



Biodiversity Finance: Identification and Analysis of key Building Blocks of a Biodiversity Finance Plan in India

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Disclaimer: The views expressed and any errors are entirely those of the authors and do not necessarily corroborate to policy view points of the contacted individuals and institutions.

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List of Acronyms

ABS	Access and Benefit Sharing
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AP	Agricultural Pump
APFDCL	Andhra Pradesh Forest Development Corporation Ltd.
AYUSH	Ayurvedic, Yoga and Naturopathy, Unani, Siddha and Homeopathy
BD	Biodiversity
BDA	Biological Diversity Act, 2002
BE	Budget Estimate
BEE	Bureau of Energy Efficiency
BIS	Bureau of Indian Standards
BMCs	Biodiversity Management Committees
BMS	Biodiversity Management System
BRFD	Biodiversity Related Financial Disclosures
BRs	Biological Resources
CAGR	Compound Annual Growth Rate
CAMPA	Compensatory Afforestation Management and Planning Authority
CBD	Convention on Biological Diversity
CBI	Climate Bond Initiative
CCDA	Coal Conservation and Development advisory Committee
CIL	Coal India Limited
CMIE	Centre for Monitoring Indian Economy
CONABIO	National biodiversity Commission, Brazil
COP	Conference of the Parties
CPEIRs	Climate Public Expenditure and Institutional Reviews
CPSEs	Central Public Sector Enterprises
CPSUs	Central Public Sector Undertakings
CSV	Creating Shared Value
DAC	Development Assistance Committee
DADF	Department of Animal Husbandry, Dairying and Fisheries
DAE	Direct Access Entity
DANIDA	Danish International Development Agency
DBTK	Direct Benefit Transfer in PDS Kerosene Scheme
DBTL	Direct Benefit Transfer for LPG
DDUGJY	Deendayal Upadhyaya Gram Jyoti Yojana
DFIs	Development Financial Institutions
DISCOMs	Distribution Companies
DJSI	Dow Jones Sustainability Index
DWAF	Department of Water Affairs and Forestry
E&P	Exploration and Production
EAFRD	European Agricultural Fund for Rural Development

EAP	Externally Aided Projects
EEA	European Environment Agency
EIA	Environmental Impact Assessments
ENR	Environment and Natural Resources
ESG	Environment-Social Governance
EU	European Union
FD	Forest Department
FDA	Forest Development Agency
FES	Foundation for Ecological Security
FMA	Atlantic Forest Fund (Fundo da Mata Atlântica)
FoKSBI	Forum Kelapa Sawit Berkelanjutan Indonesia
FY	Financial Year
GATT	General Agreement on Tariffs and Trade
GBI	Generation Based Incentive
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIM	Green India Mission
GLF	Global Landscapes Forum
GoI	Government of India
GSDP	Gross State Domestic Product
GSI	Gross Scheduled Income
GST	Goods and Services Tax
HELP	Hydrocarbon Exploration and Licensing Policy
HHP	Hadiputranto, Hadinoto & Partners
HYVs	High Yielding Varieties
IEA	International Energy Agency
IEF	Forest State Institute (Brazil)
IIED	International Institute for Environmental Development
IISD	International Institute for Sustainable Development
INDC	Intended Nationally Determined Contribution
IPDS	Integrated Power Development Scheme
IPH	Irrigation and Public Health
IPR	Intellectual Property Rights
IRDAI	Insurance Regulatory and Development Authority of India
IREDA	Indian Renewable Energy Development Agency Limited
ISPO	Indonesian Sustainable Palm Oil
ISPRL	Indian Strategic Petroleum Reserves Limited
IUCN	International Union for the Conservation of Nature
JNNSM	Jawaharlal Nehru National Solar Mission
KUSUM	Kisan Urja Suraksha Evam Utthan Mahabhiyan

LED	Light Emitting Diode
LNG	Liquefied Natural Gas
LPG	Liquid Petroleum Gas
MC	Municipal Corporation
MDBs	Multilateral Development Bank
MFR	Malua Forest Reserve
MGNREGS	Mahatma Gandhi National Rural Employment Scheme
MNRE	Ministry of New and Renewable Energy
MoEF&CC	Ministry of Environment, Forests and Climate Change
MPSBB	Madhya Pradesh State Biodiversity Board
MSBB	Maharashtra State Biodiversity Board
MSP	Minimum Support Price
MTA	Ministry of Tribal Affairs
NAP	National Afforestation Program
NAPCC	The National Action Plan for Climate Change
NBA	National Biodiversity Authority
NBAPs	National Biodiversity Action Plans
NBFCs	Non- Banking Finance Companies
NBMMP	National Biogas and Manure Management Programme
NCCF	Network for Certification and Conservation of Forest
NCEF	National Clean Energy Fund
NEF	National Electricity Fund
NELP	New Exploration and Licensing Policy
NFDB	National Fisheries Development Board
NGO	Non-governmental Organisations
NGT	National Green Tribunal
NOOA	National Oceanic and Atmospheric Administration
NPV	Net Present Value
NRM	Natural Resources Management
NTFP	Non-Timber Forest Products
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OIDB	Oil Industry Development Board
OMC	Oil Marketing Companies
ONGC	Oil and Natural Gas Corporation Ltd.
PDS	Public Distribution System
PEER	Public Environmental Expenditure Review
PEFRDA	Pension Fund Regulatory and Development Authority
PES	Payment for Ecosystem Services
PIR	Program and Institutional review
PKVY	Parampragat Krishi Vikas Yojana
PMKKY	Pradhan Mantri Khanij Kshetra Kalyan Yojana

PPC	Pay Per Click
PSDF	Power System Development Fund
PSF	Private Sector Facility
RAFTAAR	Remunerative Approaches for Agriculture and Allied Sector Rejuvenation
REDD	Reducing Emissions from Deforestation and Degradation
RKVY	Rashtriya Krishi Vikas Yojana
RSPO	Roundtable on Sustainable Palm Oil
SBBs	State Biodiversity Boards
SCBD	Secretariat of the Convention on Biological Diversity
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessments
SEEA	System of Environmental-Economic Accounting
SEMAD	Secretary of State for Environment and Sustainable Development
SPV	Special Purpose Vehicle
SRDD	State Rural Development Departments
STAP	Scientific and Technical Advisory Panel
SWCWS	Shimla Water Catchment Wildlife Sanctuary
SWES	Small Wind Energy and Hybrid Systems
T&D	Electricity transmission and Distribution
TCFD	Task Force on Climate-Related Financial Disclosure
TEEB	The Economics of Ecosystems and Biodiversity
UDAY	Ujwal DISCOM Assurance Yojana
UNEP	The United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollar
USLP	Unilever's Sustainable Living Plan
VGF	Viability Gap Funding
WAVES	Wealth Accounting and the Valuation of Ecosystems
ZBNF	Zero Budget Natural Farming

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Chapter 1

Mapping Revenue from Biodiversity at the Central Government Level

1. Objectives and Scope

The economic contribution of biodiversity and ecosystems in a country remains undervalued due to inadequate accounting frameworks. Apart from serving as a stock of natural resources, it provides with a continuous flow of goods and services¹.

While mapping and analysis of income proceeds/revenue from biodiversity is an under researched subject in the literature; there is an increasing recognition that it is important to identify and map the revenue to the governments from biodiversity for at least the following reasons:

- i. Well-designed fiscal and other economic instruments are important instrument for governments to shape relative prices of goods and services and address the problems with property rights. These instruments (e.g. tax, subsidy, fees, fines, liability, offsets, PES) can potentially be used to implement strong incentive/disincentive for conservation/reducing stress on biodiversity. These can also help raise substantial revenue for governments which can be assigned for conservation purposes.
- ii. An analysis of the type of instruments used to raise revenue can help assess the appropriateness and under-utilized potential of some of these instruments in conservation of biodiversity.
- iii. Identifying and supporting revenue streams from biodiversity-positive actions that could generate increased private sector investment
- iv. Explore the feasibility of using these revenues for creating a fund dedicated to biodiversity management and conservation.

Mapping revenue in this context will broadly comprise of the following steps:

- Identification of revenue sources and respective budget heads in respect of central government
- Compilation of data on receipts from the identified sources

The objective of this chapter is thus to:

- a. Identify the sources of revenue and the type of instruments used to mobilize revenue from biodiversity at the central government level in India; and
- b. Map the revenue flows to central government from biodiversity.

¹It is important to note that an assessment of revenues from biodiversity is different from valuation of biodiversity which is undertaken under national accounts framework.

2. Methodology

A. Guidance from the literature

I. The BIOFIN Workbook, 2016²

In this source the following sectors and categories of revenue sources have been identified in the context of biodiversity:

- i. Green Taxes
- ii. Forestry – Fees/Fines/Royalties
- iii. Fisheries – Fees/Fines/Licenses
- iv. Payments for Ecosystem Services
- v. Park/Reserve Entrance Fees
- vi. Concessions and other tourism based fees (e.g., Hotel Surcharge)

II. The OECD dataset³ on environmentally related tax revenues:

In OECD data set, sources and instruments of revenue are identified by economic sectors. The following have been classified as environmentally related tax revenues⁴ in the system irrespective of whether or not these are being allocated for environmental conservation purposes.

Table 1: Sectoral Categorization of Environmentally Related Tax Revenues in OECD Dataset

Sectors	Revenue source/instrument
Energy	<ul style="list-style-type: none">• Energy Products (Fossil Fuels, Electricity)• Transportation Fuels (Petrol, Diesel)• All CO₂ Related Taxes
Motor Vehicles and Transport ⁵	<ul style="list-style-type: none">• One-off import or sales taxes on transport equipment• Recurrent taxes on ownership• Registration or road use of motor vehicles

²http://www.biodiversityfinance.net/sites/default/files/content/publications/undp-biofin-web_0.pdf

³The OECD maintains a database of Instruments used for environmental policy, originally developed in co-operation with the European Environment Agency (EEA). The database contains detailed qualitative and quantitative information on environmentally related taxes, fees and charges, tradable permits, deposit-refund systems, environmentally motivated subsidies and voluntary approaches used for environmental policy. www.oecd.org/env/policies/database. https://stats.oecd.org/Index.aspx?DataSetCode=env_envpolicy

⁴ The characteristics of such taxes included in the database (e.g. revenue, tax base, tax rates, exemptions, etc.) are used to construct the environmentally related tax revenue with a breakdown by environmental domain.

⁵Excludes excise taxes on automotive fuels.

Sectors	Revenue source/instrument
	<ul style="list-style-type: none"> • Other transport-related taxes.
Other environment related tax	Environment related taxes not included elsewhere, e.g. <ul style="list-style-type: none"> • hunting and fishing taxes, • SO_x and NO_x emission taxes.
Water and wastewater⁶	Taxes on: <ul style="list-style-type: none"> • Water extraction • Piped water • Discharge of wastewater • Other water-related taxes.
Mining and Quarrying	<ul style="list-style-type: none"> • Mining royalties • Excavation taxes (e.g. sand and gravel).
Waste Management	Taxes on: <ul style="list-style-type: none"> • Final disposal of solid waste • On packaging (e.g. plastic bags), and • Other waste-related taxes (e.g. batteries, tyres).
Ozone – depleting substances	Taxes on specific substances, such as <ul style="list-style-type: none"> • Chlorofluorocarbons (CFCs) • Carbon tetrachloride, • Hydro chlorofluorocarbon (HCFCs) • Other Ozone-depleting substances.

Table 2 provides a comparison of the share of environment related revenue in total GDP of OECD countries and India for 2011-2014. The data shows that India being a developing country is quite close to the performance of OECD countries.

Table 2: Share of Environmentally Related Revenue in Total GDP

Region	2011	2012	2013	2014
OECD region	1.62	1.60	1.63	1.61
India	1.06	1.00	0.97	0.95

⁶Fees and charges related to water supply are not included.

III. CBD Guidelines for identification of revenue from biodiversity

In a 2004 report⁷, the CBD recognizes a big role for economic instruments (e.g. permits, quotas, user fees, labelling) in conservation of biodiversity. It provides a guideline for identifying appropriate instruments for viable solutions and in this process identifies the revenues that can be generated from biodiversity.

Table 3: Suggested Economic Instruments in Addressing Specific Externalities

Category	Revenue Instruments
Charges for Service provided directly to consumer	<ul style="list-style-type: none"> • User fees • Collection of charges for solid waste pick-up • Tolls on public roads • Access fees (ex – for recreational access)
Charges for the impact which new demand will put on existing infrastructure	Impact fees (Charge on industrial projects to compensate for the negative environmental impact (social cost). ⁸)
Addressing risks of current activities	Pollution tax/permit
Recovering damages associated with past activities	Civil and criminal penalties for natural resource damages
Addressing risks of future activities	<ul style="list-style-type: none"> • Required liability or environmental insurance • Performance bonds for proper site remediation/closure

⁷ The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges, 2004, UNEP and CBD.

⁸ An order of Government of Telangana dated 17.06.2015 states that Builders have to pay an Environment Impact Fee @ Rs.3/- per Square feet for buildings above 10,000/- Square feet of built-up area, as per the plan approved by the Competent Authority.

IV. Identification of Biodiversity Related Revenue in Other Countries

We came across three reports on the subject during our literature search. All three are BIOFIN countries.

Zambia

Zambia identifies seven biodiversity related sectors and various fiscal instruments in each of these sectors currently being implemented in the country. The data on revenue generated is however not available revenue. A summary of biodiversity related revenue in Zambia is given in Table 4.

Table 4: Biodiversity Related Revenue in Zambia

Sectors	Revenue instruments
Fisheries and Livestock	<p><i>For Fisheries:</i></p> <ul style="list-style-type: none"> • Council levies/fees • Fish Export Permit • Import of Fishing Gear • Fishing Licence • Special Fishing Licence • Registration of Boats • Aquaculture Licence • Interference with Aquaculture Facility • Use of Chemicals in Aquaculture • Fisheries and Aquaculture Development Fund⁹ <p><i>For Poultry and Animals</i></p> <ul style="list-style-type: none"> • Council Fees • Veterinary Permit • Police Form • Police Anti-theft Stock Clearance Report • Egg levy • Chick Levy • Broiler Levy
Tourism	Tourism Levy on Accommodation
Forestry Sector	<ul style="list-style-type: none"> • Permits and Licences • Forestry Development Fund¹⁰

⁹ This is a dedicated fund being serviced by government grants, philanthropy and international grants.

¹⁰ The fund is serviced by the grants from the government, and private contributions by individuals, philanthropy, and interest arising out of any investment of the Fund.

	<ul style="list-style-type: none"> • Fines and Penalties
Wildlife Sector	<ul style="list-style-type: none"> • Fixed and Variable Lease Fees • Park Entry Fees • Animal Fees (Earned from Hunting Animals) • Tourism Enterprise License Fees • Game Management Area Land-user-right fees • Penalties and Court Fines
Water	<ul style="list-style-type: none"> • Raw Water User Charge • Devolution Trust Fund under Water Supply and Sanitation Act, 1997¹¹
Environmental Management	<ul style="list-style-type: none"> • Environment Impact Assessment Fees • Discharge of Effluents Fees and Charges • Environmental Management Fund¹²
Mining	Environment Protection Fund ¹³

Vietnam

Vietnam's report as part of the study on policy and institutional review has identified economic instruments that can be used as a source of finance for Biodiversity Conservation. The list is given in the table below:

Table 5: Biodiversity Related Revenue in Vietnam

Instruments	Components
Environmental Protection Tax	<ul style="list-style-type: none"> • Petroleum • Coal • Plastic Bag • Limited-use Herbicides • Limited-use Pesticides • Limited-use Forest Product Conservation

¹¹Government grants and other partners such as GIZ/KfW, DANIDA, USAID and the EU provide grants to support the DTF.

¹²The fund has not yet been established although a World Bank grant received in 2017 is intended to go towards the setting up of the fund.

¹³It is a performance bond type of fund and its main contributors are large mining companies. In the event that a mine closes and addresses its liabilities, these funds are supposed to be refunded. Ultimately, these are restricted funds which are unavailable to address any immediate negative impacts of mining unless the funds are invested in trusts and bonds generating an earnings stream which can be channelled to biodiversity conservation.

Natural Resource Tax	<ul style="list-style-type: none"> • Mining of Metal Materials • Mining of Non-metal Materials • Natural Timber • Firewood • Bamboo • NTFPs • Natural Marine Products • Natural Water • Natural Oil • Natural Gas
Fees and Charges	<ul style="list-style-type: none"> • Licence Fees • Payment for Forest Rent • Entry Fees • Fees on Environment and Natural Resources • Payments for Land Rent Licenced by PPC • Licence for Natural Resources • Payments for Marine Rent Licenced by PPC • Licence for other Natural Resources • Payments for Land Use Right given by Government • Payment for Land Use Right for Commercial Housing Construction • Tax on Non-agricultural Land for Business Purposes • Administrative Fine on Illegal Trading conducted by Custom Office • Funds of Lottery Companies • ODA

South Africa

South Africa has defined environmentally-related tax/charge as “a tax whose tax base is a physical unit (eg. Product or service) that has a proven specific negative impact on the environment”. In other words, an environmental tax is a tax on an environmentally-harmful tax base. Included in this definition are transport fuels, motor vehicle taxes, emissions taxes, landfill taxes and, more broadly, energy taxes.

Table 6: Overview of environment-related taxes and charges in South Africa (2005/2006)

Sector	Instruments	Level	Applied to
Transport Fuels	General Fuel Levy	National	Petrol Diesel Biodiesel
	Road Accident Fund Levy	National	Petrol Diesel Biodiesel
	Equalisation Fund Levy	National	Petrol Diesel Biodiesel
	Customs and Excise Levy	National	Petrol Diesel Biodiesel
Automobile	Ad Valorem Customs & Excise Duty	National	All passenger and light commercial vehicles
	Road Licensing Fees	Provincial (state)	All registered vehicles
Aviation	Aviation Fuel Levy	National	Aviation fuel sales
	Airport Charges	National	Landing, Parking, and Passenger Service Charge
	Air Passenger Departure tax	National	International Air Travel from South Africa
Products	Plastic Shopping Bag Levy	National	All plastic shopping Bags
Electricity	NER Electricity Levy	National	All generated electricity
	Local government electricity surplus	Local (Municipal)	Electricity distributed to end-users by municipalities
Water Supply	Water resource management charge	National	All registered water use from DWAF ¹⁴ water scheme
	Water resource development and use of water works charge	National	All registered water use from DWAF water scheme
	Water research levy fund	National	All registered water use
Waste water	Waste water discharge charge system (proposed)	National Framework	All (DWAF) registered water dischargers

¹⁴Department of Water Affairs and Forestry. http://www.dwa.gov.za/iwqs/wq_guide/index.asp

B. Framework and Methodology used in this Report

Biodiversity related goods and services are often public goods. The market failure for goods and services provided by biodiversity is one of the main reasons for their unsustainable use and the loss of biodiversity.

Income proceeds/revenue¹⁵ from biodiversity can be put into three categories.

First, when revenue is generated from sale, lease, access, use etc. of goods/products and services provided by biodiversity; second when income is generated from implementing policies which regulate economic activities (that may adversely impact biodiversity and ecosystems) and/or encourage sustainable practices such as fee, fines, permits in case of fisheries, tourism etc.; third, when a compensation amount, impact fee etc. are levied on economic activities which cause significant adverse impact on biodiversity sometimes leading to complete destruction and loss. Some of these are illustrated in Table 7 below with examples.

Table 7: Examples of Different Categories of Revenue by Industrial Sectors

Industry	Nature of dependence	Adverse Impact	Main revenue sources	Instruments used
Tourism and recreation	Access and use	If sustainable practices and guidelines are not applied	Access and use	Tax and fee
Pharma	Use of goods/products, genetic material, traditional knowledge	If sustainable practices and guidelines are not applied	From sale of products Under various provisions of ABS	Fee, Royalty, and sale of goods and services
Paint and resin	Use of goods/products, genetic material, traditional knowledge	If sustainable practices and guidelines are not applied	From sale of products Under various provisions of ABS	Sale of goods and services, Fee, and Royalty
Timber industry	Timber	If sustainable practices and guidelines are not applied	Sale of products	Sale of goods and services
Agriculture and allied sectors	Products and food security	If sustainable practices and guidelines are not applied	Sale of products	Sale of goods and services
Food and health food	Products, Use of goods, genetic material,	If sustainable practices and guidelines are not applied	From sale of products	Sale of goods and services Fee, Royalty

¹⁵Revenue from sectors which are producing value added products using goods and services as inputs from biodiversity.

	traditional knowledge		Under various provisions of ABS	
Water	Access and use	If sustainable practices and guidelines are not applied	Sale of water for consumptive use Use of water as receptacle of waste Use of water for transport Use of water for sports and recreation	Sale of goods and services Pollution tax, cess, fee License and permit fee Access, License and permit fee
Fishery	Access and use	If sustainable practices and guidelines are not applied	From sale of products Under various provisions of ABS	Sale of goods and services, access fee, fines for non-compliance Fee, Royalty
Mining of Fossil fuels	Access and use	Significant impact	Resource tax/charge Compensation for impact	Tax, cess, Royalty, CAMPA provisions Offset, liability, insurance bond
Mining of other minerals	Access and use	Significant impact	Resource tax/charge Compensation for impact	Tax, cess, Royalty, CAMPA provisions Offset, liability, insurance bond
Developmental works	When involve access, use or complete change of land use	Significant impact	NPV, and Afforestation charge Impact fee	CAMPA provisions

The following framework has been used in identification of such income proceeds/revenue in India; and mapping revenue from them. Income/revenue in this context should not be seen only from the perspective of generating funding; instead we need to recognize that well-designed fiscal and other economic instruments are important instrument for governments to shape relative prices of goods and services and address the problems with property rights. These instruments (e.g. tax, subsidy, fees, fines, liability, offsets, PES) can potentially be used to implement strong incentive/disincentive for conservation/reducing stress on biodiversity

besides helping raise substantial revenue for governments which can be assigned for conservation purposes.

