changes in catch composition
   iii. Decline in availability of some species and increase in the others, such as the oil sardine along the coast line.

Table 4: Decadal Compounded Annual Growth Rate (CAGR) [108] of Marine Fish Landings:

Time Line	CAGR (%)
1961-1990	3.2
1991-2000	0.41
2001-2010	-4.7

Source: Centre for Marine Fisheries Research Institute

[104] Management Advisories for Sustaining Marine Fisheries in Maharashtra: CMFRI, Mumbai
[105] Management Advisories for Sustaining Marine Fisheries in Maharashtra: CMFRI, Mumbai CMFRI, Mumbai
[106] Management Advisories for Sustaining Marine Fisheries in Maharashtra: CMFRI, Mumbai CMFRI, Mumbai
[107] Report of the Working Group on Development and Management of Fisheries XII FYP: Government of India
[108] Management Advisories for Sustaining Marine Fisheries in Maharashtra: CMFRI, Mumbai CMFRI, Mumbai

d) Since the last 1980s there has been a consistent change in the composition of fishing vessels and the methods of fishing.

e) Rapid assessment of 25 stocks in Maharashtra showed that barely 8% were abundant, 28% less abundant, 56% declining, 4% depleted and 4% in collapsed state. [109]

f) Length based stock assessment of 36 species of commercially important finfishes, elasmobranchs, crustaceans and cephalopods by analytical methods showed that 60% of the stocks are over-exploited. [110]

g) Vulnerable Resources such as Sand Lobster (*Thenus orientalis*), Indian halibut (*Psettodes erumei*) and Karakara (*Pomadasys hasta*) have almost disappeared. [111]Thread fin (*Rawas and Dhara*) and Jew fish (*Ghol*) are facing severe depletion.

h) Extension of trawling grounds in the late 1990s led to an increase in panaeid prawn landing. Continuous exploitation has led to a change in the species composition toward small sized, low value species such as *Solenocera* and *Metapeneopsis*

i) There are little or no statistics available in the official literature on the rate of ***discard*** or ***by-catch*** from marine fisheries. Initial studies assume that no discards take place by Indian trawlers. However, there is no documented proof supporting or refuting this claim. Some estimates from existing studies are:

   i. Sathiadas et. al. (1994) estimate a discard rate of 5% in Indian fisheries

   ii. Jayaraman (2004) estimated trash fish to constitute 10-20% of total catches (271,000 tonnes) landed by trawlers along the Indian coast

   iii. FAO (2004) document estimates that Indian trawlers have a discard rate of 2% discarding 57,917 tonnes per year

   iv. Pramod (2010) provides a discard estimate for India and Maharashtra (see Table 5)

[109] Responsible Marine Fisheries: Reflections from Maharashtra: CMFRI, Mumbai
[110] Responsible Marine Fisheries: Reflections from Maharashtra: CMFRI, Mumbai
[111] Stakeholder Meeting: Principle Scientist, CMFRI, Mumbai

Table 5: Estimates of Discarded/By-Catch Marine Fisheries[112]

State	Average discards at sea by mechanised trawlers (tonnes)	Range	
		Lower Limit	Upper Limit
Maharashtra	90,037	68807	111,268
India	1,217,931	924,974	1,510,083

Source: Fisheries Centre, University of British Columbia[113]

j) As per the TEEB India Initiative report[114] the present value lost due to fishing effort plus future losses amounts to Rs. 22.72 Billion (US$ 378 m) per year. The estimates of the social cost in by-catch and juvenile species loss is Rs. 2.42 billion (US$ 40m) per year when we multiply the extra effort with the average cost of fishing effort.

3.2. Key Drivers[115]

a) Negative Drivers

i. Exploitative Fishing Techniques & Overfishing (BIOFIN Taxonomy: Natural Resource Use: Fishing)

ii. Oil Exploration & Deep Sea Mining (BIOFIN Taxonomy: Sectoral Mainstreaming)

iii. Water Pollution (BIOFIN Taxonomy: Sectoral Mainstreaming)

b) Natural & Global Phenomena

i. Climate Change

3.3. Key Sectoral Practices

a) This decrease in fish catch is attributed to the use of *purse seine fishing* targeted an overwhelmingly large volume of pelagic fish (1.5-2t/trip) as compared to the catch of traditional gill nets and *rampani* nets. Invariably there is encroachment of the purse seiners over the traditional fishing grounds.[116]

[112] Pramod, G. (2010) Illegal, Unreported and Unregulated Marine Fish Catches in the Indian Exclusive Economic Zone, Field Report, Policy and Ecosystem Restoration in Fisheries, Fisheries Centre, University of British Columbia, BC, Vancouver, Canada, 30 pages.
[113] Pramod, G. (2010) Illegal, Unreported and Unregulated Marine Fish Catches in the Indian Exclusive Economic Zone, Field Report, Policy and Ecosystem Restoration in Fisheries, Fisheries Centre, University of British Columbia, BC, Vancouver, Canada, 30 pages.
[114] TEEB India Initiative Factsheet: MOEFCC & GIZ, 2015
[115] Report of the Working Group on Development and Management of Fisheries XII FYP
[116] Responsible Marine Fisheries: Reflections from Maharashtra: CMFRI, Mumbai

b) With increasing competition and the search for increasing catch and profits, comes the need for increased risk taking. The traditional fisher communities of Gujarat and Maharashtra are unwilling to take these increasing risks. However, it is noticed that fishermen from the East Coast, particularly Andhra Pradesh (and Telangana) are migrating to the West Coast in increasing numbers to be employed by trawlers at low pay. The reason for migration is cited as low returns from fishing on their homeland, and lack of alternate employment opportunities.

c) Other important issues identified that require an in depth study are:

   i. Longer trips at sea means that while new fishing grounds have been exploited, non-commercial species of fish and shrimps are encountered in large numbers.

   ii. Unregulated Catches[117]: There is a significant gap in official estimates and actuals as unreported catches from unlicensed fishing boats are neither quantified nor accounted for in present statistical estimates

d) **Illegal Catches:** These are very high in the island territories as most violators are foreign trawlers targeting sea cucumbers, shark fins and reef fish. These gaps in patrolling and management are attributed to the fact that poaching vessels have better monitoring radar equipment than the state enforcement agencies.

Table 6: List of Vulnerable and Endangered Marine Species found in Maharashtra

Sr. No.	Species	Common names	Red List status	Year assessed	Population trend
1	fuscogilva		VU	2013	decreasing
2	oxyrinchus	Shortfin Mako	VU	2009	decreasing
3	birostris	Manta Ray	VU	2011	decreasing
4	temminckii	Broadfin Shark	EN	2009	decreasing
5	mokarran	Hammerhead Shark	EN	2007	decreasing

Source: IUCN Red List accessed on 13th April, 2016

List of Marine Species found near Maharashtra Coast[118]

e) Oil and natural gas exploration surveys have led to the demarcation of non-fishing zones which fall in the traditional 'dol' and gill net areas thus affecting the traditional fisher folk. A shelf area of about 2000 km^2 off of Thane is prohibited for fishing.[119]

[117] Pramod, G. (2010) Illegal, Unreported and Unregulated Marine Fish Catches in the Indian Exclusive Economic Zone, Field Report, Policy and Ecosystem Restoration in Fisheries, Fisheries Centre, University of British Columbia, BC, Vancouver, Canada, 30 pages.
[118] See Annexure 2.
[119] Fishermen blame ONGC for upsetting marine ecosystem: DNA, 3rd June, 2015

f) **Pollution:** Organic waste, particularly sewage is found to be a major contaminant in the estuaries/creeks. [120] The coastal waters of Maharashtra have a high resilience and potential to dilute and disperse contaminants. Coastal industries should be encouraged to release treated effluents meeting MPCB norms in coastal waters and not in creeks and estuaries. [121]

3.4. Policy & Policy Factors

a) In 1981, Government of Maharashtra enacted Marine Fishing Regulation Act (MMFRA).

b) The MFRA, in general, has provisions on regulation of fishing and conservation measures in territorial waters, which broadly include:

   i. Regulation on gear to avoid over exploitation of certain species
   ii. Reservation of zones to traditional fishermen
   iii. Declaration of closed seasons
   iv. Demarcates fishing zones in territorial waters for fishing by non-mechanized and mechanized fishing vessels

c) While the regulations on fishing areas are mandated in the Act, the decision on seasonal closure is taken on a year to year basis depending on the advancement of the south west monsoon.

d) In 2011, the DAHDF, Government of India imposed a uniform ban on all fishing vessels in the Indian EEZ (including A&N and Lakshadweep Islands) to support conservation and effective management of fishing resources and for sea safety reasons.

e) The fisher community on the West Coast very strictly follows the tradition of *Narli Purnima*: Once the monsoon begins, the community does not enter the sea again till the time the *Narli Purnima* has been celebrated, usually end of August each year. This age old tradition helps the marine ecosystem revive itself and ensures a more sustainable model of fishing.[122]

f) In particular, Maharashtra has taken the following measures to ensure sustainable fishing practices[123]:

   i. Operation of trawl net by mechanized fishing vessels is prohibited from the seashore to 5 fathoms and 10 fathoms depth zone in specified areas.

[120] Monitoring of Coastal Marine and Estuarine Ecology of Maharashtra: Phase I: National Institute of Oceanography & Maharashtra Pollution Control Board
[121] Stakeholder Meeting: Principle Scientist, CMFRI, Mumbai
[122] Stakeholder Meeting: Department of Fisheries, Government of Maharashtra, Mumbai
[123] "Fisheries Legislation in India" (2013) , Rajesh K.M., Central Marine Fisheries Research Institute, Mangalore Research Centre

ii. The Department of Fisheries has banned trawling in Northern Maharashtra, from the Zhai region to Murund.[124]

iii. Fishing is banned from 15th June to 31st July each year.

iv. Operation of trawl gear by mechanized fishing vessels is prohibited between 6pm and 6 am.

v. Fishing by mechanized vessels of any type with more than 6 cylinder engines is prohibited within the territorial waters of Maharashtra up to 22 km.

vi. Purse siene shall not be operated by any mechanized fishing vessel within the territorial water of Greater Mumbai, Thane, Raigad, Ratnagiri and Sindhudurg districts.

vii. Mechanized fishing vessels operating purse siene gear beyond the territorial waters shall not land the catch caught by such gear in any port other than Mirkarwada (Ratnagiri Port).

viii. No trawl gear having less than 35mm mesh size shall be operated by any mechanized fishing vessel within the territorial waters of Thane, Greater Mumbai, Raigad and Sindhudurg. For Ratnagiri, the mesh size must not be less than 25mm.

ix. The Government taking cognizance of the failure to enforce mesh size regulation at the consumer level, will be introducing a law to curb the mesh size at the producer level itself, i.e. the producers of fishing nets shall be required to restrict net manufacture to a certain mesh size.[125]

x. The Government of Maharashtra, taking into cognizance the impact on livelihoods of traditional fishermen, will not issue new licenses for purse seine fishing. The number of existing purse seine net permits will be reduced from 494 to 182. In addition to this, purse seine fishing will only be allowed from September to December.[126] [127]

g) Given the potential of the Marine Fisheries sources, the Central Government is developing the *National Policy on Marine Fisheries, 2016*[128] which has the following objectives:

[124] Stakeholder Meeting: Department of Fisheries, Government of Maharashtra, Mumbai
[125] Stakeholder Meeting: Department of Fisheries, Government of Maharashtra, Mumbai
[126] "No New Permits for Purse Seine Net Fishing" The Hindu, February 6th, 2016
[127] Stakeholder Meeting: Department of Fisheries, Government of Maharashtra, Mumbai
[128] National Policy on Marine Fisheries, 2016 (Draft): Statement of Intent

i. Fisheries Management by bringing Blue Revolution through sustainable utilization of the fisheries wealth from marine and other aquatic also reinforcing the Blue Growth Initiative voiced at the Rio +20 in 2012.

ii. The efforts of the Government to be directed towards fleet size optimization, mainstreaming biodiversity conservation in production processes, species specific and area specific management plans, spatial and temporal measures for resource conservation, conservation of ecologically and biologically sensitive areas (EBSA) and Vulnerable Marine Ecosystems (VMEs) [129].

3.5. Miscellaneous Observations

a) Climate Change: In the last 40 years the sea around India has seen a rise of 1 degree C. The result of this rise can be seen in the depth of distribution and extension of the range of some species. Some species such as the Indian Macakrel show a shift in the depth of their distribution and are now caught by sea-bottom trawlers, however, a shift due to environmental factors has been observed in the presence of species such as sardines and mackerel[130]

b) At the stakeholder meeting with CMFRI, Mumbai, it was mentioned that the marine ecosystem of Maharashtra is very resilient, and that despite the pressures to its functionality, it continues to be a very vibrant ecosystem. [131] In view of this it is important ensure that appropriate steps are taken to prevent any strong external shock to the ecosystem such as oil spill, erosion of sea bed.

4. Other Drivers & Developments in the Sector

4.1. Sand Mining

4.1.1. Key Biodiversity Trend: Maharashtra has a coastline of 720 km, of which about 320 Km. (about 44%) is subject to erosion. Coastal urban areas such as Mumbai have been severely affected by erosion, partly due to clearance of mangroves and associated vegetation along the shoreline and also due to construction of offshore and coastal infrastructure.[132]

4.1.2. Key Driver — Negative: Demand for construction material (BIOFIN Taxonomy: Sectoral Mainstreaming)

[129] An Umbrella Scheme 'Blue Revolution: Integrated Development & Management of Fisheries' proposed

[130] Report on the Conference on Climate Change, Coastal Ecology and Fisheries Resources and Livelihood in Maharashtra, CMFRI, Mumbai

[131] Stakeholder Meeting: Principle Scientist, CMFRI, Mumbai

[132] Coastal Issues & Concerns: Challenges for the research community: National Centre for Sustainable Coastal Management

4.1.3. Key Sectoral Practices

a) Extraction of sand from open pits, beaches, inland dunes and dredging from river and ocean beds.

b) Used for production of concrete; prevention of icing of roads; extraction of valuable minerals etc.

c) Excessive coastal mining leads to the habitat loss of such as turtles and ghariyals.

d) This is a major problem, not only from an environmental point of view, but also in terms of law & order and loss to the exchequer[133].

4.1.4. Key Sectoral Policies

a) Central Government: Sustainable Sand Mining Policy[134]

b) State Government does away with River Regulation Policy which previously lead to the stalling of several industrial projects

c) June, 2015, Maharashtra Govt. brought sand mining under the Maharashtra Prevention of Dangerous Activities (MPDA) Act, 1981 enabling law enforcement agencies to make preventive arrests of repeat offenders[135]

d) Mines & Minerals (Development & Regulation) (Amendment) Ordinance, 2015 was issued which envisaged self-regulation of environmental norms by miners

e) In 2014 the NGT banned sand mining in coastal areas after a PIL was filed by the Awaaz Foundation. However, this ban was lifted in 2015 by the State Government after assuring the NGT of adherence to precautions for maintaining ecological balance. [136]

4.2. Assisting Marine Animals in Distress

4.2.1. Key Biodiversity Trend: In the last few years, there have been many instances of live beaching as well as washing up of dead whales and dolphins. In either case, there was no nodal agency which could take control of the situation, nor is there any standard operating procedure to ensure the return of the distressed

[133] Green Tribunal halts sand mining in coastal Maharashtra: Down To Earth, 8th February, 2014
[134] Maharashtra lifts sand mining ban on coasts after green body nod: Hindustan Times, 22nd May, 2016
[135] River Sand Mining in India in 2015: South Asia Network on Dams, Rivers and People
[136] PILs lead to the framing of policy on Sand Mining for Maharashtra: SANDRP

animal to the deep sea, or undertake scientific burial. Since its formation, the Mangrove Cell has become the nodal agency in such situations.

4.2.2. Key Driver — Positive: Technical Support in cases of beaching of marine mammals (BIOFIN Taxonomy: Protection, Enhancing Implementation)

4.2.3. Key Sectoral Practices

a) Particular instance of a live beached blue whale at the coast of Alibaug in 2015 which could not be saved despite a 10 hour rescue operation[137]

b) In January 2016, a 37ft long Bryde's Whale (endangered) was washed ashore after it died at sea. The officials lacked the expertise and know-how to conserve the body or even to dispose it off in a non-hazardous manner.[138] [139]

4.2.4. Key Sectoral Policies

a) Establishment of the ***Marine Animal Stranding Management Centre*** at Malvan supported by the UNDP-GEF Project titled Mainstreaming Marine and Coastal Biodiversity into Production Sectors of Sindhudurg.

b) In February 2016, a live blue whale was stranded in shallow waters along the Dapoli Coast which was rescued by marine experts and locals and returned to the deep sea[140]

4.3. Establishment of Flamingo Sanctuary at Thane Creek

4.3.1. Key Biodiversity Trend

a) Significant biodiversity spot as 30,000 Flamingos arrive here every November-May to occupy mudflats and the adjoining mangroves

b) 200 species have been identified so far including globally threatened species such as Greater Spotted Eagle and Osprey

4.3.2. Key Driver — Positive: Protection, Enhancing Implementation through Research

4.3.3. Key Sectoral Practices

[137] Stuck for over 18 hours 42ft Blue Whale dies at Alibaug beach: Hindustan Times, 26th June, 2016
[138] Brydes Whale washed ashore Juhu Beach: Hindustan Times, 29th January, 2016
[139] Rewind: Cops-Mangrove Cell take baby steps to fast track response to beaching: 2nd February, 2016
[140] 40ft long Blue Whale rescued off Maharashtra's Dapoli Coast: 3rd February, 2016

a) Significant pressures from industrial pollution, dumping and encroachments. The creek also supports local livelihood through fishing, it is indicated that fish catch from the creek is on a decline. [141]

b) Declared 'Important Bird Area' by Bird Life International

4.3.4. Key Sectoral Policies

a) Part of the Thane Creek notified as a Flamingo Sanctuary under the Wildlife (Protection) Act in 2015. This includes an area of 1690 ha: 896 ha of Mangroves and 794 ha of water body[142] [143]

b) The Mangrove Cell now also plans to open a Nature Interpretation Centre to encourage bird watching and spread awareness on the importance of this ecosystem.[144]

c) The cell has initiated more baseline studies and a rapid biodiversity assessment of the sanctuary area with assistance from an Indo-German Project on conservation and sustainable management of marine protected areas[145]. The following aspects of biodiversity were covered in the report: Mangrove diversity; Insect and Arachnid diversity; Bird diversity; Fish diversity; Plankton diversity; Benthos and Megabenthos (crabs, gastropods etc.)[146]

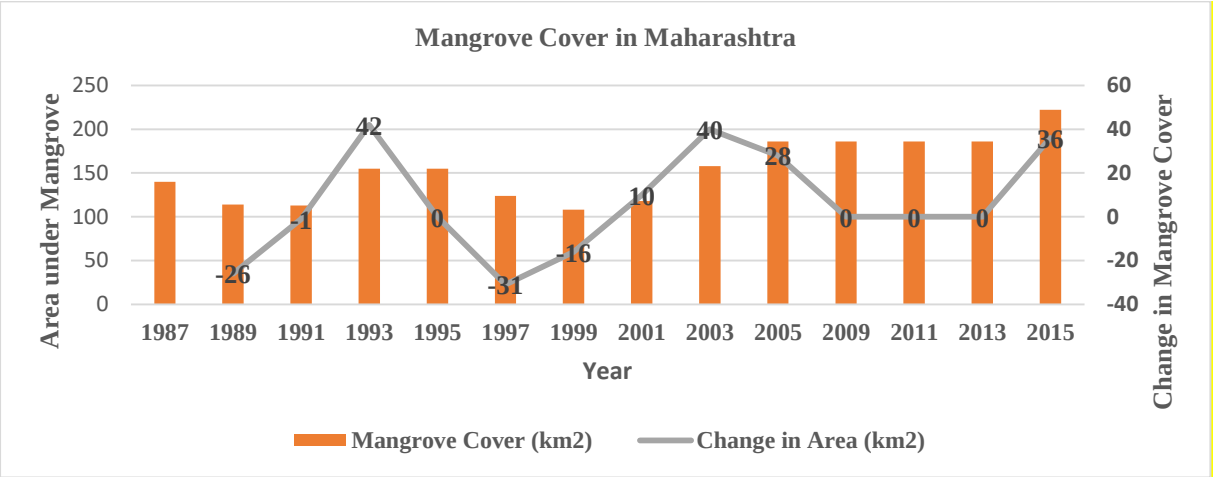
5. Case Study 1: Lessons from Management of Mangroves in Maharashtra

5.1. Mangrove Wealth of Maharashtra

Maharashtra is a state in the western region of India. It has a long coastline of about 720 km marked by fifteen rivers, five major creeks and thirty backwater areas. The total extent of mangroves in the state is 186 sq. km distributed along 6 coastal districts with about 20 species of mangroves (Forest Survey of India (FSI), 2013). Mumbai is possibly the only metropolitan city in the world to have a mangrove cover of 6000 ha.[147]

Figure 1: Trend of Mangrove Cover in Maharashtra (km^2):

[141] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[142] Mumbai gets a Flamingo Sanctuary: The Hindu, 8th August, 2015
[143] Maharashtra declares Northern part of Thane Creek as Flamingo Sanctuary: Indian Express 7th August, 2015
[144] Stakeholder Meeting with APCCF, Mangrove Cell, Forest Department, Government of Maharashtra
[145] Preliminary Report: Biodiversity of Thane Creek. Salim Ali Centre for Ornithology & Natural History (SACON)
[146] Preliminary Report: Biodiversity of Thane Creek. Salim Ali Centre for Ornithology & Natural History (SACON)
[147] Initiatives to conserve mangroves and coastal biodiversity in Maharashtra: Mangrove Cell, Government of Maharashtra.



***Source**: Forest Survey of India, Ministry of Environment, Forests & Climate Change, Government of India*

5.2. Main Issues

The mangrove cover in the state has been facing serious threat causing loss in mangrove (especially since early 2000); main drivers being illegal encroachment, 'diversion' of land for development, dumping of solid and liquid waste.

5.3. Policy measures by the State

i. The government of Maharashtra through a notification[148] reclassified all Mangrove forests (on revenue land) as Reserve Forests under the Indian Forests Act, 1927 in 2013. Following this 14,609 ha of mangrove area was handed over to the forest department in the state.[149]

ii. To promote citizens' awareness and participation in mangrove conservation, a Mangrove Protection Committee [150] was formed in 2015. The Committee is represented by citizens from all walks of life. This Committee serves as a non-government monitoring agency.

5.4. Institutional Measures by the State

5.4.1. Mangrove Cell

i. To promote scientific management of mangroves a Mangrove Cell has been set up to, among others, provide technical support to the forest department in the state. Other mandates of the Cell include:

[148] Available in Gazette Notification GOM Circular No.10/2005/CN-188/J-1 dt.21-10- 2005
[149] Based on consultations with APCCF Mangrove Cell, Government of Maharashtra
[150] Mangrove Protection Committee was established at the instance of Bombay High Court in 2015 as a Citizen Vigilance Initiative.

ii. To assist the Forest Department in monitoring and research for mangrove forests in improving existing knowledge of the mangrove diversity of the state;
iii. To create awareness about the importance of mangroves and to train staff for effective conservation;
iv. To initiate regeneration efforts for enhancing the mangrove cover of the state.

For targeted interventions in the Mumbai area the Mumbai Mangrove Conservation Unit (MMCU) was created under the Mangrove Cell in 2013. The MMCU has initiated many measures to control encroachment on mangrove land, including eviction of illegal encroachments and bringing offenders to book.

Additionally, the Mangrove Cell is also the focal point for Externally Aided Projects pertaining to mangrove conservation and livelihood initiatives in Mangrove Ecosystems. Under these projects, the Cell is engaged in

i. Promoting Mud Crab/Green Crab farming in mangroves [151]
ii. Creating a resource base for technical expertise by establishing the Marine Animal Stranding Management Centre at Malvan[152]
iii. Establishing a Nature Observation Centre at the Flamingo Sanctuary in Thane[153]

5.4.2.Mangrove & Marine Biodiversity Conservation Foundation

To complement and sustain the efforts of the Mangrove Cell a significant initiative taken by the State Government is the establishment of the Mangrove & Marine Biodiversity Conservation Foundation. The Foundation is envisioned to leverage funding from the corporate sector for biodiversity conservation.

It is noticed that the above initiatives have already taken a number of important steps in a short span of 3 years. Key stakeholders on the ground are quite hopeful of the success these measures will bring about.

6. Case Study 2: Initiatives by the Department of Fisheries, Government of Maharashtra

6.1.Fisheries in Maharashtra

The marine fishery along the coast of Maharashtra is multi-species, supported by tropical marine biodiversity which are smaller in size, fast growing with rapid turnovers. Owing to the

[151] Based on consultations with APCCF Mangrove Cell, Government of Maharashtra.
[152] Supported by the UNDP-GEF Project titled Mainstreaming Marine and Coastal Biodiversity into Production Sectors of Sindhudurg.
[153] Based on consultations with APCCF Mangrove Cell, Government of Maharashtra.

multi-species nature of the fishery resources, the marine ecosystem of the state is seen to be very resilient.[154][155]

6.2. Main Issues

Despite this resilience, there is a visible reduction in the annual average landings of Maharashtra. At present Maharashtra is ranked as the 5th largest fish producing state in the country, a drop from 2nd rank in 2012. Landings for 2015 at 2.5 lakh tonnes were 23.1% lower than the landings in 2014. This decrease manifests itself in the following ways:

i. The fishing industry has expanded its resource base by increasing the number of species being harvested. Thus species that were till now considered commercially unviable have been included in the consumer basket.
ii. The fishing community has noticed a significant change in the catch composition, particularly with respect to the size of the catch. Increasingly more juveniles are being caught indicating that the ecosystem does not have enough time to revive itself.
iii. Declining availability of some species and increase in others: for example, in Maharashtra Pomfret is highly commercially valued and so has been exploited to a great extent, whereas Oil Sardines have become abundant.

Table 1: Decadal compounded annual growth rate (CAGR) [156] of marine fish landings in Maharashtra:

Time Line	CAGR (%)
1961-1990	3.2
1991-2000	0.41
2001-2010	-4.7

***Source**: Centre for Marine Fisheries Research Institute*

6.3. Policy Initiatives by the State

6.3.1.Mesh Control

i. The DoF has taken a very significant step by mandating the shift from diamond shaped mesh to square net mesh. A square shaped net would allow the exit of juveniles and other sediments/creatures that would otherwise be caught. The DoF is planning to take this initiative further by bringing in a law to control mesh size at the production level. Through the implementation of this law, all net producing companies will no longer be allowed to produce diamond shaped nets, but only the shapes as mandated under

[154] Stakeholder Meeting: Principle Scientist, CMFRI, Mumbai
[155] Management Advisories for Sustaining Marine Fisheries in Maharashtra: CMFRI, Mumbai CMFRI, Mumbai
[156] Management Advisories for Sustaining Marine Fisheries in Maharashtra: CMFRI, Mumbai CMFRI, Mumbai

the law. In this manner, the onus of change is not on the individual fisherman, but on the seller.

ii. The DoF ordered that no trawl gear having less than 35mm mesh size shall be operated by any mechanised fishing vessel within the territorial waters of Thane, Greater Mumbai, Raigad and Sindhudurg. For Ratnagiri, the mesh size must not be less than 25mm. [157]

6.3.2. Ban on Purse Seine Fishing: One of the most harmful methods of fishing, since the net scrapes the ocean floor and captures entire schools of fishes, without allowing for the exit of juveniles and other sediments. The Government is no longer issuing new permits and is also initiating the reduction of existing permits from 498 to 186[158] and Purse Seine fishing will be allowed only from September to December.

6.3.3. Annual ban period & Traditional practices

i. Government of Maharashtra issues an annual ban period (15th June, 2016 – 31st July) for the safety of fisher folk and the regeneration of fisheries. This ban period is adjusted depending upon the advent of the monsoon.

ii. The fisher community of Maharashtra has been found to have greater awareness regarding the need for conservation and resting period. Traditionally fishers along the Western Coast of India, do not enter the sea again till the festival of Narali Purnima which marks the end of the monsoon.[159]

6.3.4. Restrictions on Trawlers

i. From the Northern part of Maharashtra Zhai to Murund, the Government has imposed a complete ban on trawling.

ii. Operation of trawl gear by mechanized fishing vessels is prohibited between 6pm and 6 am.

iii. Fishing by mechanized vessels of any type with more than 6 cylinder engines is prohibited within the territorial waters of Maharashtra up to 22 km.

7. Policy & Institutional Review in Excel Format as in BIOFIN Workbook

Policy and Institutional review for Coastal and Marine ecosystem is also presented in excel format as in BIOFIN Workbook. Excel file is attached with this report in a separate folder.

