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Abstract

Biodiversity and Ecosystem (BE) conservation finance in India, is highly fragmented. Multiple institutions are involved in directing finance often with overlapping functions. This has adversely impacted BE conservation efforts and outcomes in India. While a couple of studies have attempted to map the flow of funds towards biodiversity and ecosystem (BE) conservation, there is no comprehensive estimate of total public funding, including budgetary flows, in India. The paper not only fills this gap by presenting a methodology for mapping and estimation of fund flows for BE expenditure through budgetary and other public sources but also estimates fund flows from externally aided projects and corporate sector. Using a modified Rio-marker methodology and budgetary data on actual expenditure it estimates expenditure on BE for a period of 7 years (2009-10 to 2015-16) thereby contributing to both theoretical and empirical literature on the subject. The study estimates that states in India, on an average spend between 1.93 and 3.19 percent of their total expenditure towards BE conservation. Paper finds that owing to the fact that BE conservation in India is driven by programs of multiple institutions rather than National Biodiversity Targets; there is no mechanism for measuring either conservation expenditures or outcomes. The paper makes suggestions to address this policy gap.

Keywords: Biodiversity and ecosystem financing, Ecosystem Services, government expenditure, sub-national government, Biodiversity mainstreaming

JEL Classification: Q5

1. Introduction

Biological diversity exists at different levels, such as at the level of ecosystems, species and genes. The role played by biodiversity in key ecosystem services such as agricultural food production, regulation of soil productive potential, crop pollination, and human disease regulation have been intensively studied in recent years to show that biodiversity plays a specific role in the existence and long-term maintenance of ecosystem functions, which are keys to the provision of ecosystem services (Balvanera et al, 2016). Several studies and meta-analyses have furthered knowledge on the role of biodiversity in ecosystem functioning and the supply of ecosystem services (Balvanera et al., 2006; Luck et al., 2009; Bastian, 2013). Despite being vital for the survival of the planet, biodiversity and ecosystems (BE) are being increasingly threatened globally on account of various factors including human activities. The problem is further aggravated by undervaluation of biodiversity and ecosystem services by the markets, lack of understanding about the interconnectedness of different economic sectors with and their interdependence on BE and about the co-benefits of investments in its conservation.

Recognizing biological diversity to be essential for sustainable development and human well-being, the Convention on Biological Diversity (CBD), adopted at the 1992 Earth Summit in Rio de Janeiro is the first global agreement aimed at controlling and reversing the loss in biodiversity and degradation in ecosystems through emphasis on 5 strategic Goals (Table 3). It is a comprehensive agreement which addresses all aspects relating to biodiversity and the existence and long-term maintenance of ecosystem functions, which is vital to the provision of ecosystem services.¹

India, a mega diverse country with only 2.4 percent of world's land area, harbors 7-8 percent of all recorded species, including over 47,000 species of plants and 96,000 species of animals. Of the 34 global biodiversity hotspots, four are present in India. However, country's BE face a variety of threats ranging from land-use changes in natural habitats to overexploitation of natural resources, proliferation of invasive species, pollution and climate change. For India, conservation of BE is crucial also because it is directly linked with providing livelihoods and improving socio-economic conditions of millions of its inhabitants, thereby contributing to sustainable development and poverty alleviation. As part of its obligations as signatory to the CBD, Government of India enacted the Biological Diversity Act in 2002 and has prepared a National Biodiversity Action Plan (NBAP) in 2008 to bring the BE agenda in alignment with the National Environment Policy of 2006.

The economic cost of biodiversity loss and ecosystem degradation has been estimated to be between USD 2-4.5 trillion (3.3-3.75% of global GDP).² It is estimated that globally around USD 52 billion is being spent on biodiversity annually (Parker et al, 2012) against an estimated annual financing need ranging between USD 150-440 billion.³ Available evidence and decisions adopted by Parties to the CBD indicate that the current levels of investment are inadequate to achieve the 20 Aichi Targets defined in the Strategic Plan for Biodiversity 2011-20. Financing the gap between resource requirement and resources actually spent towards Aichi Targets is a major challenge faced by countries across the world. As a conservative estimate, India is spending approximately USD 2

¹ Convention on Biological Diversity (<https://www.cbd.int/>)

² The Economics of Ecosystems and Biodiversity (TEEB), Cost of Policy Inaction Report, 2008

³ High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011-2020 (2012) - (HLP, 2012)

billion annually towards biodiversity conservation, but requires between USD 15-45 billion per year to sustain its efforts.⁴

BE encompasses multiple activities involving diverse sectors and several cross cutting issues. Hence, responsibility for maintaining and conserving BE is confined not only to the Central Government, the role of sub-national states is equally important. BE finance in India is highly fragmented with no systematic mapping of different sources of funds flow leave aside a reliable estimate of resources being spent on conservation of BE.

It is in this context that the present paper seeks to map and quantify expenditures towards BE conservation in India. The paper bridges this important gap in empirical literature, and contributes to theoretical literature on the subject by developing a methodology for estimating BE expenditures in India. The proposed methodology has been applied to estimate BE relevant expenditure (direct expenditures and grants) from budgetary and other sources, externally aided projects (EAP) and corporate social responsibility (CSR) mandate. This methodology can be applied for quantifying BE expenditure in other countries as well.