Box 1: Biodiversity Related Sectors and Classification of Revenue Instruments

Biodiversity Related Sectors and Classification of Revenue instruments

Biodiversity Related Sectors

<ol style="list-style-type: none"> 1. Forestry and Wildlife 2. Tourism and Recreation 3. Mining 4. Water and Sanitation 	<ol style="list-style-type: none"> 5. Energy 6. Fisheries 7. Agriculture and Allied Services
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Classification of biodiversity related revenues generated from these sectors

Tax Revenue	Non-Tax Revenue	Proceeds from Sale of Products
<ul style="list-style-type: none"> •Green Tax •Energy Tax •Land •Plantations 	<ul style="list-style-type: none"> •Fees (Registration, License, Entry) •Fines (related to violations) •Charges •Royalty •Cess •Eco-labelling •Charges for NPV and Reforestation (CAMPA) •Liability •Offsets •Bioprospecting 	<ul style="list-style-type: none"> •Timber •Non-Timber Forest Products

It must be pointed out that the use economic instruments for biodiversity conservation is relatively recent and limited when compared with their use in the context of environmental pollution control and climate change. This could partly be explained by the fact that biodiversity management and conservation is more complex and multi-faceted in terms of the diverse stressors, and strategies.

For identification of current economic instruments we have reviewed the relevant Acts, Rules therein, Guidelines and various Official Notifications of the central government pertaining to identified sectors. Any information pertaining to state governments that we came across during the literature survey is also documented in Table 7.

Figure 1: Main Steps in Identification and Compilation of Revenue from Biodiversity

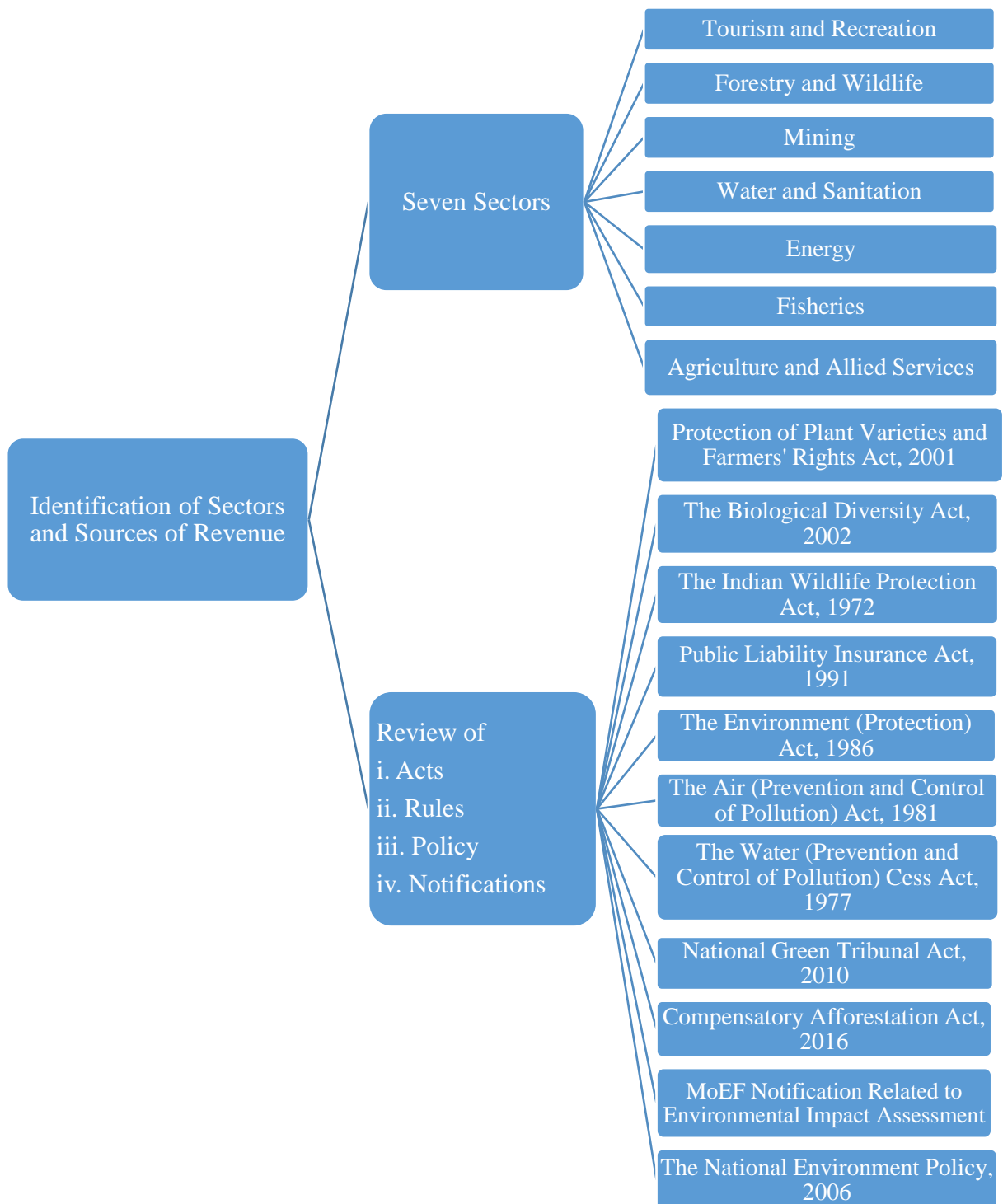


Table 8: Biodiversity Related Economic Instruments Implemented in India

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
Tax	Environment Protection	Green Tax	On Private vehicles >than 15 years old and commercial vehicle > 8 years.	State Governments of Andhra Pradesh, Kerala, and Maharashtra.
		Road Tax		Levied as Road Tax by Delhi government.
	Biodiversity conservation Environment and Natural resource conservation	Forest Development Tax	Consolidated funds of respective state governments.	State Governments of Orissa, Karnataka, and Maharashtra
		Land Revenue/Tax	Consolidated fund of central government	Central Government
		Taxes on Plantations	Consolidated fund of central government	Central Government
	Tax on Sale of Crude Oil	Consolidated funds of respective state governments.	State Governments of Andhra Pradesh, Telangana, Goa, Gujarat, and Bihar	
Cess ¹⁶	Protection of environment and ecosystems	Cess on Crude Oil	Levied under Section 15 of the Oil Industry Development Act, 1974 Rate: Rs. 60/ tonne. Base: Quantity received in a refinery. ¹⁷	Central government.

¹⁶A cess is a charge that is levied by the government to raise funds for a specific purpose.

¹⁷<http://sikkimfred.gov.in/FRED%20Acts/Documents/EcologicalFundAct.pdf>

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
		Environment Cess ¹⁸ , Sikkim	<p>The Act provides that environment cess shall be paid by:</p> <ul style="list-style-type: none"> • Anyone who brings non-biodegradable material from outside Sikkim for the purpose of sale or consumption. • Every hotel, resort, lodges and motels operating in the State with annual turnover above a certain threshold. Rate: 5% of turnover. • On entry of specified categories of vehicles. 	Government of Sikkim
		Environment Cess, Goa ¹⁹	<p>Cess is levied on those products / substances; the handling, utilisation, consumption, combustion, transportation or movement, of which, by any means, causes pollution within the state of Goa.</p> <p>Rate:²⁰ 0.5% of the sale value of the substances.</p> <p>Use: Credited to the Consolidated Fund of</p>	Government of Goa

¹⁸Sikkim Ecology Fund and Environment Cess Act, 2005. Cess will be utilized for (a) the creation and development of facilities helping in amelioration of environment and maintenance and improvement of environmental services and ecology security of the State; (b) Such other purposes and projects leading directly or indirectly to restoration of ecological balance of the various areas in the State as may be specified by the Government.

¹⁹Goa Cess on Products and Substances Causing Pollution (Green Cess) Act, 2013

²⁰Notification 100/4/2013/STE-DIR/879 dated 12 September 2014 of Government of Goa

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
			the State of Goa, to be utilised for reducing the carbon footprint in the State.	
		Green Cess, Gujarat ²¹	<p>Levied on generation of electricity. Renewable energy is exempt.</p> <p>Rate: Not more than 20 paise per unit of electricity generated.</p> <p>Use: Credited to Green Energy Fund.²²</p>	Government of Gujarat
		Green Energy Cess, Uttarakhand ²³	<p>Cess is levied on:</p> <ul style="list-style-type: none"> • Electricity generated within the state for export outside the state. • Electricity supplied to commercial and industrial consumers of the state. <p>Rate: Up to 10 paise per unit in both the cases.</p> <p>Use: First credited to Consolidated Fund of the State and after making deductions for costs of collection, transferred to Green Energy Fund.</p>	Government of Uttarakhand
Proceeds from Sale	<ul style="list-style-type: none"> • Price discovery for goods 	<ul style="list-style-type: none"> • Timber • Non-timber Forest Products 	Non-tax revenue	Central government

²¹Gujarat Green Cess Act, 2011

²²Fund utilized for promotion of generation of electricity using renewable resources.

²³Uttarakhand Green Energy Cess Act, 2014

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
of Products	<ul style="list-style-type: none"> Improving productivity of ecosystems Livelihood support of forest dwellers 			
Bioprospecting ²⁴	Protection of ecosystem and genetic diversity	Fees, charges and royalty under the provisions of Access and Benefit Sharing	<ul style="list-style-type: none"> Signing of ABS agreement between NBA and any person wishing to obtain biological resources occurring in India for research or commercial purposes. (See Appendix - 1)	Central government
Permits	<ul style="list-style-type: none"> To provide recreational access Addressing risk of activities of users. 	Protected Area Permit	Issued to foreigners, except citizens of Bhutan who wish to enter or stay in Protected Area or Restricted Area.	<ul style="list-style-type: none"> Ministry of Home Affairs All India Missions Abroad State Government
		Inner Limit Permit	Issued to Indians who wish to enter or stay in Protected or Restricted Areas.	<ul style="list-style-type: none"> State Government
		Hunting Permits	For hunting any wild animal for the purposes specified in Section 12 of the Indian Wildlife Protection Act, 1972.	Chief Wildlife Warden
		Permit to stay in Sanctuary/National Park	For entering or residing in the sanctuary for the purposes stated in Section 28 of the Indian Wildlife Protection Act, 1972.	Chief Wildlife Warden

²⁴ Systematic search for biochemical and genetic information in nature in order to develop commercially-valuable products for pharmaceutical, agricultural, cosmetic and other application.

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
			All proceeds from fees paid for permits to hunt and stay in sanctuary are credited to Central Zoo Authority Fund.	
Fees	To keep a check on and addressing risk of activities Recover cost of providing services	Registration fees	Example: Registration of Deep Sea Fishing Vessel	Central government/or as specified in the relevant Act
		License Fees	License Fees for Fishing	Central government/or as specified in the relevant Act
		Entry Fees	Entry Fees for National Park, Wildlife Sanctuary	Central government/or as specified in the relevant Act
		Environment Impact Assessment Fee charged for providing Environmental Clearance	For projects of value: <ul style="list-style-type: none"> Rs. 50 crore – fees of Rs. 1 Lakh Rs. 50 crore to Rs. 100 crore – fees of Rs. 3 lakhs Above Rs. 100 crore – fees of Rs. 15 Lakh 	Central Government and State Governments of Gujarat, Tamil Nadu and Maharashtra
		Fees for registration of plant varieties ²⁵ Annual Fees to be paid after registration of plant varieties (Section 35)	Once a registration is done by a farmer/breeder for a plant variety, no other person can use, sell, export, import or produce that plant variety or a variety identical to the one registered. All annual fees are credited to National Gene Fund.	Central Government

²⁵ Protection of Plant Varieties and Farmers' Rights Act, 2001

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
Fines/Penalties	<ul style="list-style-type: none"> Induce behavioural change Keep a check on activities harmful to environment. 		<p>Imposed when terms of an Act or regulation or contract are contravened.</p> <p>Example: A fine of Rs. 10 crore imposed on a person who fails to comply with orders/awards of National Green Tribunal. Rs. 25,000 is additionally charged for every day of such failure.²⁶</p>	Central government/or as specified in the relevant Act
Offsets²⁷	<ul style="list-style-type: none"> Addressing loss of, and damage to biodiversity and ecosystems²⁸. 	<ul style="list-style-type: none"> NPV for loss of forest land Charge for compensatory afforestation These are a form of offsets. 	Money received from the user agencies are first collected in a Fund and eventually flow back to the states where forest land is diverted upon submission of a plan for afforestation and other conservation related works in forests subject to fulfilment of certain conditions.	Compensatory Afforestation Fund Management and Planning Authority (CAMPA) ²⁹
Liability	<ul style="list-style-type: none"> Impact fee To compensate for environmental, health and livelihood impacts of mining. 	Miners to pay, in addition to royalty, an amount equal to 10-30 % of royalty payable by them.	District Mineral Foundations will implement the scheme ³⁰ .	Central Government scheme but proceeds flow to district level agencies for implementation of the scheme.
		Environment Relief Fund ³¹	Owners of hazardous substance/activity shall	Central government

²⁶ National green Tribunal Act, 2010

²⁷ Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from development plans or projects after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.

²⁸ In India, two levies (NPV and a charge for compensatory afforestation) are imposed on development projects that seek land inside a Reserved Forest or a Protected Area in a sanctuary or a national park. These collected levies are accrued in the CAMPA Funds which are to be utilised to plant trees elsewhere in order to ostensibly compensate the loss of forest due to development projects.

²⁹ In August 2016, the Compensatory Afforestation Fund Act, 2016 has come into force. This Act provides for setting up Compensatory Afforestation Fund Management and Planning Authority (CAMPA).

³⁰ Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY). <http://vikaspedia.in/social-welfare/rural-poverty-alleviation-1/pradhan-mantri-khanij-kshetra-kalyan-yojana>

³¹ This fund is constituted under the Public Liability Insurance Act, 1991. The Act provides for public liability- insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto.

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
			take out insurance policy and along with premium for policy, will pay to the insurer a specific amount which will be credited to the Fund.	
Royalties And Dead Rent	<ul style="list-style-type: none"> • A natural resource tax. • When properly designed, it is an important means of discovering resource price. • Revenue generation for the Government. 	Miners pay Royalties at specified rates.		Central government
		Royalties from Oil Producers (ONGC, Oil India Limited)		
		Dead Rent	When mine is temporarily closed, the lessee has to pay dead rent at the rate prescribed in Mines and Minerals (Development and Regulation) Act, 1957 in case of major minerals and as per minor mineral extraction rules in case of minor minerals. ³² A lessee is liable to pay royalty or dead rent whichever is higher and not both.	
Labelling	<ul style="list-style-type: none"> • Can induce behavioural changes when used as a regulation. • Can impact prices and thus demand when combined with tax/subsidy. 	ECOMARK	ECOMARK provides accreditation and labelling for households and consumer products which meet certain environmental criteria along with the quality requirements of the Indian Standards for that product.	Central government
		BIS standards and Labelling Scheme	Standard and labelling scheme was launched in the country for voluntary adoption. Bureau of Energy Efficiency (BEE) prescribes minimum energy performance standards for	

³²Regulation of Minerals, Directorate of Geology and Mining, Govt. of Maharashtra, https://mahadgm.gov.in/PDF/REGULATION_OF_MINERALS.pdf

Revenue Category	Purpose	Instruments	Overview	Implementing Authority
			appliances, buildings, etc. ³³	
Payment for Ecosystem Services³⁴	<ul style="list-style-type: none"> Environment Protection Livelihood Support to locals 		Minimum compensation in PES is set to counterbalance an income loss by not farming in a designated area or costs of undertaking certain activities. ³⁵	Central Government, State Governments, Non-profit Organisations

3. Revenue Receipts: Sectoral Analysis

3.1 Tourism and Recreation

Tourism in India is a rapidly growing sector. According to the estimates of World Travel and Tourism Council, total contribution of tourism sector to Indian GDP in 2017 was about 9.4% and supported about 8% of the employment.

Ecotourism in India, as in other countries, is catching up. The concept of ‘Ecotourism’ promotes responsible travel, based on principles of: (i) minimum impact on nature in developing infrastructure related to access to the place and lodging and adventure activities, and (ii) promotion of conservation of nature and biodiversity. In the process, ecotourism glorifies offbeat places, their rich culture, and centuries-old traditions and promotes livelihood for the local people.

Non-profit organizations are taking the lead in promoting the cause and even the government contributes its bit by boosting city tours and adventure treks. Volunteer travel programs are being designed to seek the attention of youngsters and nature lovers; and Eco Sensitive Zones have been developed to put spotlight on India’s wildlife sanctuaries, forest reserves, and biodiversity parks.

To encourage the Stakeholders to promote and practice Ecotourism practices, the Ministry of Tourism, Government of India has included categories of awards "Best Eco friendly Hotel", "Best Responsible Tourism Project", "Best Eco friendly Practices by Tour Operators" in the National Tourism Awards presented annually to various segments of travel, tourism and hospitality sector.

However, while Union budget of India provides data on revenue from the tourism sector (See Table 9 for biodiversity relevant revenues), it does not provide data separately in respect of Ecotourism.

³³Guidelines for Permittee-Standards and labelling program of BEE, Version 1, January 2016.

³⁴ For Details, See Appendix -1

³⁵ Exploring Diverse Financial Mechanisms for Biodiversity Conservation towards Advocacy and Policy Uptake, IFMR LEAD.

According to an estimate the recreational value of our five per cent of the geographic area under national parks and sanctuaries, is more than Rs 50,000 crore³⁶. In fact ecotourism is fast becoming an integral part of wildlife conservation with win-win outcomes. For instance, Ranthambore Tiger Reserve, in financial year 2016-17, was the highest revenue grosser at Rs 23.06 crore. Ranthambore is a shining example of complementarity between tourism as an economic activity and conservation: (i) the reserve boasts of a healthy tiger population; and (ii) the district earns over Rs. 350 crores each year from wildlife tourism with direct impact on local economy³⁷.

Given this, there is a strong case for promoting ecotourism in India. Promotion of ecotourism will also help reveal the recreational values of forests and biodiversity which will, in turn, encourage investment in conservation and protection. Funds generated in this process can be used for conservation programs of the government or to support responsible tourism projects/activities. Detailed guidelines for the promotion of eco-tourism would be required.

Table 9: Biodiversity Relevant Revenues from Tourism and Recreation (Rs. Lakh)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Tourism (1452)	1,137.66	3,147.4	1,886.03	2,223.97
Receipts from tourists transport (103)	4.3	2.04	0.52	1.44
Rent and catering receipts (105)	43.23	42.77	78.55	50.32
Other receipts (800)	1,090.13	3,102.59	1,806.96	2,172.21

Source: Union Budget (for various years), Government of India.

3.2 Forestry and Wildlife

Significant forest products of India include paper, plywood, *sawn* wood, timber, poles, pulp and matchwood, fuelwood, *sal* seeds, *tendu* leaves, gums and resins, cane and rattan, bamboo, grass and fodder, drugs, spices and condiments, herbs, cosmetics, tannins. The following are biodiversity relevant revenues (Table 10).

³⁶ VK Bahuguna, Promoting Eco-Tourism As Revenue Generator, Pioneer, 31 July, 2017

³⁷http://timesofindia.indiatimes.com/articleshow/58817058.cms?utm_source=contentofinterest&utm_medium=ext&utm_campaign=cppst

Table 10: Biodiversity Relevant Revenues from Forestry and Wildlife (Rs. Lakh)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Forestry (01)	2,593.06	2,922.16	2,681.63	3,825.19
Sale of timber and other forest produce (101)	1,540.12	1,609.03	1,903.05	2,338.91
Receipts from social and farm forestry (102)	0	0	0.16	0
Receipts from environmental forestry (103)	370.52	457.99	230.64	1033.77
Receipts from forest plantations (104)	0.08	0.98	10.76	0.01
Other receipts (800)	682.34	854.16	537.02	452.5
Environmental forestry and wild life (02)	521.65	917.05	1019.95	1174.85
Zoological park (111)	512.34	916.69	1015.94	1171.68
Public gardens (112)	0	0	0	0
Other receipts (800)	9.31	0.36	4.01	3.17
Plantations (0407)	16.82	0	0.48	0
Tea (01)	7.89	0	0	0
Other receipts (800)	7.89	0	0	0
Coffee (02)	0.52	0	0.24	0
Other receipts (800)	0.52	0	0.24	0
Rubber (03)	0	0	0	0
Other receipts (800)	0	0	0	0

Source: Union Budget (for various years), Government of India.