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[157] "Fisheries Legislation in India" (2013) by Rajesh K.M. Central Marine Fisheries Research Institute, Mangalore Research Centre

[158] No New Permits for Purse Seine Fishing

[159] *Narali Purnima*, Maharashtra Tourism

8. Summary and Suggestions

8.1. Key Drivers:

i. Negative Drivers: Illegal dumping of waste across Maharashtra; Land Use Change (Livelihood, Encroachment, Agriculture); Exploitative Fishing Techniques and Overfishing; Oil Exploration & Deep Sea Mining; Water Pollution
ii. Positive Drivers: Reclassification of Mangrove from Revenue Land to Reserve Forest; Aquaculture
iii. Natural & Global Phenomenon: Pest infestation; Climate Change

8.2. Key Sectoral Practices:

i. High volumes of industrial and domestic solid waste accumulation in mangroves, estuaries and coastal waters.
ii. Felling of Mangroves and Reclamation of land for residential, industrial and agricultural (kharland) purposes
iii. Occurrence of Mangroves in areas which have no previous history of swamp/marsh land indicates a sea level rise attributable to climate change
iv. Extreme pressure on fisheries resources due to mechanized trawlers; Use of small mesh nets that capture juveniles and impair the ability of the ecosystem to revive itself; excess catch and pressure of population on fisheries resources

8.3. Policy Responses:

i. Establishment of the Mangrove Cell, a unique nodal agency for all technical and legal matters relating to the conservation, protection and regeneration of mangroves in Maharashtra
ii. The Mangrove and Marine Biodiversity Conservation Foundation is an NGO headed by the CM to tap into financial resources from the private sector towards biodiversity conservation
iii. Measures by State Government to fix the mesh size, ban trawling in certain areas and seasons; encourage traditional fishers to practise sustainably; ban on new permits for purse siene fishing
iv. Annual ban periods of the state and central government depending upon the advent of the monsoon.
v. National Policy of Fisheries: Emphasis on sustainable use of fisheries resources - fleet size optimization, mainstreaming biodiversity conservation in production processes, species specific and area specific management plans, spatial and temporal measures for resource conservation, conservation of ecologically and biologically sensitive areas (EBSA) and Vulnerable Marine Ecosystems (VMEs)

8.4. Key Finance Solutions and Policy and Capacity Gaps:

COASTAL & MARINE BIODIVERSITY: MANGROVES				
Sr. No.	**Type of Trend**	**BIOFIN Classification: Key Sectoral Drivers**	**Finance Solutions**	**Capacity Gaps**
1	Negative	Sectoral Mainstreaming: Waste dumping in Mangroves, creeks estuaries	Since Waste Management is under the ambit of the Urban Local Bodies, the Forest Department should levy a penalty on ULBs for dumping waste (payable to the Mangrove Cell).	The Mangrove Cell is facing an infrastructure crunch. They require support to increase patrolling and fencing of the protected areas.
2	Positive	1. Protection, Restoration and Enhancing Implementation: Reclassification of Mangrove from Revenue land to Reserve Forest	Citizens have played a very active role in curbing destruction of Mangrove for reclamation of land. In this case, Environmental/Mangrove Conservation Trust Fund [160] can be an effective tool.	In this context, the Government of Maharashtra took a proactive step and notified the establishment of the 'Mangrove and Marine Biodiversity Conservation Foundation' in 2015. It is not clear however, which projects the MMBCF shall be undertaking and whether it is up and running. Strengthening of Mangrove cell would enable it to vigorously pursue the setting up of such a fund.
3	Negative	1. Natural Resource Use: Forestry (Fuel wood) 2. Sectoral Mainstreaming: Livelihood		As per the BDA, 2002, all Urban and Rural Local Bodies are required to form Biodiversity Management Committees (BMCs). Mangrove cell and BMCs complement

[160] **Environmental Trust Funds:** Independent legal entity and investment vehicle to help mobilizing, blending, and overseeing the collection and allocation of financial resources for environmental purposes. It is a country-driven solution that facilitates strategic focus, rigorous project management, solid monitoring and evaluation, and high levels of transparency and accountability.

				each other. A coordinated effort by these institutions should be encouraged to overcome some of the capacity gaps of these institutions.
4	Negative	1. Sectoral Mainstreaming: Infrastructure	Given the increasing demand for land in the country, and the need for infrastructure development, there will be trade-offs between ecological concerns and development objectives. In this context, the state and central governments should be open to piloting more broad based market instruments such as Biodiversity Offsets [161] and Green Bonds[162].	Design and implementation of such instruments would require either developing in-house capacities or outsourcing these services from experts. Besides, political support is required to improve acceptability of such instruments.
5	Positive	1. Natural Resource Use: Aquaculture 2. Access & Benefits Sharing: Sustainable Livelihood Generation 3. Restoration: Incentivising restoration & maintenance of natural resource on Private lands	An excellent initiative by the Mangrove Cell of green crab farming on private mangrove land has allowed the people to see commercial value in ecology that was till now thought to be of little economic value. This is a form of a finance solution called Bioprospecting[163]	We understand that the Mangrove Cell is seeking ways to upscale this initiative. Mangrove Cell needs to be supported to build hatcheries and widen its reach to other places. With the setting up of the BMCs and development of the PBRs, we are already moving towards institutionalizing the

[161] **Biodiversity Off-sets**: Measurable conservation outcome resulting from actions designed to compensate for significant residual biodiversity loss arising from project development after appropriate prevention and mitigation measures have been taken (BBOB). Offsets can, for example, deliver biodiversity benefits (e.g. reforestation) through a transaction, where offset sellers (e.g. a conservation NGO) sell offsets to developers (e.g. a mining company) who seek to compensate the residual biodiversity loss resulting from a development activity (e.g. mining).

[162] **Green Bonds:** Green bonds can mobilize resources from domestic and international capital markets for climate change adaptation, renewables and other environment-friendly projects. They are no different from conventional bonds, their only unique characteristic being the specification that the proceeds be invested in projects that generate environmental benefits.

[163] **Bioprospecting:** Biodiversity prospecting or bioprospecting is the systematic search for biochemical and genetic information in nature in order to develop commercially-valuable products for pharmaceutical, agricultural, cosmetic and other applications.

				use of BD resources. The concept of Bioprospecting can further be explored by the MSBB and strengthened using international guidelines such as the Nagoya Protocol.

FISHERIES				
Sr. No.	**Type of Trend**	**BIOFIN Classification: Key Sectoral Drivers**	**Finance Solutions**	**Capacity Gaps**
1	Negative	Natural Resource Use: Overfishing		Formation and strengthening of BMCs and preparation of PBRs should be expedited. The information so generated can be very important input for awareness and sensitization and of information regarding endangered species etc. There is need for more demonstration projects to show that compliance with regulation on juvenile catch and unsustainable fishing practices is a win-win for all stakeholders.

Annexure 1: Relevant Institutions Identified In Maharashtra

Sr. No.	Institution	Potential Roles of Institutions			
		Policy	Funding	Implementation & Enforcement	Education, Awareness & Sensitization
1	Ministry of Environment & Forests, Government of India	✓	✓	✓	✓
2	Ministry of Agriculture, Government of India	✓	✓	✓	✓
3	Coast Guard, Ministry of Defence, Government of India			✓	
4	Department of Environment, Government of Maharashtra	✓	✓	✓	✓
5	Maharashtra Pollution Control Board, Department of Environment, Government of Maharashtra			✓	
6	Mangrove Cell, Department of Forests, Government of Maharashtra			✓	✓
7	Local Bodies (Urban & Rural)	✓	✓	✓	✓
8	Judiciary (Bombay High Court, NGT, Supreme Court)			✓	
9	Research Organizations (Governmental & Non-Governmental)				✓
10	Civil Society Organizations				✓
11	Multilateral Organizations (UNDP, GEF, GIZ)				✓

Annexure 2: Coastal Regulation Zone: A Note

The Environment (Protection) Act, 1986 empowers the Union Ministry of Environment, Forests & Climate Change to take all measures that it feels are necessary to protect and improve quality of the environment and to prevent and control environmental pollution. Using Clause 3 (2) (v) of the EPA which 'restricts of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards', the Indian Government notified the Coastal Zone Regulation Rules, 1991 which were updated in 2011.[164]

The main objective of the Coastal Regulation Zone Notification, 2011 is to

- Protect the livelihoods of traditional fisher folk communities
- Preserve Coastal Ecology
- Promote economic activity necessary for coastal regions

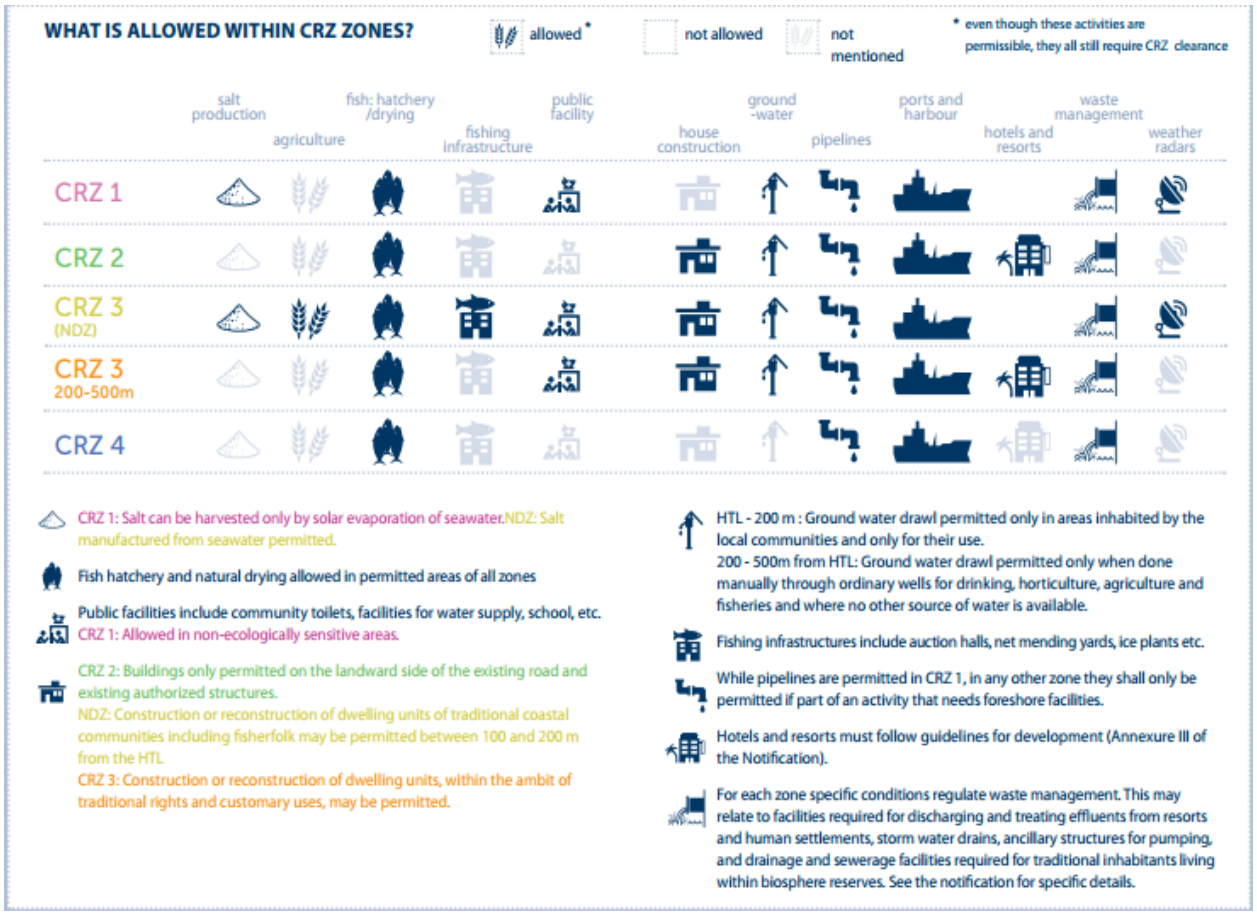
The CRZ Notification classifies 4 categories of coastal zones:

- CRZ I: Covers Ecologically Sensitive Areas like Mangroves and Mudflats
- CRZ II: Covers developed and urban areas
- CRZ III: is split into No Development Zone and 200m to 500m zone. These cover underdeveloped and rural areas, not classified as ESA's
- CRZ IV: covers territorial waters from the Low Tide Line (LTL) to 12 nautical miles out to sea[165]

In the original CRZ Notification of 1991, the territorial waters were not included in the notification. This change was brought about in 2011 in an attempt to meet the demands of the fisher folk towards their traditional rights to the sea.

[164] CZMAs and Coastal Environments: Two decades of regulating land use change on India's Coastline: CPR-Namati Environmental Justice Program
[165] Report of the Expert Committee on the Draft CMZ Notification: MOEF&CC, 2009

Annexure 3: Activities allowed within CRZ Zones[166]



Source: Karnataka State Coastal Zone Management Authority

Annexure 4: Mangrove Plant Species growing in Coastal Habitats of Maharashtra[167]

Sr. No.	Name of Plant & Family
1	*Acanthus ilicifolius* (Acanthaceae)
2	*Acrostichum aureum* (Pteridaceae)
3	*Aegiceras corniculatum* (Myrsinaceae)
4	*Aeluropus lagopoides* (Poaceae)
5	*Avicennia alba* (Verbenaceae)
6	*Avicennia marina* (Verbenaceae)
7	*Avicennia officinalis* (Avicenniaceae)
8	*Bruguiera cylindrica* (Rhizophoraceae)
9	*Bruguiera gymnorrhiza* (Rhizophoraceae)
10	*Bruguiera parviflora* (Rhizophoraceae)
11	*Ceriops tagal* (Rhizophoraceae)
12	*Clerodendron inerme* (Verbenaceae)
13	*Derris heterophylla* (Fabaceae)

[166] Pocket Diary on Coastal Regulation Zone, Karnataka State Coastal Zone Management Authority
[167] Status of Mangroves in Maharashtra: Journal of Ecological Society

14	*Excoecaria agallocha* (Euphorbiaceae)
15	*Kandelia candel* (Rhizophoraceae)
16	*Lumnitzera racemosa* (Combretaceae)
17	*Pandanus tectorius* (Pandanaceae)
18	*Porteresia coarctata* (Poaceae)
19	*Rhizophora apiculata* (Rhizophoraceae)
20	*Rhizophora mucronata* (Rhizophoraceae)
21	*Salvadora persica* (Salvadoraceae)
22	*Salicornia bracheata*(Chenopodiaceae)
23	*Sesuvium protulacastrum* (Chenopodiaceae)
24	*Suaeda maritima* (Chenopodiaceae)
25	*Sonneratia alba* (Sonneratiaceae)
26	*Sonneratia apetala* (Sonneratiaceae)
27	*Sonneratia caseolaris* (Sonneratiaceae)

Annexure 5: List of Marine Fisheries Species found near the coast of Maharashtra[168]

Sr. No.	Species	Common names	Red List status	Year assessed	Population trend
1	fuscogilva		VU	2013	decreasing
2	oxyrinchus	Shortfin Mako	VU	2009	decreasing
3	birostris	Manta Ray	VU	2011	decreasing
4	temminckii	Broadfin Shark	EN	2009	decreasing
5	mokarran	Hammerhead Shark	EN	2007	decreasing
6	arius	Threadfin Sea Catfish	LC	2012	unknown
7	chinensis	Trumpet, Trumpetfish	LC	2015	unknown
8	rubens		LC	2013	unknown
9	sordidus	Pygmy Slipper Lobster	LC	2013	unknown
10	maritimus	Sea Club-Rush	LC	2013	stable
11	reticularis		LC	2010	unknown
12	augur		LC	2013	unknown
13	dictator		LC	2013	stable
14	flavidus	Golden - Yellow cone	LC	2013	unknown
15	hyaena	Hyena Cone	LC	2013	
16	inscriptus	Engraved Cone, Tiled Cone	LC	2013	unknown
17	litoglyphus		LC	2013	unknown
18	milneedwardsi		LC	2013	unknown
19	textile		LC	2013	
20	zeylanicus		LC	2013	unknown
21	stoloniferus		LC	2013	unknown
22	petimba	Red Cornetfish	LC	2015	unknown
23	limbatus	Congaturi Halfbeak	LC	2013	stable
24	maculosa		LC	2012	unknown
25	undulata		LC	2011	unknown
26	gulio		LC	2010	decreasing

[168] IUCN Red List accessed on 13th April, 2016

27	carpenteri	Ridge-back Lobsterette	LC	2013	unknown
28	ensirostris	Gladiator Lobsterette	LC	2013	unknown
29	stewarti	Indian Ocean Lobsterette	LC	2013	unknown
30	suhmi	Red & White Lobsterette	LC	2013	unknown
31	penicillatus	Pronghorn Spiny Lobster	LC	2013	unknown
32	argenteus	Silver Javelin	LC	2012	stable
33	oligactis		LC	2012	unknown
34	omani	Oman Cuttlefish	LC	2012	unknown
35	prashadi	Hooded Cuttlefish	LC	2012	unknown
36	trygonina	Trident Cuttlefish	LC	2012	unknown
37	riqueti		LC	2012	unknown
38	amaranthoides		LC	2013	unknown
39	theraps	Large- scaled Terapon	LC	2013	unknown
40	lentiginosus		DD	2013	unknown
41	prabhui	Quilon Electric Ray	DD	2009	unknown
42	aculeata	Needle Cuttlefish	DD	2012	unknown
43	arabica	Arabian Cuttlefish	DD	2012	unknown
44	kobiensis	Kobi Cuttlefish	DD	2012	unknown
45	latimanus	Broadclub Cuttlefish	DD	2012	unknown
46	pharaonis	Pharaoh Cuttlefish	DD	2012	unknown
47	stellifera	Starry Cuttlefish	DD	2012	unknown
48	inermis	Spineless Cuttlefish	DD	2012	unknown
49	corbiculoides		DD	2013	unknown

Chapter 7

Inland Wetlands in Maharashtra: Policy and Institutional Review

1. Inland Wetlands: Functions and Uses

Wetlands provide tremendous economic benefits to mankind through fishery production, maintenance of water table, and the reduction of natural hazards like floods and draughts. Wetlands also contribute to shoreline stabilization, waste disposal, and water purification, and are very popular recreational sites. For functions and use of wetlands see Figure 1.

There are two types of Inland Wetlands:

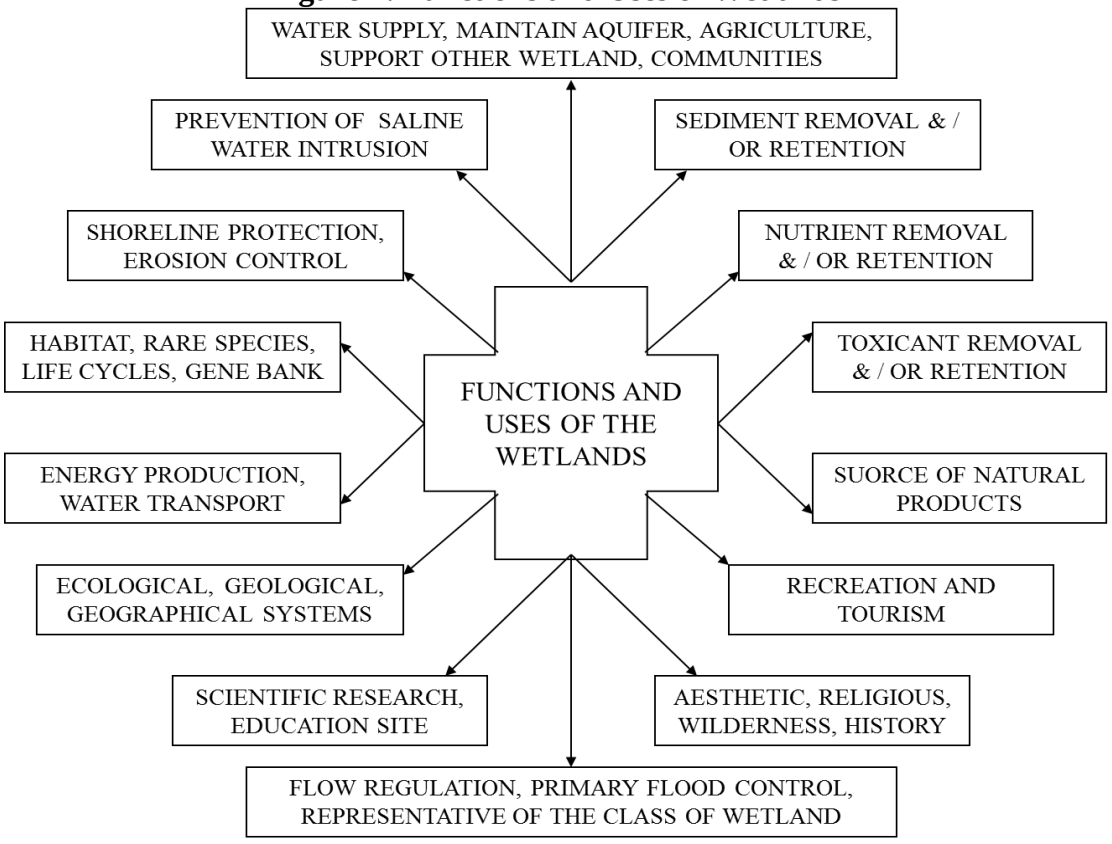
a) Natural

i. Lakes
ii. Ox-bow lakes/ Cut of Meanders
iii. High Altitude Lakes
iv. Riverine Wetlands (including Marsh)
v. River/Stream

b) Manmade

i. Reservoir (including Barrage)
ii. Tanks/Ponds
iii. Waterlogged patches
iv. Salt-pans

Figure 1: Functions and Uses of Wetlands



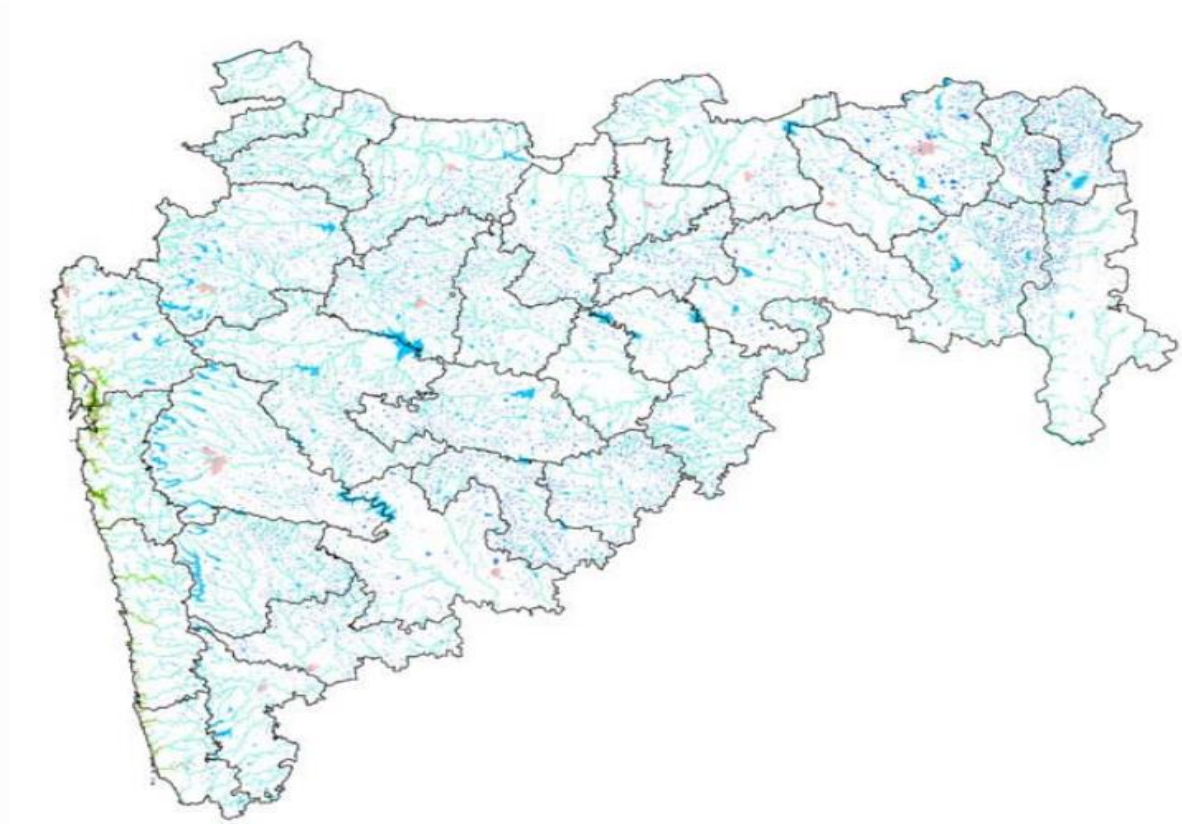
Source: Maharashtra Biodiversity Strategy & Action Plan 2003 (Draft report)

Inland water biodiversity is all biodiversity associated with inland waters such as life forms in water itself (e.g., fish), terrestrial species (e.g., water-birds), semi-aquatic animals (e.g., hippopotamus, crocodiles, beavers) and plants (e.g. flooded forest, mangroves, vegetation associated with the margins of water bodies), amphibians that breed in fresh water[169].

2. Inland Wetlands in Maharashtra: Key Trends

Maharashtra is well endowed with wetland resources. Home to one of the world's largest biodiversity hotspots, 22 river basins originate in the Konkan region of the Western Ghats bestowing an ample resource of water to Western Maharashtra (Figure 2 and Table 2). While latest estimates are unavailable, it is believed that India in the decade 1991-2001, India has witnessed a wetland loss of 38% due to various anthropogenic and natural factors.[170] Recognizing the importance of wetlands the first Wetland Atlas for Maharashtra (2010) was created under the Central scheme on National Wetland Inventory and Assessment.

Figure 2: Wetland Map of Maharashtra[171]



Source: National Wetland Atlas: Maharashtra

Maharashtra ranks third in the number of Inland wetlands in India. The natural wetlands of Maharashtra account for 30.43% of the total wetland resources (Table 1). Nearly 36% of the inland wetland area is manmade reservoirs and barrages, corresponding with the fact that Maharashtra has the largest number of dams in the country, with 1821 large and medium dams.

[169] Inland Waters Biodiversity – What is it? https://www.cbd.int/waters/inland-waters/. Accessed on September 14, 2016

[170] Salim Ali Centre for Conservation and Ornithology.

[171] National Wetland Atlas: Maharashtra (2010), MoEF&CC and Indian Space Research Organization (ISRO)

The Central Government notified the Wetland Management Rules in 2010, which required all State Governments identify and notify wetlands within a year of these Rules coming into force[172]. However, the Government of Maharashtra has not yet implemented the 2010 Rules, and a revised draft of these rules is already in the offing at the MoEF&CC.[173] At present, we have only the baseline data on wetlands, as reported by the National Wetland Atlas. Since the State Government is yet to even document the identified wetlands, there is no detailed information on the status, threats or size of wetlands in Maharashtra, which means that no management plan has been conceived. TEEB India[174] analyzed 11 studies pertaining to inland wetlands spread over 10 states, and reported 39% loss in area in the course of 27 years. This analysis however did not include any studies on Maharashtra.

Table 1: Estimated Area of Wetlands Resources in Maharashtra

		No. of Wetlands	Total Wetland Area (Ha)	% of Wetland Area
	Inland Wetlands - Natural			
1	Lakes/Ponds	39	9003	0.89
2	Ox-bow Lakes/ Cut- Off Meanders	2	15	0
3	Riverine Wetlands	1	2	0
4	Waterlogged	35	284	0.03
5	River/ Stream	3501	299730	29.54
	Inland Wetlands - Manmade			
6	Reservoirs/ Barrages	759	368135	36.29
7	Tanks/ Ponds	15845	208669	20.57
8	Waterlogged	37	310	0.03
	Total	20219	886148	87.35

Source: National Wetlands Atlas: Maharashtra

In the absence of comprehensive systematic baselines and periodic assessments on inland wetlands, there exists no comparable information at the moment to substantially comment on the status of these wetlands. Since the inland wetlands provide two critical ecosystem services: water availability and fish supply, it can be helpful to understand the factors that impact these two services, and make a deductive assessment of the status of wetlands in Maharashtra.

[172] Comparison of the Wetland (Management) Rules, 2010 and Draft Wetland Rules, 2016 is available in Annexure - I

[173] The Bombay High Court is hearing a Public Interest Litigation (PIL) on this issue by the NGO Vanashkati and the matter is sub-judice. Given that the Central Government is in the process of revising the Wetland (Management & Conservation) Rules, 2016, the State Government is reluctant to begin the identification process. However, the Bombay High Court has strongly condemned this delay and ordered that this process be initiated at the earliest.

[174] Initial Assessment and Scoping Report - Working Document by TEEB India: Ministry of Environment, Forests and Climate Change, Government of India

The Central Pollution Control Board (CPCB) has identified three primary causes of poor water quality — domestic (sewage) pollution, industrial pollution, and agricultural discharge.

i. In India, Maharashtra ranks first, among states, in sewage generation[175] at 10200.02 MLD, of which only 4254.25 MLD (41.70%) is treated. It is reported that of the installed treatment capacity in Maharashtra, only 6% is actually being utilized.

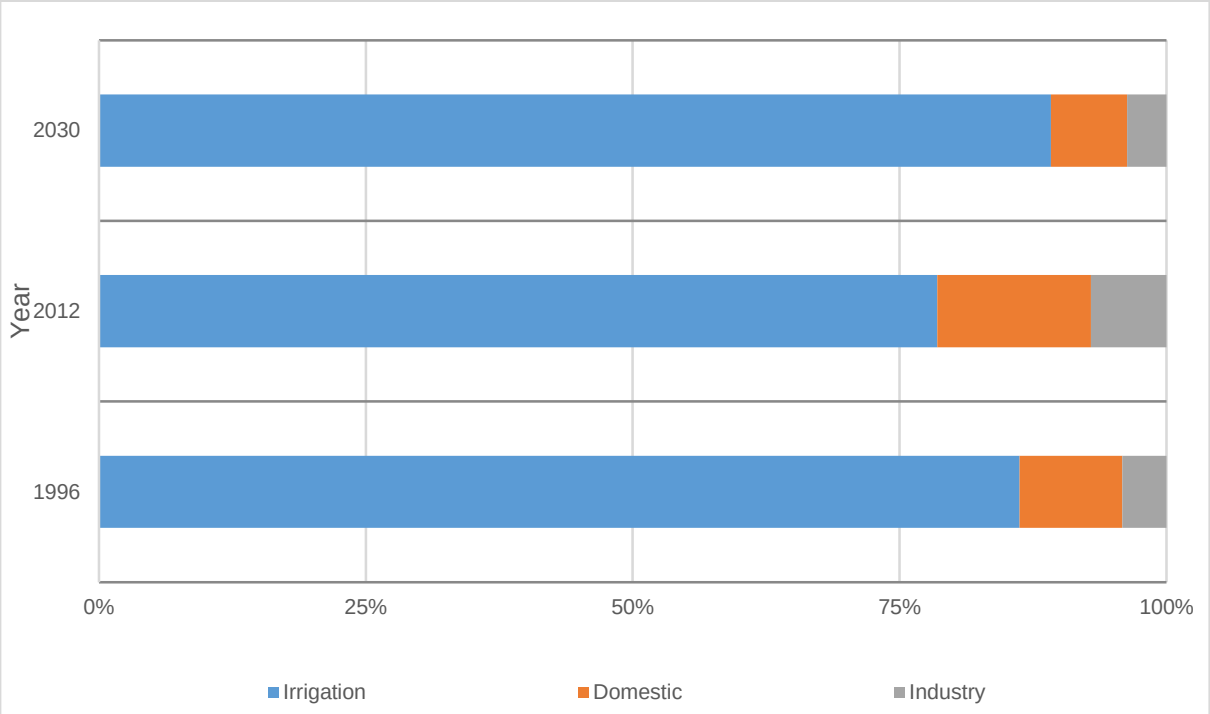
ii. According to a recent report (CPCB[176], 2014-15) on river pollution in India, water quality of rivers in Maharashtra has been found non-complaint for BOD at 153 locations out of 156 locations on 49 rivers.

iii. India and the State of Maharashtra in particular, are reeling under a situation of water stress, based on the availability of water per capita. Maharashtra has witnessed a poor monsoon and unseasonal rain for the last three years thereby further stressing the available resources. Of the 358 talukas in Maharashtra, nearly 148 are considered drought prone. The projected water use pattern for Maharashtra (Figure 3) indicates that by 2030 nearly 88% of the water resources will need to be dedicated towards irrigation purposes.

iv. While fluoride content in groundwater is a function of many factors, studies have revealed that anthropogenic activities like using fertilizers and pesticides containing phosphates, discharge of untreated industrial effluents and depletion of groundwater are also responsible for the high fluoride levels.[177] In 2007-09 the groundwater quality monitored[178] by the GSDA and CGWB showed that 4 of 35 districts of Maharashtra had fluoride levels above permissible limits.