The rest of the paper is organised as follows: Section 2 discusses the global experiences on estimating/quantifying BE relevant expenditures. Section 3 presents the approach and methodology adopted for mapping and quantifying BE relevant expenditures in India. Results and analysis pertaining to budgetary expenditure is presented in section 4. Mapping and quantification of BE relevant expenditure from funds received through external sources and CSR is presented in Sections 5 and 6 respectively. Section 7 provides all-India estimate of expenditure on BE conservation and Section 8 concludes by providing policy suggestions.

2. Literature Review

The decisions adopted by the Parties to the CBD indicate significant gaps in getting finance for biodiversity management. A preliminary assessment conducted by the HLP (2012) estimated that the global investment required for implementing the 20 Aichi Biodiversity Targets by 2020 would be between USD 150 and 440 billion annually. These estimates were derived through a simple addition of resource requirements identified for each of the 20 targets. However, the estimates need to be treated with caution. There are not many quantitative assessments that been made at the national or regional level of the resources needed to deliver CBD Targets.

At the national level, a recent study for Ecuador estimated the resource requirement for each of the Aichi targets to be around USD 4.6 billion (USD 669.8 million annually over 7 years; Albán et al, 2013). At the regional level, tens of billions of USD would be needed to meet biodiversity targets in the European Union (Secretariat of the CBD, 2014). The CBD HLP felt that it was important to piece together several fragmented evidence of costs of particular types of biodiversity action and different spatial scales in order to get an assessment of the total resource requirement. For example the cost of establishing and maintaining protected areas (Aichi target 11) are estimated to be around USD 38 billion annually; similarly addressing the problem of deforestation (Aichi target 5) through REDD+ would require funds ranging between USD 22-38 billion annually during 2010-2015 (Informal Working Group on Interim Finance for REDD, 2009); and USD 17-33 billion per year for halving global emissions from the forest sector by 2030 (Eliasch, 2008). Similarly, there is evidence of

⁴ <https://www.biodiversityfinance.net/news-and-media/india-joins-biofin-looking-financing-options-reverse-biodiversity-loss>

resource requirement for other targets. Variation in definitions and methodologies made this complex job even more challenging.

Nevertheless, the second report of the CBD-HLP (2014) highlighted that the estimates at the global, regional and national levels all point to a substantial gap between the investments needed for Implementing the Strategic Plan for Biodiversity 2011-2020 and the resources currently allocated. The report underscored need to increase investments substantially to bridge the financing gap. These findings are based on a range of studies assessing the funds required and current allocations (see studies by Parker et al. 2012; McCarthy et al. 2012; Gutman and Davidson 2008). Other reports too corroborated the findings of CBD-HLP (2014) (Cao et al. 2009 for United Kingdom; FOEN, 2010 for Switzerland; Casey et al. 2008 for North America; Frazee et al. 2003 for Africa).

Despite available evidence indicating that the scale of benefits to the economy and society at local, regional and national levels of conserving BE would far outweigh the resource requirement (Balmford et al. 2002; CBD High-Level Panel, 2014; Pascal, 2011), there exists considerable gap between the resources allocated towards BE conservation and those needed.

For India assessment of funds for 12 National Biodiversity Targets (NBTs) was done for the first time by the Ministry of Environment and Forest (MoEF) for 2010-11. The total expenditure was estimated at Rs.11,077.13 crore (USD 1.46 billion⁵). This included funding from Government of India and core (schemes/programs of departments of environment having direct and immediate impact on BE) funding by State Governments (MoEF, 2012). Using similar methodology, an assessment of expenditure for BE conservation was carried out for 2013-14 during the reporting of India's Fifth National Report to the CBD in 2014. The overall funding for BE conservation in India for 2013-14 was estimated at Rs.9,204.45 crore (USD 1.21 billion)⁶ (MoEF, 2014; Onial, 2018). A recent study by Ansari et al (2018) focusing only on government of India's expenditures puts the estimate at Rs.20,031.51 crore (USD 2.64 billion) annually during 2012-13 to 2016-17. It needs to be mentioned that India is a federal country and any estimate which does not consider the expenditure by sub-national states will be a gross underestimate of the expenditure for BE conservation through budgetary provisions.

Bhattacharya and Bhattacharya (2019) provide estimates of government expenditure at the sub-national level for the state of Punjab in India. The study uses data from Annual Financial Statement to assess the state's budgetary expenditures and estimates that Rs.124 crore (USD 16.32 million) has been spent by Punjab government in activities related to BE conservation. This study however has several limitations: (i) BE primarily form part of the concurrent list of Constitution, both the central and state governments share responsibilities for its conservation. Analysis based on appropriation account of the state for the period before 2014-15 will not fully capture the central funds spent in the state; (ii) Study does not consider local government funds from own sources thus underestimating the expenditure; (iii) EAP and CSR form a significant part of BE expenditure which is missing from analysis; and finally (iv) Does not differentiate expenditure by type of conservation activities or NBTs.

The methodology and data used in the present study not only address the limitations of the above study but also uses a modified Rio-Marker methodology which makes the paper lend itself to comparison with other similar national and sub-national studies. Yet another feature of the paper which makes it distinct from other studies is its analysis of BE expenditure disaggregated into the

⁵ We assume an exchange rate of USD 1 = Rs.76 in the paper.