In addition, levies (NPV and money for compensatory afforestation) are imposed on development projects that seek land inside a Reserved Forest or a Protected Area in a sanctuary

or a national park. These collected levies are accrued in the CAMPA³⁸ Funds which are to be utilised to plant trees elsewhere in order to ostensibly compensate the loss of forest due to development projects. *Adhoc* CAMPA was created on the order of the Supreme Court in October 2002. The Ad-hoc CAMPA decides the procedure of per-verification of credits of levies in the State-wise accounts.

In 2016, more than Rs 40,000 crore had been realized and it is estimated to increase at the rate of about Rs 6,000 crore every year. To manage and to utilize it for the designated purposes the CAMPA has been set up. The compensatory afforestation money and NPV (Net Present Value) collected from the user agency by the state government has to be deposited with the central government. The money will be eventually released to the state for compensatory afforestation or related works.

When forest land is diverted, both the forests as well as biodiversity is lost. Biodiversity as a sub-sector then has a legitimate claim on these funds.

Table 11: Funds accrued to CAMPA (Amount outstanding Rs. crore)

Year	Principle Amount (1)	Interest Accrued (2)	Estimated Total Amount (1+2)
2013	20,390,	5,907	26,297
2014	23,791	10,518	34,309
2015	26,297	9,224	35,521
2016	29,139	11,000	40,139

Source: Reply to Lok Sabha, Starred Question No.117, answered on 28.07.2015; Ministry of Environment, Forest and Climate Change.

3.3 Mining and Metallurgy

The Mining industry in India is a major economic activity which contributes significantly to the economy of India. The GDP contribution of the mining industry varies from 2.2% to 2.5% only but going by the GDP of the total industrial sector it contributes around 10% to 11%. Indian mining industry provides job opportunities to around 700,000 individuals.

Various non-tax levies such as royalty, rents and fee collected from minerals mining activities are intended to be either a resource rent/tax or a charge to mitigate adverse environmental, health and livelihood impacts of mining. Since mining activities lead to severe degradation of biodiversity, there is a case for allocating a part of these revenues for biodiversity conservation.

The following revenues generated from the Mining sector can be attributed to the biodiversity:

³⁸ In August 2016, the Compensatory Afforestation Fund Act, 2016 has come into force. This Act provides for setting up Compensatory Afforestation Fund Management and Planning Authority (CAMPA) at both central and state level.

Table 12: Biodiversity Relevant Revenue from Mining and Metallurgy (Rs. Lakh)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Nonferrous mining and metallurgical industries (0853)	1,420.03	367.52	276.66	217.56
Mineral concession fees, rents and royalties (102)	1,405.73	350.67	262.01	213.11
Mines department (104)	14.3	16.85	14.65	4.45

Source: Union Budget (for various years), Government of India.

3.4 Water and Sanitation Sector

The following biodiversity relevant revenues were being generated from the water and sanitation sector before the implementation of GST in 2017.

These instruments served as revenue raiser as well as instruments of awareness building and encouraging sustainable behaviour. Given this, there is a case for integrating water into the GST system as a ‘resource’, and tax it as such.

Table 13: Biodiversity Relevant Revenues from Water and Sanitation (Rs Crores)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Swachh Bharat Cess³⁹ (506)	0.00	0.00	0.00	288
Receipts under the water (prevention and control of pollution) Cess Act, 1977 (110)	226	261	251	242

Source: Union Budget (for various years), Government of India.

3.5 Energy Sector

India’s power sector is one of the most diversified in the world. Sources of power generation range from conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear power to viable non-conventional sources such as wind, solar, and agricultural and domestic waste.

Following revenues generated from Energy sector have been identified as relevant in the context of identifying sources of finance for funding conservation of biodiversity. (See Table 14 and for details of coal cess Tables 14-15). Although these cess and fee were not not linked to the quantum of carbon emissions; these followed the polluter pays principle. Since mining

³⁹ Became effective from 15 November 2015

and use of fossil fuels have significant direct and indirect impact on biodiversity there is a case for allocation of funds from revenue generated from such activities.

Table 14: Biodiversity Relevant Revenues from Energy Sector (Rs Crore)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Clean Energy Cess* (112)	3,053	3,081	5,393	12,676
Cess on crude oil (117)	14,510	14,533	14,655	14,310
Petroleum (Fee and Royalties) (0802)	4,799	4,865	4,942	4,348
Petroleum Concession Fees and Royalties (103)	4,602	4,717	4,833	4,226
Receipts under the Petroleum Act (104)	35	33	29	34
Licence Fee and Mining Lease Rent (106)	162	114	80	87

Source: Union Budget (for various years) of Government of India

Note: *The Finance Act, 2010 introduced a clean energy cess of Rs. 50 per tonne on production and import of coal. The stated objective of the cess was financing and promoting clean energy initiatives, funding research in the area of clean energy or for any other related purpose. In successive budgets it was raised and the pre-GST rate was Rs. 400/ton. In the budget of 2016-17, this was renamed as Clean Environment Cess.

Under the GST, supply of coal is subject to 5% GST. In addition, under the Goods and Services Tax (Compensation to States) Act, 2017, a cess of Rs. 400 per ton is levied by the center on supply of coal. No credit is provided for cess paid against payment of GST. The stated purpose of the levy of cess under GST is providing compensation to the states for loss of revenue arising on account of implementation of the goods and services tax, for a period of five years or for such period as may be prescribed on the recommendations of the GST Council. All the proceeds received from the GST compensation cess are required to be credited to a non-lapsable Goods and Services Tax Compensation Fund.

Although cess on coal has been appropriated by the government for some other use, non-tax revenues from crude oil and petroleum is still available and biodiversity as a sector would be fully justified in putting a claim on these funds.

Table 15: Collections from the Coal Cess (Rs. Crore)

Year	Coal Cess collected	Amount transferred to National Clean Energy Fund (NCEF)	Projects financed from NCEF
2010-11	1,066	0	0
2011-12	2,580	1,066	221
2012-13	3,053	1,500	246
2013-14	3,472	1,650	1,219
2014-15	5,393	4,700	2,088
2015-16	12,676	5,123	5,235
2016-17	28,500	6,903	6,903
2017-18 (BE)	29,700	8,703	-
Total	86,440	29,645	15,911

Source: Government of India

Table 16: Fund allocation from the NCEEF (Rs. Crore)

Year	Ministry of New and Renewable Energy	Ministry of Water Resources, River Development and Ganga Rejuvenation	Ministry of Drinking Water and Sanitation	Ministry of Environment & Forests	Total	Cess collected
2010-11	0				0	1,066
2011-12	160.8			59.95	220.75	2,580
2012-13	125.78		110.65	10	246.43	3,053
2013-14	1,218.78			0	1,218.78	3,472
2014-15	1,977.35		110.64	0	2,087.99	5,393
2015-16	3,989.83	1,000		244.97	5,234.8	12,676
2016-17	4,272	1,675		955.74	6,902.74	28,500
2017-18 (BE)	5,341.7	2,250		1,111.3	8,703	29,700
Total	17,086.24	4,925	221.29	2,381.96	24,614.49	86,440.24

Source: Ministry of New and Renewable Energy, Government of India

3.6 Fisheries

Indian fisheries and aquaculture is an important sector of food production, providing nutritional security to the food basket, contributing to the agricultural exports and engaging about fourteen million people in different activities. With diverse resources ranging from deep seas to lakes in the mountains and more than 10% of the global biodiversity in terms of fish and shellfish species, it constitutes about 6.3% of the global fish production and contributes to 1.1% of the GDP and 5.15% of the agricultural GDP.⁴⁰

Mapping of revenues from this sector is tricky as the prime objective of the measures undertaken for promotion of sustainable fishing is enabling livelihood and income security of fishermen. Biodiversity conservation is, at best, a by-product. However, specific fees and fines levied with the sole objective of checking violations of specific regulations or for keeping a check on overfishing have been listed below as potential revenue raised for biodiversity conservation as well as important instruments to discourage harmful practices and unlawful behaviour. Following revenues generated from Fisheries Sector are relevant for biodiversity.

Table 17: Biodiversity Relevant Revenues from Fisheries (Rs. Lakhs)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Fisheries (0405)	1,004.27	1,348.61	535.57	1,678.06
Rents (011)	12.14	10.8	11.6	10.37
Licence fees, fines etc. (102)	3.06	3.12	3.52	5.16
Sale of fish seeds etc. (103)	191.88	206.24	238.31	258.96
Services and service fees (501)	0.36	0	0	0
Other receipts (800)	796.83	1,128.45	282.14	1,403.57

Source: Union Budget (for various years), Government of India.

3.7 Agriculture

Since land is a state subject in India, revenue to central government from land is insignificant. Given that the agriculture sector is under stress various regulatory and business models are needed to encourage sustainable agriculture in India.

⁴⁰<http://nfdb.gov.in/about-indian-fisheries.htm> (National Fisheries Development Board)

Table 18: Land Revenue (Rs. Lakh)

Budget Description	2012-2013	2013-2014	2014-2015	2015-2016
Land Revenue (0029)	106.96	353.34	68.99	232.15
Land revenue / tax (101)	106.95	353.33	68.95	232.15
Taxes on plantations (102)	0.00	0.00	0.00	0.00
Rates & cesses on land (103)	0.01	0.01	0.04	0.00

Source: Union Budget (for various years), Government of India.

3.8 Mapping ABS Revenues in India

As mentioned earlier, The Biological Diversity Act, 2002 has the following key objectives:

- To protect sovereign rights of India over its biological resources.
- To stop Bio-piracy.
- To protect biodiversity in general in a holistic manner.
- To regulate use of Biodiversity.
- To ensure sustainable utilization and equitable benefit sharing.
- To provide legal recognition & support to the Biodiversity and associated traditional knowledge.

ABS is an important mechanism in fulfilling some of the above objectives. ABS revenues form an important source of biodiversity finance as ABS proceeds are earmarked for the National Biodiversity Fund⁴¹ to be utilized for supporting and encouraging conservation activities. Proceeds from the commercialization of biological resources should contribute to conservation of the resources that are monetized, and for bridging the gap between users and providers/conservers of biological resources.

The aim of this section of the chapter is to accurately document the revenue collected from ABS regime. To our knowledge, such an estimate is not yet available in public domain. This appears, partly, due to the absence of any standard protocol and format for periodically publishing and sharing this information.

To do so, we combine several sources, including the publications of relevant public agencies—the NBA and SBBs. This information has been supplemented with information obtained from research papers, newspapers, blogs etc. through google search.

Of all the funds accrued by the NBA from ABS, five percent is to be used by the NBA; of which 50% is to be passed on to the concerned SBB for administrative charges⁴². The remaining ninety five percent of ABS amounts are to be disbursed to the concerned BMC(s)

⁴¹ Section 27 of the Biological Diversity Act, 2002

⁴² Regulation 15 (1) (a) of the ABS Guidelines, 2014

and/ or benefit claimers⁴³ -- If the biological resource or knowledge is sourced from an individual or group of individuals or organizations, the benefits accrued are to directly go to them. If the benefit claimers are not identified, the funds accrued are to be used to support conservation and sustainable use of biological resources and to promote livelihoods of the local people from where the biological resources are accessed.

Similarly, when the SBB grants the approvals directly under the ABS Guidelines, it can retain 5% of ABS fees towards administrative charges and the remaining 95% is to be passed on to the relevant BMC or to the benefit claimers directly⁴⁴.

3.8.1 ABS Revenues: Three categories

ABS revenues can be categorised into: (i) Administrative Fee, (ii) Resource Fee (access fee, collection fee, royalty etc.), and (iii) Penalty for non-compliance. NBA has so far collected Rs. 47.8 lakhs (Table 19); year-wise application fee is given in Table 19 for the period 2009-10 to 2016-17.

(i) Administrative Fee

When an entity intends to use an Indian biological resource, the approval/intimation process from the NBA/SBB begins with filing of a form corresponding with the purpose of use of the resource (Form I, II, III, IV, B etc.) along with deposit of the requisite fees.

Administrative Fee: NBA

Table 19: Estimated Application Fee received by NBA

Application Forms	Purpose	Applications received since 2004*	Fee (Rs.)	Total Fee (Rs.)
Form I	Access to Biological resources and associated traditional knowledge	313	10,000	31,30,000
Form II	Transfer of Research results	50	5,000	2,50,000
Form III	Seeking 'No objection Certificate' for obtaining patent	1189	500	5,94,500
Form IV	Seeking approval for Third Party transfer of the accessed biological resources and associated	81	10,000	8,10,000

⁴³ Regulation 15 (1) (b) of the ABS Guidelines, 2014

⁴⁴ Regulation 15 (1) Proviso of the ABS Guidelines, 2014

	traditional knowledge.			
Form B	Conducting non-commercial research	31		
Others	Incomplete applications	13		
Total		1677		47,84,500

Note: *Data on number of application from NBA Annual report 2016-17
http://nbaindia.org/uploaded/pdf/Annual_Report_2016-17_Eng.pdf

Source: Authors' calculations

Table 20: Year-wise Details of Application Fees Received by NBA (Rs.)

Receipts	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Application Fees	3,99,170	2,80,703	3,13,143	3,63,945	6,21,978	6,57,536	7,40,221	6,95,467	40,72,163

Source: NBA Annual Reports of various years.

Administrative Fee: SBBs

Application Forms	Purpose	Fee (Rs.)
Form I	Access of biological resources occurring in or obtained from India and/or associated traditional knowledge for commercial utilization	Fee as per various State Laws

The application fee structure of various SBBs is in Table 21. The data on revenue from application fee in respect of SBBs is not available in public domain.

Table 21: Rates of ABS Application Fee in Various States

S. No.	State	Fee (Rs.)
1	Andhra Pradesh	For Research: 1,000 For Commercialization: 10,000
2	Arunachal Pradesh	For Government Institution: 100 For others: 500
3	Assam	To be Notified
4	Chhattisgarh	For Commercialization: 1,000

5	Gujarat	For Research: 500 For Commercialization: 5,000
6	Goa	For Commercialization: 1,000
7	Jammu & Kashmir	To be notified
8	Jharkhand	For Commercialization: 10,000
9	Karnataka	For Commercialization: 1,000
10	Kerala	For Commercialization: 1,000
11	Madhya Pradesh	For Commercialization: 1,000
12	Maharashtra	For Research: 500 For Commercialization: 5,000
13	Manipur	For Commercialization: 1,000
14	Meghalaya	For Research: 500 For Commercialization: 5,000 (50% off for SC, STs)
15	Mizoram	For Research: 100 For Commercialization: 1,000
16	Nagaland	For Research: 100 For Commercialization: 1,000
17	Odisha	To be notified
18	Punjab	For Commercialization: 5,000
19	Rajasthan	To be notified
20	Sikkim	For Research: 100 For Commercialization: 1,000
21	Tamil Nadu	For Commercialization: 10,000
22	Telangana	For Research: 1,000 For Commercialization: 10,000
23	Tripura	For Research: 100 For Commercialization: 1,000

24	Uttarakhand	For Research to be used for Research purposes: No fee For Research to be used for Commercialization: 5,000 For Commercialization like Trading or Manufacturing: 10,000
25	Uttar Pradesh	For Commercialization: 2,500
26	West Bengal	No fee

(ii) Resource Fee (access fee, collection fee, royalty etc.)

These can be collected at three levels –NBA, SBBs and BMCs.

Resource Fee: NBA

The approval for utilization of biological resources is granted by the NBA upon signing of an agreement between the NBA and the user. ABS agreements include the general objectives and purpose of the application for seeking approval, description of the resources, intended uses, conditions, restrictions and legal provisions, among other things. The main element of an ABS agreement is computation of the ABS amount. ABS fees are negotiated on Mutually Agreed Terms and in accordance with the ABS Guidelines, as described in the previous section. Since ABS fees are subject to negotiation, different entities will have different benefit sharing conditions as agreed between the parties.

Table 22: Approvals granted by the NBA

Year	Form I	Form II	Form III	Form IV	Form B	Total
2006-2007	4	1	0	2	0	7
2007-2008	5	3	12	6	0	26
2008-2009	4	4	21	6	0	35
2009-2010	2	1	9	1	0	13
2010-2011	3	1	4	1	0	9
2011-2012	1	2	6	0	0	9
2012-2013	1	0	8	7	0	16
2013-2014	1	0	14	2	0	17
2014-2015	19	0	22	1	0	42

2015-2016	31	1	51	2	7	92
2016-2017	36	4	127	0	15	182
2017-2018	36	2	248	1	31	318
2018-2019	19	1	41	1	10	72
Total	162	20	563	30	63	838

Source: NBA

From the above-mentioned data, it can be seen that approvals under Form I and Form III applications are in large numbers and have been consistently increasing over the years. A steady increase in number of Forms is a positive and encouraging sign.

Also, since most of the ABS revenues are accrued from Form I and III applications, ABS amounts coming from these two sources must be monitored and encouraged by providing procedural clarity and ease.

Table 23: Royalty Received by NBA (Rs. Thousands)

Receipts	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Royalty Fees	3,009	329	198	111	2	21	0.1	350	4,005
5% Benefit Sharing received from APFDCL*	0	0	0	0	0	154,965	186,301	124,538	465,805
Total royalty	3,009	329	198	111	2	154,967	186,301.1	124,888	469,810

Note: *Andhra Pradesh Forest Development Corporation Limited

Source: NBA Annual Reports of various years.

Resource Fee: SBBs

Since there is no publicly available information regarding the ABS applications of the SBBs and the benefit sharing agreements concluded by them, the exact data regarding the amount collected under ABS by SBBs cannot be ascertained. There are some guidelines provided by the NBA to the SBBs for levying ABS fees. These are for taking upfront payment from the applicants for access to the biological resources. As an example, one of the ABS agreements signed between M/s Habib Cosmetics and Uttarakhand SBB specifies that the amount paid by the user was based on the product turnover. In the case of Habib, the Uttarakhand SBB charged 0.5% of the product turnover amounting to Rs. 3,22,991.

Table 24: Guidelines for SBBs for charging fee for processing ABS

Purpose	From Natural Habitat (Rs.)	From Cultivated Source/ Institution/ Market (Rs.)	From Industrial Effluent (Rs.)	Threatened Species (Rs.)	Traditional Knowledge associated with BRs
Nutraceutical or Agriculture	10,000	3,000	1,000	15,000	30% more than the normal rate
Pharmaceutical, Chemical and Diagnostic	15,000	5,000	1,000	20,000	30% more than the normal rate
Cosmetics and Luxury Products	20,000	7,000	1,000	30,000	30% more than the normal rate
Environmental Bioremediation or Waste Conversion	2,000	1,000	1,000	4,000	
Other Research	5,000	2,000	1,000	10,000	30% more than the normal rate

Source: Guidelines to SBBs for processing ABS applications, NBA

Some estimates of revenue from royalty of Maharashtra and Kerala SBBs

In 2017, the Maharashtra State Biodiversity Board (MSBB) served more than 300 notices to industry for payment of royalty. It is reported that 12 manufacturers in the state deposited Rs.10 lakh as royalty in compliance with ABS.⁴⁵

Further, 155 Ayush companies have registered with MSBB to share details of the bio-resources procured for commercial utilization based on 600 notices served by MSBB.⁴⁶ It has also been reported that MSBB has asked 1,500 AYUSH units in the state to comply with the latest BDA guidelines. The Kerala SBB is reported to have issued notices to 800 ayurvedic manufacturers.⁴⁷

⁴⁵ <http://www.pharmabiz.com/PrintArticle.aspx?aid=94085&sid=1>

⁴⁶ <https://homeopathy360.com/2017/02/21/around-155-ayush-cos-registered-with-msbb-towards-abs-compliance/>

⁴⁷ <https://www.downtoearth.org.in/blog/bitter-abs-medicine-for-ayush-48825>

Resource Fee: BMC

BMCs are entitled to charge collection fees from the applicant for accessing any biological resource for commercial purposes within its territorial jurisdiction⁴⁸. Until 2014, the BMCs levied the collection fees as per Section 41(3) of the BD Act, 2002. It was unclear whether these would be part of the ABS payments made by the applicants. The ABS Guidelines clarified this in 2014 and stated that the access/collection fees shall be collected in addition to the ABS payments made by the applicants.

The BMC-level access fee is thus a supplementary fee to ABS and does not replace it. As discussed earlier, while the BMC fee is a charge to “access a biological resource” particularly when it is in the wild form, this charge essentially constitutes a resource’s cost price and is therefore, an access fee only. ABS is paid over and above this charge. However, for computation purposes, it is important to add the BMC charge under ABS revenues. As per the guidelines for setting up of BMCs, the BMCs are to maintain a separate account altogether for keeping track of the access fees collected.

(iii) Penalties

Penalties for non-compliance under the BD Act, 2002 and Rules, 2004 are collected by the NBA and SBBs. Various penal provisions of ABS regime are in Table 25.