[175] Performance Evaluation of Sewage Treatment Plants in India Funded under NRCD: Central Pollution Control Board, Ministry of Environment, Forests and Climate Change, Government of India
[176] River Stretches for Restoration of Water Quality: Central Pollution Control Board, Ministry of Environment, Forests and Climate Change, Government of India
[177] Excess Fluoride Leads to Chronic Disease: Study – Fluoride Action Network Aug, 30th 2016
[178] Water Quality Executive Summary (2007-09): Maharashtra Pollution Control Board

Figure 3: Water Use Projection for Maharashtra[179]



Source: Maharashtra Water Resources Regulatory Authority

3. Inland Wetlands in Maharashtra

3.1 Key Biodiversity Drivers

i. Poor understanding/recognition of the ecological value of wetlands (BIOFIN Taxonomy: Enhancing Implementation)
ii. Pollution due to untreated municipal sewage & industrial effluents (BIOFIN Taxonomy: Sectoral Mainstreaming)
iii. Hydrological alterations by upstream dams (BIOFIN Taxonomy: Sectoral Mainstreaming)
iv. Encroachment on riverine floodplains for development (BIOFIN Taxonomy: Sectoral Mainstreaming)
v. Over extraction of groundwater (BIOFIN Taxonomy: Natural Resource Use)

3.2 Key Sectoral Practices

a. **Water resource planning:** Water resource planning in India has often perceived water as an economic and social good. Ecological value of water has received little or no serious attention (more so in implementation of the policy) thus undermining long term ecological functions and values of natural water resources.[180] The economic, social and ecological values of water are highly interdependent. This gap in policy thus has been a key driver contributing to deteriorating wetlands.

[179] Presentation on Managing State Water Resources in Maharashtra, MWRRA - February, 2016
[180] Wetland Conservation in Maharashtra: Need, Threats and Potential: Development Research Awareness & Action Institute, Kolhapur, Maharashtra

b. **Release of untreated domestic sewage and industrial effluent:** According to a recent report (CPCB[181] 2014-15) on river pollution in India, water quality of rivers in Maharashtra was found non-compliant for BOD at 153 locations out of 156 locations on 49 rivers (Table 2). Effluent treatment plants are either non-functional or absent, resulting in release of untreated waste into the river basin. The Vashishti River[182] in Ratnagiri district showing high levels of heavy metals such as Chromium, Copper, Cobalt, and Zinc is a case in point.

Table 2: Polluted River Stretches of Maharashtra by Priority Class

Priority Class	No. of stretches
Priority I	4
Priority II	5
Priority III	18
Priority IV	12
Priority V	10
Total	49

Source: Central Pollution Control Board

c. **Hydrological alterations by upstream dams**: Maharashtra has the largest number of dams in the country, with 1821 large and medium dams. According to local communities and findings of academic studies[183] hydrological modifications due to a number of these dams have resulted in: absence of freshwater releases for downstream fisheries; obstruction to migration; change in sediment regime; growth of exotic species due to hydrological changes. These factors have had an adverse impact on biodiversity thus disrupting the livelihood of the communities. [184]

According to Central Inland Fisheries Research Institute (CIFRI) severe and drastic changes in the entire hydrological cycle of the river by dams and water abstractions has affected recruitment of most species, especially large carps, which like flowing water. Larger dams are major cause of degradation of aquatic environment and disruption of livelihood communities dependent upon the fishery along the rivers.[185]

(i) **Absence of Freshwater releases for downstream fisheries:** Reallocation of water through dams has severely affected downstream ecosystems and fisheries. Fisheries in Krishna, Godavari, Tapi and Narmada estuaries have collapsed or are declining because of

[181] River Stretches for Restoration of Water Quality: Central Pollution Control Board, Ministry of Environment, Forests and Climate Change, Government of India http://cpcb.nic.in/upload/Publications/Publication_528_RESTORATION-OF-POLLUTED-RIVER-STRETCHES.pdf

[182] Special Mention in Rajya Sabha, Parliament of India

[183] Impact of Dams on Riverine Fisheries in India: South Asia Network on Dams, Rivers and People, Sept, 2012

[184] Large Dams in Konkan, Western Ghats- Benefits & Costs: South Asia Network on Dams, Rivers and People

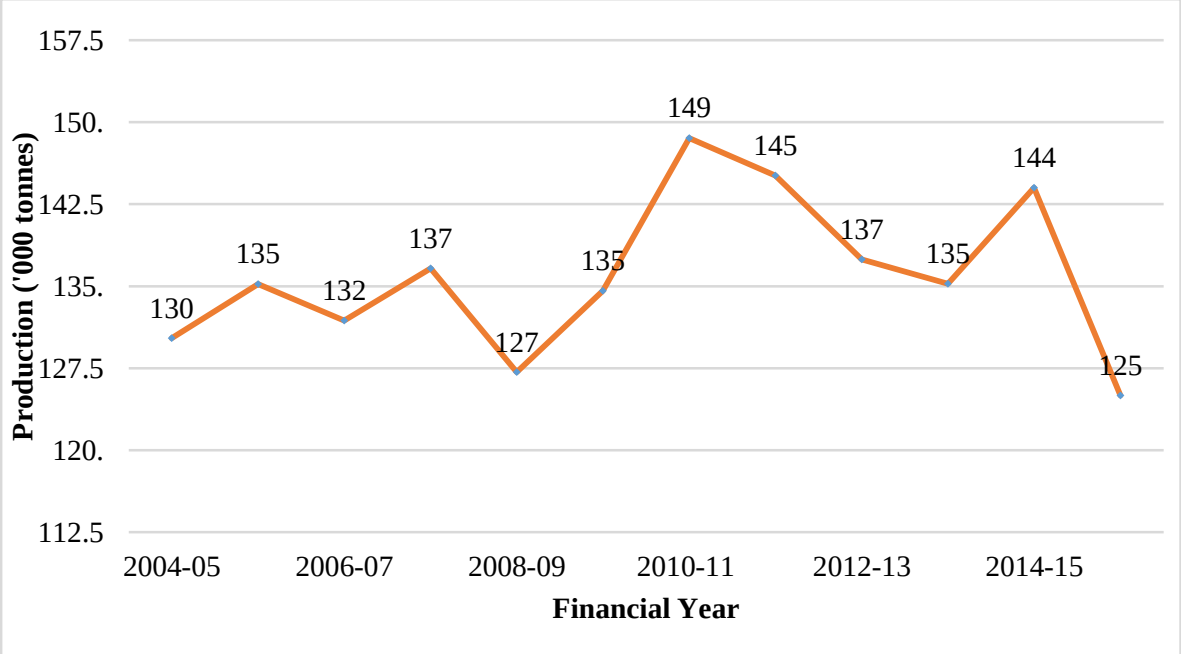
[185] Impact of Dams on Riverine Fisheries in India: South Asia Network on Dams, Rivers and People, Sept, 2012

absence of freshwater all year round. In particular, the Narmada Estuarine fisheries were already under acute pressure from the Sardar Sarovar, Narmada Sagar, Omkareshwar, Maheshwar, Tawa and Bargi Dams.

(ii) **Obstruction to Migration**: Many species of fish found in Peninsular and Himalayan Rivers migrate long or short distances for spawning and any obstruction in these routes affects recruitment. Dams without provisions for fish migration have a major impact on fisheries. Mahseer, once an abundant game and food fish in India is now on the list of endangered species with extremely limited range in rivers like Narmada where it was once found abundantly. The Tehri Dam on Bhagirathi River has already impacted Mahseer migration to a great extent.

(iii)**Change in Sediment Regime:** Decreased river flows have tremendously affected the flushing abilities of the riverbed and increased sedimentation. Decreased flows have led to aggravated siltation which has in turn raises the river bed and further affects the flow in turn. Dams also hold back silt, trapping it and leading to delta erosion like in the case of Godavari.

Figure 4: Inland Fisheries Production in Maharashtra[186]



Source: Department of Animal Husbandry, Fisheries and Dairying, GoI

(iv)**Growth of Exotic species due to hydrological changes:** According to CIFRI "The reduction in catch is also accompanied by change in species, where species favoring flowing water are replaced by species favoring still water, increase in exotics is attributed to decreased flows though dams".

(v) **Encroachment on Mithi River**: One of the oldest rivers in the state and a critical storm water drain for Mumbai. At its point of origin[187], the Mithi River is more than 100 ft. wide,

[186] Document by Department of Animal Husbandry, Fisheries and Dairying
[187] Mithi is a river, not real estate: Down to Earth April 15, 2010

tapering to a mere 40 ft. by the time it travels 14.5 km to reach the Arabian Sea due to massive encroachment by slums, commercial units, residential complexes and polluting industries.

(vi) **Destruction of mangroves due to pollution:** is cited as one of the primary reasons for the July 26, 2005, inundation in Mumbai. It exposed not only the destructive impact of haphazard urbanization, but also the city's unpreparedness towards disaster management.

3.3 Policy and Policy Factors

1.3.1. The National Water Policy 2012

The key to effective water resource planning is to understand the ecological value of water and its interrelationship with other uses of water and thus our well-being. In India, The National Water Policy (NWP) 2002[188] followed a sectoral approach in water resource planning and management. Although ecology was mentioned as a focal point of consideration along with agriculture, drinking water, hydropower etc., it never received due attention at the operational level. The National Water Policy, 2012 recognized this at least in the design and intent of the policy. It lays out 10 basic principles in the management of water resources in the country, the first of which is:

'Planning, development and management of water resources needs to be governed by common integrated perspectives considering local, regional, State and National context, having an environmentally sound basis, keeping in view the human, social and economic needs'[189]

The NWP, 2012 also recognizes Climate Change as a grave threat to India's water security and urges States to take steps towards mitigation and adaptation with respect to water availability in all sectors. This has direct bearing on the way States conserve, manage and utilize their wetland resources.

1.3.2. Schemes of Government of India

i. **River Conservation Plan:** In the 1980s the Government realized that cities cannot manage the sewage problem on their own, particularly the settlements along major rivers like Ganga and Yamuna. Therefore river conservation initiatives in India began with the launch of the Ganga Action Plan in 1985, followed by conservation plans for other rivers across India. In 1995 these plans were consolidated under the National River Conservation Plan establishing the National River Conservation Directorate[190] (NRDC), the nodal agency responsible for the conservation and management of all rivers across the country.

ii. ***National Program on Conservation of Aquatic Ecosystems (NPCA):*** The primary objective of the NPCA is holistic conservation and restoration of lakes and wetlands for achieving desired water quality enhancement besides improvement in biodiversity and

[188] National Water Policy, 2002: Ministry of Water Resources, GoI
[189] National Water Policy, 2012: Ministry of Water Resources and Ganga Rejuvenation, GoI
[190] Note: In the nearly decade and half that the National River Conservation Directorate (NRCD) has been active, the program has covered 190 towns in 20 states in 39 river basins and total pollution tackled is 3500 MLD.

ecosystem through an integrated and multidisciplinary approach with a common regulatory framework. The National Lake Conservation Program[191] (NLCP) and National Wetland Conservation Programs[192] (NWCP) have been subsumed in NPCA. This scheme was to be made operational during the XIIth Five Year Plan at a cost of Rs. 900 cr. Last known[193] estimates on the project show that the MOEF&CC has so far sanctioned projects for conservation in 63 lakes in 14 states at a cost of Rs. 1096.09 cr under the erstwhile NLCP. For Maharashtra in particular, work is ongoing in 14 lakes that were previously covered under the NLCP. A further look at the finances of the NPCA shows that Maharashtra has not tapped into the monetary resource available with the MOEF&CC.

iii. ***Wetland (Management & Conservation) Rules, 2010 and Draft Rules, 2016:*** The 2010 Rules were welcomed by all stakeholders as they laid emphasis on the identification and assessment of wetlands across India in a time bound process, an exercise that had yet to be conducted in entirety. However, as always, the issue lay in the implementation of these rules. For Maharashtra in particular, the Government has yet to commence the process of identifying critical wetlands, six years after the rules had been notified. As mentioned earlier, the Bombay High Court is in the process of hearing PILs on the matter. In the meantime, the Central Government is in the process of revising the Wetland Rules, 2010. The Draft Rules of 2016 are very different from the 2010 Notified Rules. A detailed comparison of these Rules is available in Annexure - I. The most significant differences are:

   a. **Overseeing Body:** The 2010 Rules created an expert body Central Wetland Regulatory Authority (CWRA) which has been replaced by a State Level Wetland Management Authority headed by the Chief Minister. By removing this authority, the provision to appeal against their decisions in the NGT is also lost.

   b. **Amending the Restricted Activity List:** The Draft Rules, 2016 has amended the list to remove the restriction on the following - setting up of industries in vicinity, solid waste dumping, manufacture or storage of hazardous substances, discharge of untreated effluents, any permanent constructions etc. are restricted. removed all provision pertaining

   c. **Removal of Provisions:** In the Draft Rules, 2016 the following provisions have been removed - work completion in a time bound manner; the terms ‘areas rich in genetic diversity’ and ‘areas of outstanding natural beauty’; provision for inclusion of wetland complexes.

   d. **Ambiguous nature of Draft Rules:** There are several provisions which were addressed in the 2010 notified rules, which have not been mentioned in the 2016 Draft. Critical matters such as list of regulation near wetlands, mandatory Environmental Impact Assessment (EIA); grievance redressal have been left unanswered in the new Draft Rules.

[191] Guidelines National Lake Conservation Program: Ministry of Environment, Forests and Climate Change, GoI
[192] Guidelines of National Wetland Conservation Program: Ministry of Environment, Forests and Climate Change, GoI
[193] Lok Sabha Starred Question No. 228 answered on 15.12.2015. Accessed on November 7, 2016

1.3.3. Maharashtra State Water Policy (2003) & Vision 2020 Report

Maharashtra formulated its State Water Policy in 2003. The main features of this policy are: integrated and multi-sectoral approach in planning, development and management of water resources.[194] The Water Policy also introduced the following changes:

To establish a legal framework, the State Government introduced many laws, the most significant being: Maharashtra Management of Irrigation Systems by Farmers Act, 2005; Maharashtra Water Resources Regulatory Authority Act, 2005; Maharashtra Ground Water (Development & Management) Act, 2009[195]

Maharashtra is in the process of updating its water policy. In the interim, the Maharashtra Water Resources Department has released a Vision 2020 Report[196], which details the status, problems and issues of the water sector in Maharashtra. As in the case of National Water Policy 2012, the emphasis of the Vision 2020 report is on the sustainable use of water resources.

4. Summing Up

- **Key Drivers:** Poor understanding of ecological value of wetlands; Pollution due to untreated sewage and industrial effluents; Hydrological alterations by upstream dams; Encroachment on riverine floodplains for development; over extraction of groundwater

- **Key Sectoral Practices:**
  i. Poor water resource planning: The ecological value of water has received little or no serious attention, thus undermining the long term ecological functions and values of natural water resources
  ii. Release of untreated domestic sewage and industrial effluent: A 2015 CPCB report on river pollution states that Maharashtra has the highest number of polluted river stretches in India, 153 locations out of 156 on 49 rivers.
  iii. Hydrological alterations have led to several problems such as absence of freshwater releases for downstream fisheries; obstruction to fish migration; change in sediment regime; growth of exotic species due to hydrological changes.

- **Policy Response:**
  i. New National Water Policy 2012 recognizes the importance of the ecological value of water and its interrelationship with human well-being. It emphasizes the need for sustainable use of natural resources.
  ii. Central Government Schemes such as the River Conservation Plan and the National Program on Conservation of Aquatic Ecosystems focus upon the holistic conservation and restoration of lakes and wetlands for achieving desired water quality while promoting the biodiversity and ecosystem management through a common regulatory framework
  iii. Wetland (Management & Conservation) Rules, 2010 and Draft Rules, 2016: The 2010 rules covered most aspects of wetland conservation but there is a lack of implementation. The Draft Rules approach wetland management very differently in terms of the overseeing body, the restricted and prohibited activities lists, time bound nature of implementation of rules etc.

[194] Status of Water Resources in Maharashtra: CTARA, IITB
[195] English Translation of Maharashtra Groundwater (Development and Management) Act, 2009: Maharashtra Government Gazette, Dec 3, 2013
[196] Vision 2020 Report: Water Resources Department, Government of Maharashtra

iv. Maharashtra State Water Policy, 2003 & Vision 2020 Report: The State is in the process of updating its Water Policy of 2003 which focused on the planning, development and management of water resources. The Vision 2020 Report changes this outlook in favour of sustainable use of water resources.

v. State Government Schemes: Jalyukta Shivar, changes in the cropping pattern, changes in the design and maintenance of dams, planned urban development are some of the steps that the state government is taking towards sustainable growth.

5. Suggestions:

1. **Jalyukta Shivar program:** This includes a revival of old water structures, sustainable extraction of water, and engaging in practices that revive traditional water harvesting structures. In this program, division of water between agricultural and other uses remains a contentious issue and needs to be addressed.

2. **Design and Management of Dams:** The government laid great emphasis on the significance of dams as a symbol of India's growth. Damming was considered a great development activity because of its ability to fulfil the irrigation potential of the country, which in turn would boost the agrarian economy. However, in the course of time, the over-reliance on dams, faulty designs, and in some cases construction without approval of design has led to severe ecological damage[197]. Maharashtra has the highest number of dams in the country. There is therefore a need to reexamine the value addition of building new dams, and the cost of sustaining outdated dams. Poor maintenance and faulty design of dams and supporting canal network, absence of periodic assessment of the river flow are some of the factors posing significant threat to the biodiversity of the region.

3. **Change in cropping pattern:** Following the Green Revolution, there was significant shift in cropping pattern from food crops to cash crops. This led to a major change in the cropping pattern, introducing farmers to non-native, water and nutrient intensive crops such as sugarcane. Such crops do not add value back to the soil, and are also responsible for poor yields over the years, which lead the farmer to intensify fertilizer and pesticide use in the farming process. From our stakeholder meetings in Ratnagiri[198], we were informed that the District is promoting local crop varieties and also encouraging controlled and timely use of locally available inputs. This is expected to reduce the stress on the surrounding biodiversity. This is a commendable initiative, which should be further encouraged and shared with the rest of the country.

4. **Urban Planning:** Indian metropolitan cities face several issues due to poor urban planning. Most cities are an urban sprawl, which do not have adequate provisions for solid waste management. While this problem has persisted for many decades now, the impact of poor sewerage and drainage system is felt every monsoon through loss of life, property, work days and stress on water bodies. Integration of biodiversity and environmental concerns in urban planning is critical.

[197] In Maharashtra Many Dams were built first and designed later, Economic Times, November 8, 2016. http://economictimes.indiatimes.com/news/politics-and-nation/in-maharashtra-many-dams-were-built-first-designed-later/articleshow/55306786.cms

[198] Stakeholder Meeting with District Administration of Ratnagiri, Maharashtra: June, 2016

6. Key Finance Solutions and Policy and Capacity Gaps

INLAND WETLAND				
Sr. No.	**Type of Trend**	**BIOFIN Classification: Key Sectoral Drivers**	**Finance Solutions**	**Capacity Gaps**
	Negative	Sectoral Mainstreaming: Waste	Business models to encourage private sector players to enter the Waste Management Sector have been tried using tools such as Enterprise Challenge Funds [199] These funds can be established under broad Government programs such as Swatch Bharat and Make in India, having the dual purpose of working towards a clean India while encouraging Indian entrepreneurs.	A paradigm shift in thinking is needed. Departments should be proactive in encouraging and inviting innovative technical and business models.
2	Negative	Sectoral Mainstreaming: Waste water	A water cess is charged on both industrial and residential use of water. These rates are very low and have not been revised for many years. There is a lot of scope for revision in the rates of cess. Earmarking of the funds so collected may be considered.	Enforcement of Water Act, 1974 should be tightened. Resources of enforcing agencies need to be strengthened.

[199] **Enterprise Challenge Funds:** Funding instrument that distributes grants (or concessional finance) to profit-seeking projects on a competitive basis. A challenge fund subsidizes private investment in developing countries where there is an expectation of commercial viability accompanied by measurable social and/or environmental outcomes. Challenge funds can mitigate market risks, while spurring innovation to fight poverty and environmental degradation.

3	Negative	Natural Resource Use: Agriculture	Efficient use of water resources can be encouraged when price of water signals its opportunity cost both as an input in production process and as a receptacle of waste generated in production process. This however is often a political decision. Alternatively, in environmentally aware societies finance solutions such as Impact Investments [200] have the potential to help internalize environmental and resource costs.	Openness to new ideas. Demonstration of interest directly through a pilot program or indirectly through regulation for the financial sector, FDI.

7. Policy & Institutional Review in Excel Format as in BIOFIN Workbook

Policy and Institutional review for Inland Wetland ecosystem is also presented in excel format as in BIOFIN Workbook. Excel file is attached with this report in a separate folder.

[200] **Impact Investment:** Impact investing challenges the views that social and environmental issues should be addressed only by philanthropic donations, and that market investments should focus exclusively on achieving financial returns. Impact investments can be made in both emerging and developed markets, and target a range of returns from below market to market rate, depending on investors' strategic goals. The growing impact investment market provides capital to address the world's most pressing challenges in sectors such as sustainable agriculture, renewable energy, conservation, etc. The common investor motivations are:

- **Banks, pension funds, financial advisors,** and **wealth managers** can provide client investment opportunities to both individuals and institutions with an interest in general or specific social and/or environmental causes.
- **Institutional** and **family foundations** can leverage significantly greater assets to advance their core social and/or environmental goals, while maintaining or growing their overall endowment.
- **Government investors** and **development finance institutions** can provide proof of financial viability for private-sector investors while targeting specific social and environmental goals.

Annexure – I: Comparison of the Wetland (Management & Conservation) Rules, 2010 & 2016 (Draft):[201]

Notified Rules, 2010	Draft Rules, 2016	Implication
Overseeing Body		
The Centre created the Central Wetland Regulatory Authority (CWRA), headed by the Secretary, Ministry of Environment, and consisting of bureaucrats and experts.	Removal of CWRA, to be replaced by a State Level Wetland Authority. *The power to identify and notify wetlands to be vested with the Chief Minister*, who as chief executive of the state government as well as of the state wetland authority, will propose and notify wetlands after accepting or rejecting recommendations.	The term of the CWRA ended in March, 2015 and it was not reconstituted. The policy and management support to States would be provided under the National Plan for Conservation of Aquatic Ecosystems. However, the guidelines for the NPCA are yet to be notified. While transferring powers from the central to the state authority, the draft has left out powers such as the one to periodically review the list of wetlands and the activities prohibited in them, and the power to issue "whatever directions (are) necessary for conservation, preservation and wise use of wetlands".
Time Bound Process		
Wetlands have to be notified *within a year* of the Rules coming into force. Deadlines for each process along the way: 6 months for identification and classification, 30 days to send it to a research institute for reference and opinion, 90 days for the research institute to submit its opinion. The rest of the time is available for fulfilling notification formalities, which pass through the central authority.	Provision removed	The 2010 Rules have yet to be implemented. Very few states have even begun the process of notification. In Maharashtra, this matter was brought to the notice of the Bombay High Court, which has then directed the State Government to begin this process immediately (May, 2016). There is observed reluctance on part of the State Government to begin this process.
Restricted Activities		

[201]Compiled by NIPFP

Activities within the wetlands include reclamation, setting up of industries in vicinity, solid waste dumping, manufacture or storage of hazardous substances, discharge of untreated effluents, any permanent constructions etc. are restricted.	The entire list, apart from reclamation, has been deleted. Activities that make "wise use" of wetlands have been permitted. The state authority is to decide what does, and doesn't, amount to "wise use".	The biggest threats to Wetlands are changes in surrounding land use and pollution from domestic and industrial sources. Removal of these activities from the Prohibited list go against the very ethos of the rules.
Regulated Activities		
12 activities including hydraulic alterations, unsustainable grazing, harvesting of resources, releasing treated effluents, aquaculture, agriculture, dreading, etc. will not be permitted without the consent of the State Government	Does not address the issue	The activities under this list are directly relevant to the livelihood of the surrounding communities. Such lacunae in policy leads to an attitude of resentment among the people who in turn do not participate in the conservation process.
Terminology		
State that the Rules apply also to "*areas rich in genetic diversity*" and "*areas of outstanding natural beauty*", besides protected areas.	Terms removed	Wetlands provide critical habitats for many species of fauna and flora. Countless mammal, bird, reptile, amphibian, fish and invertebrate species, quite often threatened with extinction, depend on these habitats for their survival. With the removal of these terms from the Draft Rules, we are already defeating the purpose of introducing the rules in the first place.
Wetland Complexes		
Include "wetland complexes", which are a set of wetlands dependent on each other.	Provision removed	The Wetland Complex is a very fragile ecosystem and cannot be seen in an isolated context. It is imperative to identify the interdependent wetlands and ensure sustainable use.
Environmental Impact		
An Environment Impact Assessment (EIA) is	Does not address the issue	In the absence of an EIA, the impact on the wetland cannot be assessed, hence there is no

compulsory before undertaking any activity in a wetland area.		way to limit and mitigate the damage to the wetland, and undertake future restoration activities. The Polluter Pays principle cannot be applied if the polluter and the change in ecology is not identified at the outset.
Size Specifications		
Cover all wetlands and wetland complexes larger than a specified area — 5 hectares for high-altitude regions, 500 hectares elsewhere.	All wetlands as specified by the State, regardless of size.	The identification Wetlands will largely be through the use of GIS mapping, which has its own limitations with respect to the size. However, the State Government must use its discretion to identify the important wetlands, regardless of their size.
Citizens Check		
Allow a challenge to a decision taken by the CWRA before the NGT.	Since the CWRA is disbanded, this provision is no longer relevant.	It is imperative for the Government to include a provision which allows Citizens to take up any grievances with the decisions of the State Authority first at an Appellate level, and then to the NGT.

Chapter 8
Forest Ecosystems Maharashtra: Policy and Institutional Review

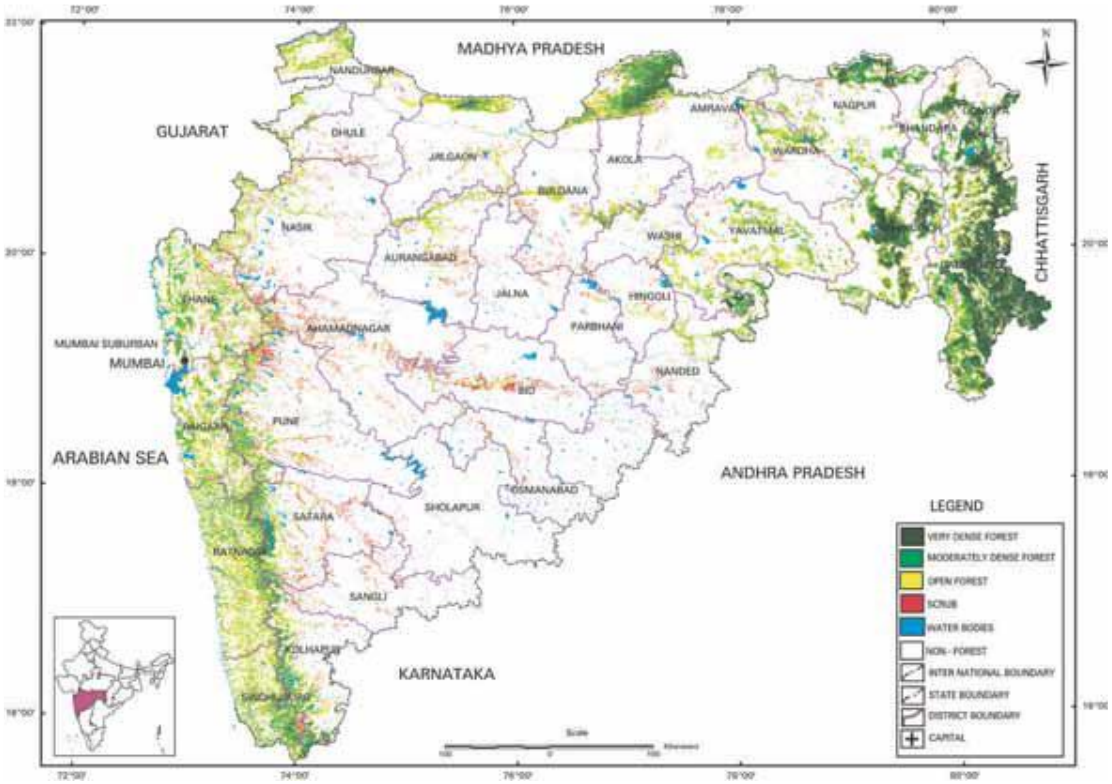
1. Introduction

The Forest Survey of India (FSI) conducts a biennial survey of the country's forests and compiles the Indian State of Forest Report (ISFR) every two years. As per ISFR 2015[202], Maharashtra is 3rd largest state of India (area-307,713 sq.km) with 4th largest forest cover[203] of approximately 50,628 sq. km which is 16.45 percent of total geographic area of Maharashtra[204]. According to MSBB there are presently 3917 species of invertebrates, 1508 species of vertebrates and 4155 species of plants recorded in the state[205].

It has five forest types and each forest type represents a unique Ecosystem. These include Southern Tropical Semi-Evergreen Forests, Southern Tropical Moist Deciduous Forests, Southern Tropical Dry Deciduous Forests, Southern Tropical Thorn Forests and Littoral and Swamp Forests[206]. For management purpose, forests of Maharashtra are also classified based on ownership, region, legal status, circle, land use and district (Annexure 1).

[202] Forest Survey of India. Indian State of Forest Report (ISFR). (2015).
[203] FSI counts all the land with more than 10 per cent canopy cover an area of more than one ha as the forest cover which, apart from the government-owned, private and community forests, also includes commercial plantations, orchids, tea and coffee gardens.
[204]In addition, the tree cover of Maharashtra constitutes 9,558 sq. km. Thus, the total forest and tree cover of Maharashtra is 60,186 sq. km, representing 19.58 percent of Maharashtra's geographic area and 7.58 percent of India's Forest and Tree Cover.
[205]MSBB .Annual Report 2014-15
[206] Maharashtra forest types as per the Champion and Seth's classification. Retrieved from http://www.mahaforest.nic.in/internal.php?id=29. Accessed on 2nd May 2016

Figure 1: Forest Cover Map of Maharashtra



Source: ISFR, 2015

2. Status of Forest: Maharashtra and India

Maharashtra lags behind all India average both in total forest cover and moderately dense and open forest cover (as per cent of total geographical area). The state is doing marginally better in terms of very dense forest and tree cover when compared with all India average (Table 1).