⁶ The exercise included expanded datasets based on peripheral funding related to 77 schemes of 23 Ministries and Departments of Government of India in addition to direct-core and non-core funding by MoEF and core funding by State governments.

taxonomy (strategic goals) of BE conservation which allows analysis of the attention to and progress on NBTs. The paper thus contributes to the literature by way of methodological improvement, use of detailed and accurate budgetary data, and analysis of results by strategic goals of CBD and India's NBTs. Besides, to our knowledge it is the only paper for India and any other CBD country that provides estimates of BE expenditure for the funds received under EAP and from corporate sector's CSR mandate.

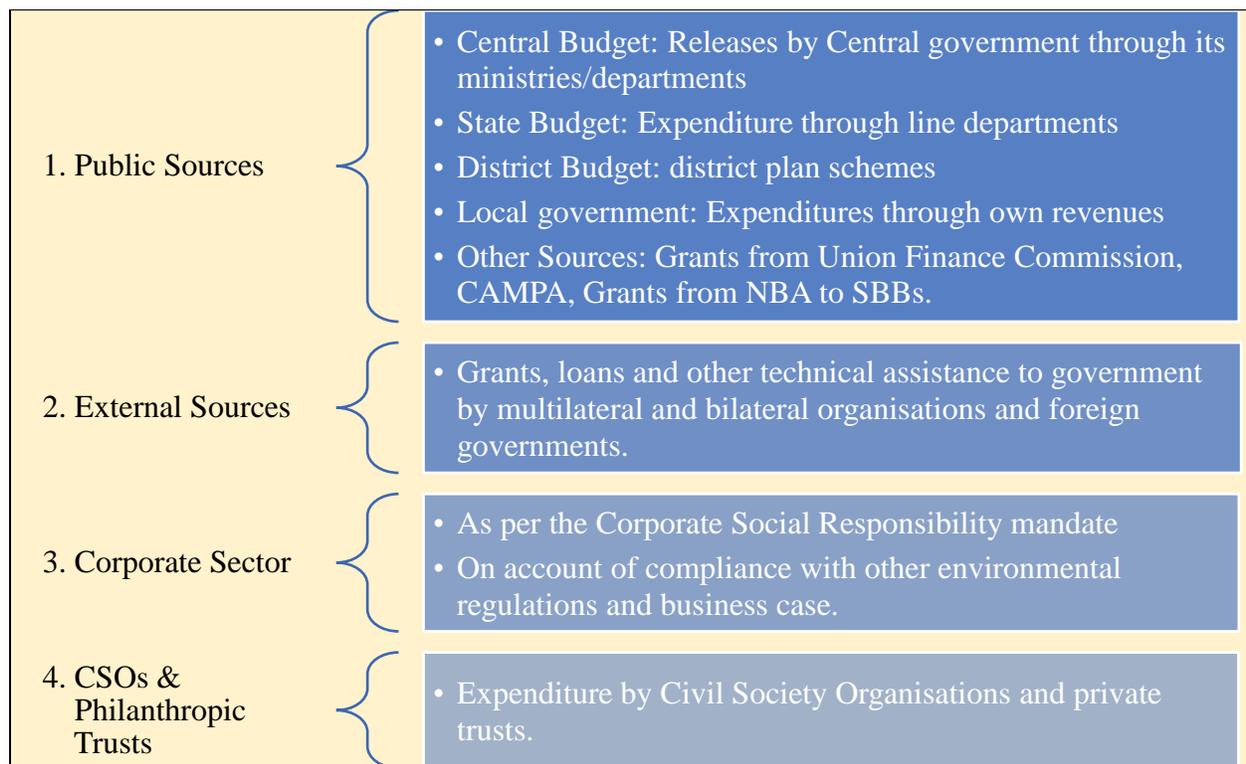
3. Approach, Methodology and Data

The broad approach adopted in the paper is inspired by the BIOFIN workbooks (UNDP, 2014, 2018). For basic concepts, definitions and scope of BE conservation, management, restoration, and protection we have followed the CBD decisions and technical documents⁷ and the NBAP of India.

3.1 Sources of Funds

The sources of funds for BE conservation considered are presented in Figure 1.

Figure 1: Sources of Funds for BE Expenditure in India



⁷ <https://www.cbd.int/convention/text/>

3.2 Scope and Approach:

This paper maps and estimates BE expenditure from public sources (central flows, state schemes, district schemes, and local government expenditure through own-revenues) for the state of Maharashtra⁸ for a 7 year period 2009-10 to 2015-16 in India. These estimates are used to derive estimates of BE expenditure for all states in India. To this estimate we have added all India estimates of BE expenditure from EAP, CSR, and other grants from public institutions to obtain all India estimate of funds flows towards conservation of BE.