Table 25: Provisions for Penalty

Penalty Provision	Penalty for Contravention of	Punishment	Fine provisions
Section 55 (1)	Section 3 or Section 4 or Section 6 Not taking approval from the NBA for obtaining biological resources, their commercialization, transfer of TK or biological material, and applying for an IPR	Imprisonment for up to 5 years	Up to Rs. 10 Lakhs or If damage is more than Rs. 10 Lakhs, commensurate fine or both imprisonment and fine
Section 55 (2)	Section 7 or Order made under Section 24 (2) Not giving prior intimation to the concerned SBB for commercial utilization of biological resources	Imprisonment for up to 3 years	Up to Rs. 5 Lakhs or both imprisonment and fine

⁴⁸ Section 41(3) of the BD Act- “The Biodiversity Management Committees 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.”

Section 56	Any direction given or order made by the Central Government, the State Government, the NBA or the SBB for which no punishment has been separately provided under the BD Act, 2002.	-	1st Offence: Up to Rs 1 Lakh Subsequent Offences: Up to Rs 2 Lakhs Continuous contravention: Additional fine extendable to Rs 2 Lakhs daily
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Penalties range from imprisonment of 3 to 5 years and fine up to Rs one lakh and higher. There have been some cases where foreign citizens have been charged and fined for contravention of Section 3 of the BD Act, viz. the Czech scientist case and the Japanese national case. In both cases, the accused foreigners were collecting biological resources for research purpose without the approval of the NBA.

Information on the quantum of monies collected by the NBA/SBBs as penalties is difficult to lay hands on as there is not a standard format or requirement for NBA and SBBs to publish this information periodically. However, proactive SBBs can bring about improvement in perception of industries towards ABS which can, in turn, help improve compliance with ABS.

3.9 Potential of ABS in India

3.9.1 Global Estimates

This is an under-researched subject in general as also in India. From the literature review on the subject we found a few estimates and some anecdotal information/statements by government officers (see Tables 25-29.)

There is no doubt that bio-resources are having huge economic potential and are the base for many manufacturing sectors such as pharmaceuticals, nutraceuticals, agriculture, horticulture, cosmetics and biotechnology. Markandya (2008) provided a rough estimate for various categories of products derived from bio-resources (Table 26). In the output value a certain amount may be in the form of rent or as abnormal profits.

Table 26: Estimates of monetary value of various products derived from genetic resources

Sector	Size (USD)	Comment
Pharmaceutical	640 bn. in 2006	25-50% derived from genetic resources
Biotechnology	70 bn. in 2006 from public companies alone	Many products derived from genetic resources (enzymes, microorganisms)
Crop protection products	30 mn. in 2006	All derived from genetic resources

Agricultural Seeds	30 bn. in 2006	All derived from genetic resources
Ornamental Horticulture	Global import value 14 mn.	All derived from genetic resources
Personal care, Botanical and Food & Beverage Industries	US \$ 22 bn. for herbal supplements US \$12 bn. for personal care US \$31 bn. for food products	Some products derived from genetic resources, Represents “natural” component of the market.

Source: Markandya A, 2008 as cited in Economic Valuation of Bio-Resources for Access and Benefit Sharing, NBA, Chennai.

Table 27: Economic Potential of Biodiversity (Rs. Crore)

Segment	2009-10		2010-11	
	Exports	Share (%) in Biotech Industry	Exports	Share (%) in Biotech Industry
Bio Pharma	4767.7	54	5535.4	52
Bio Services	2507	95	2986.3	92
Bio Agri.	58.1	3	74.4	3
Bio Industrial	124.1	22	150.2	24
Bio Informatics	73.9	32	106.02	42
Total	7530.8	53	8852.3	51.3

Source: ABLE, 2008; as cited in BIOFIN_YEAR%20II/ABS/NBA_Fact%20Sheets.pdf

Table 28: Global markets for some products derived from genetic resources

Product area	Annual sales (USD bn.)	
	Low estimate	High estimate
Pharmaceuticals	75	150
Botanical medicines	20	40
Agricultural produce	300+	450+
<i>of which:</i>		
Commercial agricultural seed	30	30
Crop protection products	0.6	3
Biotechnology, other than health and agriculture	60	120
Personal care/cosmetic products	2.8	2.8
Rounded total	500	800

Source: K. Ten Kate and SA Laird, The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing (London: Earthscan, 1999)

Table 29: States of products derived entirely from genetic resources (USD bn.)

Product area	Global sales, 1997
Botanical medicines	20
Ornamental horticultural produce	16–19
Agricultural produce	300–450+
<i>of which:</i>	
Commercial agricultural seed	30

Source: Kate and Laird (1999)

Table 30: Sale of products derived in part from genetic resources (USD bn.)

Product Area	Global Sales, 1997	Sales of Natural Origin
Pharmaceuticals	300	75
Personal Care and Cosmetics	55	2.8
Crop Protection	30	0.6 - 3

Source: Kate and Laird (1999)

3.9.2 Some Estimates of Economic Potential of biodiversity in India

State of Uttarakhand: As per a recent news report (UNI, September 2017)⁴⁹, State of Uttarakhand has claimed that it has a biodiversity economy of Rs. 10,000 Crore. Indian entities like Patanjali and Dabur drawing resources from the state for their herbal products have been served notices levying fine to the tune of Rs. 30 lakh each per year for non-compliance.

State of Madhya Pradesh: It is reported that in MP over 1,000 firms, including some MNCs, are collecting biological resources for commercial purposes unchecked and without any levy. As a result the state is losing at least Rs. 2000 crore in revenue per year due to its failure to enforce ABS guidelines. In December 2014, National Green Tribunal had directed MPSBB to issue notices to 500 companies for non-compliance of ABS guidelines.⁵⁰

⁴⁹ <http://www.uniindia.com/patanjali-dabur-violating-biodiversity-act/states/news/871872.html>

⁵⁰ <https://timesofindia.indiatimes.com/city/bhopal/biodiversity-act-tied-in-red-tape-mp-poorer-by-rs-2k-cr-a-year/articleshow/58780205.cms>

4. Key Findings and recommendations

Income proceeds/revenue⁵¹ from biodiversity can be put into three categories: **First**, when revenue is generated from sale, lease, access, use etc. of goods/products and services provided by biodiversity; **second** when income is generated from implementing policies which regulate economic activities (that may adversely impact biodiversity and ecosystems) and/or encourage sustainable practices such as fee, fines, permits in case of fisheries, tourism etc.; **third**, when a compensation amount, impact fee etc. are levied on economic activities which cause significant adverse impact on biodiversity sometimes leading to complete destruction and loss.

The above framework has been used in mapping of various instruments used to generate revenue and in analysis of revenue from seven biodiversity relevant economic sectors in India. Identification of instruments has been done through extensive review of relevant Acts, Rules, and related literature (Table 7). For mapping and analysis of revenue accrued to the central government, the data has been obtained from the Union Budget Documents of the government of India (Tables 8-17).

1. **Implementation of ABS**, which has significant income potential, is in nascent stages of implementation. Relevant institutions are actively working towards addressing the teething issues. Greater focus on minimization and early resolution of ABS related institutional and legal issues is required. There is a need to examine and address the factors that may be constraining the revenue from ABS as well as those that will help enhance the efficiency of use of these funds.

ABS systems should have very clear objectives that are ambitious but realistic. They should be reviewed on a regular basis. On the basis of such reviews, modifications should be considered if deemed necessary.

They should be based on a realistic understanding of how, and to what extent, the industries use genetic resources commercially, and how far they depend on bioprospecting. There is a great deal of anecdotal evidence but a lack of reliable data on this.

Such estimates should provide and set minimum standards for immediate, medium-term and long-term benefit-sharing.

There is need for at least two quick studies in this context:

- i. To make an assessment of ABS potential in India.
 - ii. A review of implementation and enforcement of ABS in other countries and identify good practices and what we can learn from these to improve implementation and enforcement of ABS in India.
2. **CAMPA Fund** is a promising source of resources (Table 10). There is a need for a push for earmarking a specific amount for biodiversity conservation; as well as

⁵¹ Revenue from sectors which are producing value added products using goods and services as inputs from biodiversity are not relevant here.

integration of biodiversity in utilisation of CAMPA especially for restoration and afforestation activities.

3. Available case studies show that eco-tourism is a promising strategy for conservation of biodiversity which can pay for itself. **Ecotourism** is underutilised in India. It is important to record data for ecotourism as a separate head (Table 9).
4. In Fishery and Agriculture and Allied sectors instruments used focus on regulation of activities and promotion of sustainable practices. This seems to be the correct strategy (Tables 16-17).
5. Until the financial year 2016-17, a cess on coal was in operation. The proceeds of cess were collected in **NCEF** which was to be used for various activities such as mitigation of climate change, and restoration and conservation of ecosystems and biodiversity (Tables 14-15). With the implementation of GST since July 2017, the cess on coal as well as the outstanding funds in NCEF have been earmarked for purposes other than mitigation of climate change or conservation of ecosystems and biodiversity.
6. With the introduction of GST, not only the coal cess but two other important environmental cesses have been abolished (Swachh Bharat Cess and Water Cess) besides others. This shows that environmental issues are not considered important in fiscal policy reforms. There is need for a framework to embed environmental considerations in GST.
7. **Creation of a National Environment Restoration Fund:** As suggested in NEP 2006 there is merit in creating a fund from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary contributions. The Fund may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.

Annexure 1: Case Studies of Payment for Ecosystem Services (PES) in India

Payment for Ecosystem Services (PES) are incentives offered to farmers, tribal/rural communities, or landowners in exchange for managing their land to provide some ecological services. In other words PES compensate individuals or communities whose land use or other resource management decisions influence the provision of ecosystem services for the additional costs of providing these services. Minimum compensation in PES is set to counterbalance an income loss by not farming in a designated area or costs of undertaking certain activities. All PES programs aim in procurement of some sort of ecosystem service and the production of such services can be incentivized by some organization or by the government. Following are the two PES mechanisms in India, one incentivized by the government and other by a non-profit organization⁵².

⁵²Exploring Diverse Financial Mechanisms for Biodiversity Conservation towards Advocacy and Policy Uptake, IFMR LEAD.

Case 1: Shimla Water Catchment Wildlife Sanctuary (SWCWS)

SWCWS is a popular tourist spot known for its scenic landscape. The altitude of the sanctuary ranges from 1900 – 2620 m and the range of the temperature is about -5.4°C to 23°C. This sanctuary receives a rainfall of 1600 mm annually. This apart, Shimla Water Catchment has a long history of conservation. It has been conserved for over 150 years. It was established by the British as a reserved forest. A huge water reservoir built in 1901 by the British Government that measures 120 feet in length, 20 feet in breadth and 16 feet in depth, is situated here. Since the area was tapped for water long before the advent of electricity, the supply of water is based on gravity. Initially, there were 25 intakes with a balancing reservoir at Seog, but over the years some of the water sources have become seasonal and only 16 sources are perennial. The water supply was started in 1878 by bringing water to Shimla town through gravity for a population of 16000 residents, as the rain fed stream of water is collected in a large tank constructed over a century ago within the sanctuary. The current capacity is 24 lakh gallons. The water was pumped to Shimla town through a series of steam pumps, reputed to be the first of their kind in the country. Augmentation was done from time to time with the increase in population. Besides, providing water supply to Shimla town, it is an important wildlife sanctuary with immense conservation value. Today, this pristine and undisturbed forest is the wealthiest storehouses of the Himalayan flora and fauna. The sanctuary was leased in perpetuity by the owner – Rana of Koti Estate – to the Shimla Municipal Committee in 1878. It was declared a Protected Forest in 1952 and was finally notified as wildlife sanctuary in 1999. Till 2006, it was under administrative control of Municipal Corporation of Shimla, and was then handed over to the Wildlife Division of Shimla in 2009. Hence, twin objectives of managing the sanctuary are conservation of wildlife and water harvesting. It is considered as one of the best known PES example due to the following reasons:

Institutional Structure:

- Arrangement among Forest Department (FD), Municipal Corporation (MC) and the Irrigation and Public Health (IPH) Department.
- A Shimla Water Catchment Society has been formed for this purpose. The Chief Conservator of Forests is the Chairman, the District Forest Officer is the Member Secretary. Other members are Shimla Sub-Regional Magistrate (Rural-Civil), President of two Panchayats, Executive Engineers from IPH and a Tourism Dept. representative.

Roles and responsibilities

- IPH contributes to maintenance of physical structures of the water tank and pipes through periodic checking and repairs.
- Municipal Corporation of Shimla pays tariff.
- The Forest Department protects and manages the Sanctuary.

Transaction

- MC of Shimla pays tariff to IPH Department of Shimla as IPH and FD together become providers and MC being the beneficiary.
- In the case of Rural Water Supply sector the current rates are Rs.25.19 per KL subject to minimum of Rs.100 per month. Domestic rates are Rs.31.4 per connection per month.
- For Municipal Committee areas the rates are Rs.12.60 per KL and Rs.25.19 per KL for domestic and commercial use respectively.
- For bulk supplies it is Rs.25.19 per KL.
- Payments include connection charges and consumption charges.

Case 2: PES at Kuhan Dam, Himachal Pradesh

Kuhan is located far away in the hills of Himachal Pradesh's Kangra district. This region receives high rainfall and yet faces water shortages due to lack of storage facilities. In 2003 the village pooled resources and with some help from a watershed development project constructed on Gulana Khad, a nullah (creek) that ran across the village. With irrigation now available crop production was able to increase by six times. It became possible to grow vegetables and fruits for cash.

By 2005 the reservoir had collected silt and its capacity halved. The worried villagers looked for a lasting solution. With help from Winrock International, a non-profit organization, the villagers diagnosed the problem and came up with a unique prescription. Most of the silt came from the grazing land of Ooch village, high up the nullah and something had to be done about it. Both villages discussed matters related to saving the dam and reached a formal agreement. This is a case of Coasian bargaining. Ooch banned grazing for eight years on its four-hectare common land and planted saplings of fruit, fodder bearing trees as well as bamboo and elephant grass. In exchange, Kuhan paid for the saplings and even worked out an arrangement to sell irrigation water to Ooch as and when required. The silt load in the nullah reduced and the problem was solved.

A buyer-seller arrangement exists between the two villages that can be brokered. Since Ooch had to compromise on grazing to save the water from siltation, Kuhan, being the beneficiary, compensated for it. This paid for the opportunity cost – the income sacrificed by Ooch for not grazing. Kuhan generated its own funds to pay Ooch when it delivered an environmental service. Winrock International, the NGO, through facilitating the agreement, helped reduce the transaction costs. To extend the logic of the Kuhan-Ooch joint venture to forests, people will want to conserve them if they are paid to do so. Kuhan is an important example, albeit on a small scale, not only of a successful PES model, but also what it implies for the future of resource management. There are lessons here for policymakers.

Chapter 2

Mapping Public Subsidies: Potentially Harmful to Biodiversity

1. The Context

Biodiversity decline and loss encompasses more than just species loss. It also includes the loss of genetic diversity within species and loss of ecosystems. Thus preservation of biodiversity is not about preservation of endangered species alone, but it is about protecting fauna and flora as a whole, which involves the variety of species, and also the many interactions among the species and interactions of species with their ecosystems.

Throughout the world, an increasingly rapid rate of decline in biodiversity has been observed giving rise to fears of serious upheavals in our environment⁵³. Some of the key factors causing this are:

- Overexploitation,
- Loss of Ecosystem Resilience,
- Fragmentation of terrestrial habitats including wetlands caused by infrastructure and residential developments and expansion of agriculture;
- Disturbances in and pollution of marine ecosystems;
- Pollution from industrial and residential activities;
- Introduction of invasive alien species; and
- Climate change.

These factors could be caused/supported by either market failures or policy failures. To the extent certain government policies cause or support these factors it is a matter of concern and calls for investigation so as to identify and implement the appropriate corrective measures.

Public subsidies of a budgetary or fiscal character constitute such policies.

The presence of subsidies and other fiscal policies harmful to biodiversity, in various countries, has also been recognized by the CBD and thus has been captured in Aichi Target 3.

Aichi Target 3 states that “by 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio- economic conditions⁵⁴”.

⁵³ Fossil records indicate that the diversity of species on the planet has never been stable. Instead, diversity rose and fell in natural cycles that spanned tens of millions of years. The problem people face today is an estimated rate of species loss that is nearly 1,000 times greater than historical rates.

<https://sciencing.com/reason-decline-biodiversity-22141.html>

⁵⁴ <https://www.cbd.int/incentives/perverse.shtml>

The recognition of presence of subsidies and the need for reforming subsidies harmful to environment in general, is also found in other international contexts such as:

- a. **The Agenda 21** program adopted at the Rio Conference in 1992 states that the signatory countries shall “remove or reduce those subsidies that do not conform with sustainable development objectives”, as well as “reform or recast existing structures of economic and fiscal incentives to meet environment and development objectives”.
- b. The reference of reforming environmentally harmful actions/subsidies is also found in the **World Summit on Sustainable Development**, adopted at Johannesburg in 2002.
- c. **The European Commission** mentioned this subject in its Green Paper of 2007.
- d. **The EU biodiversity strategy** of 1998 recommends “the removal of incentives with perverse effects on the conservation and sustainable use of biological diversity”⁵⁵. This intention is specified in the new biodiversity strategy of 2011.
- e. Amongst its objectives, the **European Commission** sets the following (17 c): “to provide the right market signals for biodiversity conservation, including work to reform, phase out and eliminate harmful subsidies at both EU and Member State level”⁵⁶.

2. Objectives

In the context of BIOFIN (see BIOFIN Workbook 2016), the purpose of a review and mapping of subsidies is to identify subsidies which can be recommended for a reform with the two main objectives: (i) to reduce their unintended harmful impact on biodiversity, and (ii) to potentially free up public resources which can then be used for promoting conservation of biodiversity.

Accordingly, the objective of this chapter is to undertake a mapping of various subsidies — of a budgetary or fiscal character that may have adverse impact on biodiversity — at the Central Government level. However, going beyond the scope of this chapter three case studies of state level subsidies are also provided with a view to understand if there is any pattern in the trends in magnitude of subsidy at central and state government levels.

3. The Indian Context

In India the question of subsidies, in general, has received attention from the perspective of the extent to which these are a drain on government budget and thus a large part of the research on this subject has been around the estimation and analysis of on-budget subsidies.

The question of fiscal policies, and subsidies that are harmful to environment has received little attention and thus has not been explored much. This is perhaps due to:

⁵⁵ European Commission (1998), “Communication of 4 February 1998 on a European Community biodiversity strategy, COM (1998) 42.

⁵⁶ European Commission (2011), “Our life insurance, our natural capital: An EU biodiversity strategy to 2020”, Communication from the Commission to the European Parliament, the Council, the economic and Social Committee and the Committee of the Regions, COM(2011) 244 final.

- i. The predominance of regulatory instruments (accompanied by some economic instruments) in environmental and biodiversity conservation policies in India⁵⁷;
- ii. The focus of environmental policy has been on addressing ‘market failures’ with little or no attention on investigation of the role of ‘policy failures’; and
- iii. Concerns with subsidies have been articulated in terms of their contribution to ‘deteriorating health of public finances’ and not in terms of their unintended impact on environment and biodiversity in necessary details as may be required.

This is partly reflected in the fact that while it is mandatory, in India, to carry out an environmental impact assessment before a proposed activity/project can be given a go ahead by the government; there is neither a standard requirement for a scrutiny/assessment of ‘fiscal policy, subsidy’ for its negative impact on biodiversity/environment, nor there is a practice of Government presenting the Parliament with an environmental impact assessment with regard to public subsidies of a budgetary or fiscal character.

White Papers on Subsidies commissioned by various central governments have not dealt with environmental and biodiversity impact of subsidies in necessary detail.

4. Subsidies: Definition and Measurement Approaches

4.1 Defining a Subsidy

It has been well recognized that while the definition of a subsidy is a useful part of the framework for a policy discussion, there are several definitions of subsidy and one may use a definition that is most relevant for the analytical purpose at hand⁵⁸. For instance:

- The total volume of the budgetary subsidy will be of particular interest to those wanting to assess the drain on the public money;
- The resource use perspective will consider subsidies looking at whether the price reflects the true resource price (shadow price) of the good;
- Implicit subsidies relating to not paying for environmental impacts may concern not only the local people and the local governments, but also the neighboring jurisdictions/countries and the society at large depending upon the nature of environmental impact.

Barg (1996) proposed three different definitions of subsidies:

⁵⁷ The government’s approach towards prevention of pollution has been mostly in the nature of legislation-based command and control measures while natural resource management has been largely program driven. The use of fiscal instruments towards environmental objectives in India has been rather limited, even though the need to employ economic and fiscal policy instruments for the control of pollution and management of natural resources has gained steady recognition during the 1990s.

⁵⁸ OECD (2006).

- **Economic Definition:** A government-directed, market-distorting intervention which decreases the cost of producing a specific good or service, or increases the price which may be charged for it.
- **Fiscal Definition:** Government expenditure, provision for exemption from general taxation, or assumption of liability which decreases the cost of producing a specific good or service, or which increases the price which may be charged for it.
- **Environmental Definition:** An environmental subsidy consists of the value of uncompensated environmental damage arising from any flow of goods or services

As such, subsidies can be as an important policy tool in achieving well-defined redistributive objectives, and to promote consumption of goods and services with significant positive externalities.