Figure 2: Forest cover of Maharashtra (2015)

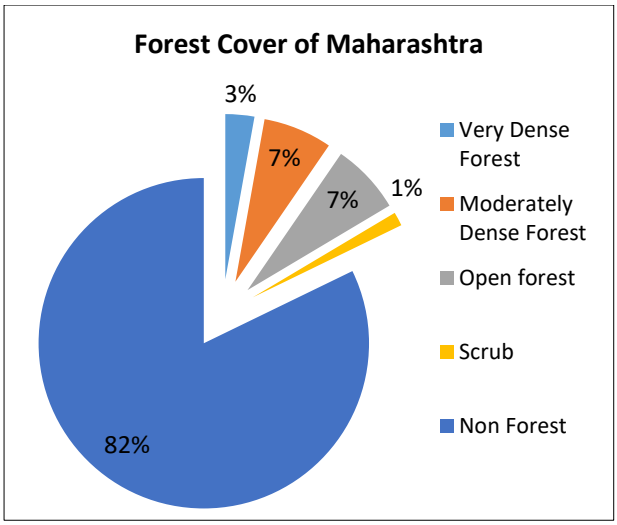
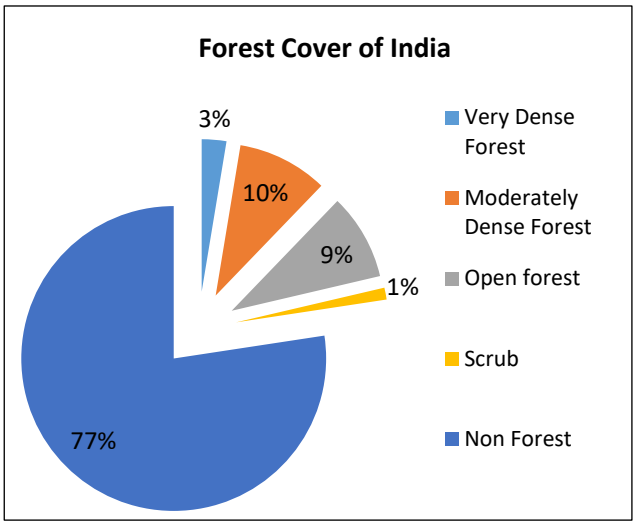


Figure 3: Forest cover of India (2015)



Source: ISFR, 2015

Table 1: Forest Cover of Maharashtra and India (2015)

Forest Categories	Forest Cover of Maharashtra		Forest Cover of India	
Forest Cover	Area (sq. Km)	Percentage	Area (sq. Km)	Percentage
Very Dense Forest	8712	2.83	85904	2.61
Moderately Dense Forest	20747	6.74	315374	9.59
Open forest	21169	6.87	300395	9.14
Total Forest Cover*	50628	16.45	701673	21.34
Scrub	4157	1.35	41362	1.26
Non Forest	252928	82.19	2544228	77.4
Tree Cover	9558	3.10	92572	2.82
Total Forest & Tree Cover	60186	19.56	794245	24.16
Total geographic Area	307713	100	3287263	100

*Includes forest area under mangroves

Source: ISFR, 2015

3. Key trends in Forest Cover: Maharashtra

*3.1.*Recent trends in forest cover

According ISFR, 2015 the forest cover in Maharashtra shows a decline of 27 sq. km. in terms of canopy density, in Very Dense Forest; 87 sq. km in Moderately Dense Forestland an increase of 92 sq. km in Open Forest. The decline has been recorded more in Bhandara, Nagpur,

Sindhudurg, Chandrapur districts[207]. If we look at the trend since 2009 by forest type, the same trend follows (Table 2). During 2009-2015 while the total forest cover has recorded a decline of 4 sq. km, total tree cover shows an increase of 4.5 sq. km.

FSI, is now also collecting information on various parameters of quality of forests such as intensity of regeneration, damage to crops, presence of weeds and grass, humus, incidents of fire and grazing. It has also come up with the data on contiguity of the forest patches. This, in future, would help the government to monitor the changes in the quality of forests along with their area and density.

Table 2: Forest Cover Change in Maharashtra (2009 -15) & (2013-15)

Class	Forest Cover 2015 (sq. Km)	Forest Cover 2009 (sq. Km)	Change during 2009-2015 (sq. Km)	Change during 2013-2015 (Sq. Km)	Trend type
Very Dense Forest	8712	8739	-27	-8	Negative
Moderately Dense Forest	20747	20834	-87	-23	Negative
Open forest	21169	21077	+92	+27	Positive
Total Forest	50628	50650	-22	-4	Negative
Total Tree Cover	9558	9466	+92	+4.5	Positive
Total Forest + Tree Cover	60186	60116	+70	+412	Positive

Source: ISFR, 2009, ISFR, 2011, ISFR, 2013 ISFR, 2015[208], [1]

3.2.Trends in hill districts and Tribal areas

During the years 2013-15, while the hill districts recorded an increase in forest cover by 11 sq. km the tribal districts show a decline of 13 sq. km in forest cover (Table 3). Tribal districts constitute 12.97 per cent of geographic area of Maharashtra and hold 6.79 percent of total forest cover. The decline is attributed largely to weak implementation of FRA, 2006[209] [210]weak planning and management, non-compliance with Forest (Conservation) Act, lack of incentive or support for forest protection & regeneration, and lack of opportunities for diversification in

[207] News Article. The Times of India, Feb 12, 2016. Retrieved from : http://timesofindia.indiatimes.com/city/nagpur/Mahas-forest-cover-declines-despite-successful-plantations/articleshow/50952793.cms

[208] Forest Survey of India. Indian State of Forest Report (ISFR). (2009, 2011, 2013).

[209]Status Report on the implementation of the schedules Tribes and other traditional Forest Dwellers Act, 2006 for period ending 31st January, 2016. (http://tribal.nic.in/WriteReadData/CMS/Documents/201603111003551696366FRAMPR_JAN0001.pdf)

[210] For implementation of FRA for period ending 31st January 2016, 96.01% of claims received have been disposed of and titles have been distributed to 30.94% of total claimants, which spreads across an area of 1095042.02 acres.

livelihoods (Table 4). It is important to note that under FRA, maximum no. of claims has been filed from Gadchiroli district[211] because of considerable tribal population, history of Tribal self-rule coordinated civil society efforts and supportive government machinery in the district[212]

Table 3: Forest Cover Change (in other categories) in Maharashtra (2013-15)

Class		Forest Cover 2015 (sq. Km)	Change during 2013-15 (Sq. Km)	Trend type
Total Forest Cover in Hill Districts w.r.t geographic area under hill districts		15529	+11	Positive
Total Forest Cover in Tribal districts w.r.t. geographic area under tribal districts		30668	-13	Negative
Forest within Green Wash Areas/Recorded Forest Area	**VDF**	8361	-8	Negative
	MDF	15939	-23	Negative
	OF	13143	+11	Positive
	Total	37443	-20	Negative
Forest outside Green Wash Areas/ Protected Areas	**VDF**	351	0	No Change
	MDF	4808	0	No Change
	OF	8026	16%	Positive
	Total	13185	16%	Positive

Source: ISFR, 2015

[211]Some of the major tribal communities in Gadchiroli district include Gond, Madia, Pardhan and Kolam
[212]Kalpavriksh & Vasundhara, a National Report on Community Forest Rights under Forest Rights Act : Status & Issues, 1–92.

Table 4: Status of Implementation of FRA in Maharashtra as on 31 January 2016[213]

Types of Rights	No. of claims filed at GS	No. of claims recommended by Gram Sabha to SDLC	No. of claims recommended by SDLC to DLC	No. of claims approved by DLC for title	Number of titles distributed	No. of claims rejected
Individual Rights	346017	290169	111264	106088	105856	227951
Community Rights	7152	6984	4838	3957	3436	1843
Total claims	353169	297153	116102	110045	109292	229794
Percent claims at different stage of approval		84.13	32.87	31.15	30.94	65

3.3.Trends in green wash area

To find out how the forest cover is changing in the government-recorded forest lands and outside such lands, the FSI for the first time overlaid its satellite images of the forest cover with the topo-sheets of the Survey of India[214]. It found that most of the increase in the forest cover has been outside the traditional forest areas marked as the green wash' areas in the topo-sheets[215]. In Maharashtra, of the total forest cover of 50,628 sq. km, 73.95 percent falls in green wash area and 26.04 percent is outside the green wash area (Table 3). For the year 2013-15, the forest cover within green wash area has declined by 20 sq. km while it has increased by 16 sq. km in areas outside green wash areas. This could be owing to plantations and mangrove rehabilitation.

3.4.Historical Trend in forest cover

The recorded forest cover of Maharashtra has undergone considerable changes in the past 28 years (Annexure 2)[216]. There has been an increase of 5012 sq. Km (9.9 percent) of forest area since 1987. It would be seen from Figure 3 that the forest cover shows a decline during 1987 to 1995, an increase thereafter with a slight dip in 2003. A sharp rise is seen during 2003 and 2005 thereafter it has been stagnant. Since a substantial increase is seen outside green wash

[213] Status Report on the implementation of the schedules Tribes and other traditional Forest Dwellers Act, 2006 for period ending 31st January, 2016.

[214]The state of Forest Cover within recorded forest boundaries of the Maharashtra (under control of Maharashtra Forest Department) has not been assessed by FSI due to unavailability of digitized forest boundaries for Maharashtra. At present, this data is available only for 12 State Forest Departments including Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tamil Nadu, Telangana, Uttarakhand and A & N Islands. Therefore, Green wash areas of survey of India top sheets has been used in ISFR as a proxy to recorded forest areas.

[215] The green wash areas include the traditional government-owned, community and private forests.

[216]Jeyalakshmi, S. et al., 2013. Statistics Related to Climate Change - India. , p.280. Retrieved from http://mospi.nic.in/sites/default/files/publication_reports/climateChangeStat2015.pdf

areas, the overall increase could be attributed to increase in plantations and mangrove rehabilitation.

Figure 4: Historical change in Forest Cover of India & Maharashtra from 1987-2015

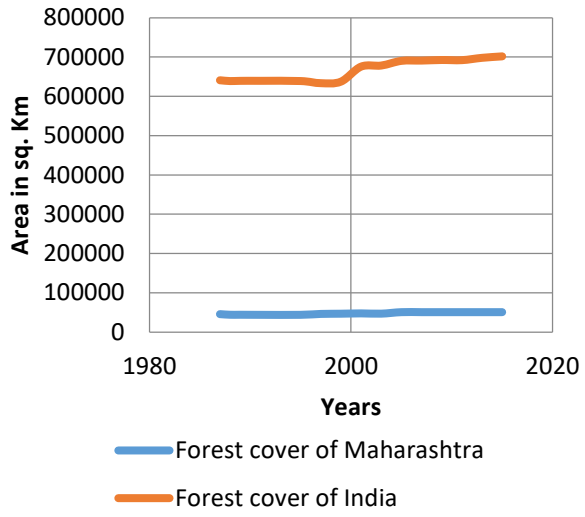
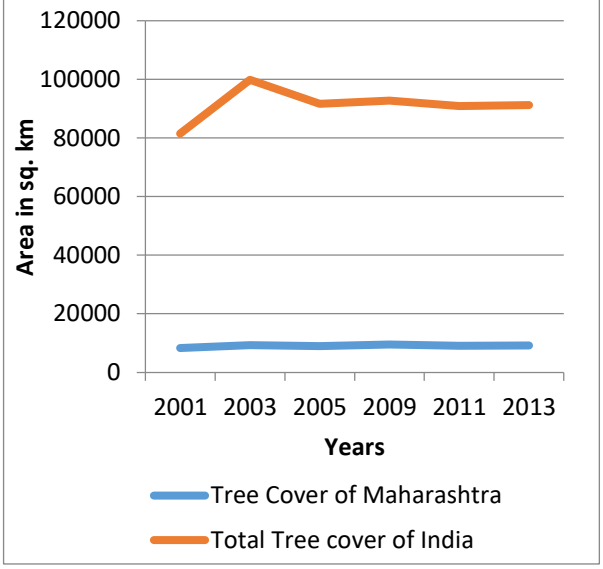


Figure 5: Historical change in Tree Cover of India & Maharashtra from 2001-15



3.5.Status of Threatened, Endangered and Vulnerable Species

IUCN red list categorizes each taxonomic unit at (or below the species level)into Extinct (EX), Extinct in Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), near Threatened(NT), Least Concerned (LC) and Data deficient (DD).[217] According to this list (Annexure 3), it includes 101 species of animals with 2 CR, 1 EN, 4 VU, 2 NT, 96 LC and 6 under data deficient category. There are no records of extinct or extinct in Wild species among animals. It is interesting to note that data on status of 87 percent of animal species is not known in the list &only 17 percent showing stable status.

Among plants (Annexure 4), it includes 316 plants with 8 CR, 10 EN, 20 VU, 4 NT, 262 LC and 12 under category DD. In this case of plants, the status of 42 percent species is reported to be unknown, with approximately10 percent species showing a decreasing trend and 47 percent species showing stable status.

However, In case of birds at district level, the majestic Great Indian Bustards (GIBs) are found to have vanished from Nashik region as not a single GIB has been spotted since 2007.[218] Thus, the concerns may vary at regional level.

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[217] IUCN, 2000. IUCN Red List Categories and Criteria. Retrieved from: http://cmsdocs.s3.amazonaws.com/keydocuments/Categories_and_Criteria_en_web%2Bcover%2Bbckcover.pdf

[218]News Article. Times of India. Mar 21, 2016 (http://timesofindia.indiatimes.com/city/nashik/Great-Indian-Bustards-extinct-in-Nashik-region-not-spotted-since-2007/articleshow/51489785.cms?)

It is important to emphasize here that there may be more such species which require conservation action, but have not been listed here as threatened due to limited research or data deficiency.

3.6.Status of Biodiversity in Protected Area (PA) Network of Maharashtra

In India, as in many other countries, PAs have been used as important concept and strategy for conservation of biodiversity. The protected areas of the state are presented in Table 5, for details see Annexure 5.

Table 5: List of different category of PAs in Maharashtra

Category of PA	Number in State
Tiger Reserves	6
National Parks	6
Wildlife Sanctuaries	47
Sacred Groves	386
Conservation Reserves	4

Source: MSBB Annual Report, 2015

Many of these reserves also act as important Bird Areas of the country, as have been identified by Bombay Natural History Society (BNHS) in consultation with relevant stakeholders.

In both developed and developing countries, it has been seen that declaration of PAs does not always result in adequate protection. In order to assess how successfully Maharashtra has been able to use PAs as a tool of conservation, Management Effectiveness evaluation (MEE) of National Parks and Wildlife Sanctuaries of India from 2006-2014 has been conducted[219,220]. The MEE score and rank derived in this evaluation is based on the performance of PAs on 6 criteria (Context, Planning, Inputs, Processes, Outputs and Outcomes) which include 30 headline indicators customized around the conservation needs of India (Annexure 6).The overall mean MEE score for 7 PAs of Maharashtra is low at 57.13 against the National MEE score of 60.80. Some of the main issues identified in these PAs include:

- Lack of comprehensive information on threatened species as a result only flagship species are being conserved. Inadequate reporting of critical information.
- Lack of capacity of staff, especially in respect of planning and carrying out restoration activities.
- Delays in release of funds especially for restoration activities.
- Stakeholder involvement and participation is less than desired.
- Administrative issues when PA falls under more than one forest division.

[219]Wildlife Institute of India (2015). Management Effectiveness evaluation (MEE) of National Parks and Wildlife Sanctuaries of India, 2006 to 2014 (http://www.wiienvis.nic.in/Content/publications_8380.aspx)

[220] This assessment includes 3 National parks and 4 WLS of Maharashtra: Sanjay Gandhi (Borivilli) NP, Nawegaon NP , Bhimashankar WLS , Chandoli NP, Chaprala WLS, Great Indian Bustard WLS, Karnala WLS.

- Fragmentation and disturbance due to human and developmental activities.

4. Drivers of Biodiversity Loss in Maharashtra

- According to ISFR, 2015, the main reasons for decline of forest cover in Maharashtra are rotational felling, diversion of forests for non-forestry purposes, and encroachments; while increase in Forest in certain pockets is due to plantations and mangrove rehabilitation.
- (Ravindranath et. al., 2012) [221] identifies population growth technological change-induced effects, economic activity and associated market failure, inadequate awareness of biodiversity values at the public and decision making levels and policy and institutional weakness as major drivers of biodiversity loss in developing countries like India.
- India's fifth National Report to the Convention on Biological Diversity[222]attributes land use change due to agriculture, urbanization, industrial development, invasive alien species and overexploitation of natural resources, including plant and animals, amongst the major threats faced by biodiversity globally and in India.
- According to a threat assessment of biodiversity across 10 biogeographic zones in India[12]. The Western Ghats and Deccan Peninsula being the most relevant biogeographic regions in this case; the following threats have been identified: a) Western Ghats- Invasive species, exotic plantations, encroachment, mining, extraction of medicinal plants and NTFPs, livestock pressure, poaching, fire, pathogens and disease transmission, climate change; b)Deccan Peninsula - Deforestation, grassland degradation, invasive species, development and urbanization, mining, pathogens and disease transmission
- Based on literature review and stakeholder consultations the main sectoral drivers for biodiversity loss in Maharashtra have been identified as: Land use change, degradation and fragmentation of forests, unsustainable natural resource use, pollution, and climate change.

These have been illustrated with specific examples in what follows.

4.1. Land Use Change

Loss of habitat due to forest diversion is one of the key drivers for loss of biodiversity in Maharashtra[223].

- Takle et. Al., 2007, analysing the temporal changes in land use of Maharashtra during 1970 to 2000, show that while a positive growth has been observed in land under non-

[221]Ravindranath, N.H. et al., 2012. Forest Ecosystems. The Economics of Ecosystems and Biodiversity - India: Initial Assessment and Scoping Report., pp.19–60.
[222]DPWL/UNEP, 2014. National Report to the Convention of Biological Diversity. , p.66.
[223] Compendium of Environment Statistics India, 2015 (http://mospi.nic.in/Mospi_New/upload/comp_env_2016/comp_SECTION_5_16mar16.pdf)

agriculture uses (1.46%), miscellaneous tree crop (1.65%) and fallow land (3.24%), there was negative growth in forest land (-0.16%) barren and uncultivable land (-0.49%) and permanent pasture land (-1.47%). The reasons for change in land use, among others, include shifting of about 5 lakh ha area to non – agriculture sector (76% of total area shifted) and agriculture sector (24 %)[224].

- **Rapid expansions of infrastructure and development projects:** In Maharashtra, hydro power, irrigation, roads, fire range and wind mill projects require forest land[225] (Table 6). According to MOEF, close to 6724 ha of forests have been diverted in Maharashtra from 2012-2015. The rate of diversion is reported to have increased by 33% from 2012 to 2014[226]. There are several examples of diversion in and around protected forest areas (National Parks and Wildlife Sanctuaries) which led to diversion of forest corridors connecting adjacent protected forests. In Vidarbha, widening of highways - NH6 & NH7 is reported to have adversely affected at least six tiger corridors (Nagzira-Navegaon, Kanha-Indravati, Bor-Melghat on NH6 and Tadoba-Kawal, Tadoba-Bor, and Tadoba-Tipeshwar on NH7). Similar concerns have been raised for corridors in Bhimashankar Wildlife Sanctuary, Kanha-Pench corridor, Achanakmar-Phen-Kanha corridor, Pench-Satpuda corridor and Satpuda-Melghat corridors which spread across neighbouring states. The degradation and fragmentation of forests and these corridors is reported to have threatened the wildlife Pas, decrease genetic diversity (due to inbreeding), increase man –animal conflicts, and increase poaching pressure[227].

Table 6: Approvals for diversion of forests under FCA, 1980 as on 23/11/2016

S.No.	Agency Name	No. of Proposal	Area (Ha)
1	Defense	4	66.161
2	Forest	27	4650.109
3	Irrigation	561	37185.618
4	MSEB	189	2154.256
5	Private	132	2020.267
6	PWD	108	971.401
7	Rural Development	62	476.058
8	Railways	13	193.703
9	Others	529	14507.4
10	**Total**	**1625**	**62225**

[224] Takle, P. et al., 2007. Dynamics of land use pattern in Maharashtra, India. , 3(2), pp.36–39 (http://www.researchjournal.co.in/upload/assignments/3_36-39-13.pdf)

[225] Maharashtra Forest Department Webpage Accessed on 22 August 2016 (http://www.mahaforest.nic.in/internal.php?id=53)

[226] The Times of India. Nov 2, 2015 http://timesofindia.indiatimes.com/india/Projects-consume-over-6k-ha-forest-land-in-Maharashtra-in-3-years/articleshow/49623556.cms

[227] Wildlife Trust of India Website. Stories: Protecting tigers in Central India. Accessed on August,25 2016 (http://wti.org.in/NewsDetails.aspx?NewsId=90)

- A query answered through RTI (2016) reveals that Maharashtra allocated 530 sq. km of forest land to government and private projects in a period of 28 years (1987 to 2015). Of this, 175 sq. km was given in last 10 years (from 2005 to 2015)[228].

- **Tourism** related activities in Hill regions of Western Ghats and other hill districts have put pressure on fragile ecology. Poor monitoring and enforcement of regulations has been identified as a major threat[229].

- **Threats are also posed by mineral mining** in Aravalli Range and the Western Ghats,[230, 231] which are also known as mineral belt of Maharashtra (rich in coal, manganese, iron ore and limestone). New coal mines in Chandrapur, Nagpur and Gondia will impact the tiger corridors connecting Tadoba's tiger population southwards with tiger reserves in Chhattisgarh and Andhra Pradesh. Since, three of the four captive mines namely; Lohara-Lohara Extension, Agarzari and Lohara (west) are in Tadoba Andhari Tiger Reserve buffer zone, it is important that mining is regulated in these areas.

Box 1: Some cases of Land Diversion and Biodiversity Loss in Maharashtra

AN IRRIGATION CANAL UNDER CONSTRUCTION RUNNING THROUGH FORESTS IN BRAHMAPUTRA FOREST DIVISION ADJACENT TO TADOBA TIGER RESERVE.

MINING ACTIVITIES IN CHANDRAPUR DISTRICT FRAGMENTING SOUTHERN FOREST CORRIDOR CONNECTING TADOBA TIGER RESERVE WITH SOUTHERN FOREST BLOCK

[228] The Times of India. Jun 26, 2016 http://timesofindia.indiatimes.com/city/mumbai/Maharashtra-lost-530-sq-km-green-cover-to-government-private-projects-in-28-years/articleshow/52921843.cms
[229]Scientific Paper: Planning and Managing Hill Stations in the Northern Western Ghats
[230] Kasturirangan, K. et al., 2013. Report of the High Level Working Group on Western Ghats, I (April), pp.1–143.
[231] Pillay, R. et al., 2011. Patterns of spatiotemporal change in large mammal distribution and abundance in the southern Western Ghats, India. Biological Conservation, 144(5), pp.1567–1576.

Laborers engaged in blasting activity for the 113-MW Andhra Lake Wind Power Project located at a distance of 3.5 km from the Bhimashankar Wildlife Sanctuary in Maharashtra

The 20 km access road for which over three lakh trees were allegedly cut in Bhimashankar Wildlife Sanctuary in Maharashtra

4.2.Encroachment of forest land

- According to ISFR, 2013, the State of Maharashtra lost 1400 hectare (14 sq. km) forest cover between 2011 and 2013 to encroachments[232]. The Union Minister for Environment and climate Change replying to a query in the parliament in April 2016 mentioned, of the total forest area under encroachment in India, 29% is under encroachment in Madhya Pradesh, followed by Assam (16%), Telangana (9.6%), Maharashtra (9.6%) and Chhattisgarh (6.2%)[233].
- Besides, there have also been illegal diversions for expansion of several irrigation and water supply projects and the amount of 661.39 cores Net Present Value (NPV) was still unpaid in 139 such projects by Water resource department (CAG, 2012)[234].

4.3.Monoculture and conversion of natural forest

- Large areas under private forest in western belt is seen as reason for degradation of forests. Ratnagiri district has highest area under private forest and Sindhudurg district has highest number of evergreen private forests. The area under private forest in Western Ghats region of Maharashtra is close to 12,043 sq. km, which is more than double the recorded government forest of 5,656 sq. km.[235]. As there are complex regulations on felling and transit of trees grown on private land, farmers/private owners prefer to sell their land to businessmen, for construction of resorts and farm houses, wind mill construction and conversion to plantations of coconut, rubber, banana, pineapple etc. (monoculture).

[232]ISFR. (2013). Forest Survey of India.
[233] Live Mint , April 29, 2016 (http://www.livemint.com/Politics/75gTa1ikLOy7MSspIeOsJK/Nearly-19-million-hectares-of-forest-land-in-India-encroach.html)
[234] CAG (2014), Report on Management of Irrigation Projects.
[235]Kulkarni, J. & Mehta, P., 2013. Status, distribution and dynamics of private and community forests in Sahyadri-Konkan corridor of Maharashtra Western Ghats (February), p.156.

- Maharashtra has second highest population of scheduled tribes (10.08%) in India after Madhya Pradesh (14.69%) as per 2011 Census. Scheduled tribes are largely concentrated in the western hilly districts of Dhule, Nandurbar, Jalgaon, Nashik, Palghar, Thane, Raigad, Ahmadnagar and Pune and in the eastern forest districts of Chandrapur, Gadchiroli, Gondia, Nagpur, Amravati, Yavatmal and Nanded. Due to low awareness, lack of training and alternate livelihood opportunities there is degradation of forest in tribal areas.

4.4.Unsustainable natural resource use

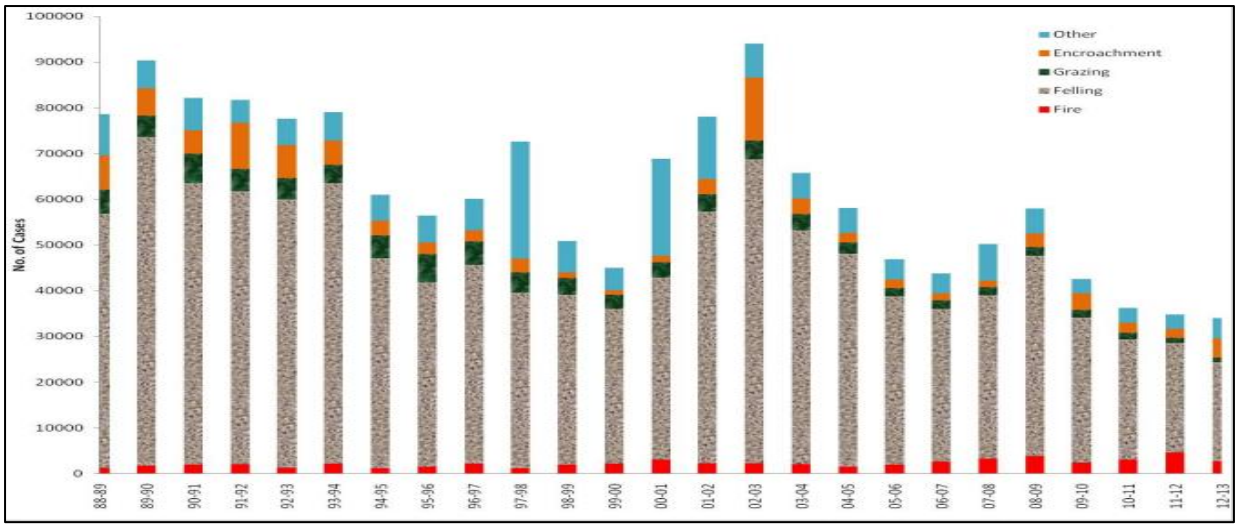
The pressure on forestlands and forest resources such as Timber, Firewood, Fodder and Non-Wood Forest Products has increased many folds due to human disturbances and climate change. In Maharashtra, The extraction of this forest produce (timber and non-timber) is mostly regulated by Forest Department, Forest Labour Cooperative Societies and Tribal Development Corporation.

- **Illicit felling:** Despite a substantial overall decline in illegal felling, this continues to be a threat in some districts. The districts where incidences of illicit cutting have been on rise include Gadchiroli, Amravati, Nagpur, Nashik, Pune, Kohlapur, Yavatmal, Thane and Dhule[236,237]

Due to paucity of studies, it cannot be ascertained whether decline in wood felling cases is due to shift in demand from fuel wood to other energy options, or improved protection. A plausible explanation could be that the demand for fuel wood might have shifted from protected areas to fringe areas and other unprotected areas. Any increase in population in villages around unprotected forests can contribute to illegal felling unless alternatives are made available to them.

[236]Performance Budget of Maharashtra (2013-14), Government of Maharashtra.
[237]Annual Administrative Report (2013-14), Forest Department, Government of Maharashtra. (http://www.mahaforest.nic.in/report_file/1431496035Annual%20Administration%20Report%202013-14.pdf)

Figure 6: Overview of Offence Cases in Maharashtra (25 years)



Source: Brief Review and Statistical Analysis of Forest Offence Cases during Last Quarter-Century (25 Years) [238]

According to a study on Critical Assessment of Forest Legislations, number of cases of illegal felling reported in Maharashtra state were highest during 2008-2012 when compared with other states and UTs[239](Table 6).

Table 7: Number of Illegal Felling of Trees in select states (2007-08 to 2011-12)

States/UTs	2008-09	2009-10	2010-11	2011-12
Andhra Pradesh	38492	28222	-	-
Goa	237	207	-	-
Gujarat	39771	38207	29221	16629
Haryana	6317		-	-
Jharkhand	192	114	-	-
Karnataka	4077	2301	-	-
Madhya Pradesh			16554	-
Maharashtra	**186189**	**201144**	**166359**	**107228**
Odisha	65221		-	-
Rajasthan	11662	9879	-	-
Uttarakhand	1380	1736	1282	1726
West Bengal	1094	581	-	-
Total	**354632**	**282391**	**213416**	**125583**

Source: Lok Sabha Unstarred Question No. 70, dated 01.08.2011 & Lok Sabha Unstarred Question No. 4038, dated 30.04.2012

[238]Anon, Maharashtra Forest Department Brief Review and Statistical Analysis of Forest Offence Cases during Last Quarter-Century (25 Years). , Annexure 7, pp.1–29

[239] Anon, A Critical Assessment of Forest Legislations in India (2014). Centre for Public Policy Research.

4.5.Unsustainable Harvesting Practices

- There have been instances where Maharashtra government gave permission to FDCM for felling trees in tiger habitat as compensation in lieu of conversion of reserve forest to wildlife sanctuaries such as Lendezari in Pench-Nagzira tiger corridor in Bhandara division[240].

- Poor exploitation of bamboo when compared with approved plan leading to loss of revenue[241].

4.6.Pollution

Air, water and land pollution has a direct bearing on the biodiversity of a region, however studies on impact of pollution on biodiversity are scarce in India. Plants constantly take up direct and dissolved atmospheric gases from air and water respectively every day to sustain biological processes. Plants growth is negatively affected if the surrounding air, water or soil is polluted with atmospheric pollutants, untreated sewage, excessive use of agricultural fertilizers, industrial chemicals.