3.3 Collation of Data

3.3.1 Central Government Funds to States

Central fund flows to sub-national states in India are in the form of Centrally Sponsored Schemes, Central Sector Schemes, Normal Central Assistance, Additional Central Assistance, and Special Central Assistance on the plan side and non-plan grants from various central ministries. While some of these schemes are fully funded by the Central Government, others are co-funded by state governments. Moreover the state government's share is not uniform across schemes.⁹

We reviewed the guidelines of each of these schemes and identified those that had activities/components directly or indirectly relevant for BE conservation. Since scheme-wise expenditure data for the identified central schemes for Maharashtra was not readily available, we used data on central releases to Maharashtra (only Central Government's share) for each of the identified schemes as a proxy for expenditure.¹⁰ This data was collected from Ministry of Finance, Government of India for the period 2009-10 to 2015-16. Data on State's share under these schemes was obtained from respective line departments of Government of Maharashtra.¹¹

3.3.2 State Government Funds

Maharashtra government also has a number of schemes funded entirely from its Consolidated Fund. List of these schemes was taken from the Annual Plan Document and Budget documents of Government of Maharashtra. Scheme specific guidelines were used to identify schemes that had activities/components directly or indirectly relevant for biodiversity conservation. Actual expenditure under each of the identified scheme was compiled from the budget documents of Maharashtra for the period 2009-10 to 2015-16.

⁸ Maharashtra is a large and a truly representative state as it has large coastal area, natural forests and houses various biodiversity and ecosystems unique to India. Besides it was as one of the pilot states of the BIOFIN India study.

⁹ In 2015-16, central schemes to states were restructured. This restructuring involved reducing the number of schemes, changing their sharing pattern etc. For details see Chakraborty and Gupta (2016).

¹⁰ It is assumed that funds once released by Central Government will be spent by the State. If the state does not spend these funds, releases of subsequent installments will be stopped. Thus we have used releases as a proxy for expenditures.

¹¹ Respective line departments verified the data on scheme-wise releases of Central government's share to Maharashtra.

3.3.3 District Level Funds

District Development Plan, prepared by consolidating the development plans of local bodies (rural and urban) in the district, is financed by resources from the District Plan in the State, various schemes/programs of Central Government and State schemes funds meant for the districts.

Two districts were selected - Ratnagiri and Chandrapur. For the selected districts, District Planning Department provided details of District Plan schemes operational in their respective districts.¹² BE relevant schemes were identified in consultation with district officials and scheme specific guidelines. Data on expenditure under these schemes for 2009-10 to 2015-16 was collected from published sources and in-person meetings with the concerned district officials.

While selecting Central, State and District Schemes utmost care was taken to avoid double counting of expenditure. For example, if a Central/State scheme is operational in the district we have not considered it in the district expenditure. Similarly, state's share in central schemes is not considered as part of state government's expenditure.

3.3.4 Funds from Other Sources

- i. **Grants from Union Finance Commission¹³:** Recognizing the special role of forest wealth, the Twelfth FC was the first FC to provide a grant of Rs.1000 crore, spread over its award period 2005-10, to states for maintaining forest cover. The forest grant was distributed across states in accordance with their forest share in the country (Finance Commission, 2004). The Thirteenth FC enhanced the quantum of its forest grant to Rs.5000 crore for its award period 2010-15 (Finance Commission, 2009). The Fourteenth FC incentivized the states for maintaining forest cover by including forest cover as one of the criteria for determining states' share in divisible tax pool for its award period 2015-20 (Finance Commission, 2014). Data on forest grants released to Maharashtra during 2009-10 to 2014-15 was provided by Ministry of Finance, Government of India. Since Fourteenth FC did not recommend any forest grant, there were no releases in 2015-16.
- ii. **CAMPA Funds:** The Forest (Conservation) Act, 1980 requires that when forest land is diverted for non-forest use, the user agency must undertake compensatory afforestation¹⁴ on non-forest land equal to the size of the forest being diverted. 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.

These receipts service a fund which is maintained and managed by the Compensatory Afforestation Fund Management and Planning Authority (CAMPA). There was until recently in

¹² Only those schemes which were financed entirely by the District plan were considered.

¹³ Finance Commission (FC) is a constitutional body set up by the President of India (under Article 280 of the Constitution) every five years. Its primary task is determining the sharing of centrally collected tax revenues between the Union and state governments, and distribution of grants-in-aid of revenues across states. The Fifteenth FC which is currently at work will cover the period 2020-26.

¹⁴ User agencies, which are often private parties, are not expected to undertake afforestation work themselves. This work has to be done by state governments, but the entire expenditure on creating this 'new forest' including purchase of land for the purpose has to be borne by the user agency.

place, an ad hoc CAMPA¹⁵ which had been authorized by the Supreme Court in July 2009 to release Rs.1000 crore annually to states in proportion to the jurisdictional collections. Data on funds released to Maharashtra during 2009-10 to 2015-16 was taken from the CAMPA website.¹⁶

- iii. **Grants from National Biodiversity Authority (NBA):** Maharashtra State Biodiversity Board (MSSB), established in January 2012 receives grants from NBA to carry out its mandate. While data on these grants were obtained from MSBB's annual reports, discussions with the Board's officials helped in tracking funds spent on biodiversity related activities.

3.3.5 Externally Aided Projects (EAP)

Government of India receives external assistance by way of loans and grants through bilateral and multilateral agreements for program/projects implemented directly by the Central or State Government or for non-government organizations where the government acts as a guarantor. Such projects are known as EAP.

Mapping of fund flows for biodiversity conservation through external assistance would require project/program/activity-wise data. This information was collected from the Aid Accounts and Audit Division of Department of Economic Affairs, Ministry of Finance, Government of India. Projects/activities which had BE relevant components were identified and data in respect of utilization of funds under each of the identified projects/activities during a financial year were compiled for the period 2009-10 to 2015-16.