On a theoretical level subsidies can be defined as a form of government support that promotes activities that governments consider beneficial to the economy, a sector, a constituency, or the society as a whole.

However, at the policy level, the issue of determining which measures constitute a subsidy is both tricky and complicated making it difficult for a consensus on a common definition. For instance, categorization is done on whether subsidy is limited to only explicit transfers and payments (eg. income transfers, covering liabilities, tax credits and exemptions etc.); or implicit benefits (resulting from lack of full cost pricing, failure to internalize externalities), and weak regulation and its lax enforcement also fit the definition of a subsidy.

Subsidies are also distinguished in terms of whether they are 'on-budget' and 'off-budget'. On-budget subsidies relate to all expenditures and financial transfers that show up in the government budget. Off-budget subsidies do not show in the budget (Examples: soft loans, guarantees, tax exemptions etc.). However, the latter impact the government revenues and liabilities.

Box 1: Classification of Subsidies

Three main categories of public support

- Subsidies (explicit transfers and payments)
- Expenditures (programmatic interventions)
- Implicit subsidies (lack of full cost pricing; prices not reflecting environmental costs)

On-budget subsidies broadly constitute:

- Direct transfer of funds e.g. grants.
- Potential direct transfer of funds e.g. covering liabilities.
- Government provides goods and services other than general infrastructure.
- Government directs other bodies to do any of the above.

Examples of some off-budget subsidies are:

- Tax credits, exemptions and rebates.
- Implicit income transfers resulting from non-internalization of externalities (prices not reflecting social and environmental costs).
- Implicit income transfer resulting from a lack of full cost pricing.
- Selective exemptions from government standards.
- Further, a subsidy could be a non-targeted general public measure OR it could be a targeted intervention where the beneficiary is identifiable.

4.2 Measuring subsidies

Table 1 provides an overview of some of the methodologies used in estimation of subsidies based on the purpose at hand and the sector for which the assessment of subsidy is done. The purpose of presenting this table is to highlight the limitations of these methodologies in terms of data gaps and the fact that comparability value of such studies may be limited.

Table 1. Overview of subsidy measurement approaches

Approach/Description	Strengths	Limitation
<p>Programme- aggregation Quantifies financial transfers associated with various government programmes. Aggregates programmes into overall level Support.</p>	<p>Captures transfers whether or not they affect prices.</p>	<p>Does not address question of ultimate incidence of pricing distortions. Requires programme-level Data.</p>
<p>Price-gap: Evaluates positive or negative “gaps” between the domestic and border prices. Also known as Market Price Support.</p>	<p>Can be estimated with relatively little data. Useful for multi-country studies. Good indicator of pricing and trade distortions.</p>	<p>Sensitive to assumptions regarding “free market” and transport prices. Understates Full value of support by ignoring transfers that do not affect end market prices.</p>
<p>Resources rent gap: Estimates the difference between the full economic rent and the price paid for exploiting a natural resource.</p>	<p>Relevant for natural resource sectors such as forest and water.</p>	<p>Data intensive. Sensitive to assumptions.</p>
<p>Marginal Social cost approach: Estimates the difference between the marginal social cost (that internalises all externalities) and the price paid.</p>	<p>Most Comprehensive approach. Used for transport.</p>	<p>Data intensive. Requires a significant amount of modelling. Sensitive to assumption and has a wide range of uncertainty.</p>
<p>Producer/Consumer Support Estimate: Systematic method to aggregate budgetary transfers and consumer transfers (through market price support calculation) to specific industries.</p> <p>Unrecovered costs of public provision of private goods.</p>	<p>Integrates budgetary transfers with market price support into holistic measurement of support. Distinguishes between support to producers and Consumers.</p> <p>Captures budgetary subsidies</p>	<p>Data intensive.</p> <p>Does not capture implicit subsidies and does not necessarily distinguish between producer and consumer subsidies.</p>

Based on Koplow & Dernbach, 2001

5. Defining Environmental Subsidies

In studies dealing with budgetary subsidies in India, subsidies have often been defined as unrecovered costs of public provision of private goods⁵⁹.

In the environmental definition of subsidies also, subsidies are taken as unrecovered costs⁶⁰. However, the concept of cost is broader than the one usually applied in case of budgetary studies.

For example, when a budgetary subsidy is used to encourage the production/use of say fertilizer there are two types of unrecovered costs:

- (a) The difference between the cost of provision of fertilizer and the receipts from the users,
- (b) To the extent lower price of fertilizer encourages the use of more than the optimal quantities of fertilizer, it may result in harmful impact on soil, water and crop. The value of these damages are unrecovered costs to the society. This is a typical example of un-internalized externality.

While measurement of (a) is straightforward, measurement of (b) would require huge empirical data which is difficult to come by and poses a serious challenge in subsidy reform.

Moreover, in practice this gets even more complicated owing to the fact that the issue of un-internalized externalities is treated differently across different sectors.

For example:

(i) **In the transport sector** the generally accepted definition of subsidy includes the failure to internalize the marginal social cost of transport (OECD, 2005).

(ii) **In the water sector**, the failure to include the full cost of water is considered to be a subsidy (OECD, 2005).

(iii) In contrast, **in the energy sector** the most commonly used definition considers a subsidy to be any government action that lowers the cost of energy production, raises the price received by energy producers, or lowers the price paid by energy consumers (IEA, 1999; OECD, 2005; UNEP, 2008). Environmental externalities are not considered to be a subsidy in these definitions.

⁵⁹ Mundle and Rao, 1991; Srivastava et. al., 1997. Srivastava, Pandey and Rao, 2012.

⁶⁰ Barg, (1996).

This dichotomy is also reflected in subsidy definitions used by international organizations, while some have focused on un-internalized externalities, others on full cost pricing of resources (Box 2). This perhaps can be attributed to the fact that a broad definition including both full cost pricing of resources and externalities is operationally difficult. Nevertheless, it is important to recognize that such implicit subsidies exist and can be quite significant in all sectors with serious implications for the livelihood and health of citizens.

Box 2: Definitions of harmful subsidies in the context of biodiversity

Convention on Biological Diversity (CBD)

The CBD describes perverse incentives as “*a policy or practice that encourages, either directly or indirectly, resource uses leading to the degradation of biological diversity*”. Hence, such policies or practices induce unsustainable behaviour that reduces biodiversity, often as unanticipated side effects as they were initially designed to attain other objectives. Several common types of perverse incentives are usually identified as: environmentally perverse government subsidies; persistence of environmental externalities; and, laws or customary practices governing resource use⁶¹”.

Environmental Assessment Institute

Subsidy: Policy intervention that allows consumers to purchase goods and services at prices lower than those offered by a perfectly competitive private sector, or raises producers’ incomes beyond those that would be earned without this intervention.

Environmental harmful subsidy: *An environmental harmful subsidy increases production or use of a product/substance with environmental harmful effects.*

Perverse subsidy: A subsidy that is harmful to the environment as well as to the economy even though it may represent some benefits to the receivers of the subsidy

OECD

“In general, a subsidy is a result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs... The more detailed definitions differ between sectors and, sometimes, between countries, organizations and analysts for given sectors. Agriculture is the sector which is the most advanced in using a widely accepted definition, with the total producer support estimate (PSE) providing a measure that is produced by one organization (OECD) and is comparable across countries”.

OECD defines “incentives to broadly include those measures that make use of the price system and market forces to achieve their objectives. Governments use incentive measures in a variety of public policy contexts to achieve socially desirable outcomes as efficiently as possible. In many instances, those incentives will have unforeseen consequences — some of which may be harmful. For such cases, the incentive can be considered 'perverse'. *For biodiversity, perverse incentives are important issues that have been identified as being particularly relevant to its conservation and sustainable use*”.

⁶¹ SCBD 2000: 11

World Resources Institute

“A perverse subsidy in the context of forests is one that causes forest loss or degradation and has no lasting positive impact on economic development. Such subsidies undermine commitments to sustainable development”.

World Trade Organization

“A subsidy shall be deemed to exist if [8]:

(a) (1) there is a financial contribution by a government or any public body within the territory of a Member (referred to in this Agreement as "government"), i.e. where:

(i) A government practice involves a direct transfer of funds (e.g. grants, loans, and equity infusion), potential direct transfers of funds or liabilities (e.g. loan guarantees);

(ii) Government revenue that is otherwise due is foregone or not collected (e.g. fiscal incentives such as tax credits) [9];

(iii) A government provides goods or services other than general infrastructure, or purchases goods;

(iv) a government makes payments to a funding mechanism, or entrusts or directs a private body to carry out one or more of the type of functions illustrated in (i) to (iii) above which would normally be vested in the government and the practice, in no real sense, differs from practices normally followed by governments;

or (a)(2) there is any form of income or price support in the sense of Article XVI of GATT 1994; and

(b) A benefit is thereby conferred”

6. Environmentally Harmful and Environment Promoting Subsidies

Examples of environmental degradation due to market failures:

1. When car drivers pollute the atmosphere for all citizens and gain a benefit at everyone's expense implying that common citizens subsidize the car owners.

2. Similarly, when farmers spray pesticides, they introduce toxic effluents into the commonly shared ecosystems. Industrialists often introduce pollutants into commonly shared water bodies.

3. Policy instruments for containing environmental degradation within acceptable thresholds have often focused on market failures.

Examples of environmental degradation due to policy failures:

When economic policy itself become a cause of environmental degradation, these may be cited as instances of policy failures. Several examples of the environmentally harmful subsidies which are introduced as part of a conscious economic policy may be cited.

(i) Subsidization of agriculture through subsidization of water or fertilizer or support prices can foster over-loading of croplands leading to erosion and compaction of top soil.

(ii) Subsidies to chemical fertilizers and pesticides can lead to overuse and thus adverse impact on biodiversity present in soil and water, and de-nitrification of soils.

(iii) Subsidies for road transportation can cause atmospheric pollution.

(iv) Subsidies for water encourage misuse and overuse of this scarce resource.

Reform of subsidies and other fiscal policies can address these.

Some examples of environmentally beneficial subsidies:

Afforestation programs; subsidies to promote renewable energy, cleaner fuels, energy efficiency; wasteland development; and soil and water conservation.

It is quite likely that the volume of environment promoting subsidies is small, and its impact is limited. On the other hand, the volume of the environmentally harmful subsidies is large, although its environment degrading impact remains unrecognized, unmeasured, and unmonitored. This is discussed in the following sections.

7. Examples of subsidies and their potential harmful impacts in biodiversity relevant economic sectors

In environmental policy discussions and more recently in biodiversity conservation policy discussions there is increasing recognition that there are substantial opportunities for improving the environment, biodiversity, ecosystems and thus the livelihood and health through reform of various subsidies that distort the decisions made by producers and consumers.

This has led to policy research and constructive debate over the issues involved and the policies that should be pursued to address this. Some examples of possible environmentally harmful consequences of subsidies in biodiversity relevant economic sectors are presented in Table 2.

Table 2: Some examples of potential environmentally harmful consequences of sectoral subsidies

1. Fisheries			
Subsidies encourage excess capacity and wastage of fish resulting in overfishing and by-catch problem.			
Other pressures on Marine Biodiversity and Fish Stocks			
Increase in activities such as sea freight, recreation, aquaculture, offshore wind farms, marine current water turbines, wave energy converters, very deep water drilling put pressure on marine environment. These activities benefit from price support and tax exemption , preferential loan, capital grants etc.			
S No.	Type of subsidy	Examples of subsidies	Example of environmental damage
1	Direct payments	<ul style="list-style-type: none"> • Price support payments to fishers • Grants for new vessels • Grants for modernization • Vessel decommissioning payments • Buyouts of licenses and permits • Buyouts of quota and catch history • Income support 	<ul style="list-style-type: none"> • Depletion of species • Damage to marine ecosystems/biodiversity • Reduced gene-pool
2	Cost reducing transfers	<ul style="list-style-type: none"> • Fuel tax exemptions • Subsidized loans for vessel construction • Subsidized loans for vessel modernization • Payments to reduce accounting costs • Provision of bait services • Loan guarantees • Preferential taxation • Insurance support • less wasteful gear 	
3	General services	<ul style="list-style-type: none"> • Research expenditure • Management expenditure • Enforcement expenditure • Market intervention schemes • Regional development grants • Support to build port facilities • Protection of marine areas 	
2. Agriculture			
Incentives leading to intensified production may cause increased emissions of e.g. pesticides, nitrogen, phosphorus, greenhouse gasses. Increased monoculture may result in increased soil exhaustion and increased pesticide usage; while Increased usage of marginal land may cause deforestation and thus increased erosion.			
1	Direct payments	<ul style="list-style-type: none"> Market price support Other output support 	

		Natural disaster support	<ul style="list-style-type: none"> • Eutrophication of lakes, oceans, groundwater/public water supplies. • soil degradation and erosion • wetland loss and reductions in groundwater levels from over abstraction as a result of drainage or irrigation • Water Pollution • global warming • Eutrophication of terrestrial ecosystems from deposition of airborne nutrients • loss of biodiversity-rich extensive farmlands due to increased fertilizer use.
2	Cost reducing transfers	<ul style="list-style-type: none"> • Subsidy on Fertilizer • Subsidy on Energy • Subsidy on Water • Subsidy on Pesticide • Insurance support • Subsidized loans • Loan waivers 	
3	General Services	<ul style="list-style-type: none"> • Research and development expenditure • Extension services support 	

3. Water

Water is linked to biodiversity in terms of its quality as well as its quantity. Deterioration of water quality affects aquatic biodiversity. The extraction of excessive amounts of water from rivers causes considerable damage to aquatic environments and endangers the species that live in them

	In general, the different subsidies result in underpriced water (in case of both irrigation and household use), which will then be used inefficiently, resulting in water being wasted.	<p>Irrigation water: subsidies are government expenditure covering all or some of the costs of installing and/or maintaining surface irrigation systems, or on the basis of the water's true value to the irrigator.</p> <p>Various cost reducing transfers are provided for developing under-ground water based irrigation.</p> <p>Municipal water supplied for households: subsidies are government expenditure covering all or some of the costs of installing and/or maintaining water supply systems</p>	<ul style="list-style-type: none"> • Salinization • Waterlogging • Decline in water tables • disruptions of river hydrology • siltation of water bodies • draining of wetlands • depletion of fish stocks • Water pollution and disease • Reduced farmland productivity • Increased pressure on marginal/ecological fragile land.
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4. Mining

	Direct payments		<ul style="list-style-type: none"> • pollution of water sources from mercury and cyanide, dust, mine pits • diversion of rivers • water siltation • landscape degradation • deforestation • destruction of aquatic life habitat • loss of biodiversity • Contamination of soil, groundwater and surface water by chemical from mining process.
	Cost reducing transfers	Underpricing of the resource	
	General services		

			<ul style="list-style-type: none"> • Formation of sink holes
5. Infrastructure			
	Direct payments		<ul style="list-style-type: none"> • Land degradation • Forest loss, degradation • Biodiversity loss, habitat fragmentation • Fresh water: scarcity, pollution • Marine and coastal zones: degradation • Atmosphere: pollution • Urban and industrial: contamination, waste
	Cost reducing transfers	Non-internalization of external costs	
	General services		
6. Forests			
Various sectoral subsidies may encourage to deforestation and degradation of forests and thus biodiversity loss.			
	<ul style="list-style-type: none"> • Subsidies to agriculture, infrastructure, mining etc. • In many cases subsidies to forestry may encourage monoculture/plantation • Subsidies encourage over-logging 	<ul style="list-style-type: none"> • Subsidies to many sectors other than forests encourage conversion of forest land into other uses 	<ul style="list-style-type: none"> • Flooding • Groundwater quality • Soil Erosion • Global warming • Less biodiversity (reduced gene-pool) • commercial logging contribute to deforestation
7. Transport			
The subsidies result in increased traffic resulting in Increased air pollution, Waste and Noise with implications for health issues, declining water quality, and land use			
	General services	Transport-related services provided by government at less than full cost	<ul style="list-style-type: none"> • Land use change • Increased pollution and waste. • Stress on biodiversity • Air pollution due to combustion of fossil fuels in engines. • Increased health problems due to transport noise • Declining water quality • Global warming
8. Energy			
Direct and indirect transfers to producers, provision of energy related infrastructure and services, supply at low prices/free energy to farmers. Lower energy prices for consumers increase consumption and result in waste and spills. This leads to health issues, global warming and encourages inefficient use water			
	Direct payments	<ul style="list-style-type: none"> • Grants to producers • Grants to consumers 	<ul style="list-style-type: none"> • Overuse stimulates local pollution. • Global Warming

			<ul style="list-style-type: none"> • Declining Water Quality • Eutrophication
	Cost reducing transfers	<ul style="list-style-type: none"> • Supply at low prices/free energy to farmers • Low-interest or preferential loans to producers • Preferential tax treatment • Rebates , Tax credit , Accelerated depreciation allowances on energy equipment 	<p>Groundwater exploitation</p> <p>Water systems are affected by:</p> <ul style="list-style-type: none"> • Deposition of acid rain • hazardous air pollutant
	General services	Direct investment in energy infrastructure, research and development	<ul style="list-style-type: none"> • Renewable energy could also have negative environmental impacts even though they do not contribute to global warming. For instance, the building of dams can result in the loss of forests, wildlife habitat, species population, aquatic biodiversity.

Source: Authors' construction.

8. Magnitudes of subsidies: Some Estimates

Discussion in preceding sections brings out that an assessment of environmentally harmful subsidies in a country would require estimates of subsidies from a large number of sectoral studies. It has also been pointed out that such studies are difficult to find in the literature as the subject of environmental subsidies is an under researched area in many countries especially in developing countries including India -- due to poor focus, and methodological issues and data gaps in estimation of external costs and opportunity costs/shadow prices. Data gaps are also there in estimating implicit subsidies.

In this section we have put together: (i) estimates of explicit subsidies in respect of sectors and schemes relevant for biodiversity (see Section 8.1; Table 3) put out by the Central Government in its budget documents; and (ii) estimates of energy subsidies, drawing on a recent study (IISD, 2017)⁶², provided by the Central Government in India (see Section 8.2; Tables 4-8).

8.1 Explicit Subsidies with a Bearing on Biodiversity: Put out by the Central Government

⁶² India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017. Also available at <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

Table 3: Explicit Subsidies in Central Government Budget (Rs. Crore)

	Type of Subsidies	Actuals	Actuals	Revised Estimates	Budget Estimates
		2015-2016	2016-2017	2017-18	2018-2019
		1	Total Food Subsidy	139419	110172.96
	Urea Subsidy	50477.61	47469.51	42721.7	44989.5
	Nutrient based Subsidy	21937.56	18843.42	22251.8	25090.35
2	Total Fertiliser Subsidy	72415.17	66312.93	64973.5	70079.85
	LPG Subsidy	22660	18678	15656.33	20377.8
	Kerosene Subsidy	7339	8860.71	8804.15	4555
3	Total Petroleum Subsidy	29999	27538.71	24460.48	24932.8
4	Procurement of Cotton by Cotton corporation under Price Support Scheme	259.6	609.75	302.67	924
5	Production Subsidy to Sugar Mills to offset cost of Cane and facilitate timely payment of Cane price dues of Farmers	...	521.71	23.1	...
6	Scheme for Extending Financial Assistance to Sugar Undertakings, 2014	800	616.52	385	200

Source: Budget documents of the Central Government, Ministry of Finance, Government of India.

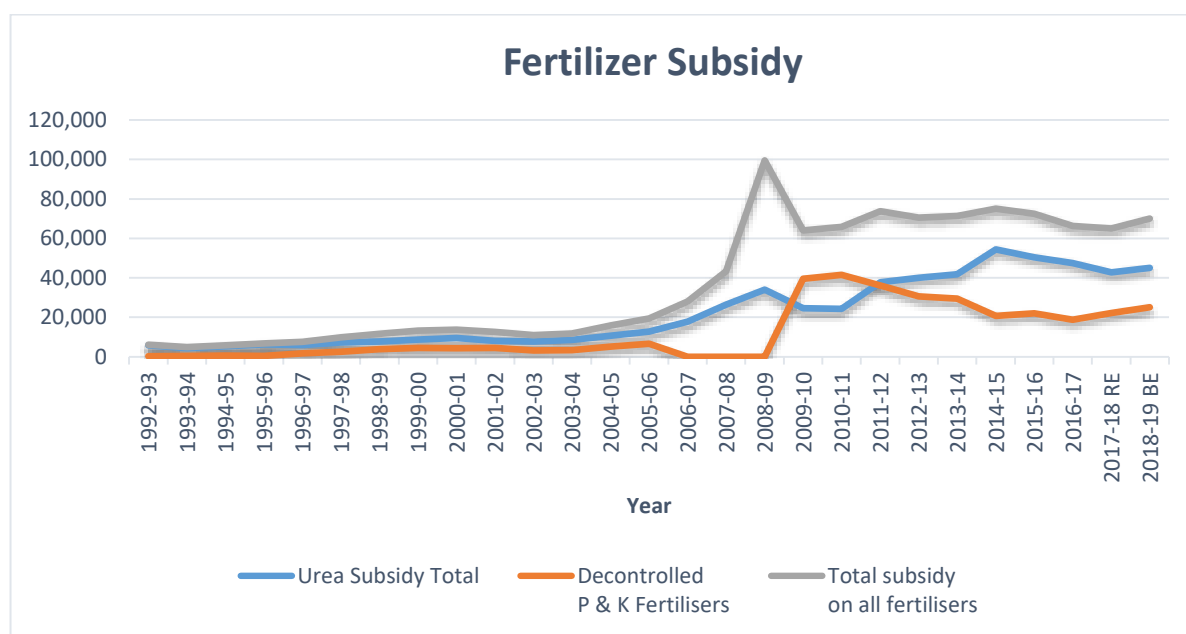
8.1.1 Fertilizer Subsidy by Central Government: Some Trends

The subsidy on fertilisers as defined in India is the difference between net realization by the domestic fertiliser manufacturers (farmer’s price minus distribution margins) and the ex-factory retention price (inclusive of equated freight) fixed by the government. In the case of imported fertilisers, the subsidy is the difference between the C.I.F. (cost, insurance and freight) price of imported fertiliser plus the pool handling charges and the farmer’s price (excluding dealer’s margins and sales tax)⁶³.