Air Pollution: Among the primary air pollutants RSPM (PM10) and NOX concentrations are found beyond permissible limits in areas like Chandrapur, Navi Mumbai, Pune, Nashik, Aurangabad and Amravati[242] [243].

Water Pollution: According to MPCB reports, untreated sewage is one of the major causes of pollution of surface and ground water as there is a huge gap between generation and treatment capacity of domestic waste water. Maharashtra has 256 local bodies which include 26 Municipal Corporations and 230 municipal councils out of which only 18 Municipal Corporations and 10 Municipal Councils have treatment facilities for domestic effluent.[244] In the absence of treatment facilities, untreated sewage is often discharged into creeks through nallah, affecting the biodiversity of rivers and coasts. The problem exacerbates in places like Mahabaleshwar, Lonavla and Panchgani which have a large tourist inflow.

The water quality survey carried out by the Maharashtra Pollution Control Board (MPCB) in association with The Energy and Resources Institute (TERI) show that almost half of the water quality stations recorded poor quality in18 of a total of 46 rivers in 2013-14.[245,246] Poor

[240] The Times of India. September 2, 2014 (http://timesofindia.indiatimes.com/home/environment/developmental-issues/Stop-Forest-Development-Corporation-of-Maharashtras-plan-to-log-in-tiger-habitat-for-profit/articleshow/41456204.cms?)
[241] CAG (2015), Performance Audit Report on Economic Sector.
[242] Economic Survey of Maharashtra 2015-16. 241 (2016), Government of Maharashtra.
[243] Air Quality Status of Maharashtra (2014), Maharashtra pollution control board.
[244]Annual Report (2012-13), Maharashtra pollution control board.
[245]News Article. The Times of India, Sep 21, 2014. http://timesofindia.indiatimes.com/india/Rivers-in-Pune-most-polluted-in-Maharashtra/articleshow/43045111.cms
[246]Teri Environmental Survey. (2014).

implementation of state laws is found to be largely responsible for poor water quality in rivers and reservoirs in the state.[247]

Solid Waste Management: Maharashtra generates 22,570 MT/Day out of which only 19 % is treated (ESM, MPCB (2015). Inadequate finance for management of solid waste, inadequate trained staff, lack of management skills, and lack of R& D and selection of improper waste processing technology by Local Bodies are cited as main difficulties in implementation.[248]

4.7.Climate change

Considering the variable precipitation pattern and temperature in Maharashtra, parts of Western Maharashtra, Vidarbha and Marathwada which already receives very scanty rainfall, are highly vulnerable to temperature rise due to changing climate. According to a study by TERI[249] parts of south central Maharashtra are projected to experience more dry days in the 2030s relative to its baseline.

Maharashtra is situated in the western and central part of the country. According to recent assessments of the impact of projected climate change on forest ecosystems in India, the forests in the central part of India and northern and central parts of the Western Ghats are particularly vulnerable to climate change (INCCA, 2010) and (Chaturvedi et al., 2011). Although forests in southern Western Ghats are considered more resilient (due to their high biodiversity, high tree density as well as low rates of vegetation change) yet the pressure of deforestation and fragmentation is high in these areas and thus demands special attention on conservation measures. Further, given that 40 % (21,169 sq. km) of Maharashtra's total forest cover is open forest of low density, the overall vulnerability is particularly high in central and other parts which include Thane, Nashik, Amravati, Dhule, Aurangabad, Nagpur and Yavatmal circle. Some of the key climate change related risks highlighted in Maharashtra Climate Change Adaptation report include the following:

- Increased fire risk in savanna woodlands of Northern Western Ghats and Northern Vidarbha due to higher temperatures and arid conditions.
- Increased aridity and reduced fodder supply in Marathwada, Khandesh, and Vidarbha.
- Local species loss especially of mangroves, fish and associated biota due to increased salinity of water.
- Longer term threats (by 2070s) to endangered species and ecosystems due to poor regeneration of species (Tropical evergreen forests of Western Ghats), habitat reduction for faunal species such as Chinkara, Maldhok (Bustard), Tanmore (Florican), etc. (Grasslands of Marathwada, Khandesh, Vidarbha).

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[247] News Article. Indian Express. October 6, 2015 (http://indianexpress.com/article/cities/mumbai/badalta-maharashtra-1-lakh-hectares-of-forest-land-encroached-upon/)

[248] Maharashtra Pollution Control Board. Annual Report. Implementation of Municipal Solid Waste (Management & Handling) Rules, 2000. (2014).

[249] TERI. Assessing Climate Change Vulnerability and Adaptation Strategies for Maharashtra : Maharashtra State Adaptation Action Plan on Climate Change (MSAAPC). (2014).

- Longer term changes (by 2070s) in composition and quantum of fish landings and impacts on associated livelihoods.

4.8.Policy and Governance related Drivers

Some of the drivers of biodiversity loss as above may be due to policy and governance challenges underlying these causes as follows:

4.8.1. Poor mainstreaming biodiversity in sectoral policies and programs

Maharashtra is one of the highly industrialized states of India. With the increasing thrust to industrial sector under Make in India Program, it is crucial to integrate biodiversity conservation in relevant sectoral planning and programs (infrastructure, agriculture, energy, industry and mining)

A recent study conducted by the Institute of Advanced Studies argues that NBSAPs will have limited impact on the ground if they are not translated into sub national actions[250]. It is therefore pertinent that biodiversity conservation issues are integrated in sectoral planning of different levels of government and not just in Maharashtra's State Biodiversity Plan. Box 2 and 3 provide key points of the State Biodiversity Action Plan of Victoria state (Australia)[251]and a local Biodiversity Action Plan in United Kingdom[252].

[250] Secretariat of the Convention on Biological Diversity. NBSAP training modules version 2.1 – Module 8 Biodiversity Planning for States , Provinces , Cities and Other Local Authorities : How to Develop a Sub-National Biodiversity Strategy and Action Plan. 1–37 (2011).

[251] Department of Sustainability and Environment. 2010. Biodiversity is Everybody's Business: Victoria's Biodiversity Strategy 2010 – 2015. Melbourne: Victorian Government Department of Sustainability and Environment. (consultation draft) Available online at: http://www.dse.vic.gov.au/conservation-and-environment/biodiversity/victoriasbiodiversity-strategy

[252]Information on the UK Biodiversity Action Plan, including on the ways it is implemented at local levels, is available at: http://www.ukbap.org.uk/

Box 2: Victoria State Biodiversity Strategy 2010 – 2015

Like a number of other States in Australia, Victoria is completing a revision of its Biodiversity Strategy. This was guided by an evaluation of the earlier Strategy, which outlined a number of concrete ways for improvement in implementation. It incorporates new thinking related to ecosystem functions and addresses emerging issues of climate change, marine biodiversity, fire management, and indigenous values and capacity. The title Biodiversity is Everyone's Business reflects the strong linkages between biodiversity, human well-being, and the necessity of public participation.

The strategy has been developed within the context of Victoria's Land and Biodiversity White Paper "Securing our Natural Future," which sets the vision and policy agenda for the next 20 to 50 years to safeguard Victoria's environment. The Strategy itself provides the strategic direction through a framework of action composed of seven critical elements for biodiversity management:

• Leadership (including advocacy and improved coordination);
• Mainstreaming public awareness, understanding, and action;
• Working together to achieve biodiversity outcomes through coordinated action, innovation, and capacity-building;
• Standards to retain, enhance, and restore biodiversity and ecosystem function;
• Modernizing legislation related to government as well as the business sector;
• Knowledge management to build and share the knowledge base that underpins biodiversity conservation; and
• "Nature print" serving as a blueprint for strategic planning and implementation.

For each of the seven elements, the Strategy outlines the current situation and priority issues, provides a set of goals, indicates the different ways the government will respond, and puts forward several key expected outcomes. Through this, the Strategy provides a mechanism for delivering on the Government's commitments over the next five years through programs, standards, and targets for government and the environment sector. To achieve this, there is a strong focus on influencing and changing behaviors. The strategy puts forward the notion of a 'biodiversity sector,' with public, private, and community groups working in partnership to deliver biodiversity outcomes.

Source: CBD Training Package: Updating National Biodiversity Strategies and Action Plans in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets.

Box 3: Biodiversity Action Plans at the Local Level: Case of United Kingdom

Implementation of the UK Biodiversity Action Plan12 is supported predominately through biodiversity strategies developed by each of the UK's four countries. Within each country, Local Biodiversity Action Plans (LBAPs) have been developed at different geographic scales, including for parishes, counties, and national parks. LBAPs have been encouraged since 1995 when, in consultation with the Local Authority Association and Local Government Board, the UK Biodiversity Steering Group developed a set of guidelines for LBAPs. While the UK Biodiversity Action Plan structure has since changed at the national and country levels, LBAPs remain crucial implementation mechanisms. Their functions are:

• To translate national targets for species and habitats into effective action at the local level;

• To identify targets for species and habitats important to the local area and reflecting the values of local people;

• To stimulate effective local partnerships to ensure programs for biodiversity conservation are developed and maintained in the long term; and

• To raise awareness of the need for biodiversity conservation and enhancement in the local context.

Local Authorities are required to develop Community Strategies for economic, social, and environmental well-being. LBAPs are identified as one of the elements to be used when preparing these Community Strategies.

Throughout the UK, LBAP implementation is first and foremost based on a Partnership Approach14 that connects Local Authorities and a wide range of government, private sector, and civil society stakeholders in order to identify and deliver local action for biodiversity. For instance, in Wales, implementation of the LBAP actively involves farmers, landowners, foresters, game managers, fishery managers, managers or grazers of common land, environmentalists, government departments, conservation charities, industrial/ commercial enterprises, and local authorities. Implementation of LBAPs involves working together with local community groups, schools, colleges, and people of all ages. As of 2009, 190 LBAPs have been prepared in the UK.

Source: CBD Training Package: Updating National Biodiversity Strategies and Action Plans in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets.

4.8.2. Weak Enforcement of Laws and Policies

This is identified as one of the major factors leading to deforestation in the state and biodiversity [253](Table 7). Some of the policy issues linked to weak enforcement and monitoring are:

Table 8: Limitations of Biodiversity related laws

Policies	Limitations
• **Maharashtra Forest Policy (MFP), 2008** • **Forest Conservation Act (1980)**	• Illegal diversion of Forests for irrigation projects & water supply projects by Water Resource Department[32] • Illegal Felling and encroachment of forest areas[31] (Table 5) • Recognition of submerged forest cover in the catchments of hydro power plants as forests(Stakeholder consultations with MFD) • Development of Green funds stated in MFP, 2008 is yet to be done. • Shortfalls in preparation, implementation and revision of Working Plan and inadequate monitoring of working plans[32] • Under deployment of operational staff: Area ratio for monitoring an patrolling, lack of incentive for forest guards (Stakeholder consultations with MFD) • Delay in conviction of offenders and disposal cases by tribunal[32] • Low performance of afforestation, plantation &social forestry measures [32] • Weak micro planning under Joint Forest Management [254] • Inadequate protection of forests outside PA • Delay in notification of 'Zudpi jungle' (shrub forest) and Non acquisition of private forest land under the reserved/protected category[32,255]
State Mineral Policy of Maharashtra	• Open cast coal , bauxite mining sprouting around wildlife corridors, buffer zones and protected areas[28,29]
Environment (Protection) Rules, 1986	• Inadequate compensation for diversion of forest land- Poor management and utilization of CAMPA, Poor Monitoring and data recording, Non Payment, delay in payment NPV[256] • Weak implementation and monitoring under ESA notification,2006 at state and National level [24,28,32] • Improper waste management in Hill stations leading to forest land degradation (Mahabaleshwar and Matheran)

[253] News Article. The Indian Express May 31, 2016 http://indianexpress.com/article/cities/pune/rs-6881-crore-and-8-years-later-forest-cover-in-maharashtra-actually-dips-2826468/

[254] Afforestation, N. Submitted to National Afforestation and Eco-Development Board (NAEB) Ministry of Environment and Forests (MoEF) Government of India.

[255] Press Release by Lok Sabha: Webpage on Zudpi Jungle in Maharashtra. Accessed on Aug 25, 2016 (http://pib.nic.in/archieve/lreleng/lyr2001/rapr2001/23042001/r2304200141.html)

[256] CAG. Report No. : 21 Compensatory Afforestation in India. (2013).

Biological Diversity Rules, 2008 **Wildlife (Protection) Act,1972**	• Delayed implementation of BD Rules, 2008[257] • No law specifically defines or protects wildlife corridors • Delayed notification, monitoring & restoration of Ecologically sensitive zones, wildlife life corridors and buffer zones[258]
Maharashtra Tourism Policy 2016	• Lack of tourism regulatory mechanisms based on carrying of each Protected area to determine how much tourists traffic can be absorbed without negatively disturbing wildlife[259,27]
Maharashtra Regional and Town Planning Act 1966	• Violations of building byelaws in major hill stations of Maharashtra[6,27]
Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 **PESA,1966**	• Wrong recognition of rights under FRA especially in the districts such as Nandurbar, Jalgaon, Gondiya and Gadchiroli [7,8] • Inadequate capacity building of tribes regarding forest conservation and regeneration[7,8] • Legal & Political difficulties in implementing PESA – (a) definition of village, (b) gaps and inconsistencies between the Central and the State Acts, (c) clash between PESA and pre-existing laws d) lack of Political Will[260]

4.8.3. Low performance on Afforestation and Restoration initiatives

The FCA 1980 provides special provision of Compensatory Forestation in lieu of diversion of forest land for non- forest purposes. It is observed that most of the afforestation schemes turn out to be plantations which are unable to replace natural forests and the ecosystem services offered by those forests and only act as carbon sink[261] [262]. Moreover the success rate of plantations is not satisfactory. For, performance of a flagship program of the state government 'Afforestation under 20 Point Program' shows under 2 per cent achievement in terms of the number of seedlings planted during 2009-2015[263].

[257] Annual Report 2011, Maharashtra State Biodiversity Board
[258] Srivastava, R. & Tyagi, R. Wildlife corridors in india : Viable legal tools for species conservation ? 18, 205–223 (2016).
[259] Planning and Managing Hill Stations in the Northern Western Ghats 2012-14
[260] Sudipta, B. Implementation of PESA : Issues, Challenges and way Forwards. 4, 49–54 (2015).
[261] Stakeholder Consultation
[262] Padma, T.V, 2015. Forest situation worries experts, despite minister's promise. Accessed on 18 Sept. 2016 (http://indiaclimatedialogue.net/2015/01/23/forest-situation-worries-experts-despite-ministers-promise/)
[263] Website of National Afforestation & Eco-Development Board, Ministry of Environment and Forests Government of India. Accessed on Aug28,2016 (http://naeb.nic.in/progSchem.html)

4.8.3.1. National Afforestation and Eco-Development Board Scheme [52]

According to a Mid Term evaluation study (The Indian Council of Forestry Research and Education (ICFRE) and NAEB, 2008), NAP Plantation achieved in sampled FDAs (12 out of 45 FDAs in Maharashtra) is 68 percent[264]. Some of the reasons attributed to this are:

- In case of some FDAs in Maharashtra, activities have been delayed and are running behind schedule due to the non-availability of land. In another FDA, the villagers are getting good remuneration as wage labourers in grape plantations and are not interested in participating in forestry activities. Thus, forest dependency of local people is low so they are not attracted towards the NAP scheme.

- Poor performance in formulation of micro plans, training and awareness generation among JFMC, record keeping and effectiveness of FDAs & VFCs, flow of forest produce and mechanism for common fund creation.

- The survival rate of the plantations made under NAP scheme in Western Ghats and Deccan Peninsula region was good at 82.33% and 70.25% respectively.

4.8.3.2. Performance of Plantation Initiatives: Survival Rate

For a successful plantation program, the survival percentage according to norms should be at least 40 % and above after three years of plantation. In five of 24 sites visited by CAG audit committee, the survival percentage was found to be less than 20 %. In many cases, the status of plantations was poor and the data was either not updated or overstated. Government of Maharashtra attributes cattle grazing, non-deployment of chowkidars, and damage by wild boards as the reason of failure of the plantations.

Yet another evaluation report by state forest department (which reveals the circle-wise performance of 10-year-old plantations since 2004), shows that in Nagpur Circle, only 22% plantations were successful, 11% partially successful and 67% failed. A more recent evaluation paints even grimmer picture with a survival rate of 8 per cent in Nagpur circle[265].

4.9.Market Failure

Forest management, regulation, monitoring, timber harvesting, and forest product marketing is largely administered by the state government in India. Due to monopoly of state in the market, market failures occur where true economic value of forests and products like (timber, fuel wood

[264] The National afforestation Program (NAP) is a flagship afforestation program under the aegis of National Afforestation and Eco-development Board (NAEB), Ministry of Environment and Forests, Government of India. Under this scheme, forest management responsibilities have been devolved to local communities via two tier mechanism of Forest Development Agency (FDA, at Forest Division level) and Joint Forest Management Committee (JFMC) (village level).The overall objective of the program is ecological restoration and environmental conservation through peoples' participation in conformity with the objectives as laid down in the NFP, 1988.

[265] News Article. The Times of India. Feb 12, 2016

and NTFPs) is often not reflected. This failure of markets to account for non-priced benefits and costs may be an important underlying source of forest decline in India.[266].

4.10. Financing Constraints

4.10.1. Gap in funding

Sufficient and timely funding is important for conservation activities. Recognizing this National Forest Commission, 2006 recommended 2.5 % of total plan outlay to forestry sector. However, the total outlay of forestry sector in state of Maharashtra during 2010-15 ranged between 0.64 to 1.10 % amounting to a gap of as much as 51 per cent. Further, against the average annual requirement of Rs. 250 core for implementation of working plans[267], the State Government allocated only about Rs. 80-90 crores (14th FC). Also, the inadequacy of funds slows down rehabilitation work, and the State is not able to continue the initiatives in a time bound manner.[268]

4.10.2. Inefficient use of funds including diversion for non-forest purposes:

- Against 203.32 Cr. of FDT remitted to GoM only 3.22 were apportioned to forest department (2010-15) (CAG).
- Maharashtra government levies green cess on sale of electricity to industrial and commercial consumers. Proceeds from green cess are to be transferred to Maharashtra Energy Development Agency (MEDA) for promotion of renewable energy. During 2007-8 and 2014-15, Rs. 2,315 crores were collected however, only Rs. 112.79 cores was transferred[269].

4.10.3. Delay in creation of Green Fund

According to Maharashtra SFP, 2008, a green fund was to be created by the State's forest department to support investments on conservation, wasteland development, eco-restoration, and watershed development. The fund is to be serviced from CAMPA, corpus of forest development tax and resources mobilized from levy of 2 % green cess on Municipal corporations using water from forest areas. Funds available from Clean Development Mechanism (CDM) and other similar schemes are also to be a part of this fund. But no green fund has been created till now. The non-existence of green fund has affected the implementation of forest development programs and led to financial gaps in the framework[39].

4.10.4. Inefficient management and utilization of CAMPA: The main issues are:

[266] Slingenberg, A. et al. Study on understanding the causes of biodiversity loss and the policy assessment framework. Framework 1–206 (2009).
[267] Mandatory works include fire prevention measures, regeneration measures in harvested areas and demarcation of precious forest lands which must be done in timely manner.
[268]News Article. The Hindu. April 15,2916 (http://www.thehindu.com/news/cities/mumbai/news/cag-pulls-up-government-over-shrinking-forest-no-green-fund/article8478157.ece)
[269]News article. Times of India. Aug 18, 2016 (http://timesofindia.indiatimes.com/city/mumbai/Non-utilisation-of-green-cess-fund-in-Maharashtra-CAG/articleshow/53755280.cms)

- Delay in collection of NPV payments from project developers (under collection to the tune of 661.39 cr) [32].
- Delays in identification of land for afforestation.
- Poor recording of data. Serious discrepancies in data on central CAMPA and State CAMPA in respect of NPV received from and released to Maharashtra.

4.11. Lack of Financial Incentive for Conservation, Sustainable Harvest and Use

The forest and biodiversity related laws and policies largely focus on providing rights for collection and sharing of forest products but do not provide any financial incentive for conservation, sustainable harvest and use. For example, the access and benefit sharing under Biodiversity Act do not provide operational guidelines to do so. A study in Western Ghats shows that programs like Joint Forest Management have not been effectively able to provide financial incentive and livelihood opportunities to communities due to lack of information on true value of forest products, sustainable rates of extraction and legally established markets and institutional mechanisms[270]. Additionally, these Local Institutions like JFMC and BMC are not empowered enough to enforce economic charges for forest products and services.

Additionally, there are no financial incentives for private land owners to sustain natural high value species in these forests, which often force them to convert their lands into other commercial uses (monoculture, agriculture, tourist lodges and housings).

5. Policy Response

In promoting the conservation of biodiversity the state of Maharashtra has adopted a number of policy and institutional measures in recent years besides several specific programs and activities. In terms of legislative measures Maharashtra has overarching MFP, 2008 and Biological Diversity Rules, 2008. Maharashtra is also preparing its own biodiversity action plan.

Besides, Maharashtra has incorporated forest management and development objectives at state, district and local level through several laws and policies (Annexure 7). These laws and plans are implemented by a network of institutions such as Maharashtra Forest Department (MFD) (includes wildlife wing), the Forest Development Corporation of Maharashtra (FDCM), Revenue Department, The Directorate of Social Forestry (SFD), Maharashtra State Biodiversity Board (MSBB) and Department of Tribal Welfare.

Some specific policy initiatives taken by Maharashtra to augment biodiversity conservation are as below:

[270] MOEFCC & GIZ. Ecosystems and biodiversity. Econ. Ecosyst. Biodivers. TEEB India Initiat. Interim Rep. - Work. Doc. 92p (2014).

5.1. Wide Network of Protected Areas

In addition to these PAs, biodiversity Hotspots have also been identified for the Western Ghats of Maharashtra by a NGO, Research and Action in Natural Wealth Administration (RANWA), under the Biodiversity Hotpot Conservation Program of WWF-India (Annexure 5). Further, Critical Ecosystem Partnership Fund (CEPF) and ATREE has identified specific pockets in the Western Ghats for conservation importance.

5.2. Maharashtra Vision 2020

Maharashtra government has given thrust to Forest Protection and Jungle Habitat Development in the Vision 2020 by adopting following targets:

- To increase scope of Forest covered area
- To use Satellite and Remote sensing technology effectively address Deforestation (Jungle Surveillance System)
- Liberating forests from criminality, will appoint guards from Paradhi community and thereby economic development of Paradhi community
- To develop a policy for Bamboo cultivation, with bamboo Industry.
- To plan sustainable development for Tribal Community and people from Burud community

5.3 Maharashtra State Adaptation Action Plan on Climate Change (MSAAPCC)[271]

Following action Points have been mentioned to improve Forests and Biodiversity of Maharashtra:

- Launch a Green Maharashtra Mission 2020 for biodiversity
- Conservation
- Development of Buffers
- Biodiversity conservation
- Ecosystem research on climate variability
- Reducing the non-climatic stressors on the mangrove ecosystem by formulation of Regional Monitoring Networks

5.4 ICT Vision for Maharashtra Forest Department

State of Maharashtra has a long history of scientific forest management. It is now planning to integrate information communication and advancing technology for speeding up decision making & monitoring. Maharashtra government in consultation with KPMG has also developed an ICT vision document for forest department. The main objective of the ICT deployment in Maharashtra Forest Department (FD) to systematically organize planning implementation and monitoring of forestry and other related operations by systemic collection

[271] KPMG. ICT Vision for Maharashtra Forest Department.

storage and retrieval of MIS and Geo-spatial data through a computer based communication network. Following ICT initiatives have been envisaged under this plan:

- Development of a Communication Network across the state
- Local Area Network connecting each office.
- Development of Forestry Based applications integrating GIS and MIS Data
- Development of Generic and Office applications
- Procurement of Data Collection Devices Like PDA/Smartphones
- Creation of a Hardware and Software Infrastructure
- Sharpening the ICT skills of the manpower
- Introduction GIS technology for Forest Monitoring and Research Development.

5.5 Shyamaprasad Mukherjee Jan Van Vikas Scheme

Maharashtra Cabinet has approved Shyamaprasad Mukherjee Jan Van Vikas Scheme for development of villages around tiger reserves from 2015-16 to 2019-2020. The objectives of the scheme is to reduce the man-animal conflict and achieve sustainable development of these villages. The scheme is expected to reduce dependence of villagers on forests by creating alternative employment possibilities in these areas[272].

5.6 Constituted Maharashtra State Bamboo Development Board

Bamboo is listed as a Non forest minor produce by Maharashtra government. This year, Maharashtra State Cabinet cleared setting up of Maharashtra State Bamboo Development Board (2016) on the recommendation of a state-level committee, for development of bamboo sector in Maharashtra. Bamboo is called as green gold and timber of the poor. The board will regulate the utilization of Bamboo for various domestic and industrial purposes in the state and generate employment opportunities for skilled and unskilled persons[273][274].

5.7 Maharashtra Eco-Tourism Policy[275]

Government of Maharashtra formulated its eco-tourism Policy in the year 2008. The policy highlights are:

- Employment generation
- Increased involvement of local people
- Protection of environment and culture
- Promotion of sustainable tourism in the state
- Provision of infrastructure

[272] http://articles.economictimes.indiatimes.com/2015-07-24/news/64817303_1_tiger-reserves-buffer-zones-maharashtra-cabinet
[273] http://timesofindia.indiatimes.com/city/nagpur/Bamboo-Board-gets-Maha-nod/articleshow/53256193.cms
[274] http://timesofindia.indiatimes.com/city/nagpur/Forest-departments-vigilance-wing-renamed-as-bamboo-board/articleshow/53623652.cms
[275] http://mahaforest.nic.in/policy_file/1310720768eco-tourism-policy.pdf

Maharashtra State Tourism Development Corporation plays a key role in promoting eco-tourism. Some of the unique tourism experience scheme introduced by MTDC to explore biodiversity are Agro tourism, Ecomantra, Konkan tour, Nature trails, Nisarg Vihar, Tiger trails, etc.[276]

6. Suggestions

Some of the suggestions are summarized below:

6.1. Credible Scientific Data on Biodiversity for Effective Planning and Management

Credible data and information is paramount for effective conservation and management of biodiversity. Significant progress has been made in the past few years but lot remains to be done. There is need for creating and strengthening existing specialized institutions to collect and maintain continuous and comparable data.

6.2. Strengthen Enforcement of Laws Related to Forests and Biodiversity Conservation

There is need to strengthen enforcement and monitoring of laws. The major limitations in existing laws and policies have been identified in Maharashtra state based on rapid assessment of these laws. (Table 6) .Following measures can be taken to augment biodiversity conservation:

- Digitize the boundaries of forests, wildlife sanctuaries and protected areas for efficient monitoring and reporting. This information should be put in public domain which will help different departments in planning their activities. To know important wildlife, biodiversity and corridor connectivity values when projects are planned and "ecological solutions are adopted, especially for infrastructure like railways, irrigation, roads and mining agencies.
- Develop a comprehensive national research/capacity-building programme on biodiversity assessment, management & monitoring.

6.3. Streamline Financing for Biodiversity Conservation

There is need to expedite creation of green fund and address gaps in financing and utilizing funds. A detailed finance needs assessment should be done which would then help in medium term planning for flow of funds.

[276] Joshi, V. M. Eco-Tourism – A Key to Protect the Biodiversity in Maharashtra. 3, 15167–15174 (2014) http://www.rroij.com/open-access/ecotourism--a-key-to-protect-thebiodiversity-in-maharashtra.pdf

6.4. Incentivize Sustainable Management of Forests Outside Protected Area

Maharashtra government should incentivize sustainable forest management through agro – forestry, farm forestry and scientific management of forests on private lands. There is need to review existing regulations governing private forests. For private forests, Maharashtra may also conduct pilots of The Lok Vaniki Scheme (2001) of Madhya Pradesh State, which regularizes wood production on private land based on sustainable forest management principles. Guidance and training should be provided to private forest owners about high conservation value forests and high yielding varieties in case of degraded forests. To enhance the value of forest and forest products, government should also promote and incentivize forest & timber certification in India by providing suitable technical and budgetary support.

6.5. Mainstreaming Biodiversity in Sectoral Policies

It is important to ensure that screening procedures and guidelines include clear biodiversity criteria so that projects with potentially detrimental effects on biodiversity are subject to comprehensive EIA. Presently, EIA reports are weak when it comes to assessment of biological diversity of a project area and the consequent impacts on it.

Biodiversity impact assessment (BIA) studies are generally generic and conducted over a single season, which is not enough to capture species level information & temporal changes in biodiversity. It is advisable that these studies are conducted as a continuous effort and independent of project proponent by government organizations (Zoological Survey of India, Botanical Survey of India, BNHS, other credible research organizations & universities identified for EIA). This will reduce time spent and prevent repetition of assessment studies in a particular region and provide uniform and comprehensive baseline data about biological diversity of the region. Once approved, BIA reports should be made publicly accessible as standalone reports with the EIA. For more details on biodiversity issues that need to be considered at different stages of impact assessment, CBD background document to Decision VIII/28 can be referred.

6.6. Landscape Planning

In order to reconcile between different emerging needs of society and protection of natural resources, it is important to understand the functions of different landscapes. Landscape approach will help to define the conservation priorities across the landscape, rather than to concentrate conservation efforts on the established protected areas. This approach will also help to cope with new threats or demands on the landscape by redistributing landscape according to its conservation priorities and reducing fragmentation.

6.7. Thrust on Green Infrastructure, Agro & Urban Forestry & Indigenous Varieties

Biodiversity and ecosystems should not be limited to forest boundaries. Agro Forestry or social forestry has been an integral part of traditional agricultural practices like the Oraons of Rajasthan, Kangeyam system of Tamil Nadu, home gardens and Cardamom Hill Reserves of Kerala, alder-based large cardamom system in Sikkim and other NE states but lost

recognition over the course of time. With growing pressure of urbanization, commercialization and growing resource crunch, it is important that practices like urban forestry, agro forestry, and green infrastructure are integrated systematically in land use planning process and existing policies. These practices not only serve important social, psychological health, aesthetic, ecological and economic functions but also enhances the relationship between biodiversity and society.

6.8 Biodiversity and Ecosystem Health Assessment

There are several assessments and studies on geographical distribution of forests, wetlands, mangroves and other ecological areas but very few comment on health of these ecosystems . In order to understand changes occurring in ecosystem health and vitality of ecosystems, it is important to understand what determines a healthy ecosystem. Rapport et al. (1985) 277has identified recurrent features of a stressed terrestrial systems, including impairments in primary productivity, nutrient cycling, reduced resilience, altered community dominance favouring "r" selected species (shorter reproductive cycles, smaller size), increase in non-native species (exotics), increased disease prevalence, increased instability in component populations, reduced biodiversity, etc. In order to get a quantitative portrait of ecosystem health, it is important to relate these indicators of health to appropriate synoptic data, for each landscape.