3.3.6 Corporate sector

The Companies Act 2013, along with Companies (Corporate Social Responsibility Policy) Rules, 2014 mandate companies meeting certain threshold¹⁷ to spend at least 2 percent of their average net profit for the immediately preceding three financial years on CSR activities. Environmental sustainability, biodiversity conservation is among the various activities on which these funds can be spent as per Schedule VII of the Act.

Since CSR data is reported theme-wise (renewable energy, environmental sustainability, health, education etc.) whereas we needed activity-wise expenditure data to be able to identify the BE relevant activities. In the absence of any other study or data source we conducted a survey of 97 Central Public Sector Enterprises (CPSEs), incorporated under the Companies Act. The survey involved collecting relevant information through a detailed questionnaire and several follow-ups through in-person interaction with senior officials and examination of sustainability reports, annual reports, and CSR reports of these companies. The BE expenditure data so obtained was used to extrapolate CSR expenditure on BE conservation for 38000 companies (Pandey et al, 2020).

¹⁵ The Compensatory Afforestation Fund (CAF) Bill was passed by the Parliament in August 2016 and associated Rules were notified on 10 August 2018. States are now free to use the remaining accumulated funds lying with the ad hoc CAMPA. The Union Government on 29 August 2019 released Rs.47,436 crores of CAMPA funds to states.

¹⁶ <http://egreenwatch.nic.in/>

¹⁷ Companies with market cap of more than Rs. 5 billion or turnover of Rs. 10 billion or net profit of Rs. 50 million or more are mandated to spend at least 2 percent of their average net profit for the immediately preceding three financial years on CSR activities.

3.4 Methodology

Having identified BE relevant schemes/activities we next determine BE relevant expenditure under each of the schemes/activities which are composite schemes with multiple objectives. This involves:

- a) Defining the scope of BE-related activities. While the definition and scope of biological diversity used here is as provided by the CBD, the scope of BE related activities is inspired by the NBAP of India, BIOFIN Workbook, and the existing literature on classification of activities.
- b) The impact of identified schemes on BE conservation is not uniform. While some schemes have a direct bearing on BE, others may indirectly impact it. In terms of impact, when the primary purpose of a scheme/activity is BE conservation we have classified it as 'Direct'; but when BE conservation is a significant but not the primary objective, the scheme/activity has been categorized as 'Indirect'. Framework developed by us for classification of schemes in terms of their impact, linkages of these schemes with CBD goals, Aichi targets and NBTs is presented in table 1.¹⁸ Activities/schemes categorized as 'Indirect' have been further classified into (i) Indirect-high, (ii) Indirect-medium and (iii) Indirect-low, reflecting varied levels of impact on conservation of BE.

Table 1: Framework for classification of schemes and their linkages with CBD Goals and NBTs

	Strategic Goal-A	Strategic Goal-B	Strategic Goal-C	Strategic Goal-D		Strategic Goal-E
CBD Strategic Goals	Address underlying causes of BE loss by mainstreaming biodiversity	Reduce direct pressures on biodiversity and promote sustainable use	Improve status of BE by safeguarding ecosystems, species genetic diversity	Enhance the benefits to all from biodiversity and ecosystem services		Enhance implementation through participatory Planning, knowledge management and capacity building
NBTs	NBT (1,2,10)	NBT (3,4,5,6)	NBT (6,7)	NBT (3,8,9)		NBT (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 Aichi Target-9 & NBT-4	Protection Strategies include Aichi Target-9 & NBT-4	Restoration strategies	ABS Aichi Target-16 & NBT-9	Implementation Strategies
Impact on BE	Indirect	Indirect In most cases except Aichi Target-9 & NBT-4	Direct	Direct In most cases except when it is a very small component	Direct	Indirect Direct only when implemented by MOEF&CC; There can be some deviations

Source: Authors' construct

¹⁸ Pandey et al (2019).

Expenditure under schemes/activities classified as ‘direct’ is conceptualized to be fully attributed to BE. For schemes categorized having ‘Indirect’ relevance, a system of expenditure attribution (i.e., coefficients/proportion of expenditure attributable to BE conservation) needs to be established (Table 2).

Table 2: Determining Attribution for BE Expenditures

BE Relevance	Criteria	Expenditure Attributable to BE Conservation		
		Scenario-1	Scenario-2	
Direct	Where the primary purpose is BE conservation. Examples: Tiger conservation, afforestation, etc.	100%	100%	Rio Marker II
Indirect-High	Where conservation of BE is a significant objective. Example: National Project on organic farming, etc.	50%	Average of the range 50%-75% (i.e., 62.5%)	Rio Marker I
Indirect-Medium	Where conservation of BE is an important objective and significant biodiversity relevant outcomes are expected. Example: Water conservation, National project on management of soil health & fertility, etc.	25%	Average of the range 25%-50% (i.e., 37.5%)	
Indirect-Low	Where biodiversity conservation is a by-product. Example: renewable energy, general awareness and training, etc.	2.5%	Average of the range 0%-25% (i.e., 12.5)	

Source: Authors’ construct

In the two scenarios considered, for schemes whose primary objective is BE conservation and have direct relevance to BE, we have attributed their entire expenditure towards BE conservation. For schemes classified under Indirect-high, indirect-medium, and Indirect-low respectively, 50 percent, 25 percent and 2.5 percent of their expenditures are considered to be BE relevant under Scenario-1.