Since FY 2011-12 fertiliser subsidy shows a stabilising trend. Subsidy on urea has seen a decline while nutrient based subsidy is on a slight upward trend (Figure 1).

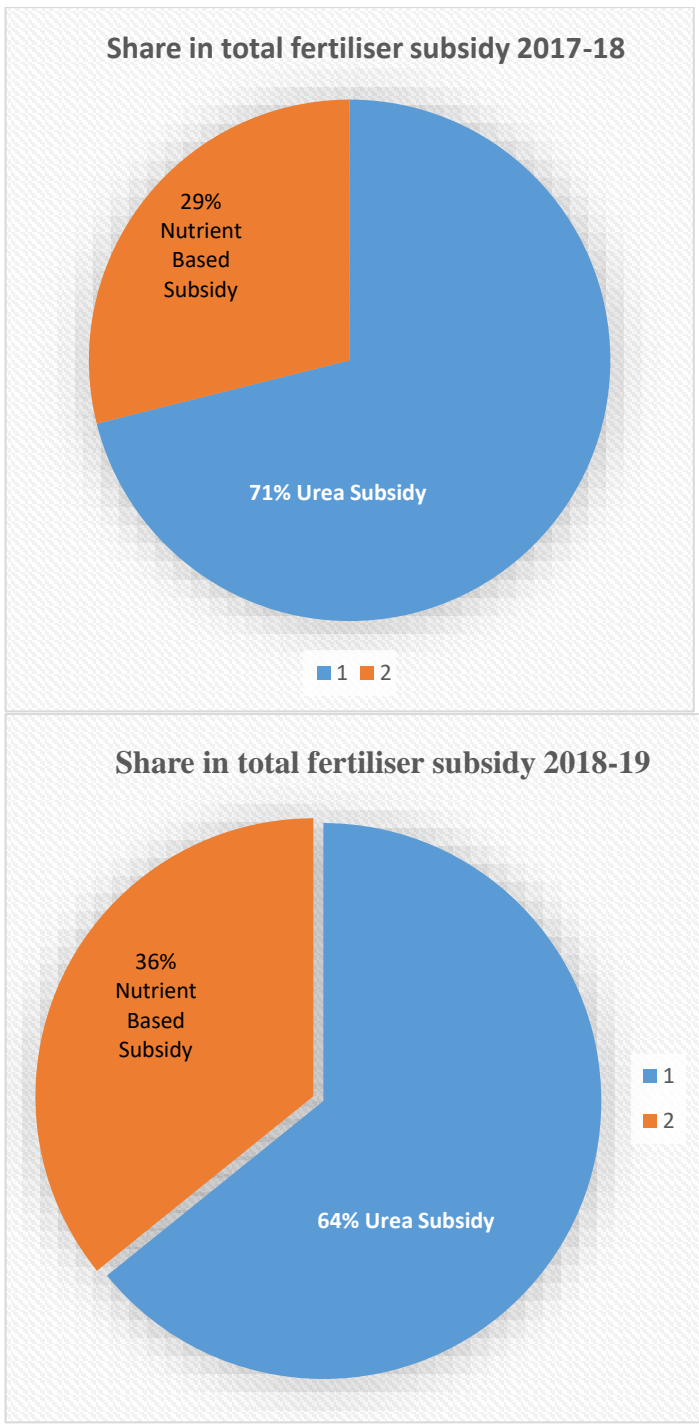
It may also be seen from Table 3 that petroleum subsidies as well as subsidies to Sugar cane farmers and sugar industry also show a declining trend.

Figure 1: Trends in Fertilizer Subsidy by the Central Government (Rs Crore)



⁶³ https://www.indiaagronet.com/indiaagronet/Manuers_fertilizers/contents/fertiliserPricesubsidies.htm

Figure 2: Components of fertiliser subsidies: As share of total subsidies



8.2 Energy Subsidies by Central Government in India: Some Estimates

The section draws heavily from a recent study, IISD (2017)⁶⁴. This report claims to present the first comprehensive inventory of energy subsidies in India by the Central Government. One of the aims of the study is map the magnitude and trends in government support from fossil fuels to renewables, and to enhance transparency and dialogue on energy choices in India.

Table 4: Typology of energy subsidies depending on their mechanism

Direct and indirect transfer of funds and liabilities	Direct spending	<p>Earmarks: Special disbursements targeted at the sector.</p> <p>Agency appropriations and contracts: Targets spending on the sector through government budgets.</p> <p>Research and development support: Funding for research and development programs</p> <p>Government procurement of goods or services for above-market rates</p>
	Government ownership of energy-related enterprises	<p>Security-related enterprises: Strategic petroleum reserve; securing foreign energy shipments or key assets.</p> <p>Municipal utilities and public power: Significant public ownership of coal- and natural gas-fired electricity stations; some T&D systems for both natural gas and electric power</p>
	Credit support	<p>Government loans and loan guarantees*: market or below-market lending to energy-related enterprises, or to energy-intensive enterprises such as primary metals industries</p> <p>Subsidized credit to domestic infrastructure and power plants</p> <p>Subsidized credit to energy-related exports</p>
	Insurance and indemnification	<p>Government insurance/indemnification: market or below-market risk management/risk-shifting services</p> <p>Statutory caps on commercial liability: can confer substantial subsidies if set well below plausible damage scenarios</p>
	Occupational health and accidents	Assumption of occupational health and accident liabilities
	Environmental costs	<p>Responsibility for closure and post-closure risks: facility decommissioning and cleanup, long- term monitoring, remediation of contaminated sites, natural resource restoration, litigation</p> <p>Waste management: avoidance of fees payable to deal with waste</p> <p>Environmental damages: avoidance of liability and remediation to make the environment whole.</p>
Government revenue foregone	Tax breaks and special taxes	<p>Tax expenditures: Tax expenditures are foregone tax revenues, due to special exemptions, deductions, rate reductions, rebates, credits and deferrals that reduce the amount of tax that would otherwise be payable.</p> <p>Overall tax burden by industry: Marginal tax rates are lower than other industry.</p> <p>Exemptions from excise taxes/special taxes: excise taxes on fuels, special targeted taxes on</p>

⁶⁴ India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017. Also available at <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

		energy industry (e.g., based on environmental concerns or “windfall” profits)
Provision of government goods or services below market value	Government-owned energy minerals	<p>Process for mineral leasing: auctions for larger sites, sole-source for many smaller sites</p> <p>Royalty relief or reductions in other taxes due on extraction: reduced, delayed or eliminated royalties are common at both federal and provincial levels. Royalties targeted based on type of energy, type of formation, geography or location of reserve (e.g., deep water).</p> <p>Process of paying royalties due: allowable methods to estimate and pay public owners for energy minerals extracted from public lands</p>
	Government-owned natural resources or land	Access to government-owned natural resources land: at no charge or for below fair-market rate
	Government-owned infrastructure	Use of government-provided infrastructure: at no charge or below fair-market rate
	Government-provided goods or services	Government-provided goods or services at below-market rates
Income or price support	Market price support and regulation	<p>Consumption mandates and mandated feed-in tariffs: fixed consumption shares for total energy use.</p> <p>Border protection or restrictions: controls on imports or exports leading to unfair advantages.</p> <p>Regulatory loopholes: any legal loopholes, either in the wording of the statute or in its enforcement, that transfers significant market advantage and financial return to particular energy market participants</p> <p>Regulated prices set at below-market rates: for consumers (including where there is no financial contribution by government)</p> <p>Regulated prices set at above-market rates: including government regulations or import barriers</p>

Source: IISD, 2017

8.2.1 Subsidies to Electricity Transmission & Distribution

Electricity Transmission & Distribution (T&D) in India faces several challenges, such as ageing infrastructure and a lack of financial resources for existing utilities, as well as expanding access for people still living without electricity. Subsidies seek to strengthen T&D infrastructure and provide financial support to distribution utilities under a range of programs that are funded by both central and state governments.

Fourteen subsidies have been identified to T&D provided by the central government. Their total value has increased from Rs. 40,331 crore in FY 2013-14 to Rs. 64,896 crore in FY 2015-16 (61% increase). There are two main reasons for this increase.

- First, allocations under ongoing schemes were increased, including in the form of budgetary transfers to distribution companies (DISCOMs) to cover losses for supplying power at low rates to agriculture and household consumers.

- Second, new schemes were introduced, such as the National Electricity Fund Scheme and the Power Sector Development Fund.⁶⁵

However, during FY 2015-16 and FY 2016-17 there has been a sharp decrease of 86% in subsidy (Table 5 and Figure 3). It may be due to, the central and the state governments have provided bailout packages to distribution companies from time to time in order to improve their operational and financial performance. A Financial Restructuring of State DISCOMS scheme was introduced in 2012, but it did not change the poor financial health of DISCOMs, and this led to the UDAY restructuring scheme to bail out the ailing DISCOMs. The government has committed to taking over 75 per cent of DISCOM debt totalling Rs 170,000 crore over a two-year period in FY 2015-16 and FY 2016-17.

Table 5: Central Government Support to Transmission & Distribution (Rs. crore)

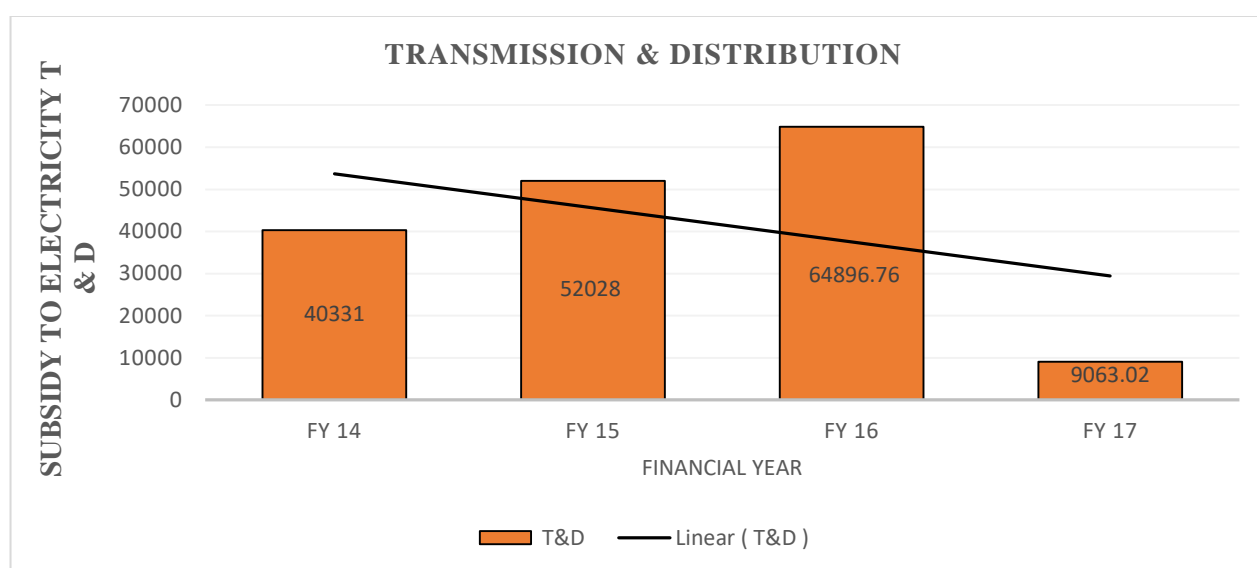
Subsidy	2013- 14	2014- 15	2015- 16	2016- 17
Deendayal Upadhyaya Gram Jyoti Yojana" (DDUGJY)	2594.0	2414.0	4500.0	3350.0
Integrated Power Development Scheme (IPDS)	575.0	1261.0	1001.6	4524.0
Subsidised loans from multilateral organisations	not calculated	not calculated	not calculated	not calculated
Power System Development Fund (PSDF)	not in place	1.0	1150.7	619.3
Fund for Power System Improvement in North Eastern States excluding Arunachal Pradesh and Sikkim	not in place	150.0	247.3	78.0
Fund for Strengthening of Transmission Systems in the States of Arunachal Pradesh and Sikkim	not in place	100.0	150.0	255.3
Fund for Energy efficiency and energy conservation activities implemented through Bureau of Energy Efficiency (BEE)	82.0	41.0	91.8	111.3
Research and Training support by Ministry of Power	28.0	95.0	67.0	106.2
National Electricity Fund (NEF) (Interest subsidy) Scheme	-	1.0	7.0	9.0
National Smart Grid Mission	not in place	not in place	1.3	10.0
Green energy corridor projects	not in place	not in place	not in place	not in place
Custom duty rebates on transmission and distribution equipment	not calculated	not calculated	not calculated	not calculated

⁶⁵India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017 <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

Excise duty rebates on transmission and distribution equipment	not applicable	not applicable	not applicable	not applicable
Under-recovery of costs by distribution utilities for keeping below-market prices for certain categories of consumers	37052.0	47965.0	57680.0	not available
Total	40331.0	52028.0	64896.8	9063.0

Source: IISD, 2017

Figure 3: Subsidies to Electricity Transmission & Distribution



Source: IISD, 2017

8.2.2 Subsidies to Coal

The government provides support in the form of direct and indirect subsidies to coal sector companies (mainly CIL). This includes support for undertaking regional drilling for identification of additional resources of coal and lignite and exploration in difficult areas, funds for conservation and safety of coal mines, financial support for improving environmental conditions in old mined-out areas, special benefits for employees and exemptions from paying duties and taxes for coal mining equipment, among others.⁶⁶

A number of subsidies (a total of 18) have been identified; of which only ten have been quantified, owing to data limitations. Total amount of subsidies for the coal mining sector is estimated at Rs. 15,791 crore in FY 2013-14 and Rs. 14,979 crore in FY 2015-16. This includes indirect subsidies in the form of government revenue foregone due to concessional duties and taxes, which is around 90 per cent of the total subsidies, and direct budgetary support which is only 10 per cent of the total subsidy. The coal subsidy is decreased by 44% for the FY 2016 - 17.

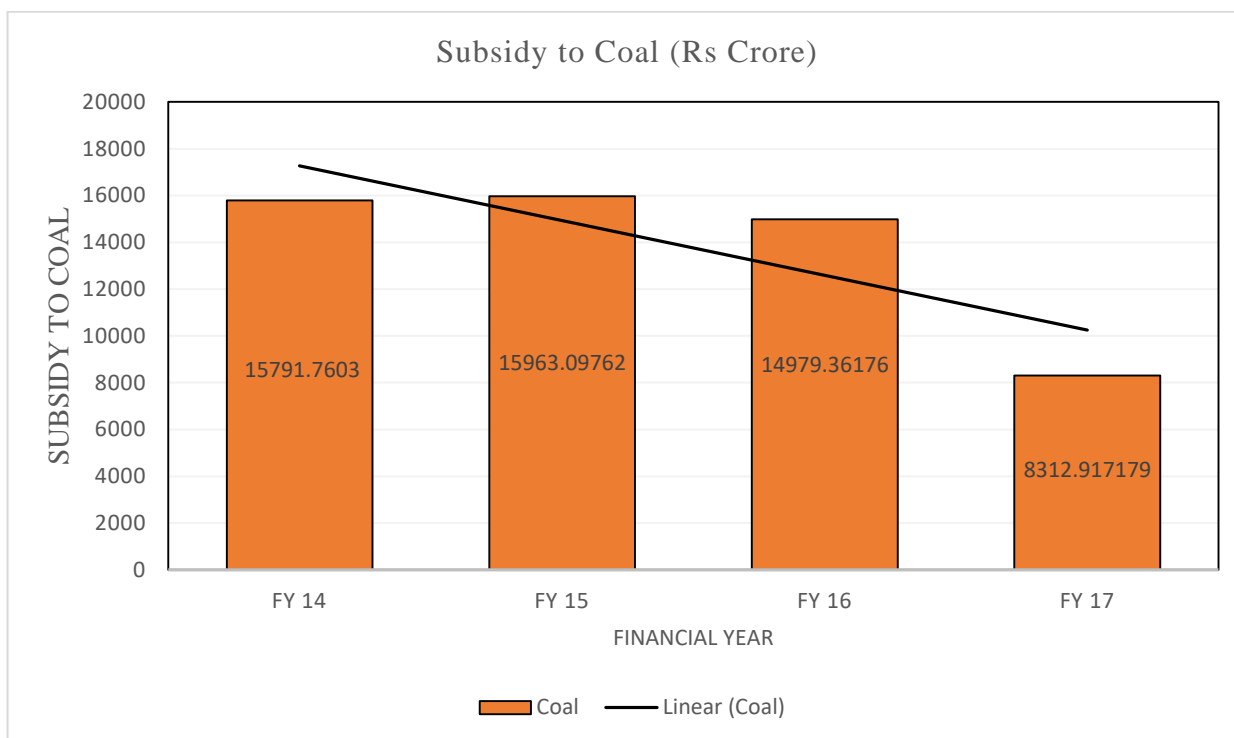
⁶⁶ India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017 <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

Table 6: Central Government Support to Coal (Rs crore)

Subsidy	2013- 14	2014- 15	2015- 16	2016- 17
Non-incurrence of costs due to non-compliance of mandate related to coal washing/beneficiation	995.5	1043.8	1064.2	1103.4
Conservation and Safety in Coal Mines and Development of Transport Infrastructure under Coal Conservation and Development advisory Committee (CCDA)	261.1	260.0	245.0	350.5
Detailed Drilling in Non-CIL /Captive Mining Blocks	184.5	135.7	151.2	89.5
Promotional (Regional) Exploration in Coal and Lignite	64.0	58.8	105.1	50.0
Coal Mines Pension Scheme	22.0	22.3	22.4	21.0
Research and Development (R&D) Programs in the Coal Sector	11.7	18.0	18.0	10.0
Credit support from Multilateral organisations	not calculated	not calculated	not calculated	not calculated
Environmental Measures and Subsidence Control	1.0	0.5	0.5	0.5
Low interest rate loans for power plants	not calculated	not calculated	not calculated	not calculated
Concessional Custom Duty Rates on import of Coal	7991.0	7839.0	6452.0	6688.0
Concessional Excise Duty Rates on Coal Production	6215.0	6526.0	6886.0	not available
Concessional Duty Rebates on Coal Mining Equipment	46.0	59.0	35.0	not available
Income Tax exemption for the generation of power	not calculated	not calculated	not calculated	not calculated
Concessional rates Railway Freight for long distance Coal Transportation	not calculated	not calculated	not calculated	not calculated
Government Revenue Foregone from coal distribution through MoU route (rather than competitive bidding route)	not applicable	not applicable	not applicable	not applicable
Compensation for land acquired for coal mining purposes	not calculated	not calculated	not calculated	not calculated
Lack of regulator in Coal Sector	not calculated	not calculated	not calculated	not calculated
Pricing of Coal	not calculated	not calculated	not calculated	not calculated
Total	15791.8	15963.1	14979.4	8312.9

Source: IISD, 2017

Figure 4: Subsidy to Coal



Source: IISD, 2017

8.2.3 Subsidy to Oil and Gas

Owing to limited indigenous capacity of oil and gas, the reliance on imported crude is huge in India. In view of this, Indian Prime Minister Narendra Modi has “urged all stakeholders to increase the domestic production of oil and gas to reduce import dependence from 77 per cent to 67 per cent by the year 2022” (Lok Sabha Secretariat, 2017). In consonance with this vision of reducing import dependence, several measures have been undertaken to transform India into a refining hub.

To this end, the GoI also provides support to both production and consumption of oil and natural gas in the form of direct budgetary allocations and indirect measures such as tax and duty exemptions, income or price support and the provision of goods and services below market value.⁶⁷

From FY 2013-14 to FY 2016-17 subsidy is reduced by more than three quarters Table 7 and Figure 5).