[277] Rapport, D.J., Regier, H.A. and Hutchinson, T.C. (1985) Ecosystem behavior under stress. The American Naturalist 125(5): 617-640

7. Key Finance Solutions and Policy and Capacity Gaps

FOREST			
Type of Trend	**Key Sectoral Drivers**	**BIOFIN Driver Category**	**Finance Solutions/Capacity gaps**
Positive	1. Improved Protection in PA's and better protection regime such as recruitment of more forest guards, better communications, Modern Fire Protection Measures, 24 hour surveillance etc.	1. Protection	1. Improve Collection and utilization of existing charges (Green cess, fuel tax, entry fee, toll tax on roads passing from protected areas, forest development tax, penalties for forest offence & CAMPA funds (NPV)
		2. Restoration	2. Adoption of Environmental Fiscal Reforms by putting pollution taxes on polluting industries
		3. Enhancing Implementation	3. Increase funds focused on biodiversity under aegis of Climate change
			4. Mobilize Resources through Green Bonds
			5. Expedite Development of Green fund and streamline utilization
			6. Earmark funds for biodiversity conservation from enhanced fiscal Transfers to states.
Positive	1. Increased Focus on Tiger Protection and Conservation	1. Protection	1. Profits generated by Forest Development Corporation from sale of forest products should be shared with JMCs/VFCs as incentive for sustainable management of forests
	2. Protected area Network in Maharashtra has expanded by another 1000 km(Addition of protected area -60Kms in Bore tiger Reserve, 250 km in Nagzira, 125 km in Nawegaon, etc.) - 48 Tiger reserves	2. Restoration	
			2. Create infrastructure for Bioprospecting and promote development of commercially valuable products.
Positive	Improving public participation in protection and generating livelihood from such activities	1. Sectoral Mainstreaming	3. Branding and marketing of high quality forest products
		2. Access and benefit sharing	

Negative	1. Increasing demand for forest products (Timber, Sandal wood, NTFPs)	1. Unsustainable Natural Resource Use	1. Promote Conservation Education as a means to mobilize funds such as Mobile Phone Campaigns, Wildlife Clubs, organising expeditions, campaigns, etc.
	2. Changing Land use Land cover	2. Sectoral Mainstreaming	2. Explore opportunities of 'Biodiversity Stewardship' by communicating with both private and public sector business sector.
	3. Illicit felling of trees	3. Weak Protection	
	4. Illegal Encroachments in and around forest lands	4. Laxity in Implementation	
	5. Monoculture and conversion of Natural Forest		
	6. Forest Fire		
	7. Ineffective management and limitation of resources with MFD		
	8. Lack of incentive for forest conservators		
	9. Delay in conviction of offenders and disposing cases by tribunal		
Negative	1. Increasing Dependence on Forest produce (firewood, fodder for livestock, NTFPs)	1. Natural Resource Use	1. Revive and promote 'Carbon Markets'
	2. Conversion of degraded Forest for Non Forest Purposes (63)	2. Laxity in Implementation	2. Utilize CSR funds to set up financial mechanisms to promote conservation of forests (incentives to JFMCs and BMCs)
	3. Increase or decrease in Tribal population and biomass demand (no study reflects)		3. Explore options like Lok Vaniki with private sector to include them in conservation, sustainable development and harvesting of forest products
			4. Revive Carbon Markets for plantation projects
Negative	1. Low success rate of plantations	1. Poor Restoration	1. Revive and promote carbon markets
	2. Low to average performance of Afforestation schemes like JFM, NAP, Massive Afforestation, etc. (15) (16)	2. Laxity in Implementation	2. Utilize CSR funds to set up financial mechanisms to promote conservation of forests (incentives to JFMCs and BMCs)

	3. Inefficient use and management of CAMPA Funds		3. Explore options like Lok Vaniki with private sector to include them in conservation, sustainable development and harvesting of forest products
	4. Weak monitoring, evaluation and internal controls		4. Revive Carbon Markets for plantation projects
Negative	1. Lack of mainstreaming of Forestry sector	Sectoral Mainstreaming	Green Fund
	2. Gap in allocation of budget		Green Bonds
	3. Inefficient Utilization		
Negative	1. Destruction and fragmentation of Habitat	1. Weak Protection	Focus on research and credible data collection
	2. Human disturbances	2. Unsustainable Natural Resource Use	
	3. Illegal Killing	3. Other	Research capacities should be Strengthened.
	4. Increasing air & Water pollution and ineffective waste management		
	5. Human Wildlife Conflict		Evaluation of programs/schemes for feedback
	6. Lack of studies assessing impact on biodiversity at state and regional levels		
	7. Lack of comprehensive information on threatened & endangered species in public domain		
	8. No records of biodiversity from unprotected areas		

8. Policy & Institutional Review in Excel Format as in BIOFIN Workbook

Policy and Institutional review for Forest ecosystem is also presented in excel format as in BIOFIN Workbook. Excel file is attached with this report in a separate folder

Annexure 1 Different types of Classifications of Forests in Maharashtra as per State Forest Report 2011[1]

By Management or Ownership	• **Forest Department** • **Forest Development Corporation** • **Revenue Department** • **Private Forests brought under possession of the forest department**		
Different Regions of Maharashtra	**1.** Vidarbha **2.** Marathwada **3.** Western Maharashtra		
By Legal Status	• Reserved Forests • Protected Forests • Unclassed forests		
Territorial Circle & Wild life Wings	**Territorial Circles (11)** • Thane • Nashik • Dhule • Pune • Kolhapur • Aurangabad • Amravati • Yavatmal • Nagpur • Chandrapur • Gadchiroli **Wildlife Wings (4)** • WL Mumbai • WL Nashik • Paratwada T.P Dn • WL Nagpur		
Land use	• Very Dense • Moderately Dense • Open Forests • Scrub		
Forest Cover By District (as per 2013)-[278] (35)	**All Districts** (35) 1. Mumbai City 2. Mumbai Suburban 3. Thane 4. Raigad 5. Ratnagiri 6. Sindhudurg 7. Nashik 8. Dhule 9. Nandurbar 10. Jalgaon	**Tribal Districts** (11) 1. Ahmadnagar 2. Amravati 3. Chndrapur 4. Dhule 5. Gadchiroli 6. Jalgoan 7. Nagpur 8. Nashik 9. Pune 10. Thane	**District wise Mangrove Cover** (6) 1. Mumbai City 2. Mumbai Suburban 3. Raigarh 4. Ratnagiri 5. Sindhudurg 6. Thane

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	11. Ahmadnagar 12. Pune 13. Satara 14. Sangli 15. Solapur 16. Kolhapur 17. Aurangabad 18. Jalna 19. Nanded 20. Parbhani 21. Hingoli 22. Beed 23. Osmanabad 24. Latur 25. Buldhana 26. Akola 27. Washim 28. Amravati 29. Yavatmal 30. Wardha 31. Nagpur 32. Bhandara 33. Gondia 34. Chndrapur 35. Gadchiroli These districts are grouped into six administrative divisions- Amravati, Aurangabad, Konkan, Nagpur, Nashik, and Pune.	11. Yavatmal	

Annexure 2: Historical estimates of Forest cover of Maharashtra and India (1987-2015)

Years	Forest Cover of Maharashtra (Sq. km)	Forest Cover of India(sq. km)
1987	45616	640819
1988	44044	638804
1989	44044	639364
1991	43859	639386
1995	43843	638879
1997	46143	633397
1999	46672	637293
2001	47482	675538
2003	46865	678333
2005	50661	690171
2007	50650	690899
2009	50650	692394
2011	50646	692027
2013	50632	697898
2015	50628	701673

Source: M/o Environment, Forest and Climate Change

Annexure 3: IUCN Red List of Vulnerable, Endangered and Critically Endangered Fauna in Maharashtra

S. No.	Species ID	Common Name	IUCN Red List Category	Year Assessed	Population
1	189700	Kondana Soft-furred Rat/Kondana Rat	Critically Endangered	2008	Decreasing
2	13524	Konkan Tiger Toad	Critically Endangered	2013	Decreasing
3	172706	Poona Skink	Endangered	2013	unknown
4	194104	Das's Day Gecko, Gund Day Gecko	Vulnerable	2013	Unknown
5	172592	White-striped Viper Gecko	Vulnerable	2013	Unknown
6	172622	Satara Gecko	Vulnerable	2013	Unknown
7	194111	Phipson's Earth Snake, Phipson's Shieldtail	Vulnerable	2013	Unknown
8	63673	Karwar Large Burrowing Spider	Near Threatened	2008	decreasing
9	194827	Bicatenate Uropeltis, Two-chained Uropeltis	Near Threatened	2013	unknown
10	63558		Least Concern	2010	Unknown

11	63566		Least Concern	2010	Unknown
12	166694		Least Concern	2010	Unknown
13	167267	Wandering Midget, Pygmy Wisp, Wandering Wisp	Least Concern	2013	Unknown
14	167350		Least Concern	2010	Unknown
15	167325	Brown Vine Snake, Brown-speckled Whipsnake, Thunderbolt Snake	Least Concern	2013	Unknown
16	167280		Least Concern	2010	Unknown
17	167316	Nilgiri Keelback	Least Concern	2013	Unknown
18	167258	Vagrant Emperor	Least Concern	2013	Unknown
19	59811	Blue Emperor, Emperor Dragonfly	Least Concern	2013	stable
20	59812		Least Concern	2010	Unknown
21	167346		Least Concern	2008	stable
22	167279		Least Concern	2010	unknown
23	169143	Banded Krait	Least Concern	2013	stable
24	161242		Least Concern	2013	unknown
25	167147	Angled Pierrot	Least Concern	2011	stable
26	167328	Striped Coral Snake, Black Coral Snake	Least Concern	2013	unknown
27	59864	Elliot's Forest Lizard	Least Concern	2013	unknown
28	167369	Roux's Forest Calotes, Roux's Forest Lizard	Least Concern	2013	stable
29	167372		Least Concern	2010	unknown
30	169109	Asian Chameleon, Indian Chameleon	Least Concern	2014	unknown
31	169181	Fimbriated Striated Burrowing Spider, Indian Violet	Least Concern	2008	decreasing
32	167307	Copper-head Trinket Snake, Copperhead Rat Snake, Radiated Ratsnake	Least Concern	2014	unknown
33	175165		Least Concern	2010	unknown

34	167060	Indian Smooth Snake	Least Concern	2013	unknown
35	169098	Lesser Dog-faced Fruit Bat, Common Short-nosed Fruit Bat, Lesser Short-nosed Fruit Bat	Least Concern	2008	unknown
36	167093	Clouded Indian Gecko	Least Concern	2013	unknown
37	167365		Least Concern	2013	unknown
38	167291	Black Percher	Least Concern	2013	stable
39	167375		Least Concern	2010	unknown
40	190840		Least Concern	2010	unknown
41	167318		Least Concern	2010	unknown
42	167393	Southern Flying Lizard	Least Concern	2013	stable
43	169112	Indian Egg-eater, Westermann's Snake, Indian Egg-eating Snake	Least Concern	2013	unknown
44	167383		Least Concern	2010	unknown
45	167275		Least Concern	2010	unknown
46	167308	Western Indian Leopard Gecko	Least Concern	2013	unknown
47	167357	Schmidt's Mabuya	Least Concern	2013	stable
48	165506	Three-banded Mabuya	Least Concern	2013	unknown
49	167384	Boulenger's Indian Gecko	Least Concern	2013	unknown
50	167281	Forest Spotted Gecko, Kollegal Ground Gecko	Least Concern	2013	unknown
51	167269	Gunther's Indian Gecko, Deccan Ground Gecko, Banded Ground Gecko	Least Concern	2013	unknown
52	167295		Least Concern	2013	unknown
53	167385	Beaked Worm Snake, Beak-nosed Worm Snake	Least Concern	2013	unknown
54	169154		Least Concern	2010	unknown
55	167329		Least Concern	2010	unknown
56	167133		Least Concern	2013	unknown

57	167395	Giant Gecko	Least Concern	2013	unknown
58	167370	Graceful Leaf-toed Gecko	Least Concern	2013	unknown
59	167216	Spotted Leaf-toed Gecko	Least Concern	2013	unknown
60	134378	Bombay Leaf-toed Gecko, Prashad's Gecko	Least Concern	2013	unknown
61	6103	Indian Leaf-nosed Bat, Indian Round leaf Bat	Least Concern	2008	unknown
62	10142	Schneider's Leaf-nosed Bat, Schneider's Round leaf Bat	Least Concern	2008	stable
63	10162		Least Concern	2010	unknown
64	40023		Least Concern	2010	unknown
65	20056		Least Concern	2013	unknown
66	17338	Gossamer Damselfly	Least Concern	2013	stable
67	194103	Emerald Spreadwing	Least Concern	2011	unknown
68	172598		Least Concern	2010	unknown
69	194099		Least Concern	2010	unknown
70	194115	Yellow-spotted Wolf Snake	Least Concern	2013	unknown
71	196006	Travancore Wolf Snake	Least Concern	2013	unknown
72	172618	Günther's Writhing Snake	Least Concern	2013	unknown
73	172628	Lined Supple Skink	Least Concern	2013	unknown
74	172590		Least Concern	2013	unknown
75	172717		Least Concern	2010	unknown
76	172614	Beddome's Black Earth Snake, Beddome's Black Shieldtail	Least Concern	2013	unknown
77	172625		Least Concern	2010	unknown
78	172714		Least Concern	2010	unknown
79	170381	Beddome's Snake-Eye	Least Concern	2014	unknown
80	192063	Jerdon's Snake-eye, Punjab-snake-eyed Lacerta, Rugose	Least Concern	2010	stable

		Spectacled Lacerta, Snake-eyed Lacerta			
81	172635		Least Concern	2010	unknown
82	172683	Small Skimmer	Least Concern	2013	unknown
83	172701		Least Concern	2013	increasing
84	194108		Least Concern	2010	unknown
85	178245	Indian Ornamental, King Parachute Spider, Regal Parachute Spider	Least Concern	2008	decreasing
86	172624		Least Concern	2010	unknown
87	178461	Stout Sand Snake	Least Concern	2013	unknown
88	172658		Least Concern	2013	unknown
89	172688		Least Concern	2013	unknown
90	172659		Least Concern	2013	unknown
91	172666	Olive Forest Snake, Olive Trapezoid Snake	Least Concern	2013	decreasing
92	172708		Least Concern	2010	unknown
93	194102	Beddome's Horseshoe Bat, Lesser Woolly Horseshoe Bat	Least Concern	2008	stable
94	172695		Least Concern	2010	unknown
95	172649		Least Concern	2010	unknown
96	172638	Desert Yellow Lesser House Bat., Desert Yellow Bat	Least Concern	2008	unknown
97	172687	Dormer's Bat, Dormer's Pipistrelle	Least Concern	2008	stable
98	172617	Common Bamboo Viper	Least Concern	2013	stable
99	191907	Malabar Pit Viper, Malabarian Pit Viper	Least Concern	2013	stable
100	172582		Least Concern	2010	unknown
101	172670	Dancing Dropwing, Long Legged Marsh Glidder	Least Concern	2010	unknown
102	172643	Elliot's Earth Snake	Least Concern	2013	stable
103	194117	Bombay Earth Snake, Large-scaled Earth Snake	Least Concern	2013	stable

104	7091	Red-lined Earth Snake	Least Concern	2013	unknown
105	172657		Least Concern	2010	unknown
106	175181	Kolhapur Day Gecko	Data Deficient	2013	unknown
107	167322	Graceful Racer	Data Deficient	2013	unknown
108	194121		Data Deficient	2013	unknown
109	172692	Blanford's Mabuya	Data Deficient	2013	unknown
110	172653	Riopa goaensis	Data Deficient	2013	unknown
111	172585		Data Deficient	2010	unknown

Annexure 4: IUCN Red List of Vulnerable, Endangered and Critically Endangered Flora in Maharashtra

S. No.	Species ID	Common Name	IUCN Red List Category	Year Assessed	Population
1	50126575		CR	2015	decreasing
2	31231	Balsamodendrumwightii	CR	2015	decreasing
3	177340		CR	2013	decreasing
4	176919		CR	2013	decreasing
5	177354		CR	2013	decreasing
6	177377		CR	2013	unknown
7	176942		CR	2013	unknown
8	38746		CR	1998	
9	19891945	Cassia kolabensis	EN	2012	decreasing
10	44392545	Hitcheniacaulina	EN	2013	unknown
11	19892181	Amerimnoncongestum	EN	2012	unknown
12	177100		EN	2013	decreasing
13	50126590	White Cedar	EN	2015	decreasing
14	50126609		EN	2015	decreasing
15	33470	Artocarpusponga	EN	1998	
16	50126619		EN	2015	decreasing
17	177381		EN	2013	unknown
18	50126621		EN	2015	decreasing
19	50126569		VU	2015	decreasing
20	50126571	Cissuspedata	VU	2015	decreasing
21	50126577		VU	2015	decreasing
22	173539	Diospyrosarnottiana|Diospyroscanarica|Diospyrosoligandra	VU	2015	decreasing
23	173931		VU	2015	decreasing

24	19892847	Desmodiumbakeri |Desmodiumrottleri |Eleiotistrifoliata	VU	2012	unknown
25	177327		VU	2013	unknown
26	177297		VU	2013	decreasing
27	175211		VU	2013	decreasing
28	50126592	Brindoniaindica	VU	2015	decreasing
29	44393261	Manisurissantapui	VU	2013	unknown
30	175226		VU	2013	unknown
31	50126615		VU	2015	decreasing
32	177162		VU	2013	decreasing
33	33526		VU	2015	decreasing
34	31219		VU	1998	
35	19892259	Rhynchosiacoodoorensis	VU	2012	unknown
36	175206		VU	2013	unknown
37	50126639		VU	2015	decreasing
38	177088	Utriculariaogmosperma	VU	2013	unknown
39	19891613	Atylosia cajanifolia |Cantharospermum cajanifolium	Near Threatened	2012	unknown
40	177396		Near Threatened	2013	unknown
41	177390		Near Threatened	2013	unknown
42	19892969	Phaseolus grandis |Phaseolus khandalensis |Vigna grandis	Near Threatened	2012	unknown
43	19891432		Least Concern	2012	stable
44	168948	Sola Pith Plant, Pith Plant	Least Concern	2011	unknown
45	168873		Least Concern	2012	stable
46	19892921		Least Concern	2012	stable
47	176960		Least Concern	2013	unknown
48	176953	Whitejacket, Kulayadambu	Least Concern	2013	unknown
49	19378961		Least Concern	2012	stable
50	176889		Least Concern	2013	stable

51	19892321		Least Concern	2012	unknown
52	19891953	Butterfly-tree, Hawaiian Orchid Tree, Hong Kong Orchid Tree, Purple Camel's Foot	Least Concern	2012	stable
53	177343		Least Concern	2013	unknown
54	177339		Least Concern	2013	unknown
55	176928		Least Concern	2013	stable
56	164167		Least Concern	2013	stable
57	177335		Least Concern	2013	stable
58	62332		Least Concern	2013	unknown
59	194145		Least Concern	2013	stable
60	19892765		Least Concern	2012	stable
61	177389	Crimson Seeded Sedge	Least Concern	2013	stable
62	177090		Least Concern	2013	unknown
63	177156		Least Concern	2013	unknown
64	177031		Least Concern	2013	unknown
65	176924		Least Concern	2013	stable
66	175214		Least Concern	2013	stable
67	177059		Least Concern	2013	unknown
68	177240	Day Flower	Least Concern	2013	stable
69	177167		Least Concern	2013	unknown
70	177277	Willow Leaved Dayflower	Least Concern	2013	unknown
71	177028	Climbing Dayflower, Creeping Day Flower, Birdbill Dayflower, Spreading Dayflower	Least Concern	2013	stable
72	176972	White Mouth Dayflower, Slender Dayflower, Blue Commelina, Blousel Blommetjie, Widow's Tears Day Flower	Least Concern	2013	stable
73	177042		Least Concern	2013	stable
74	177318		Least Concern	2013	unknown

75	19891554		Least Concern	2012	stable
76	19892827		Least Concern	2012	stable
77	19891731		Least Concern	2012	stable
78	19893123		Least Concern	2012	unknown
79	175210		Least Concern	2013	stable
80	19892332		Least Concern	2012	unknown
81	44393595	Hidden Lily	Least Concern	2013	unknown
82	177075		Least Concern	2013	unknown
83	169042		Least Concern	2011	unknown
84	177182		Least Concern	2013	stable
85	177228		Least Concern	2013	unknown
86	177386		Least Concern	2013	stable
87	177046		Least Concern	2013	unknown
88	177030		Least Concern	2013	stable
89	164443	Fostail Sedge, Matsedge	Least Concern	2013	unknown
90	176905		Least Concern	2013	unknown
91	177199		Least Concern	2013	stable
92	177207		Least Concern	2013	stable
93	176908		Least Concern	2013	unknown
94	177203		Least Concern	2013	stable
95	177276		Least Concern	2013	stable
96	164510	Finger Flatsegde	Least Concern	2013	stable
97	177093	Slender Cyperus	Least Concern	2013	stable
98	164083	Yellow Nutsedge, Earth Almond, Tiger Nut, Earth Nut	Least Concern	2013	unknown
99	177331		Least Concern	2013	unknown
100	176951		Least Concern	2013	stable
101	176876		Least Concern	2013	stable
102	176961		Least Concern	2013	unknown
103	176887		Least Concern	2013	stable

104	177175		Least Concern	2013	stable
105	177301		Least Concern	2013	stable
106	158183	Nut-grass	Least Concern	2013	stable
107	177157		Least Concern	2013	stable
108	177290		Least Concern	2013	unknown
109	177286		Least Concern	2013	unknown
110	177145		Least Concern	2013	unknown
111	177271		Least Concern	2013	stable
112	177150	Nut Grass, Purple Nut Sedge	Least Concern	2013	unknown
113	19891753		Least Concern	2012	unknown
114	199701		Least Concern	2011	stable
115	19892245		Least Concern	2012	unknown
116	19892960		Least Concern	2012	stable
117	19892360		Least Concern	2012	stable
118	164134	Sicklebush	Least Concern	2012	stable
119	177086		Least Concern	2013	decreasing
120	177087		Least Concern	2013	unknown
121	19891993		Least Concern	2012	stable
122	19891544		Least Concern	2012	unknown
123	177074		Least Concern	2013	stable
124	177168		Least Concern	2014	stable
125	164219	Canada Spikesedge, Spike Rush	Least Concern	2015	stable
126	177122		Least Concern	2013	stable
127	176968		Least Concern	2013	stable
128	177058		Least Concern	2013	stable
129	177215	Spike Grass	Least Concern	2013	stable
130	177225		Least Concern	2013	unknown
131	177345		Least Concern	2011	stable
132	177051	Pond Lovegrass	Least Concern	2013	stable
133	177216		Least Concern	2013	unknown

134	177113		Least Concern	2013	unknown
135	177246		Least Concern	2013	unknown
136	177032		Least Concern	2013	unknown
137	177154		Least Concern	2013	decreasing
138	176965		Least Concern	2013	stable
139	177108		Least Concern	2013	stable
140	177195	Buttonhead Pipewort	Least Concern	2013	stable
141	176881		Least Concern	2013	stable
142	177121		Least Concern	2013	stable
143	177404		Least Concern	2013	stable
144	177065		Least Concern	2013	unknown
145	177308		Least Concern	2013	stable
146	177322		Least Concern	2013	unknown
147	176882		Least Concern	2013	decreasing
148	176993	Starry Pipewort	Least Concern	2013	unknown
149	177224	Short Pipe-Wort	Least Concern	2013	unknown
150	177387		Least Concern	2013	unknown
151	176994		Least Concern	2013	unknown
152	177263	Spring Grass, Cup Grass	Least Concern	2013	stable
153	19891448	Indian Coral Tree	Least Concern	2012	stable
154	177365		Least Concern	2013	stable
155	176879		Least Concern	2013	stable
156	164037		Least Concern	2013	stable
157	177407		Least Concern	2013	stable
158	177062		Least Concern	2013	stable
159	176964	Harper's Fimbristylis	Least Concern	2013	stable
160	177144	West Indian Fimbry	Least Concern	2013	stable
161	177194		Least Concern	2013	unknown
162	177328		Least Concern	2013	stable

163	177006	Lesser Fimbristylis, Grass-Like Fimbristylis	Least Concern	2014	stable
164	177020		Least Concern	2013	unknown
165	177347		Least Concern	2013	stable
166	176923		Least Concern	2013	stable
167	177363		Least Concern	2013	stable
168	176946		Least Concern	2013	unknown
169	177155	Ditch Fimbry	Least Concern	2013	stable
170	177405		Least Concern	2013	stable
171	19891533		Least Concern	2012	stable
172	176990	Climbing Flower Cup	Least Concern	2011	unknown
173	158207		Least Concern	2013	unknown
174	177082		Least Concern	2013	stable
175	164041		Least Concern	2013	unknown
176	177180		Least Concern	2013	unknown
177	177091	Yefen	Least Concern	2013	stable
178	177026		Least Concern	2013	stable
179	44393450		Least Concern	2013	unknown
180	177295		Least Concern	2013	stable
181	177368		Least Concern	2013	decreasing
182	194940		Least Concern	2013	stable
183	19893018		Least Concern	2012	stable
184	177237	Whip Grass, Jove grass	Least Concern	2013	unknown
185	177264		Least Concern	2013	unknown
186	176888	Willow-Leaved Water Croton	Least Concern	2013	stable
187	168934		Least Concern	2013	unknown
188	176955		Least Concern	2013	unknown
189	177226		Least Concern	2013	unknown
190	177027		Least Concern	2013	unknown
191	177035		Least Concern	2013	unknown

192	19891422	Slender Indigo	Least Concern	2012	stable
193	19892881		Least Concern	2012	stable
194	19892487		Least Concern	2012	stable
195	19892353		Least Concern	2012	stable
196	19379012		Least Concern	2012	stable
197	19891695		Least Concern	2012	stable
198	19892008		Least Concern	2012	stable
199	177329		Least Concern	2013	stable
200	177287		Least Concern	2013	unknown
201	176999		Least Concern	2013	unknown
202	168638	Swamp Millet	Least Concern	2013	increasing
203	177013		Least Concern	2013	stable
204	176936		Least Concern	2013	unknown
205	177174		Least Concern	2013	stable
206	176932		Least Concern	2013	unknown
207	168653		Least Concern	2013	unknown
208	177052		Least Concern	2013	stable
209	176898		Least Concern	2013	unknown
210	177219	White Water Sedge, White Kyllinga, Whitehead Spike Sedge, White-Flowered Kyllinga	Least Concern	2013	stable
211	176501	Caley Pea, Winterpea, Rough Pea, Hairy Vetchling	Least Concern	2012	stable
212	19379058		Least Concern	2012	stable
213	164493	Mucronate Sprangletop	Least Concern	2013	stable
214	19891575		Least Concern	2012	stable
215	199712		Least Concern	2011	unknown
216	177117		Least Concern	2013	unknown
217	176929		Least Concern	2013	unknown
218	176939	Hairy Slitwort	Least Concern	2013	unknown
219	168747		Least Concern	2011	stable

220	176877		Least Concern	2013	unknown
221	177022		Least Concern	2011	unknown
222	177250		Least Concern	2013	unknown
223	177183	False Pimpernel, Round-leaved False Pimpernel	Least Concern	2013	unknown
224	177313		Least Concern	2013	decreasing
225	177056		Least Concern	2011	unknown
226	176963	Tiny Slitwort	Least Concern	2011	stable
227	177209		Least Concern	2013	unknown
228	177039		Least Concern	2013	unknown
229	177243		Least Concern	2013	stable
230	177208		Least Concern	2013	decreasing
231	176901		Least Concern	2013	unknown
232	19891513		Least Concern	2012	stable
233	177204	Seed Box, Linear lLaf Water Primrose	Least Concern	2013	stable
234	177025		Least Concern	2013	stable
235	19891936		Least Concern	2012	stable
236	176956	Kidney Leaf Morning Glory	Least Concern	2013	stable
237	176943	Chickweed Sparrow	Least Concern	2011	unknown
238	19892086		Least Concern	2012	stable
239	19891625		Least Concern	2012	stable
240	19892162		Least Concern	2012	unknown
241	176970		Least Concern	2013	unknown
242	176950		Least Concern	2013	stable
243	177118		Least Concern	2013	unknown
244	177085		Least Concern	2013	unknown
245	168883		Least Concern	2011	unknown
246	194161		Least Concern	2013	unknown
247	177178		Least Concern	2013	unknown
248	176902		Least Concern	2013	increasing

249	164368	Royal Fern	Least Concern	2014	unknown
250	199694		Least Concern	2011	unknown
251	19892645		Least Concern	2012	unknown
252	164447		Least Concern	2012	stable
253	177132	Barefoot Panicgrass	Least Concern	2013	stable
254	19891751		Least Concern	2012	unknown
255	177346		Least Concern	2013	stable
256	168983	Kodo Millet	Least Concern	2013	unknown
257	176949		Least Concern	2013	unknown
258	163977	Water-pepper	Least Concern	2014	stable
259	164411		Least Concern	2013	unknown
260	19891445		Least Concern	2012	stable
261	177280		Least Concern	2013	stable
262	177292		Least Concern	2013	unknown
263	177402		Least Concern	2011	stable
264	177128		Least Concern	2013	increasing
265	176997		Least Concern	2013	unknown
266	177242	Batiki Bluegrass, Indian Murainagrass, Toto Grass	Least Concern	2013	stable
267	168724		Least Concern	2012	stable
268	177137		Least Concern	2013	increasing
269	177048		Least Concern	2013	unknown
270	177164		Least Concern	2013	stable
271	176962		Least Concern	2013	stable
272	176987		Least Concern	2013	stable
273	176906	Queensland Sedge	Least Concern	2013	stable
274	19892691		Least Concern	2012	stable
275	19379374		Least Concern	2012	stable
276	177114		Least Concern	2013	unknown
277	177218		Least Concern	2013	unknown

278	164377		Least Concern	2013	stable
279	177094		Least Concern	2013	stable
280	164356		Least Concern	2014	stable
281	164086	Bog Bulrush	Least Concern	2013	unknown
282	177352		Least Concern	2013	stable
283	177064		Least Concern	2013	stable
284	175224	Sesbania Pea	Least Concern	2013	stable
285	175219		Least Concern	2013	stable
286	175227		Least Concern	2013	stable
287	175220		Least Concern	2013	stable
288	19892187		Least Concern	2012	stable
289	177147		Least Concern	2013	unknown
290	177190	East Indian Globe Thistle	Least Concern	2011	stable
291	19891484		Least Concern	2012	stable
292	19891474		Least Concern	2012	stable
293	19892432		Least Concern	2012	stable
294	175217		Least Concern	2013	decreasing
295	19892795		Least Concern	2012	stable
296	19891465		Least Concern	2012	stable
297	177192		Least Concern	2013	stable
298	164362	Humped Bladderwort	Least Concern	2014	unknown
299	168720		Least Concern	2013	stable
300	177333		Least Concern	2013	decreasing
301	19379811	Bramble Vetch, Fine-leaf Vetch	Least Concern	2012	stable
302	19892280		Least Concern	2012	stable
303	194169		Least Concern	2013	stable
304	44393388		Least Concern	2013	unknown
305	19891683		Data Deficient	2012	unknown
306	19892282		Data Deficient	2012	unknown
307	19891421		Data Deficient	2012	unknown