Under Scenario-2, for schemes having Indirect-High relevance we have assumed that the percentage of expenditure attributable for BE would range between 50-75 percent. Taking the midpoint of 50 and 75 we get 62.5 percent. In other words, a scheme having Indirect-High relevance 62.5 percent of its expenditure is attributable for BE. Similarly, for schemes having Indirect-Medium and Indirect-Low relevance we have considered BE attributable expenditure to be 37.5 percent (average of 25-50 percent) and 2.5 percent of their expenditure respectively.

The identified schemes are further classified into six themes following the taxonomy of BE conservation provided by the CBD to reflect the focus and progress on Aichi and national targets. These are: (i) Sectoral Mainstreaming, (ii) Natural Resource Use, (iii) Biodiversity Protection, (iv) Biodiversity Restoration, (v) Access and Benefit Sharing, and (vi) Enhancing Implementation. The

next step is to align thematic classification with NBAP targets, Aichi targets and CBD goals. The classification of schemes/programs is illustrated in Table 1.

4. Results and Discussion

4.1 Central Government Schemes in Maharashtra (inclusive of State's share)

- (a) Table 3 shows that 42-52 schemes of central government implemented in states has BE conservation focus (during 2009-10 and 2015-16), and these accounted for 25-39 percent of the total expenditure of central schemes. This indicates that the central schemes implemented through state governments have a significant focus towards BE conservation.
- (b) Another interesting and encouraging observation is that the central schemes are promoting sectoral mainstreaming (in sectors like agriculture, horticulture, animal husbandry, pollution control) and policy making and implementation capacities (data, research, training), and rightly so in its role as a federal government (Tables 4 and 5).
- (c) Analysis of expenditure 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 BE. 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 BE.

Table 3: Central Government Schemes in Maharashtra

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
BE Relevant Schemes (No.)	53	50	49	45	44	42	52
BE Expenditure (Rs. crore)							
a) Scenario-1	894.7	953.4	1662.3	1659.3	1314.7	927.1	1374.1
b) Scenario-2	1514.9	1684.4	2766.3	2521.9	2082.2	1501.5	2009.9

Source: Authors' calculations

Table 4: Central Schemes based on Biodiversity Taxonomy

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	18	16	16	17	16	17	23
Natural Resource Use	7	8	7	8	8	7	11
Protection	6	5	5	4	4	3	4
Restoration	2	1	1	0	0	1	1
Access & Benefit sharing	3	3	3	3	4	2	2
Enhancing implementation	17	17	17	13	12	12	11
Total	53	50	49	45	44	42	52

Source: Authors' calculations

Table 5: BE Expenditure for Central Schemes: Maharashtra
(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Scenario-1							
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							
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

4.2 State Government Schemes in Maharashtra

- a) The focus of state government in terms of number of BE relevant schemes shows a steady increase except in 2015-16. BE expenditure as a share of GSDP or total expenditure in the state is very low (Table 6). Distribution of schemes based on biodiversity thematic classification show large number of state schemes focus on Natural Resource use, Protection, and Enhancing Implementation categories (Table 7).
- b) All conservation activities except research, data and training are important for states. In terms of distribution of amount of funds, schemes with direct and indirect high and medium relevance get priority over others (Table 8). This is consistent with the constitutional responsibilities of the states and complementary role played by the central government in this context. However, what is discouraging is that Access and Benefit sharing activities, which is fully in states' domain, are yet to take off in the state. This, to a large extent, can be attributed to poor institutional capacity in the state.

Table 6: State Government Schemes

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
BE Relevant Schemes (No.)	100	209	214	191	225	227	167
<i>BE Expenditure (Rs. Crore)</i>							
a) Scenario-1	609.76	661.60	1075.15	1074.68	1063.60	1514.91	1590.45
b) Scenario-2	744.88	824.10	1343.16	1350.39	1305.71	2070.10	1964.16
<i>BE expenditure % of state expenditure</i>							
a) Scenario-1	0.54	0.53	0.76	0.68	0.60	0.76	0.67
b) Scenario-2	0.66	0.66	0.94	0.86	0.74	1.04	0.83

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
BE Expenditure % of state GSDP							
a) Scenario-1	0.07	0.06	0.09	0.08	0.07	0.09	0.08
b) Scenario-2	0.09	0.08	0.11	0.10	0.09	0.12	0.10

Source: Authors' calculations

Table 7: State Government Schemes based on Biodiversity Taxonomy

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sectoral Mainstreaming	13	34	33	28	30	32	24
Natural Resource Use	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 8: BE expenditure State Schemes: Maharashtra

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Scenario-1							
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							
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

4.3 Schemes in Selected Districts of Maharashtra

- a) Two representative districts were selected. While Chandrapur district is highly forested, Ratnagiri is a coastal district with rich coastal ecosystems and biodiversity. The district level estimates of expenditure on BE 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 largely due to a strong policy bias in favour of forests (Table 9).
- b) 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, in Ratnagiri in the absence of a separate coastal conservation department, most of the conservation is through the Fisheries and Agriculture departments. Ratnagiri is doing better in terms of sectoral mainstreaming of biodiversity conservation than Chandrapur which could be owing to fewer opportunities for mainstreaming due to presence of a strong forest department in the latter. Distribution of schemes based on biodiversity thematic classification show that district schemes focus on sectoral mainstreaming, restoration and protection.¹⁹