⁶⁷ India’s Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017. Also available at <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

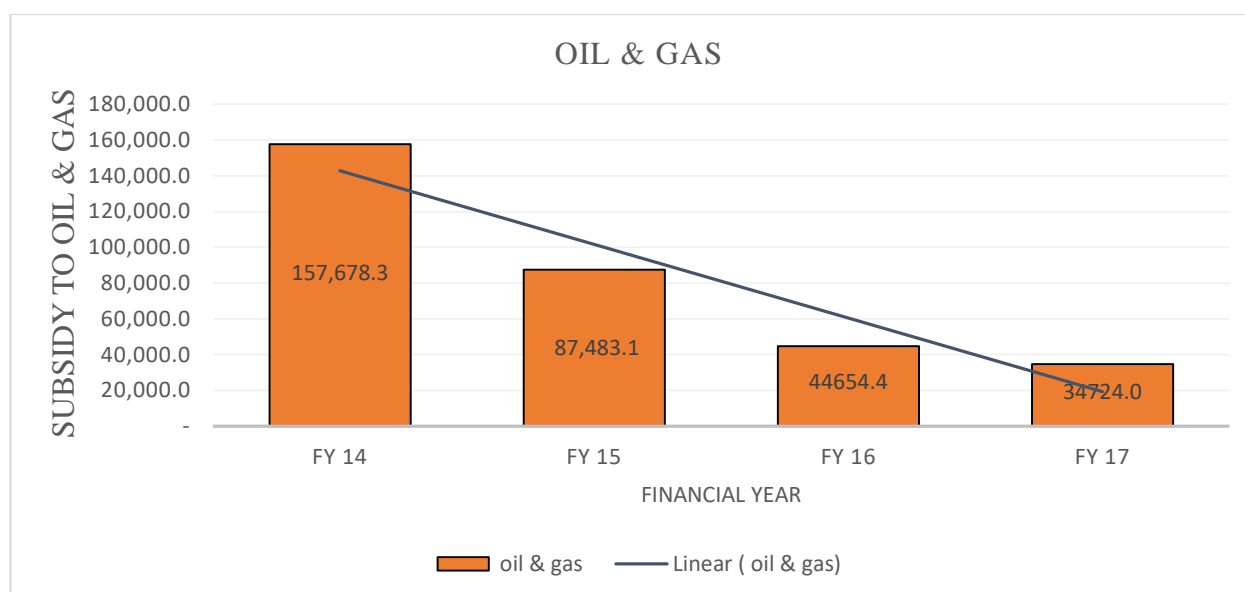
Table 7: Central Government Support to The Oil & Gas (Rs. crore)

Subsidy	2013-14	2014-15	2015-16	2016-17
Freight Subsidy on Domestic LPG	16.0	17.0	not applicable	not applicable
Freight Subsidy on PDS Kerosene	5.0	4.0	not applicable	not applicable
Fiscal Subsidy on LPG	1904.0	2272.0	not applicable	not applicable
Fiscal Subsidy on Kerosene	676.0	not applicable	not applicable	not applicable
DBTL Subsidy on Domestic LPG (Subsidised)^	3869.3	3970.9	16056.1	12133.0
Rajiv Gandhi Gramin LPG Vitaran Yojana	not applicable	not applicable	not applicable	not applicable
Permanent Cash Advance pertaining to DBTL	1234.0	not available	5755.0	not available
Project Management Expenditure pertaining to DBTL	43.2	not applicable	200.0	not available
DBTK (Actual and BE)	not applicable	not available	not available	0.0
Cash Incentives for Kerosene Distribution Reforms*	not applicable	not available	not available	81.0
Assistance to States/UTs for establishment of Institutional mechanism for direct transfer of subsidy in cash for PDS Kerosene beneficiaries* (RE and BE)	not applicable	not available	not available	2.0
Natural Gas Subsidy Scheme for North Eastern States	625.0	661.0	660.0	744.6
Diesel Subsidy in Drought and Deficit Rainfall Affected Areas	not available	not available	not available	7.4
Under Recovery on Diesel#	62836.9	10934.6	not applicable	not applicable
Under Recovery on Domestic LPG (Subsidised)^	46457.8	36580.2	18.4	not applicable
Under Recovery on PDS Kerosene	30574.5	24799.4	11496.2	7595.0
Customs Duty Exemption on Imported LPG use for Domestic Use	not computed	not computed	not computed	not computed
Excise Duty Exemption on Domestic LPG	4,055.71	3,702.58	5,045.61	5,844.20
Sales Tax Differential on LPG under Declared Good Status	not computed	not computed	not computed	not computed
Customs Duty Exemption on PDS Kerosene	not computed	not computed	not computed	not computed

Subsidy	2013-14	2014-15	2015-16	2016-17
Excise Duty Exemption on PDS Kerosene	4279.7	3471.6	1795.1	1229.8
Customs duty exemption to power companies purchasing imported LNG	910.5	534.5	248.5	58.1
Expenses on LPG Subsidies for the Poor (Ujjwala Scheme)	not applicable	not applicable	not applicable	2500.0
OMC Support for Extension of LPG connection to poor families under CSR Scheme@	39.1	224.8	791.5	not available
Oil Industry Development Board (OIDB) grants and subsidies on oil and gas	151.7	310.6	275.2	not available
Expenditure towards ISPRL towards strategic petroleum reserves*	not available	not available	1159.9	2046.0
Capital Outlay on Petroleum	not available	not available	1153.0	2483.0
Income Tax exemption to companies engaged in production of “mineral oil” from NELP blocks	not computed	not computed	not computed	not computed
Differential taxes between Indian and foreign companies engaged in E&P	not computed	not computed	not computed	not computed
Income Tax exemption to foreign companies involved in storage and selling of crude oil in India	not computed	not computed	not computed	not computed
Special allowances to companies engaged in E&P	not computed	not computed	not computed	not computed
Special Allowance/Deduction for site restoration expenses	not computed	not computed	not computed	not computed
Accelerated Depreciation on specified assets for mineral oil exploration	not computed	not computed	not computed	not computed
Allowance for investment in new machinery	not computed	not computed	not computed	not computed
Allowance/Incentives for investment in cross-country pipeline network for distribution and storage facilities	not computed	not computed	not computed	not computed
Allowance/Incentives for capital expenditure on research	not computed	not computed	not computed	not computed
Customs duty exemption to import of specified goods required for petroleum operations	not computed	not computed	not computed	not computed
Concessional Royalty under Hydrocarbon Exploration and Licensing Policy (HELP)	not computed	not computed	not computed	not computed
Total	157678.3	87483.1	44654.4	34724.0

Source: IISD, 2017

Figure 5: Subsidies to Oil and Gas



Source: IISD, 2017

8.2.4 Subsidies to Renewables

Government is providing a number of subsidies through a wide range of mechanisms, including direct subsidies in the form of budgetary support and indirect subsidies through policies such as tax breaks, credit support, and services provided below market value and price support incentives for renewable energy projects. They are provided across the value chain of renewable energy projects—that is from R&D to entrepreneurial activity, manufacturing, project development and end-consumption.⁶⁸

The total subsidies provided by the central government has more than doubled from Rs 2,607 crore in FY 2013-14 to Rs 9,310 crore in FY 2015-16. Owing to data limitation, a lot of subsidies could not be estimated for FY 2016-17; however, where data was available, subsidies totalled Rs 14,500 crores. This is primarily due to the introduction of new schemes, an increase in expenditure on pre-existing schemes and incremental tax breaks owing to large capacity additions. The subsidy has increased by 456% From FY 2013-14 to FY 2016-17.

⁶⁸ India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017. Also available at <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

Table 8: Central Government Support to Renewable Energy Sector (Rs crore)

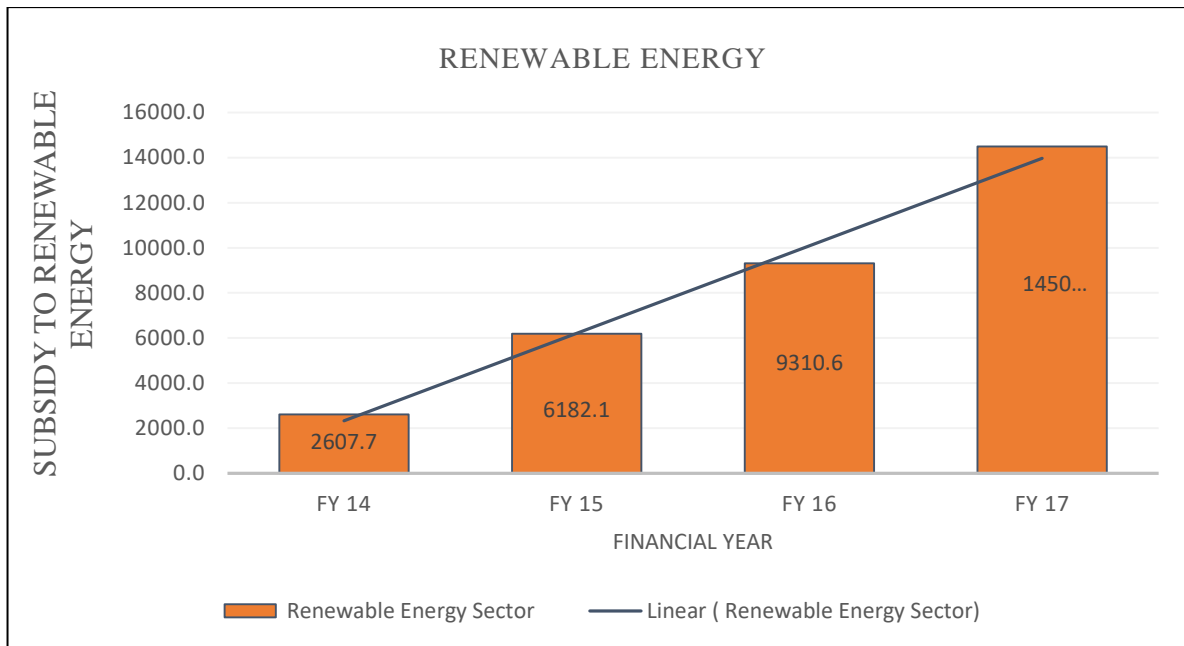
Subsidy	2013-14	2014-15	2015-16	2016-17
Viability Gap Funding (VGF) Scheme- 750 MW, 2000 MW, 5000 MW under Jawaharlal Nehru National Solar Mission (JNNSM) Phase II	468.8	468.8	968.8	2593.8
Off-Grid and Decentralized Solar Application Scheme	not available	224.3	684.5	31.5
Scheme for development of Solar Parks and Ultra Mega Solar Power Projects	not in place	172.5	365.7	162.8
Support for Research and Development activities	146.9	131.6	92.3	205.1
Grid Connected SPV Rooftop and small solar power programme	1.5	3.7	4.0	499.6
National Biogas and Manure Management Programme (NBMMP)	90.3	122.7	131.1	142.0
Scheme for setting up of over 300 MW of solar power projects by Defence establishments	not in place	150.0	150.0	150.0
Scheme for setting up of 1000 MW of Grid-Connected Solar PV Power projects by Central Public Sector Undertakings (CPSUs) under Batch- V of Phase II of JNNSM	not in place	not in place	128.8	304.4
MNRE Small Hydro Incentive Schemes	114.1	106.5	100.0	not available
Financing and non-financing schemes: IREDA and other organisations	39.3	77.1	122.4	not available
Canal Bank/ Canal Top Scheme	not in place	69.0	76.0	76.0
Support for Grid Interactive Biomass Power and Bagasse Cogeneration in Sugar Mills	5.6	77.5	29.0	10.3
Biomass Gasifier Programme	0.0	14.3	14.3	14.3
Small Wind Energy and Hybrid Systems (SWES) Programme	5.0	10.0	3.0	10.0
Capital subsidy scheme for promoting Solar Photovoltaic water pumping systems for irrigation purpose	not in place	5.9	14.7	not available
Biogas Power (off-grid) Programme for decentralized	5.8	0.4	3.2	not available

Subsidy	2013-14	2014-15	2015-16	2016-17
power generation applications and thermal applications				
Implementation of Wind Resource Assessment in Uncovered/New Areas under NCEF Scheme and subsequent development.	0.9	0.5	1.8	not available
Scheme for installation of Solar Charging Stations with LED lanterns	not in place	not in place	not in place	not in place
Akshay Urja Shops Programme ⁶⁹	not available	not available	not available	not available
Accelerated Depreciation	909.0	2686.0	3885.0	5471.0
Tax breaks on Excise and Custom Duty: Solar & Wind	642.0	1682.0	2365.0	4660.0
Waiver of inter-state transmission charges and losses on transmission of electricity generated from solar and wind plants	not in place	not in place	not in place	not available
Generation Based Incentive (GBI) for Grid Interactive Wind Power Projects	171.0	171.0	171.0	171.0
Market Development and Promotion of Solar Concentrators Based Process Heat Applications	7.5	8.3	not in place	not in place
Total	2,607.7	6,182.1	9,310.6	14,501.8

Source: IISD, 2017

⁶⁹ India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017 <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

Figure 6: Subsidies to Renewables (Rs Crore)



Source: IISD, 2017

9. Case Studies of Subsidies in three States of India

Case study 1: Haryana

Irrigation policies are under the administrative control of state governments and while farmers are charged for using surface water for irrigation, many state governments have not revised water tariffs for over two decades. This has led to revenue losses and insufficient funds to innovate infrastructure or even cover standard operation and maintenance costs (Varma, Dhingra, & Swamy, 2013).

Table 9: Agricultural Subsidy Scheme in Haryana⁷⁰

Subsidy	Pattern of Assistance	Subsidy provider	Potential Impact on Biodiversity
Electricity (groundwater irrigation) subsidy	<p>In 2010–11 the average all India cost of per kilowatt hour (kWh) of power was Rs 3.78, but the agricultural sector was only charged Rs 1.15 per kwh of power (Central Electricity Authority, 2014, p. 35)</p> <p>In 2013-2014, State Electricity Boards across India faced a commercial loss of Rs 311.48 billion (Planning Commission, 2014b, Annex 4). In part, this loss is a result of the aforementioned high subsidization in the agricultural sector.</p>	State Government	<p>The high percentage of electricity subsidies explains the alarmingly low groundwater levels in Haryana.</p> <p>Electricity subsidies have enabled farmers to access electricity at prices below the marginal cost of supply, thereby lowering the cost of irrigation and groundwater extraction, an essential input in agricultural production. However, these benefits have come at an environmental cost through groundwater exploitation and a financial burden on distribution companies.</p> <p>They have also influenced cropping patterns by inducing farmers to grow more water-intensive crops.</p>
Fertilizer subsidy	See Table		Due to excessive use of fertilizers; deterioration in soil health and hence crop productivity
Subsidy for electric pumps for irrigation	See table	State Government	Groundwater levels are extremely stressed in areas with electric pumps (Mukherji, Shah, & Giordano, 2012). This implies that, in such areas, farmers are installing pump sets to be able to extract deeper groundwater, with the consequence of further depleting groundwater levels.
Scheme for Managing Micro-Nutrients	To provide subsidy at 50 per cent or Rs 500 per hectare (whichever is less) with a maximum ceiling of 2 hectares per farmer on the	Central Government State Government	

⁷⁰ Rationalizing energy subsidies in agriculture: A scoping study of agriculture subsidies in Haryana, India, IISD, September, 2015. Also available at <http://www.iisd.org/library/rationalizing-energy-subsidies-agriculture-scoping-study-agricultural-subsidies-haryana>

Subsidy	Pattern of Assistance	Subsidy provider	Potential Impact on Biodiversity
Deficiency in the Soil	supply of micronutrients fertilizers.		
Scheme for Promotion of Sustainable Agriculture:	To provide 100 per cent seed treatment and fungicides to wheat farmers free of cost.	Central Government State Government	
Scheme for Stocking and Distribution of Fertilizers by Institutional Agencies		Central Government State Government	
National Agriculture Insurance Scheme:	This is a centrally sponsored scheme wherein only a part of the premium is paid by the cultivator and the rest is borne by the central and state governments on a 50/50 basis.	Central Government State Government	
Weather-Based Crop Insurance Scheme		Central Government State Government	
Credit Services to Farmers ⁷¹	<p>If the total of cost of cultivation and cost of consumption (which is assumed to be 25 per cent of cultivation cost) is less than Rs 300,000, then a loan is provided at a rate of 7 per cent through subvention. This can be further reduced by up to 4 per cent if the farmer has a good credit history. For loans greater than Rs 300,000, interest on the first 300,000 is charged at 7 per cent and at the regular rate on the amount in excess of 300,000 (which varies from bank to bank; usually around 12 per cent).</p> <p>In addition, another form of subsidy that is intangible and uncountable is that agricultural income is not taxed in India.</p>	Central Government State Government	

⁷¹ Rationalizing energy subsidies in agriculture: A scoping study of agriculture subsidies in Haryana, India, IISD, 2015 <http://www.iisd.org/library/rationalizing-energy-subsidies-agriculture-scoping-study-agricultural-subsidies-haryana>

9.1 Groundwater Irrigation: Electricity Subsidy

Irrigation through groundwater uses high-capacity electric or diesel pump sets. In the case of electric agricultural pump (AP) sets, the electricity tariff applicable falls under two categories: AP metered consumers billed on an energy-consumption basis and AP unmetered consumers who are currently paying a flat rate based on pump rating per month. The quantum of subsidies to be set aside each year is determined the Haryana Electricity Regulatory Commission in its annual Tariff Order based on Annual Revenue Requirement filings by the state's distribution utilities.

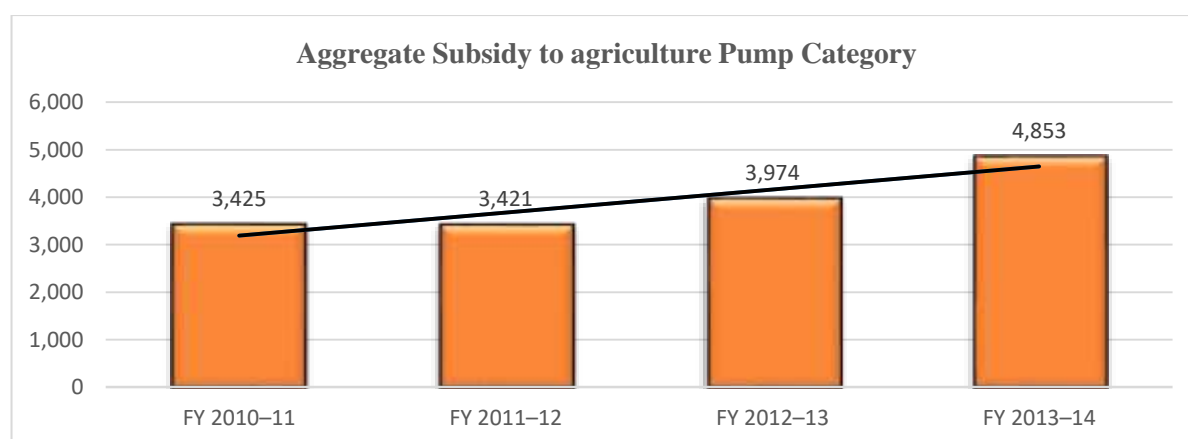
AP users have to pay only a small fraction of the actual tariff, with the result that, each year, subsidies run into thousands of crores for the agriculture sector. The entire revenue gap in the AP consumer category is bridged by way of the AP subsidy from the state government, and no consumer category is cross-subsidizing the AP consumers. However, the subsidy from the state government is not always reimbursed, which has invariably resulted in state DISCOMs operating in a state of perpetual loss and poor financial health.

Table 10: Subsidy to Agriculture Pump Set Users (Rs crore)

Year	Total Subsidy to Agri Pumps
2010–11	3,425
2011–12	3,421
2012–13	3,974
2013–14	4,853

Source: Haryana Electricity Regulatory Commission

Figure 7: Aggregate Subsidy to Agriculture Pump set Category (Rs Crore)



Subsidy for agriculture pump by the Haryana Electricity Regulatory Commission for the FY 2012-13 was Rs 3,974 Crore and it has increased by 18.11% to Rs 4,853 crore for the FY 2013-14.

9.2 Surface Water Irrigation Subsidy

Subsidies for water provided to farmers via surface irrigation projects has been estimated using the Global Subsidy Initiative’s Net Cost to Supplier approach, as was done previously for the case of Andhra Pradesh (Palanisami, Mohan, Giordano, & Charles, 2011). In this approach, major irrigation projects serving the state are identified and data pertaining to cost and benefits from each project are obtained. “Subsidy” is defined as the net cost incurred by the supplier of water (state or central government), which is simply equal to total expenditure minus gross receipts.