308	19891822		Data Deficient	2012	unknown
309	69322338	Eared Cyphostemma	Data Deficient	2015	unknown
310	177278		Data Deficient	2013	unknown
311	177379		Data Deficient	2013	unknown
312	19891440		Data Deficient	2012	unknown
313	19892851		Data Deficient	2012	unknown
314	19892314		Data Deficient	2012	unknown
315	177320		Data Deficient	2013	unknown
316	19892502		Data Deficient	2012	unknown

Annexure 5: List of Protected Areas in Maharashtra[279]

List of National Parks				**Other Categories**
No.	Name	Area (km^2)	District	
1	Chandoli NP	317.67	Sangli, Satara, Kolhapur, Ratnagiri	Hotspot
2	Gugamal NP	361.28	Amravati	
3	Nawegaon NP	133.88	Bhandara (Gondia)	Bird Area
4	Pench (Jawaharlal Nehru) NP	257.26	Nagpur	
5	Sanjay Gandhi (Borivilli) NP	86.96	Thane & Mumbai	Hotspot, Bird Area
6	Tadoba NP	116.55	Chandrapur	
List of Wild life Sanctuaries				
1	AmbaBarwa WLS	127.11	Buldhana	
2	Andhari WLS	509.27	Chandrapur	
3	Aner Dam WLS	82.94	Dhule	
4	Bhamragarh WLS	104.38	Gadchiroli	
5	Bhimashankar WLS	130.78	Pune & Thane	Hotspot, Bird Area
6	Bor WLS	61.1	Wardha& Nagpur	
7	Chaprala WLS	134.78	Gadchiroli	
8	Deulgaon-Rehekuri WLS	2.17	Ahmednagar	
9	Dhyanganga WLS	205.23	Buldhana	
10	Gautala-Autramghat WLS	260.61	Aurangabad &Jalgaon	
11	Great Indian Bustard WLS	1222.61	Solapur&Ahmednagar	Bird Area
12	Jaikwadi WLS	341.05	Aurangabad &Ahmednagar	Bird Area
13	KalsubaiHarishchandragad WLS	361.71	Ahmednagar	Hotspot
14	Karnala Fort WLS	4.48	Raigad	Hotspot
15	KaranjaSohal Blackbuck WLS	18.32	Akola	
16	Katepurna WLS	73.63	Akola &Washim	
17	Koyana WLS	423.55	Satara	Hotspot, Bird Area
18	Lonar WLS	1.17	Buldhana	
19	Malvan Marine WLS	29.12	Sindhudurg	
20	Mansingdeo WLS	182.59	Nagpur	
21	MayureswarSupe WLS	5.15	Pune	
22	Melghat WLS	778.75	Amravati	
23	Nagzira WLS	152.81	Gondia, Bhandara	
24	Naigaon Peacock WLS	29.89	Beed	
25	NandurMadhameshwar WLS	100.12	Nashik	Bird Area

[279] ***National Wildlife Database Cell, Wildlife Institute of India, 2005***
http://wiienvis.nic.in/Database/npa_8231.aspx

26	Narnala Bird WLS	12.35	Akola	
27	Nawegaon WLS	122.76	Gondia	Bird Area
28	New Bor WLS	60.7	Nagpur-Wardha	
29	New Nagzira WLS	151.33	Gondia	
30	Painganga WLS	324.62	Yeotmal&Nanded	
31	Phansad WLS	69.79	Raigad	Hotspot
32	Radhanagari WLS	351.16	Kolhapur	Hotspot, Bird Area
33	Sagareshwar WLS	10.87	Sangali	
34	Tansa WLS	304.81	Thane	
35	Thane Creek Flamingo WLS	16.905	Mumbai Suburban	Bird Area
36	Tipeshwar WLS	148.63	Yeotmal	
37	Tungareshwar WLS	85	Thane	
38	Yawal WLS	177.52	Jalgaon	
39	YedsiRamlinGhat WLS	22.38	Aurangabad (Osmanabad)	
40	Umred-Kharngla WLS	189.3	Nagpur &Bhandara	
41	Wan WLS	211	Amravati	
Conservation Reserves				
1	Bhorkada (Bhorgad)	3.49	Nashik	
2	Kolamarka	180.72	Gadchiroli	
Tiger Reserve				
1	Melghat	1500.49	Amravati	Bird Area
2	Tadoba-Andhari	625.82	Chandrapur	
3	Pench	257.26	Nagpur	
4	Sahyadri	600.12	Sangli	
5	Nawegaon-Nagzira	653.674	Gondia, Bhandara	Bird Area
6	Bor	138.12	Wardha Nagpur	
Other Hotspots				
1	AmbavaneKhandala valley			CEPF priority area
2	AmboliSawantwadi			
3	Mahabaleshwar plateau and Hill Complex			CEPF priority area
4	Marleshwar			
5	Matheran			
Other Bird Areas				
1	Burnt Island Vengural Rocks			
2	Gangapur Dam and Grasslands			
3	INS-Shivaji and Lonavala			
4	Mahul-Sewree Creek			
5	Ozar and Adjoining Grassland			

6	Taloda Reserve Forest			
7	Thane Creek			
8	Toranmal Reserve Forest			
Other CEPF priority area				
1	48 I/1/SE - Reserve Forests in Dodamarg			
2	47 F/8/NE -Sinhagad Reserve Forest			
3	Bhimgad Reserve Forest			

Annexure 6: Status of Performance of 3 National Parks and 4 WLS of Maharashtra based on MEE Evaluation

Sr. No.	Name	Strengths	Weakness	MEE %	Rank
1	Sanjay Gandhi (Borivilli) NP	• Threats-systematically identified, assessed and monitored • Human threats to site have been curbed • Comprehensive management plan and well planned restoration plans • Safeguards a large number of threatened species. • Excellent protection strategy • Well integrated into landscape with Tungareshwar Sanctuary in the north and linked with Tansa Sanctuary • Public and NGOs participation and support in management, conservation and eco restoration	• Comprehensive information on threatened species unavailable • Little opportunity for participation of stakeholders in planning process • Insufficient and untimely release of funds for habitat restoration • Lack of trained officers & staff. • Lack of institutionalization of performance link with management objectives • Only flagship species are conserved, leopards have reached optimal capacity	62.10	Good

		• Effective complaint redressal system • Two interpretation centers and a tiger orientation center • Assists conservation of heritage site -Kanheri caves			
2	Nawegaon NP	• Threats-perceived & documented • Conservation being practiced since 1975, locals turned conservationist • Safeguards a large number of threatened species- Sarus Crane, otter, vulture, etc. • Well planned restoration • Public participation in protection and population estimation exercise • Provision for visitors, local guides available • Population of threatened species increasing and others stable	• Lack of systematic documentation, assessment and monitoring of biodiversity • No buffer area, pressure on fringe areas • Law & order problem due to naxal activities • Little opportunity for participation of stakeholders in planning process • Not integrated in wider landscape • Central assistance is not timey for optimal utilization; no provision for vaccination, crime, detection training, boundary demarcation & essential activities; insufficient funds • Inadequate protection, research, monitoring & education • Staff untrained in wildlife mgt. • No disclosure in public domain on PA management related information	53.80	Fair

			• Inadequate reporting on forest cover or population estimates		
3	Chandoli NP	• Threats-systematically identified and assessed • Safeguards a large number of threatened species. • Population of threatened species increasing and others stable • Effective protection strategy • Public and NGOs participation and support in management • Signage's , nature interpretation center for visitors	• Some biotic interference(5 villages and 100 feral cattle) • Revision of management plan due • Inadequate funds for grasslands • Few /habitat restoration programs • Ad hoc reintroduction of March Crocodiles, posing threat to other areas • Lack of trained officers, staff, tourist guides, tourism infrastructure	60.16	Good
4	Bhimashankar WLS	• Threats-systematically identified, assessed and documented • Duly approved management plan • Safeguards a large no. of threatened species. • Effective protection strategy • Status of flagship species, Ratulaindica improved substantially • NGOs support in management (WWF, Kalpavriksh, BNHS and Symbiosis) • Good status and regeneration of biological communities	• Notified but not categorized due to pending declaration • Administrative problems due to spread over 3 forest division and 2 circles. • Increasing pressure for de-notification and diversion for non-wildlife use • Insufficient financial resources available • Sub optimally utilized tourism • Inadequate protection of cultural and heritage values	58.30	Fair
5	Chaprala WLS	• Threats-systematically monitored and assessed	• Extensive Human and biotic interference	54.69	Fair

		• Part of comprehensive Tadoba Management plan • Signage's , nature interpretation center and natural trails for visitors • Population of threatened (Giant Squirrel)and endangered species increasing and other stable	• No mechanism for systematic review and updating mgt. plan • Unsuccessful habitat restoration due to lack of staff • Adhoc, inadequate and untimely fund allocation • Lack of public participation in management.		
6	Great Indian Bustard WLS	• One of the rare habitats for Great Indian Bustards • 40 grass species recorded • Sufficient infrastructure and communication network • Fragmented but effectively managed threats	• Invasion of grasslands by woodlands. • Fragmentation and disturbance due to conflicting land use practices (agricultural lands, village, towns, roads and railway line) • Pressure from adjoining villages leading to Man – animal conflict	47.50	Fair
7	Karnala WLS	• Rich Biodiversity and Mosaic of habitats of diverse varieties of plants & animals • Adequate management infrastructure	• Very small size • Fragmentation and disturbance due to NH17, connecting Mumbai to Goa • Very low tourism	63.33	Good
	Overall mean MEE Score			57.13	Fair-Good

Annexure 7 Overview of Biodiversity relevant state laws and policies in Maharashtra

	List of National Policy, Acts& rules	List of Maharashtra State Acts & Rules
Biodiversity Related	National Biodiversity Act National Biodiversity Act Rules Biological Diversity Rules,2004 National Biodiversity Action Plan (NBAP	• Maharashtra Biological Diversity Rules, 2008 •
Wildlife	Indian Wild life (Protection) Act 1972 amended 1993 National Zoo Policy The National Wildlife Action Plan (2002-16) Guidelines for National Lake Conservation Plan	Maharashtra Wildlife protection Rules 2014
Forest & Schedule Tribes Related	National Forest Policy Forest Conservation Act 1980 amended 1988 Forest Rights Act,2006 Joint Forest Management (Forest Policy, 1988)	• Maharashtra Forest policy • Draft Bamboo Policy • Joint Forest Management (Forest Policy, 1988) • Maharashtra Village Forest Rules 2014 • Maharashtra Private Forest Acquisition Rules,2014 • Forest Right Rules 2007 • The Maharashtra supply of Forest Produce by Govt. Revision of Agreement Rules 1983 • The Maharashtra Forest Protection of Forests from Fire Rules 1982 • Grazing Rules for the Maharashtra State 03.11.1973 Mah. Felling of Trees Regulation Amendment Rules 2005. • Mah. Felling of Trees Regulation Rules 1967 (Revised) • Mah. Land Revenue Disposal of govt. trees etc. Rules 1969 • Mah. Land Revenue Reg. of cutting supply etc. Rules 1970 • Mah. Land Revenue Reg. of Right to trees etc. Rules 1967 • Mah. M.F.P. Regulation of trade in Apta leaves Rules 1971 • Mah. M.F.P. Regulation of Trade in Tendu leaves Rules 1969

		• The Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Rules, 2007 • Government Resolution for Western Ghat Eco-sensitive Area • Maharashtra Sale of trees by Occupants belonging to scheduled Tribe • The Maharashtra Forest Produce Regulation and Trade Act 1969 • The Maharashtra Protected Forests Marathwada or Konkan or Western Maharashtra Rules 1998
Environment Protection Related	National Environment Policy, 2006 The Environment (Protection) Act, 1986, amended 1991 The Environment (Protection) Rules, 1986	•
Other Biodiversity Relevant	National Conservation Strategy and Policy Statement on Environment and Development	• Export import Rules
Programs	National forestry Action Program (NFAP)	• Compensatory Afforestation Fund Management and Planning Authority (CAMPA) • Project Tiger

Chapter 9

Taking Steps towards Mainstreaming Biodiversity in Sustainable Development Discourse in Maharashtra

1. Need for Biodiversity Mainstreaming

The concept and the need for mainstreaming biodiversity has taken various forms based on the context of the discourse.

The concept of mainstreaming was included in article 6(b) of the Convention on Biological Diversity[280], which called on the Parties to the Convention to "integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programs and policies".

The need to mainstream biodiversity could stem from one or more of the following:

(i) Country experiences on scanty importance and support biodiversity conservation received on its own;

(ii) Stakeholder perceptions that biodiversity conservation goals are distinct from development goals;

(iii) The political economy challenges in different countries currently at and following different development and growth paths – where a particularly sticky issue is addressing subsidies with harmful effects on biodiversity and ecosystems; and strengthening support for conservation, restoration activities and promotion biodiversity promoting policies.

(iv) Mainstreaming is seen as an important tool for changing the value structures of key stakeholders.

Some of these have been articulated in different formal international forums as below:

a. "The most important lesson of the last ten years is that the objectives of the Convention [on Biological Diversity] will be impossible to meet until consideration of biodiversity is fully integrated into other sectors. The need to mainstream the conservation and sustainable use of biological resources across all sectors of the national economy, the society and the policy-making framework is a complex challenge at the heart of the Convention"[281].

b. Yet another view on need for mainstreaming biodiversity stems from a theoretical perspective in a world where awareness among stakeholders about the significance of

[280]Article 6 (b): Integrate biodiversity into relevant sectoral and cross-sectoral plans, programmes and policies https://www.cbd.int/doc/nbsap/nbsapcbw-global-01/nbsap-nairobi-scbd-mainstreaming.pdf

[281] The Hague Ministerial Declaration from the Conference of the Parties (COP 6) to the Convention on Biological Diversity, 2002

biodiversity remains absent /poor (due to intangible nature of its benefits and the inter-generational aspects of benefits) to expect any demand side or supply side interventions for conservation and sustainable use of biodiversity from ministries other than those in charge of environment and forests would be a wishful thinking except in some small pockets where costs of not doing so are very high and immediate.

c. "With more than 80% of the earth's surface never likely to be managed within legally designated protected areas (PAs), biodiversity conservation interventions across all landscapes and seascapes are vital. Mainstreaming addresses this need".[282]

d. Another view from a political economy perspective is that Mainstreaming biodiversity was developed as a means of addressing the fact that biodiversity conservation goals are viewed as distinct from, and sometimes even contradictory to, the goals of development and economic growth. The higher priority put on development means that biodiversity work does not receive the political, social and financial support it needs to succeed (UNDP and UNEP, 2008).

e. Mainstreaming is not a controlled experiment, but rather a social experiment in changing the value structures of institutions and individuals – with vital consequences for the natural world and the humans who rely on it. While mainstreaming may not prove amenable to rigorous testing, it does however deserve more systematic inquiry.[283]

2. What is Biodiversity Mainstreaming?

"The systematic integration of biodiversity in development processes is called 'biodiversity mainstreaming'. The overall goal of biodiversity mainstreaming is to have biodiversity principles included at every stage of the policies, plans, programmes and project cycles, regardless whether international organisations, businesses or governments lead the process" (CBD 2010 in Kosmus et al. 2012).

The word "mainstreaming" has been used synonymously with "inclusion and embedding." Mainstreaming means integrating or including actions and embedding considerations into policies, strategies and practices:

(a) Of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably used both locally and globally related to conservation and sustainable use of biodiversity

(b) Relating to production sectors, such as agriculture, fisheries, forestry, tourism and mining. Mainstreaming might also refer to including biodiversity considerations in poverty reduction plans and national sustainable development plans.

[282] Mainstreaming Biodiversity In Practice : A STAP Advisory Document http://www.stapgef.org/sites/default/files/stap/wp-content/uploads/2014/04/Mainstreaming-Biodiversity-LowRes.pdf

[283] Mainstreaming Biodiversity In Practice : A STAP Advisory Document

Mainstreaming biodiversity can take place and/or can be pursued in different settings and scales e.g., ecosystem[284], landscape[285]; at various level of governance such as local, national or global levels. It can also focus on development policy, legislation, resource use planning, finance, taxation, economic incentives, international trade, capacity building, research, and technology. In addition, it can focus on commodity chains and certification of major natural resources. Finally, mainstreaming can be pursued by a wide range of actors: NGOs, industries, governments, communities (Petersen and Huntley, 2005).

However, national strategies have not been fully effective in addressing the main drivers of biodiversity loss and only a few countries have used their plans as a means of mainstreaming biodiversity.

The CBD-mandated National Biodiversity Strategies and Action Plans (NBSAPs) are the major national level instrument for delivering biodiversity mainstreaming (CBD and UNEP, 2008). Countries have been revising their NBSAPs to include a greater focus on mainstreaming by 2014 (Prip and Gross, 2010; UNEP, 2012). Roe and Mapendembe (2013) provide a review (state of the knowledge) for mainstreaming biodiversity and development into efforts such as National Biodiversity Strategies and Action Plans.

To truly integrate environment/biodiversity and development objectives is a long-term process of institutional change that proceeds on many tracks. These tracks include education and awareness, piloting, public administration reform, political debate, and both civic and private entrepreneurship – as well as improved planning. There is no single fast track to mainstreaming, although improving the planning process is a core need[286].

Table 1: Some examples of national approaches and strategies towards mainstreaming biodiversity in practice

S No.	Country	Mainstreaming approach	Mainstreaming strategy	National/sub-national level	Reference
1	Brazil		REDD	National level program	Desk, 2014
2	UNDP	drylands			UNDP, 2014
3	Australia	Ecosystem services		National level plan	Pittock et al. (2012)
4	South Africa	land-use planning & decision making processes across a range of sectors		National level	Cadman et al., 2010

[284] The primary framework for the CBD is the "ecosystem approach", targeted at such areas, in which there is "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" (CBD, 2014a).

[285] The landscape approach is being heavily promoted as a means of addressing food insecurity, climate change, poverty and water scarcity (GLF Committee, 2013), which creates the opportunity to further expand the reach of biodiversity mainstreaming.

[286] Aongola L et.al. (2009), Creating and protecting Zambia's Wealth, IIED, UK.

5	Uganda	Across a range of government sectors			Keizire and Mugyenyi, 2006
6	UK		National Ecosystem Assessment		UK NEA, 2014
7	UK	a program to mainstream biodiversity into European Union policies			JNCC, 2014
8	GEF	Mainstreaming interventions	Ecosystem services		
9.	Philippines	Mainstreaming interventions	Small interventions		Antonio et al., 2012
10.	Zambia[287]	Mainstreaming interventions	Among other, integration in development plans; regional planning; and environmental units in sector institutions	National level review to assess how far the twin endeavours of environment and development have become linked over the years in Zambia.	Aongola et al., 2009
11.	Viet Nam	Mainstreaming interventions	Integrating pro-poor and pro-environment attributes in decisions and institutions	National level review to assess the outcomes of interventions	Bass et al., 2010[288]

3. What Constraints Biodiversity Mainstreaming in Practice

In any serious discussion, in this context, lack of political will and the public good nature of biodiversity will top the list of constrains in the way of mainstreaming biodiversity conservation in development planning.

However, if this question is rephrased to say what constraints our preparedness for implementation of biodiversity mainstreaming, some practical challenges are:

(i) Mainstreaming is a complex, costly process that takes a long time – decades or even a generation – to achieve impact at scale and across sectors. Transaction costs can be

[287] Experience and next steps in environmental mainstreaming, IIED, 2009.
[288] Paper resulting from the Viet Nam Environmental Mainstreaming 'Lessons Learned Review' of March 2009 organized by IIED in association with the Viet Nam/UNDP Poverty Environment Programme

high, and in some cases greater investment in design, monitoring, evaluation and publication of results will be needed[289].

(ii) Strong and detailed science-based biophysical and socio-economic data and knowledge at appropriate spatial scales have underpinned successful mainstreaming interventions. Investment in such foundational knowledge is essential to program success, but such data and knowledge collection should be policy relevant to achieve cost-effective impact[290].

(iii) Good governance and strong institutions are key determinants of project success or failure. A balance needs to be struck between working in countries and sectors where there is sufficiently strong governance capacity for mainstreaming outcomes to have a good chance of success, and tackling the most pressing mainstreaming challenges in situations where globally valuable biodiversity is threatened but capacity is often lacking[291].

4. Mainstreaming to achieve what?

- Mainstreaming characteristics and considerations reported in the literature include: integration/ internalization/inclusion of biodiversity goals in development models, policies and programs; and modifying human behaviour to increase sustainability.

Mainstreaming or "integrating" biodiversity into development process, would often involve changing the focus of development policies and interventions towards the values of biodiversity so as to achieve positive biodiversity and development outcomes. There is little information in the literature on what has been learned from mainstreaming practice, based on testable and replicable evidence. In view of the practical challenges in mainstreaming biodiversity (see Section 3 above) a more practical option would be to work through a few cross sectoral and/or composite schemes.

- In cross sectoral policies like poverty reduction, employment generation or composite schemes for sustainable development, and livelihood etc. which invariably have environmental and biodiversity conservation/enhancement elements or components better coordination between relevant departments has the potential to improve biodiversity focus thereby improving biodiversity outcomes of government expenditure. The efforts towards improvement in departmental coordination resulting in better dividends from implementation of programs and schemes would also constitute steps towards integration of biodiversity.

In what follows we identify and work around some simple and practical steps in implementing cross sectoral policies in Maharashtra with a view to improve the biodiversity outcomes of the identified programs and policies.

[289] Understanding Synergies and Mainstreaming among the Biodiversity Related Conventions, UNEP, 2016.
[290] UNEP 2016.
[291] UNEP, 2016.

5. What will this involve?

If we had a program like Biodiversity Conservation Mission we could look for convergence with other biodiversity relevant schemes. In the absence of such a program we will need to identify entry points in cross sectoral policies. As mentioned earlier as a first step, our entry point would be planning and implementation of programs/schemes and the target would be higher Governance, behavioural, and expenditure efficiency outcomes. In other words focus will be on the role of communication, co-operation, education and awareness etc. Specific interventions will depend upon the scheme/program at hand.

In the case of a scheme like MGNREGS this will involve improving coordination between relevant state departments and central ministries; as well as among the relevant state departments and among the central ministries. Whereas in a scheme like Jal Yukt Shivar of the government of Maharashtra this will involve improving coordination among the relevant state departments and other institutions. For different schemes relevant institutions and other agents will be different.

In so far as the identification of the elements of BD to be mainstreamed is concerned, in a program like MGNREGS, if the focus is plantation activity, the relevant biodiversity elements would be identifying species, post plantation care strategy, any technical information for improving survival rate, etc. In a scheme like Jal Yukt Shivar, relevant biodiversity elements would be incentives and awareness for water conservation, and appropriate technology for improving water productivity etc.

6. Present Efforts of Convergence under MGNREGS: For illustration of the process

This Scheme came into effect with the adoption of the MGNREG Act of 2005. A Centrally Sponsored Scheme, MGNREGS aims to provide 100 days of guaranteed waged employment to an adult who is willing to do unskilled manual work.

Schedule I of the MGNREG Act, 2005[292] lists in *order of priority* the works that can be carried out under the scheme:

1. Water Conservation and Water Harvesting
2. Drought Proofing (Afforestation and Tree Plantation)
3. Irrigation Canals including micro and minor irrigation works
4. Provision of irrigation facility to households belonging to SC/ST/LR/IAY
5. Renovation of traditional water bodies including desilting of tanks
6. Land development
7. Flood control and protection works including drainage in water logged areas
8. Rural connectivity to provide all weather access
9. Any other work which may be notified by the central government in consultation with the state government

[292] National Rural Employment Guarantee Act, 2005: Gazette of India, dated 7th September, 2005. Accessed on 15th February, 2017

A number of components of the scheme are biodiversity promoting. Given our focus on Maharashtra, the following are the works approved by the State Council of Maharashtra to be undertaken under MGNREGS. Of these works at serial number 10-17 are potentially biodiversity promoting works.

1. Anganwadi and other Rural Infrastructure
2. Bharat Nirman Rajeev Gandhi Sewa Kendra
3. Food Grains
4. Land Development
5. Play Ground
6. Rural Sanitation
7. Rural Connectivity
8. Rural Drinking Water
9. Other works
10. Coastal Areas
11. Drought Proofing
12. Fisheries
13. Flood Control and Protection
14. Micro Irrigation Works
15. Renovation of Traditional Water Bodies
16. Water Conservation and Water Harvesting
17. Provision of irrigation facility to households belonging to SC/ST/LR/IAY

MGNREGS has three broad headings for expenditure[293]:

a. Labour Cost (Wages): Borne by the Central Government 100%

b. Administrative Cost: Borne by Central Government for the Central Employment Guarantee Council + any other administrative costs determined by the Central Government; State Government for the State Employment Guarantee Council

c. Materials Cost: 75% by the Central Government & 25% by the State Government

As can be seen from the list of works, there is a significant emphasis on promoting works that fall within the ambit of Natural Resource Management during FY 2014-2017[294] (Table 2).

Table 2: Expenditure in MGNREGS in Maharashtra

Rs. In crore	**2014-15**		**2015-16**		**2016-17**	
Components	**Labour Exp.**	**Material Exp.**	**Labour Exp.**	**Material Exp.**	**Labour Exp.**	**Material Exp.**
Flood Control	23.39	4.11	40.96	3.54	45.46	3.91
Rural Connectivity	339.15	194.96	329.44	142.70	196.80	159.88
Water Conservation And Water Harvesting	176.55	86.48	285.16	78.87	205.58	58.62

[293] Chapter II, Report to the People 2016

[294] In a status meeting held in 2016, it was reported that across the country of the total number of works sanctioned under NREGS, over 1,20,000 works fell in the ambit of Natural Resource Management.

Renovation of Traditional Water Bodies	35.34	5.37	60.95	7.13	50.82	4.33
Drought Proofing	248.59	36.20	210.16	23.59	72.39	14.14
Irrigation Canals	5.29	1.23	12.19	2.97	6.59	1.97
Irrigation Facilities To SC/ST/IAY/LR	124.65	101.86	288.69	169.35	278.15	133.37
Land development	44.41	1.92	62.32	1.56	58.97	1.87
Other works	6.00	10.12	4.03	4.58	1.34	5.27
Rajiv Gandhi Seva Kendra	1.76	7.70	1.31	2.15	0.24	3.01
Coastal Areas	0.00	0.00	0.00	0.00	0.00	0.00
Rural Drinking Water	0.71	0.64	3.22	1.04	4.99	1.46
Fisheries	0.24	0.69	0.48	0.05	0.11	0.01
Rural Sanitation	32.73	22.46	6.53	5.12	5.86	8.23
Total	**1038.81**	**473.73**	**1305.44**	**442.65**	**927.29**	**396.08**

Source:

The Parliamentary Standing Committee on Rural Development, examined the implementation of NREGA across India in 2012-13. The Standing Committee report highlights the need for convergence under MGNREGA[295].

In 2010-11, the Department of Rural Development undertook a mapping exercise of 200 odd schemes (Central and State) and found that governments invest nearly Rs. 8,00,000 cr. in the field of Rural Development each year. The failure to produce commensurate results is attributed to, among others, little or no coordination at the Ministry, State, Department, and District level leading to duplication of efforts.

To address this, the Department of Rural Development put forth a two pronged convergence strategy:

a) To explore areas of convergence within the Ministry/Department

b) To explore areas of convergence among other Ministries and State Level Departments

The Department has identified the following flagship schemes/programs that can be converged with MGNREGS:

- Integrated Watershed Management (IWMP) and other Watershed Programs
- Rashtriya Krishi Vikas Yojana (RKVY)
- National Horticulture Mission (NHM)
- Scheme of Artificial Recharge of Groundwater using Dug wells and BRGF

In 2009, the Central Ministry of Rural Development formulated and disseminated convergence guidelines with different schemes and programs in particular those belonging to the MoEF&CC, MoWR ICAR, MoA, and Department of Fisheries etc. Learnings based on good practices from the pilot projects on convergence, have been documented by the Ministry.

[295] A comparison of the list of works under MGNREGS, and the schemes identified in Chapter 2 of this report, show many instances of overlapping objectives and duplication of efforts.

A website http://nrega.nic.in/netnrega/convergence/conindex.aspx has been set up to manage all information regarding the process of convergence. However, this website has limited public access. It has been reported that some Districts in West Bengal have success stories of convergence of schemes with a specific focus on natural resource management and ecological restoration.

Maharashtra has submitted a State Convergence Plan (SCP) to the Ministry of Rural Development in 2014.

Table 3: Abstract of State Convergence Plan – Maharashtra for FY 2014-15 (Rs. In Cr.)

S No	Details	Statistics
1	Number of Convergence Partner Ministries/Departments	10
2	Contribution from MGNREGS	307.84
3	Contribution from Line Department	1130.17
4	Total Project Cost	1438.01
5	% Contribution from Line Department	78.59

Source: Convergence under MGNREGA

6.1 How Convergence works:

From the mapping exercise undertaken by the Ministries, areas/schemes with overlap have been identified. The department which has a scheme with components/works similar or complimentary to MGNREGS are transferred to MGNREGS, and the remaining components of the scheme are completed under that scheme itself. The decision to transfer the specific components is made after due consideration of the Objective; Funding; Subsidy; Unit Cost; Norms; Area Coverage; Institutional Framework etc. This entire process is to be coordinated by the District Planning Committee, District Collector and the CEO of the Zilla Parishad[296].

For example, works pertaining to Rainfed Area are covered under IWMP (MoRD); RKYV and NHM (MoA); RRR and Dug Well Recharge (MoWR). These works are also permitted under MGNREGS but only on land belonging to SC/ST/BPL/SF/MF/Beneficiary of Land Reform and IAY. Therefore, all works on individual lands are carried out by the respective ministry/department, whereas MGNREGS implements the scheme for above mentioned target group[297].

A Roadmap for Inter-Departmental Convergence of MGNREGS with Other Schemes of Maharashtra for 2014-15 has been put up at the MGNREGS website. http://nrega.nic.in/netnrega/writereaddata/Circulars/Maharashtra_convergence_july14.pdf

Ministry of Rural Development is reportedly reviewing targets and performance of convergence under MGNREGA on a monthly basis with the Principal Secretary, Department of Rural Development, Government of Maharashtra. From communications available in the public domain[298] for the months of March and April 2016, works under the NRM category of MGNREGA constituted a total of 28% and 27% respectively, and expenditures constituted 31% and 34% of the total. In both communications, the MoRD has requested the Chief

[296] Annexure III in particular of the MGNREGS field manual is helpful in determining the objectives and overlaps.
[297] Annexures II and IV of the MGNREGS Field Manual show a sample exercise in identifying works/activities that can be undertaken through convergence.
[298] Communication from MoRd to Principal Secretary, Department of Rural Development, Government of Maharashtra dated 01.04.2016 and 06.05.2016

Secretary to scale up quantum of works under this category and to ensure full convergence of MGNREGA with the Pradhan Mantri Krishi Sinchayee Yojana.