Table 9: Biodiversity Relevant Schemes in Selected Districts

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Ratnagiri							
BE relevant schemes (No.)	12	12	16	17	17	19	19
BE Expenditure (Rs. Crore)							
a) Scenario-1	2.71	2.47	3.50	2.96	4.68	5.72	6.00
b) Scenario-2	3.81	3.37	4.57	4.07	6.24	8.03	8.38
Chandrapur							
BE relevant schemes (No.)	16	16	15	16	20	18	20
BE Expenditure (Rs. Crore)							
a) Scenario-1	1.89	3.79	3.99	6.28	6.78	11.31	19.16
b) Scenario-2	2.45	4.55	4.72	7.72	7.87	12.49	21.43

Source: Authors' calculations

Maharashtra has 36 districts. For each year we calculate the average attributable expenditure of the two selected districts as percentage of their average District Domestic Product (DDP). Multiplying the average attributable expenditure-DDP ratio thus obtained with the DDP of each of the 33 districts in the state we derive for each district the total attributable expenditure for that year. Aggregating across all the districts including the two selected districts we obtained BE expenditure for all the districts in the state for each year (Table 10).

4.4 Total Public Expenditure on BE Conservation in Maharashtra

Aggregating expenditures attributable towards biodiversity conservation in Maharashtra from central schemes (inclusive of state shares), state schemes, district schemes, Finance Commission forest grants, CAMPA releases to Maharashtra and grants to MSSB from NBA we get the total

¹⁹ Distribution of district schemes based on BIOFIN thematic classification and attributable expenditures are not reported but are available with the authors.

expenditure on BE conservation from public sources in Maharashtra during 2009-10 to 2015-16 (Table 10).

Table 10: Public Expenditure on BE Conservation in Maharashtra

(Rs. Crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
(Scenario-1)							
1. Central government Schemes	894.66	953.43	1662.29	1659.30	1314.65	927.12	1374.13
2. State government Schemes	609.76	661.60	1075.15	1074.68	1063.60	1514.91	1590.45
3. District Schemes	150.77	208.99	245.91	309.62	393.02	441.41	506.37
4. FC Forest Grants	14.00	38.70	38.70	77.40	77.40	77.40	--
5. NBA Grants	0.00	0.00	0.01	0.00	0.02	1.15	0.12
6. CAMPA funds	89.35	85.49	82.63	78.21	78.00	148.00	172.00
Total BE Expenditure (1 to 6)	1758.53	1948.21	3104.70	3199.21	2926.70	3109.99	3643.08
BE expenditure (% of GSDP)	0.21	0.19	0.24	0.22	0.18	0.17	0.18
BE expenditure (% of total expenditure)	1.57	1.57	2.20	2.05	1.67	1.58	1.71
(Scenario-2)							
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. District Funds	205.67	264.35	305.18	395.06	483.66	541.57	617.56
4. FC Forest Grants	14.00	38.70	38.70	77.40	77.40	77.40	--
5. NBA Grants	0.00	0.00	0.01	0.00	0.02	1.15	0.12
6. CAMPA funds	89.35	85.49	82.63	78.21	78.00	148.00	172.00
Total BE Expenditure (1 to 6)	2568.81	2897.02	4535.96	4422.99	4027.01	4339.66	4763.75
BE expenditure (% of GSDP)	0.30	0.28	0.35	0.30	0.24	0.24	0.24
BE expenditure (% of total expenditure)	2.29	2.33	3.21	2.83	2.30	2.20	2.23

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

The state is spending 2.20 to 3.21 percent of its total expenditure or 0.23 to 0.35 percent of its GSDP on BE conservation. In the absence of a target based finance plan for BE conservation it is not possible to assess the current gap in expenditure on biodiversity. However, given the mega diverse biodiversity status and a wide range of threats including pressure from a large population current expenditure towards BE conservation appears to be on the lower side.

5. Mapping EAP Expenditure on BE Conservation

Estimated BE expenditure in EAP (grants and loans) in India is presented in Table 11. These range from Rs. 1228 crore to Rs. 1658 crore during the study period. As percentage of total fund flows under the EAP this works out to around 3.6-5.7 percent.

Projects having direct relevance to BE account for about 60 percent of the total biodiversity attributable expenditure under EAP, followed by those having indirect high and medium relevance.

Given that the share of grants was 1-2 percent in total EAP with the exception of 2010-11 when it was higher at 7.48 percent, it is to the credit of governments and public institutions in India that soft loans have been taken for projects in which the primary intent as well as objectives are focused on BE conservation and protection.

Table 11: BE Expenditure in EAP Fund Flow in India

(Rs. crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total EAP	25318.7	38002.9	28996.7	25619.6	29034.3	35133.8	37517.4
BE expenditure in EAP	1228.7	1382.7	1658.6	1392.5	1642.3	1650.8	1756.0
BE as % of total EAP	4.85	3.64	5.72	5.44	5.66	4.70	4.68

Source: Author's calculations

6. Mapping BE Conservation through CSR

The sampled CPSEs on an average spent Rs. 460.56 crore annually on CSR activities during 2009-10 and 2015-16 of which Rs.13.66 crore (or 2.97 percent) was estimated to be towards BE conservation. Applying the attribution coefficient of 2.97 percent to the annual CSR expenditure of 38000 Indian companies we derive their BE expenditure as part of their CSR mandate (Table 12).

Table 12: BE Expenditure through CSR in India

(Rs. crore)

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
CSR Expenditure (97 CPSEs)	2209.80	2328.78	2451.62	2639.93	3017.69	3228.80	3431.23
Of which BE Expenditure	65.63	69.16	72.81	78.41	89.63	95.90	101.91
Based on CMIE data for 38000 companies						487.43	570.35

Source: Author's calculations

7. BE Expenditure in India (Public Sources, EAP and CSR)

Maharashtra is a large and representative state. It is among the top 5 states in India in terms of overall species diversity and natural resources. We use year-wise estimates of BE expenditure as percent of total expenditure for Maharashtra (see Table 9) to estimate BE expenditure from public sources for each of the states in India. Aggregating across all states we derive all-state estimate of BE expenditure. Adding estimates of EAP and CSR to all-state estimates we get estimated BE expenditure for the country (Table 13). Estimates are derived for both the scenarios and can be seen as lower and upper estimates. We observe a steady rise in BE expenditure which is encouraging. In 2015-16 India spent Rs. 50,388.86 crore (USD 7198.4 million) and as a conservative estimate BE expenditure was Rs. 38971.95 crore (USD 5567.4 million). These respectively work out to 2.53 percent and 1.96 percent of India's GDP in 2015-16. This is no small feat for a developing country like India. However, it is important that this momentum needs to be maintained given that the benefits of BE expenditure

are multifold and are in sync with the key development goals of poverty eradication, and sustainable development.

Table 13: BE Expenditure in India

(Rs. Crore)

Year	Based on Total Expenditure (Public Sources, EAP and CSR)	
	Scenario-1	Scenario-2
2009-10	16078.72	22890.93
2010-11	18375.89	26618.26
2011-12	29080.86	41688.86
2012-13	30667.01	41835.25
2013-14	28509.59	38576.87
2014-15	31874.74	43787.24
2015-16	38971.95	50388.86

Source: Author's calculations

8. Conclusion and Way Forward

This paper presents a methodology for a detailed mapping, data collation, and estimation of (i) fund flows for BE conservation through budgetary and other public sources (CAMPA, FC, NBA etc.); (ii) EAP and (iii) CSR mandate. These estimates are aggregated to derive a comprehensive all-India estimate of BE expenditure in India covering over 90 percent of funds flows.

The study finds that biodiversity finance is highly fragmented, in India, lacks a clear policy and a road map. Multiple institutions are involved in directing finance often with overlapping functions and no systematic tracking.

Further, government budgets are the principal source of funds for BE conservation in India. Results show that although there is a steady increase in BE expenditure there is no clear trend in its growth during the period of study which could partly be explained by the fact that biodiversity conservation in India is driven by programs and schemes of multiple institutions rather than a clear and measurable set of targets, strong synergies among institutions and systematic tracking of biodiversity outcomes.

States on an average spend 1.93-3.19 percent of their total expenditure; or 0.23-0.39 percent of their GSDP on BE conservation. In the absence of a target based finance plan for BE conservation in India it is not possible to assess the current gap in expenditure on biodiversity. However, given the mega diverse biodiversity status and a wide range of threats including pressure from a large population current expenditure in India appears to be on the lower side.

Besides the Ministry of Environment and Forest, the other key central ministries contributing towards BE conservation are Ministries of Water Resources, Rural development, and Agriculture. At the state level the key departments are Forest, Planning, Water Resources and Agriculture.

While central government schemes are focused towards Sectoral Mainstreaming and Sustainable use of Natural Resources, state and district schemes are directed towards sustainable use of natural resources, enhancing implementation, restoration and protection aspects of biodiversity conservation.

During the study period, BE expenditure through EAP range from 3.64-5.72 percent of the total EAP funds. With CBD's increasing focus on mainstreaming biodiversity in social sector as well as development projects there is huge potential of increasing biodiversity expenditure through EAP.

The paper finds that the corporate sector is spending only 2-3 percent through its CSR mandate towards BE conservation, although there is potential for increasing such expenditures.

Schemes categorized under 'direct' and 'indirect-high' categories of biodiversity relevance have a relatively greater impact on biodiversity conservation. Ensuring higher budgetary allocations for such schemes and maintaining their continuity over the years would improve BE conservation. This would require tagging and tracking of expenditures of these schemes in the budgets on a regular basis.

Simple and practical steps towards better coordination between relevant departments have the potential to improve BE focus in their programs, thereby improving outcomes of government expenditure in general and biodiversity outcomes in particular. A beginning has been made in this direction by the central government in the context of implementation of the Sustainable Development Goals. This could be taken as a model to emulate.

The concept of mainstreaming was included in article 6(b) of the CBD, 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"²⁰. One of the entry points for mainstreaming BE is the use of NBAP as a policy instrument to embed BE priorities into national development strategies and vice versa. Future research on developing a BE mainstreaming index can provide an important indicator and potentially a measure of the progress towards achieving Aichi Targets or NBTs in case of India. And thus should be high on agenda.

²⁰ <https://www.cbd.int/convention/articles/?a=cbd-06>

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