6.2 Role of NBA and MSBB in preparation of SCP in Maharashtra

At present there does not seem to be a formal involvement of the NBA and MSBB as an important stakeholder in this exercise of preparing SCP. Lack of demand for the expert input from these institutions and at the same time lack of pro-active instance from these institutions in preparation of SCP to the extent it cuts across biodiversity relevant schemes and programs is somewhat puzzling.

To understand this we undertake an exploratory analysis of the main provisions pertaining to the roles and responsibilities of different institutions under NBA 2002, and MBDR 2008. Institutional arrangement and finance links under NBA 2002 and MBDR 2008 are presented in Diagram 1 and a snap shot of the main provisions on roles and responsibilities of various institutions is presented in Table 4. Key observations are presented in Section 6.3.

Diagram 1: Biodiversity Conservation: Institutional Arrangement and Finance Links

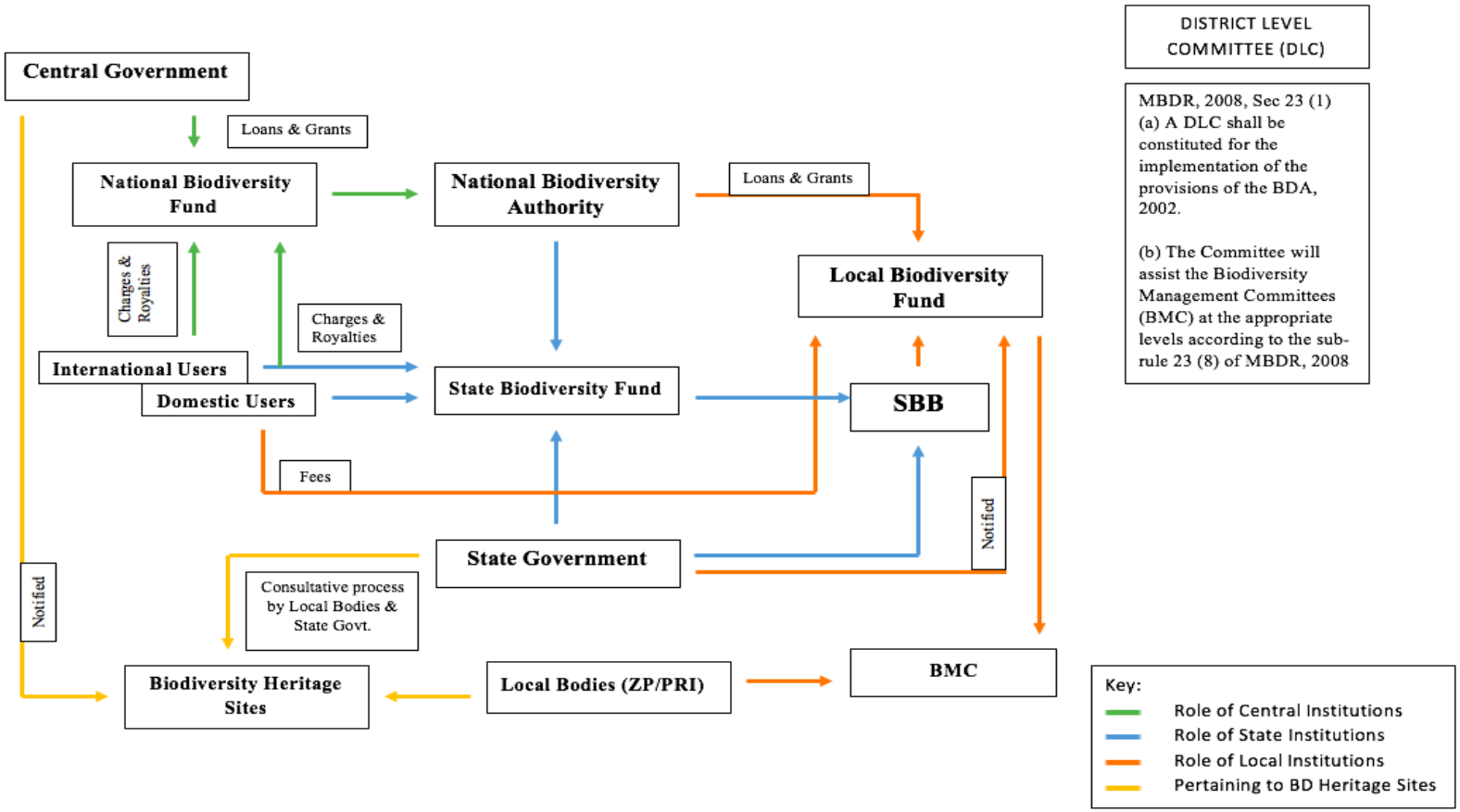

Table 4: Constitutionally Mandated Roles and Responsibilities of Indian Biodiversity Finance Institutions

Constitutionally Mandated Roles and Responsibilities of Indian Biodiversity Finance Institutions				
Institutions	**National Biodiversity Authority (NBA)**	**State Biodiversity Board (SBB)**	**District Level Committee (DLC)**	**Biodiversity Management Committee (BMC)**
Established By	Biological Diversity Act, 2002: Section 8	Biological Diversity Act, 2002: Section 22	Maharashtra Biological Diversity Rules, 2008: Section 23	- Biological Diversity Act, 2002: Section 41 - Biological Diversity Rules, 2004: Section 22 - Maharashtra Biological Diversity Rules, 2008: Section 23 (2)
Jurisdiction	- Whole of India - All Union Territories	Respective State	Respective District	Jurisdiction of Local Body
Composition	**BDA, 2002: Sec 8 (4)** - Chairperson - 3 ex officio members: 2 from MOEFCC (1 ADGF/DGF); 1 from Tribal Affairs	**BDA, 2002: Sec 22 (4)** - Chairperson - Maximum of 5 ex officio members	**MBDR, 2008 Sec 23 (1)** - Chairman: Collector - Members: CEO, ZP; Dist. Health Officer; President, AHADF, ZP; President of Local District NGO; Microbiologist; Chemist and Druggist Association; Ayurvedic Association; Ornithologist; Dist. Head Fisheries Dept; Rep, Zoo Advisory Board; Expert Water/Irrigation Dept; Dy Director, Social Forestry; Dist. Superintendent Agriculture Officer;	**MBDR, 2008 Sec 23 (1)** - Chairperson: Elected from amongst members of the BMC - Members: 7 local persons to nominated by the local body

	- 7 ex officio members: Agriculture Research & Education; Biotechnology; Ocean Development; Agriculture & Cooperation; Indian Systems of Medicine & Homoeopathy; Science & Technology; Science & Industrial Research	- Maximum of 5 experts	- Nodal Officer: DCF	- Nominated Members: Local Body can nominate 6 ***special invitees*** to the BMC from Forest, Agri, Livestock, Health, Fisheries and Education Dept
	- 5 non-official members: specialists & experts	**MBDR, 2008** - Sec 3: Chairperson - Sec 9: Maximum of 5 Ex-officio Members Secretary, Agriculture; Secretary, Tribal Development; PCCF; VC State Agriculture University; Member Secretary, MSBB; Secretary, Animal Husbandry; Secretary, Fisheries		- Local MLA & MP to be ***special invitees*** to the BMC
Functions	**BDA, 2002**	**BDA, 2002**	**MBDR, 2008, Sec 23 (1)**	**BDA, 2002, Sec 41**

				- Every Local Body shall constitute a BMC within its area for the purpose of promoting conservation, sustainable use and *documentation of biological diversity* including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.
	- Sec 3: Restricts certain persons not to undertake Biodiversity related activities without approval of the NBA	- Sec 23: (a) Advise State Govt subject to guidelines issued by the Central Govt.; (b) Regulate granting of approvals/requests for commercial utilization or bio-survey or bio-utilization of resources by **Indians**.	The Committee shall assist the Biodiversity Management Committees at the appropriate levels according to the sub 23 (8) of the rules	- The BMC may levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purposes from areas falling within its territorial jurisdiction.
	- Sec 4: Restricts transfer of research results to certain persons without approval of the NBA	**MBDR, 2008, Sec 14**		**BDR, 2004, Sec 22**
	- Sec 6: Regulates applications for Intellectual Property Rights on Indian Biodiversity			- The main function of the BMC is to prepare People's Biodiversity Register in consultation with local people. The Register shall contain comprehensive information on availability and knowledge of local biological resources, their medicinal or any other use or any

				other traditional knowledge associated with them.
	- Sec 18: (a) Advise Central Govt. on matters relating to the conservation of biodiversity, sustainable use and equitable sharing; (b) Advise State Govts. in the selection of Biodiversity Heritage Sites	- Provide Technical Assistance and guidance to the departments of the State Govt. - Formulate and implement SBAP		**MBDR, 2008, Sec 23** - The BMCs shall facilitate preparation of People's Biodiversity Register.
		- Commission studies and sponsor research		- The Committee shall also maintain a register giving information about the details of the access to biological resources and traditional knowledge granted, details of the collection fee imposed and details of the benefits derived and the mode of their sharing.

		- Collect compile and publish technical and statistical data manuals codes etc relating to biodiversity		
Funded Through	National Biodiversity Fund	State Biodiversity Fund	It is unclear whether the DLC is independently funded, or the work of the DLC is in addition to the existing responsibilities of member officials	Local Biodiversity Fund
Operating Authority	Chairperson of the National Biodiversity Authority	Chairperson and Member Secretary of the State Biodiversity Authority		Biodiversity Management Committee
Sources of Finance	**BDA, 2002, Sec 27** - Any grants and loans made to the NBA under Sec 26 - All charges and royalties received by the NBA under this Act - All sums received by the NBA from such other sources as may be decided upon by the Central Government. **BDR, 2004, Sec 21**	**BDA, 2002, Sec 32** - Any grants and loans to the SBB under Sec 31 - Any grants and loans made by the NBA - All sums received by the SBB from such other sources as decided upon by the State Government **MBDR, 2008, Sec 20**		**BDA, 2002, Sec 43** - Any grants and loans made under Sec 42 - Any grants and loans made by the NBA - Any grants and loans made by the SBB - Fees referred to in subsection (3) of Sec 41 received by the BMC

	- The National Biodiversity Fund shall have two separate heads of accounts, one relating to the receipts from the Central Government and the other concerning the fee, license fee, royalty and other receipts of the Authority.	- The Fund shall have two separate heads of accounts, relating to the receipts (grants and loans) from the Central Government / NBA / State Government, including, receipts from such other sources as decided by the Board, and, other concerning the Fee, License Fee, Royalty and other receipts of the Board.		- All sums received by the LBF from such other sources as may be decided upon by the State Government
				MBDR, 2008, Sec 24 - A LBF shall be constituted for each BMC. The Board shall provide to the local body any loans or grant received by it from the State Govt. Central Govt. or from the Authority for the purpose of the Act. The Local Body can also access such funds from other sources as it identifies, or as specified by the Board.

6.3 Some Observations

BDR 2004 and MBDR, 2008 provides for MSBB, DLCs and BMCs. While these institutions have been formed in Maharashtra and these are functional, though at varying level of efficiency. There appears disconnect among the institutions. For instance, one of the functions of the MSBB is to provide technical assistance and guidance to the departments of the State Government. A formal structure and arrangement of how MSBB will fulfil this responsibility is not clear. Whether MSBB will proactively liaison with relevant departments including the planning department or it will provide advice as and when sought from MSBB. In case MSBB wants to proactively discharge its function 'to Provide Technical Assistance and guidance to the departments of the State Government' what would be the forum to facilitate this. Moreover, technical guidance and assistance is equally required by departments at the district level. Therefore, it is important that the MSBB should have connect not only with the state level departments but also with district level departments/institutions.

At present, MSBB seem to lack connect with District Level Committees (DLCs) at a formal level. A provision for cross membership will provide a platform for exchange of information and knowledge which is important for efficient functioning of these institutions.

The DLCs, established by the MBDR, 2008, is an institution envisioned to advice and provide support to BMCs. Maharashtra has nearly completed the process of establishing BMCs in the State and the work on preparation of PBRs is in progress. However, preparation of PBRs is only one of the mandates of the BMCs. The BMCs will need to be trained and strengthened to take on the responsibility for the conservation of biodiversity, sustainable use of its components and ensuring equitable access and benefit sharing from resources as envisioned in BDA, 2002 (Sec 41(1)).

6.4 General observations and suggestions: NBAP

a. The NBAP, in India, proposes 13 strategies and 175 action points. The NBAP has been perceived more as an initiative focussing on preserving biodiversity from the impacts of development[299] rather than an initiative to promote the biodiversity as a positive foundation for development. This is because, NBAP is yet to launch itself as a mission and at the same time become a part of the mainstream planning process at different levels of governance. *NBAP has to have a focal point in central ministry of finance and for that it has to have a clear connect with national development strategy.*

b. NBAP has no provision for a multi-sector, multi-disciplinary assessment and planning process – drawing on government-wide consultation. Also, NBAP lacks a strategy on public and political engagement. There is no direction on improving coordination amongst central ministries, parastatals and NGOs, private business, local authorities, civil society (apart from environmental NGOs) and communities (views of local people in terms of their dependences and deprivations).

[299] EIA also provides such safeguards in development planning.

c. NBAP has no strategy to develop evidence on the importance of investment in environmental management in economic terms. It has made a scientific and, to some extent, a political case, but not in the terms that are required to develop a credible Finance Plan – e.g. what income can businesses, governments and poor groups make from investment in forests, soils, water, etc., and at what cost. This makes it difficult to attract mainstream government or private investment.

Attachment 1: Some pictures of consultation meetings during the project cycle

National Stakeholder Consultation on Biodiversity Finance Initiative (14th January, 2016)

National Stakeholder Consultation on Biodiversity Finance Initiative (15th January, 2016)

Stakeholder Meeting with Mangrove Cell, Mumbai (6th May, 2016)

Stakeholder Meeting with District Administration, Ratnagiri

(6th June, 2016)

Meeting with global BIOFIN Team (July, 2016)

Stakeholder Meeting at the office of Directorate of Agriculture, Pune (August, 2016)

Attachment 2: List of Stakeholders consulted during the project cycle

S. No.	Name	Designation	Organization
	New Delhi – 14th December, 2015		
1	SG Dastidar	Controller of Aid Accounts and Audits	Aid Accounts and Audit Division, Department of Economic Affairs, Ministry of Finance
2	Neelkanthan R.	Deputy Controller of Aid Accounts and Audits	Aid Accounts and Audit Division, Department of Economic Affairs, Ministry of Finance
3	JP Singh	Deputy Controller of Aid Accounts and Audits	Aid Accounts and Audit Division, Department of Economic Affairs, Ministry of Finance
	New Delhi – 15th - 16th January, 2016		
4	Shri Amitabh Gautam	Joint Secretary	Ministry of Agriculture & Farmer Welfare-Department of Agriculture & Cooperation
5	Dr. Shomita Biswas	CEO	Ministry of Ayush
6	Shri R. Bandopadhyay	(IAS-R) Former Secretary	Ministry of Corporate Affairs
7	Shri Anurag Kumar	Curator	Ministry of Culture(National Council of Science Museum)
8	Shri V.S. Goel	Consultant	Ministry of Culture
9	Shri K.Venkatarama Sharma	Scientist-E	Ministry of Earth Sciences
10	Shri Prashant Nikam	Director DM/MHA	Ministry of Home Affairs
11	Shri N.P. Toppo		Ministry of Panchayati Raj
12	Dr. Shahid Ali Khan	Chief (ENV) NHPC	Ministry of Power
13	Dr. Akhilesh Gupta	Head CCP	Ministry of Science and Technology-Department of Science & Technology
14	Dr. Nisha Mediratta	Director	Ministry of Science and Technology-Department of Science & Technology
15	Shri Krishna Kumar	DDG	Ministry of Statistics and Programme Implementation
16	Rakesh Murya	Director	Ministry of Statistics and Programme Implementation
17	Shri Uttam Kumar Kar		Ministry of Tribal Affairs
18	Shri S.V. Singh	Director	Ministry of Urban Development
19	ShriSathish Kumar	Sr. Tech. officer	Ministry of Urban Development

20	Shri S.K. Mohiddin	Scientist	Ministry of Water Resources, River Development and Ganga Rejuvenation
21	Shri Arijit Ganguly	Young Professional	Ministry of Water Resources, River Development and Ganga Rejuvenation
22	Shri S.L. Meena	Dy. Secretary	Ministry of Youth Affairs and Sports
23	Dr. Paramjeet Singh	Director	Botanical Survey of India
24	Dr. D.Saha	Scientist In-charge Biodiversity	Central Arid Zone Research Institute
25	Shri K.Vinod	Principal Scientist	Central Marine Fisheries Research Institute
26	Shri O.P.Dhawan		CSIR-Central Institute of Medicinal and Aromatic Plants
27	Dr. H.B.Vasistha	Head (Ecology and Environment Division)	Forest Research Institute
28	Dr. MridulaNegi	Scientist D	Forest Research Institute
29	Mr. Mukul Trivedi	Joint Director	Forest Survey of India
30	Dr. D.H. Upadhayay	Director	ICRISAT - Liaison Office
31	Dr. K.V. Prabhu	Director (Research)	Indian Agricultural Research Institute
32	Shri S.K.Dhyani		Indian Council of Agricultural Research
33	Dr. VandanaTyagi		National Bureau of Plant Genetic Resources
34	Dr. Rajiv	Scientist G	Indian Council of Forest Research Education
35	Dr. Sarnam Singh	Dean, IIRS	Indian Institute of Remote Sensing
36	Dr S. K. Peshin	Head, EMPI, IMD	Indian Metrological Department
37	Dr. Senthil Kumar Sampath	Asst. Professor	Indira Gandhi National Forest Academy
38	Dr. R. P. Singh		ISRO, Ahmedabad
39	Dr. M. Rajendra prasad	Scientist	Jawaharlal Nehru Tropical Botanic Garden And Research Institute
40	Shri A.K. Nigam	PCCF & HOFF	Maharashtra Forest Department
41	Dr. Vilas Bardekar	Chairman	Maharashtra State Biodiversity Board
42	Dr. D.K.Upreti	Chief Scientist	National Botanical Research Institute
43	Dr. Sushil K. Sharma		National Bureau of Agriculturally Important Microorganisms
44	Dr. Jaya H. Surya	Principal Scientist	National Bureau of Soil Survey and Land Use Planning
45	Dr. R.K. Fagodiya	Principal Scientist	National Bureau of Soil Survey and Land Use Planning

46	Dr K.Venkatraman	Senior Scientist	National Centre for Sustainable Coastal Management
47	Shri R. Kirubagaran	Scientist G	National Institute of Ocean Technology
48	Dr. N.Ramaiah	Chief Scientist	National Institute of Oceanography
49	Dr. C. S. Jha	Scientist	National Remote Sensing Agency
50	Smt. Pratima Gupta	Director	Niti Aayog
51	Dr. Rakesh Shah	Chairman	Uttarakhand State Biodiversity Board
52	Dr. Kailash Chandra	Director	Zoological Survey of India
53	Ms. Monika Srivastava	Manager	ACC Cement
54	Shri Sandeep Srivastava	Head, Environment & Sustainability	Ambuja Cement
55	Dr. S Badari Narayan	Head Biodiversity	Dabur Research & Development Centre, Dabur India Ltd.
56	Dr. N.J. Singh	Wholetime Director-EHS	DCM Shriram Ltd.
57	Ms. Tejashri Joshi	DGM- Environment & Sustainability	Godrej Construction
58	Shri Dinesh Kaundal	Manager, Sustainability Cell	IL&FS
59	Shri Sunil Pandey	Section Head	ITC LIMITED
60	Vijay Vardhan	Operation Manager	ITC LIMITED
61	Shri S. Majumdar	Chief Sustainability Officer	JSW Group
62	Shri Amit Aggrawal	Director	Natural Remedies
63	Shri Kamal Meattle	Chief Executive Officer	Paharpur Business Centre
64	Dr. Hishmi Jamil Husain	Environment Superitendent	Rio Tinto
65	Shri Pankaj Satija	GM	Tata Steel Ltd.
66	Dr. Vinita H. Apte	President	Terre Policy Centre
67	Shri Mitesh Pandya		Vedanta Resources
68	Shri Himanshu Shekhar	Assistant Vice President	YES Bank
69	Shri Nitin Singh		YES Bank
70	Ms. Priti Sinha		YES Bank
71	Dr. Suresh Babu	Director CUES	Ambedkar University
72	Dr. P. Pushpangadan	DG Amity University	Amity University, Noida (Amity Institute of Biotechnology)
73	Dr. K. Kathiresan	Director	Annamalai University

74	Dr. Ganesan Balachander	Director	Ashoka Trust for Research in Ecology and the Environment (ATREE)
75	Dr. Vitthal Kauthale	Programme Executive (Research)	BAIF Development Research Foundation Kamdahnu
76	Dr. D.T. Gokak	Chief Manager (R & D)	Bharat Petroleum
77	Sudha Tyagi	BPCL Corporated R&D Senior Manager	Bharat Petroleum
78	Dr. Erach Bharucha	Director BVIEER Pune	Bharati Vidyapeeth
79	Ms. Neha Sinha	Advocacy and Policy Officer	Bombay Natural History Society
80	Dr. Ravi Khetarpal	Regional Advisor	Commonwealth Agricultural Bureau International South Asia
81	Shri Pravir Deshmukh	Counsellor	Confederation of Indian Industry (CII)
82	Dr. Karthik Shankar	Chairperson	Dakshin foundaton
83	Shri Anukul S. Bhamra	Deputy Manager	Development Alternatives
84	Shri Himangana Gupta	Deputy Manager (Env. Magt.)	Development Alternatives
85	Dr. Gautam Vohra	Chairperson	Development Research and Action Group
86	Dr. Pranab J. Patar		Earth Watch Institute
87	Ms. Priyanka Dhingra	Consultant Environment	Federation of Indian Chambers of Commerce and Industry (FICCI)
88	Ms. Rita Roy Choudhary	Sr. Director & Head Environment, CC & Water	Federation of Indian Chambers of Commerce and Industry (FICCI)
89	Shri Dushyant Kumar	Deputy General Manager (HSE)	Gas Authority of India Ltd.GAIL
90	Arvind Kumar Namdeo	Deputy General Manager (HSE)	Gas Authority of India Ltd.GAIL
91	Dr. Aditi Haldar	Director GRI South Asia	Global Reporting Initiative (GRI)
92	Dr. Rita Singh	Professor USEN	Guru Gobind Singh Indraprastha University
93	Dr. R.M. Dongarial	Head Regional Office	Hindustan Petroleum Corporation Ltd
94	Ms. Rajni Mehta;	DGM- Sustainability	Hindustan Petroleum Corporation Ltd

95	Dr. Yogesh Dubey	Associate Professor	Indian Institute of Forest Management
96	Dr. K.M.S. Palni	Professor & Dean	Indian National Science Academy
97	Dr. Manu Bhatnagar	Principal Director, Natural Heritage Division	Indian National Trust For Art And Cultural Heritage (INTACH)
98	Shri Khetiho Yeptho	AGM Solar	Indian Renewable Energy Development Agency Limited (IREDA)
99	Ms. Ruchika Drall	Ass. Envir. Officer	Indian Renewable Energy Development Agency Limited (IREDA)
100	Dr. Ranjit Tigga	HOD, Dept. of Tribal Studies	Indian Social Institute
101	Dr Archana Chatterjee	Program Officer	IUCN
102	Dr. T.N.C. Vidya	Assistant Professor	Jawaharlal Nehru Centre for Advanced Scientific Research
103	Shri M.S. Sudarshan	DGM Environment	Mangalore Refineries & Petrochemicals Ltd.
104	Shri Jogendra Chopra	DGM (Tech)	National Fertilizers Ltd.
105	Dr. Alind Rastogi	CEO & ED (Environment)	National Thermal Power Corporation Limited (NTPC)
106	Dr. A.J.T. Johnsingh	Director	Nature Conservation Foundation
107	Shri Sanjeev Kakar	Chief Engineer (Mechanical)	Oil and Natural Gas Corporation Limited (ONGC)
108	Shri J. Lahiri	Chief Manager (Eng & HSB)	Oil India Ltd.
109	Dr. R.K. Srivastav	Additional General Manager	Power Grid Corporation of India
110	Ms. Nayantara Jain	Executive Director	Reefwatch India
111	Dr. Meenakshi Dhote	Head Dept. of Env. Planning	School of Planning & Architecture: Dept of Environment & Planning
112	Shri W. Vivek Babu	Additional GM (Forestry)	Singareni Collieries Company Ltd.
113	Shri Pramod Tyagi	Executive Director	Society For Promotion of Wastelands Development (SPWD)
114	Shri Prabhat Kumar	DGM	Steel Authority of India Ltd. SAIL
115	Shri Sunil Singhal	DGM	Steel Authority of India Ltd. SAIL
116	Katja Pole	Volunteer	Vatavaran
117	Shri Raghav	Volunteer	Vatavaran
118	Dr. Rahul Kaul	Sr. Director	Wildlife Trust of India

119	Dr. Vishesh Uppal	Director- Sustainable Livelihoods & Governance	WWF-India
120	Prof A. Damodaran	Professor	Indian Institute of Management-Bangalore
121	Dr. Ulganathan Sankar	Professor	Madras School of Economics
122	Shri R. Bandopadhyay	(IAS-R) Former Secretary	Ministry of Corporate Affairs
123	Shri Hem Pande	Special Secretary	Ministry of Environment, Forest & Climate Change
124	Shri Ashok Lavasa	Secretary	Ministry of Environment, Forest & Climate Change
125	Dr. Jagdish Kishwan	Former ADG Wildlife	Ministry of Environment, Forest & Climate Change
126	Shri R.S. Rana	Chairman Member	National Biodiversity Authority
127	Dr. Amarjeet Ahuja	Chairman on Medicinal Plants in NBA	National Biodiversity Authority
128	Mr. S.S.C. Parthiban	GGM-Chief CSR	Oil and Natural Gas Corporation Limited (ONGC)
129	Dr. Shankar Venkateswaran	Chief	Tata Sustainability Group
130	Dr. Anupam Joshi	Environment Specialist	The World Bank
131	Ms. Marina Walters	Deputy Country Director	United Nations Development Programme (UNDP)
	New Delhi – 20th January, 2016		
132	G. Areendran	Director	ENVIS Centre on NGOs and Parliament, WWF - India
133	Rajeev Kumar	Senior Program Officer	ENVIS Centre on NGOs and Parliament, WWF - India
	New Delhi – 17th March, 2016		
134	Dr. Vishesh Uppal	Director	Sustainable Livelihoods & Governance, WWF - India
	New Delhi – 4th April, 2016		
135	SK Mathur	Joint Controller General of Accounts	Public Finance Management System, Department of Expenditure, Ministry of Finance
136	Parul Gupta	Additional Controller General of Accounts	Public Finance Management System, Department of Expenditure, Ministry of Finance
	Mumbai – 4th - 6th May, 2016		

137	Mr. Madan		Department of Agriculture & Marketing, Government of Maharashtra
138	P.M. Tatke		Department of Higher Education, Government of Maharashtra
139	R.J. Jadhav	Joint Commissioner	Department of Urban Development, Government of Maharashtra
140			Department of Water Resources, Government of Maharashtra
141			Department of Water Conservation, Government of Maharashtra
142			Department of Rural Development & Panchayati Raj, Government of Maharashtra
143	Ms. Mohini Sankar	Additional Chief Secretary	Department of Environment, Government of Maharashtra
144	Mr. S.S. Kshatriya,	Chief Secretary	Government of Maharashtra
145	Mr. Sudhir Srivastav	Additional Chief Secretary, Finance	Government of Maharashtra
146	Mr. V Patil	Deputy Secretary	Government of Maharashtra
147	Mr. Ashok N Bhosle	Joint Secretary Budget	Government of Maharashtra
148	Tanaji Patil	ACF	Mangrove Cell, Department of Forests, Government of Maharashtra
149	Bhaskar J Paul	Programme Officer	GIZ-Mangrove Cell, Department of Forests, Government of Maharashtra
150	Dr. Veerendra Vir Singh	Principle Scientist & Scientist in Charge	ICAR-CMFRI, Mumbai
151	Madhukar B. Gaikwad	Commissioner, Fisheries	Department of Fisheries, Government of Maharashtra
152	V.V. Naik	Joint Commissioner of Fisheries (Marine)	Department of Fisheries, Government of Maharashtra
153	Dr. Mohan Jha	APCCF (Wildlife - West)	Department of Forests, Government of Maharashtra
154	Sanjivan Chavan	Officer - Social Forestry	Department of Forests, Government of Maharashtra
155	M.M. Kulkarni	CCF (Wildlife)	Wildlife, Department of Forests, Government of Maharashtra
156	Anish Andheria	President	Wildlife Conservation Trust
	Ratnagiri – 6th – 7th June, 2016		
157	Sarang Kodalkar	Resident Commissioner	District Administration, Ratnagiri
158	SJ Malap	Planning Officer	District Administration, Ratnagiri

159		Commissioner - Fisheries	District Administration, Ratnagiri
160	Pradeep P.	District Magistrate	District Administration, Ratnagiri
161	Lakshminarayan Mishra	Chief Executive Officer	Zilla Parishad, Ratnagiri
162	Mohan Upadhyay	Programme Officer	GIZ-Mangrove Cell, Department of Forests, Government of Maharashtra
163	Arif Shah	District Superintending Agriculture Officer	District Administration, Ratnagiri
164	VD Sawant	Assistant Director - Social Forestry	District Administration, Ratnagiri
165	PN Deshmukh	Agriculture Development Officer	Zila Parishad, Ratnagiri
166	Sanjay Godbole	Officer	Ratnagiri Municipal Council
167	Nutan Sawant	Deputy COO - Sanitation	District Administration, Ratnagiri
	Nagpur & Chandrapur - June, 2016		
168	Dr. Dilip Singh	APCCF & Member Secretary	Maharashtra State Biodiversity Board
169	Dr. Arun V Sapre	Member Secretary	Maharashtra State Biodiversity Board
170	Mr. Vivek Yennarwar	Pharmaceutical Expert	
171	Dr. Vinay Sinha, IFS	APCCF (Conservation)	
172	Mr. Sanjay P. Thakre	Chief Conservator of Forest	Department of Forests, Government of Maharashtra
173	VM Markandey	Deputy Commissioner - Employment Guarantee	District Administration, Chandrapur
174	Praful Poreddiwar	ADPO	District Planning Committee, Chandrapur