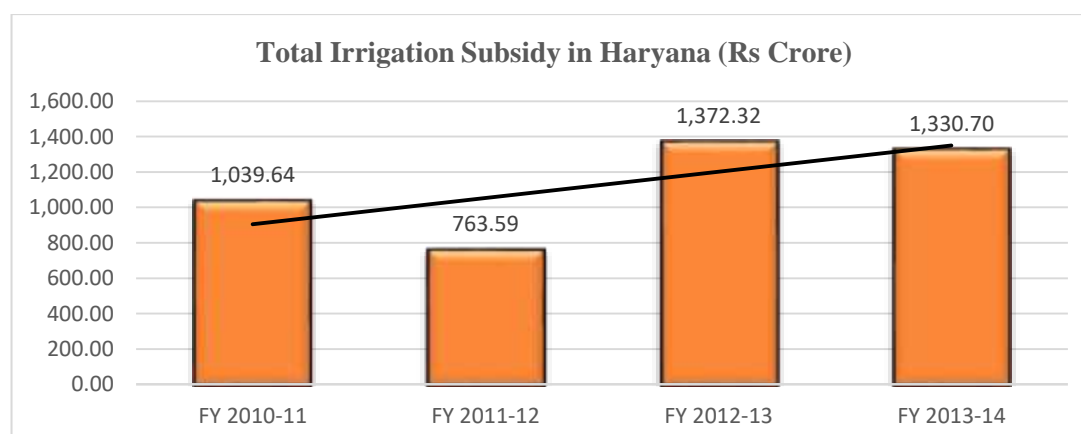
Bhakra Canal Project and Western Jamuna Canal Project are the two largest irrigation projects to have been implemented in Haryana, collectively accounting for almost 77 per cent of the total irrigated area in the state. Using data from the Department of Irrigation and Water Resources, Government of Haryana, for major as well as minor irrigation projects in the state. Irrigation subsidies were evaluated using GSI’s Net Cost to Supplier approach.

Table 11: Surface Water Irrigation Subsidies in Haryana (Rs Crore)

Year	Capital Expenditure	Energy Expenses	O&M Expenses	Interest Charges	Total Cost	Total Revenue	Total Subsidy	Subsidy (Rs/ha)
2010-11	407.75	309.54	206.03	344.51	1267.83	228.1	1039.64	1,631
2011-12	489.11	280.05	260.19	351.71	1381.06	617.4	763.59	1,198
2012-13	479.50	302.63	304.34	454.33	1540.8	168.4	1372.32	2,153
2013-14	406.76	233.04	317.02	496.02	1452.84	122.14	1330.70	2,087

Source: Department of Irrigation and Water Resources, Government of Haryana

Figure 8: Surface Water Irrigation Subsidy in Haryana (Rs Crore)



9.3 Power Tariffs and Subsidies to Agriculture: Comparison of Key States⁷²

Since electricity tariffs are under state administration, states differ on electricity tariffs, based on political and economic considerations. Table 12 shows that Haryana, Punjab and Madhya Pradesh offer substantial power subsidy to the agricultural sector.

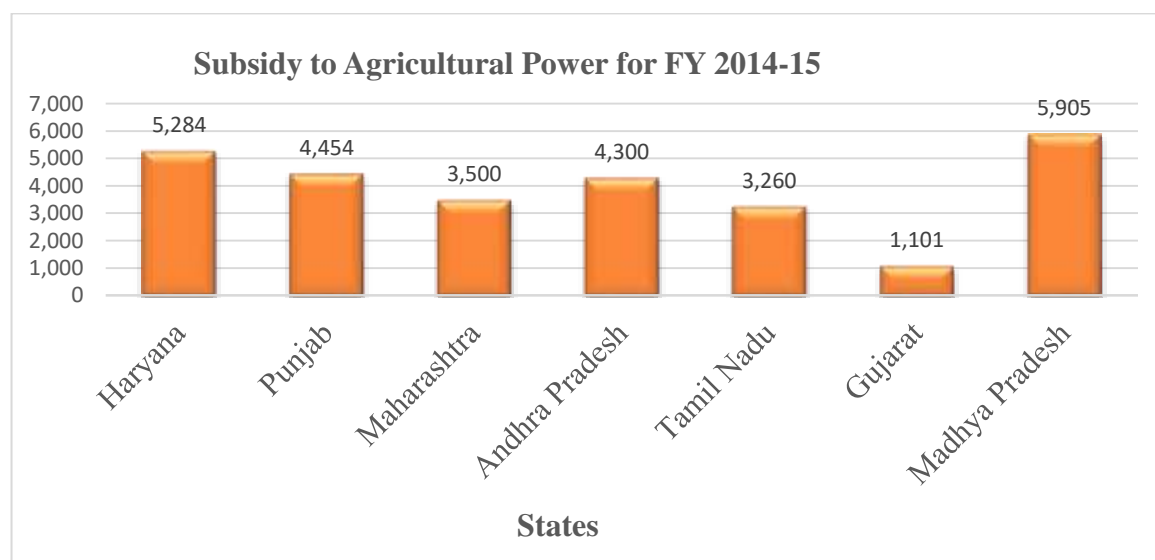
Table 12: Electricity Tariffs and Power Subsidies to Agriculture (2014–15)

State	Power Tariff – Agricultural Consumer (Rs)	Subsidy To Agricultural Power (Rs Crores)
Haryana ¹	0.08-0.10	5,284
Punjab ²	0	4,454
Maharashtra ³	2.10	3,500
Andhra Pradesh ⁴	0.50 – 1.0	4,300
Tamil Nadu ⁵	3.22	3,260
Gujarat ⁶	0.60	1,101
Madhya Pradesh ⁷	3.20 – 4.05	5,905

Source: Respective SERC tariff orders

- ¹ Haryana Electricity Regulatory Commission. (2014a, pp. 123–124)
- ² Punjab State Electricity Regulatory Commission (2014, pp. 270 & 277)
- ³ Maharashtra State Electricity Distribution Co. Ltd. (2012, p. 6)
- ⁴ Andhra Pradesh Electricity Regulatory Commission (2013, pp. 170 & 175)
- ⁵ Tamil Nadu Electricity Regulatory Commission (2014, pp. 251 & 254)
- ⁶ Gujarat Electricity Regulatory Commission (2014, p. 102)
- ⁷ Madhya Pradesh Electricity Regulatory Commission (2014, pp. 90 & 170)

Figure 9: Subsidy to Agriculture Power (Rs crore)



⁷² India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, International Institute of Sustainable Development, 2017. Also available at <http://www.iisd.org/sites/default/files/publications/india-energy-transition.pdf>

9.4 Fertilizer Subsidies in Haryana

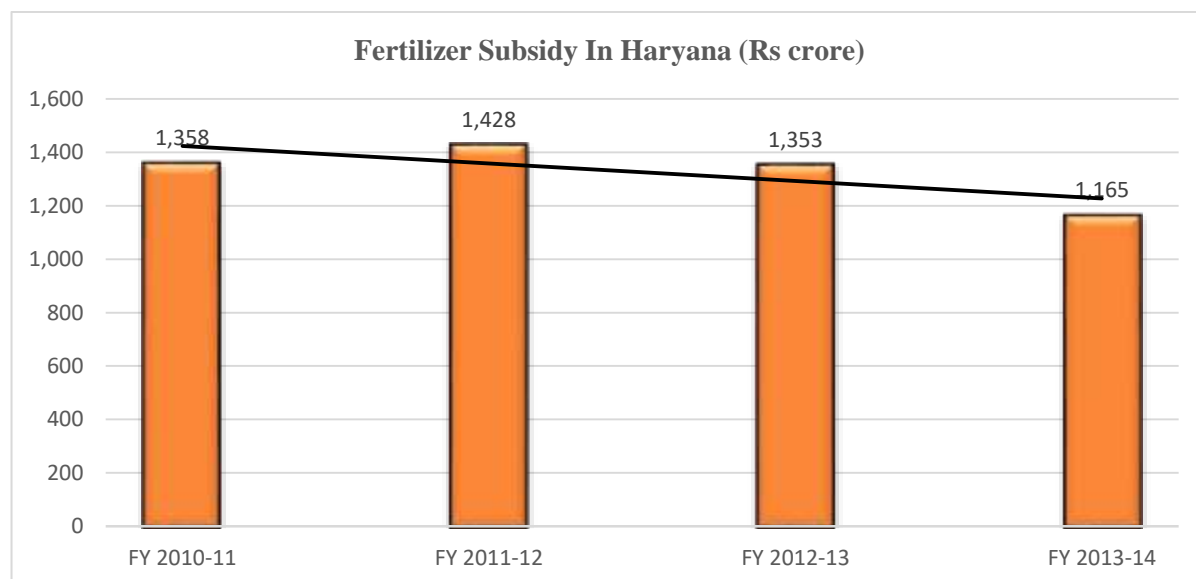
Fertilizers are one of the most important agricultural inputs, and increasing fertilizer use has been a critical component of the green revolution package of inputs and practices. However, an increase in fertilizer use has come at significant costs. While the fiscal burden of fertilizer subsidies has increased significantly, other costs in the form of long-term soil damage, straining of water resources and general saturation of yields due to application of suboptimal nutrient ratios have become important in recent years (Kishore, Praveen, & Roy, 2013).

Table 13: Fertilizer Subsidies in Haryana

Year	All India NPK Consumption (1,000 Tons)	Haryana NPK Consumption (1,000 Tons)	Consumption Share	All India Subsidy (Rs. Crore)	Haryana Subsidy (Rs. Crore)	Subsidy (Rs/Ha)
2010-11	28,122.2	1,357.62	4.83%	65,837	1,358	3,178
2011-12	27,790.0	1,428.05	5.14%	73,791	1,428	3,792
2012-13	25,536.2	1,353.06	5.30%	70,592	1,353	3,740
2013-14	24,482.4	1,164.67*	4.76%	71,251	1,165	3,390

Source: Fertilizer Association of India (2014); Department of Agriculture and Statistical Analysis, Haryana (2015) *Provisional figure (up to December 31, 2013)

Figure 10: Fertilizer Subsidies in Haryana



The Fertilizer subsidy provided by the Haryana government for the FY 2012-13 was 1358 crore rupees which has decreased to 1165 crore rupees for the FY2013-2014. There is a significant drop in the fertilizer subsidy of 13.9% for the FY2013-2014 as compared to the last year.

9.5 Subsidies on Electricity, Irrigation and Fertilizers Available to Farmers in Haryana

Table 14: Subsidies on Electricity, Irrigation and Fertilizers to Farmers: Per Hectare

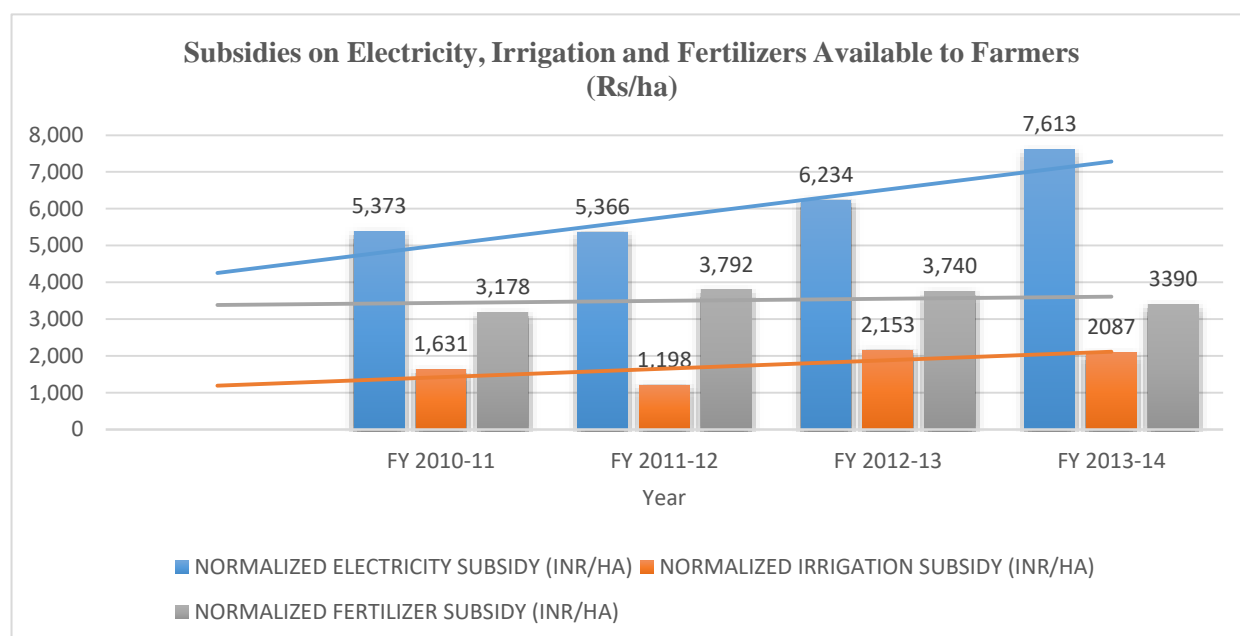
Year	Normalized Electricity Subsidy		Normalized Irrigation Subsidy		Normalized Fertilizer Subsidy		Total Subsidy
	(Rs/ha)	%	(Rs/ha)	%	(Rs/ha)	%	
FY 2010-11	5,373	45%	1,631	14%	3,178	42%	11,989
FY 2011-12	5,366	43%	1,198	10%	3,792	48%	12,512
FY 2012-13	6,234	44%	2,153	15%	3,740	41%	14,254
FY 2013-14	7,613	51%	2,087	14%	3,390	35%	15,017

Normalized Electricity Subsidy with respect to gross area = (Electricity Subsidy for a given financial Year / Total Gross Crop Area). Similarly for Normalized irrigation Subsidy and Normalized fertilizer Subsidy.

- Electricity (groundwater irrigation) subsidy: approximately 46 per cent of total subsidies
- Surface water irrigation subsidy: approximately 13 per cent of total subsidies.
- Fertilizer subsidy: approximately 41 per cent of total subsidies.

While fertilizer and irrigation subsidy appear to be stabilizing, electricity subsidy shows an upward trend.

Figure 11: Subsidies on Electricity, Irrigation and Fertilizers Available to Farmers



Case study 2: Telangana

Table 15: Subsidies to Agriculture by state government of Telangana

Subsidy Type	Pattern of Assistance	Subsidy provider	Impact on the Biodiversity
Loan Waiver and low interest loans	Loan Waiver of crop loans to a tune of Rs 16,124 crore benefitting 35.20 lakh farmers. Fresh loans to farmers at 25 paisa interest.	State	
Direct support to irrigation projects	Major irrigation projects being constructed for irrigation of 1.23 crore acres of land. Rs 25,000 crore earmarked annually for these projects.	State	
Subsidies for micro irrigation	100% for SCs/STs 90 % for small and marginal farmers 80% subsidy for others.	State	
Storage infrastructure	Subsidy for storage construction	State	
Tax abolished on tractors		State	
Subsidy under farm mechanization program	50%-95% subsidy on agriculture tractor Subsidy allowed for 4 WD tractor, 35 HP and above is Rs. 2,00,000 and for 2 WD tractor 35 HP and above is Rs.1,50,000.	State	
Subsidy under farm mechanization program	13,934 tractors distributed by state government till march , 2018	State	
Distribution of Agricultural tools	31,274 agriculture tools to be attached to tractor distributed	State	
Other agricultural tools	4,71,000 tarpaulins and 26719 sprayers also distributed	State	
planting machines to be provided at subsidized rates	10 planting machines per Mandal , totaling 5,500 machines	State	
		State	
Drip irrigation tools subsidy	100% for SCs/STs	State	

Subsidy Type	Pattern of Assistance	Subsidy provider	Impact on the Biodiversity
	90 % for small and marginal farmers 80% subsidy for others.		
Subsidy on rice seeds.	75% subsidy on rice seeds	State	
Power subsidy	24 Hours Free power supply to maximize use of the 23 lakh motor pump sets in the state.	State	
Encouraging poly house cultivation on a large scale to cultivate fruits, vegetables and flowers using modern cultivation technologies.	Poly house granted 75% subsidy	State	

Source: The Times of India, 10 May 2018; and Annual reports and various notifications of the government of Telangana.

Telangana is a newly formed state in India. Many of these subsidies have been announced recently and are in various stages of implementation. Department of Agriculture has formulated these schemes to help farmers and to boost growth in Agriculture sector. We would like to suggest that in view of the potential harmful effects on biodiversity and environment in general, a holistic view of the agricultural subsidies is required.

Case study 3: Andaman & Nicobar Islands⁷³

Table 16: Subsidies provided by the department of agriculture in Andaman and Nicobar Islands

Subsidy Name	Pattern of Assistance	Subsidy provider	Total Subsidy(In Crore)
Subsidy for all seeds, fertilizers and other inputs.	20% of cost	State	0.70
Subsidy for all organic manures / bio fertilizers.	50% of cost	State	0.55
Subsidy for Plant Protection Equipment's.	20% of cost	State	0.02
Subsidy bio pesticides	75% cost subsidy	State	0.20
Subsidy for Plant Protection Chemicals.	15% cost subsidy	State	0.02
Transport subsidy on the purchase of all Agriculture Inputs.	100% subsidy on transport for purchase of agriculture inputs	State	0.80
Distribution of Tractor (up to 40 PTO hp) with matching implements, extension wheel, cage wheel to the farmers on loan / cash -cum - subsidy	25% of cost. Subsidy is limited to Rs.1.0 lakh whichever less, with 100% transport subsidy.	State	0.04
Distribution of Power Tiller (8BHP and above) to the farmers on loan / cash -cum - subsidy basis	40% of cost. Subsidy is limited to Rs.45000/- whichever is less, with 100% transport subsidy.	State	0.22
Distribution of Modern Farm Machineries / Equipment's to the farmers on loan / cash -cum - subsidy basis	40% of cost. Subsidy is limited to Rs.45000/- whichever is less, with 100% transport subsidy.	State	0.025
Subsidy on Crop Insurance Premium (Paddy & Pulses)	100% Subsidy on Crop Insurance Premium (Paddy & Pulses)	State	

⁷³ The Department of Agriculture, Adman and Nicobar administration <http://agri.and.nic.in/planschemes.htm>

Subsidy Name	Pattern of Assistance	Subsidy provider	Total Subsidy(In Crore)
Subsidy on construction of Minor Irrigation Pond on loan / <i>shramdhan</i> / cash -cum - subsidy basis to individual beneficiary / Cooperative Societies.	50% of cost of construction of MI pond.	State	
Subsidy on purchase of Pump set (0.5hp to 5.0hp) on loan / cash - cum - subsidy basis to individual beneficiary / Cooperative Societies.	50% of cost on purchase of pump set.	State	
Installation of Micro Irrigation System with assistance of 75% of cost subsidy on purchase of Pump set (0.5hp to 5.0hp) on loan / cash - cum - subsidy basis to individual beneficiary / Cooperative Societies.	75% of cost on purchase of pump set.	State	

Source: The Department of Agriculture, Adman and Nicobar administration, Port Blair

It would be seen from the above Table that a scanty information is available on magnitude of subsidies. As pointed out earlier, comprehensive studies are required for an informed debate on reform of environmentally harmful subsidies.

10. Key Findings and Way Forward

- i. A decreasing trend in central government subsidies has been observed (as provided in central government budgets). Since FY 2011-12 fertiliser subsidy shows a stabilising trend. Subsidy on urea has seen a decline while nutrient based subsidy is on a slight upward trend (Figure 1).

Petroleum subsidies as well as subsidies to Sugar cane farmers and sugar industry also show a declining trend (Table 3).

- ii. Comprehensive estimates of energy subsidy (both explicit and implicit wherever data allows) by the central government in a recent study (IISD, 2017) show encouraging results. While there is a declining trend in subsidy in case of coal, and oil and gas; renewable energy has seen a sharp rise in subsidy since 2013-14. During FY 2013-14 and 2016-17 oil and gas subsidy is reduced by more than three quarters (Table 7); coal subsidy is declined by 44% for the same period (Table 6).

However, in this decade, subsidy to transmission and distribution has seen an upward trend owing to ageing infrastructure and poor financial health of electricity utilities, as well as expanding access for people still living without electricity. Subsidies seek to strengthen T&D infrastructure and provide financial support to distribution utilities under a range of programs that are funded by both central and state governments.

- iii. According to a recent study (IISD, 2015), subsidies by the state government of Haryana to the agriculture sector (surface water irrigation, ground water irrigation and

electricity) have seen a steady rise, although fertilizer and irrigation subsidy appear to be stabilizing in recent years, electricity subsidy shows an upward trend.

- iv. Telangana is a newly formed state in India. Many of these subsidies have been announced recently and are in various stages of implementation. Department of Agriculture has formulated these schemes to help farmers and to boost growth in Agriculture sector. We would like to suggest that in view of the potential harmful effects on biodiversity and environment in general, a holistic view of the agricultural subsidies is required.
- v. Whilst it is now widely recognized that subsidies are in a number of instances environmentally harmful (besides being costly, often inefficient, and distorting), reforming and phasing out these subsidies faces formidable challenges due to a number of factors.
- vi. Assessing the environmental impact of subsidies is technically complex. Improving the conceptual framework for analysing the environmental impact of subsidies and testing a “checklist” designed to assess the environmental impacts in various sectors (such as energy, water, transport, agriculture) is required.
- vii. Considerable work needs to be done by developing effective analytical tools to get a clearer picture which will pave the way for an informed debate on reform of environmentally harmful subsidies case-by-case.
- viii. Supplementing and updating existing databases on subsidies and exploring the fuller inclusion of subsidies in National Accounts should be actively pursued.
- ix. Strengthening co-operation between the various institutions working in this area; and examining the role of subsidies in the broader context of sustainable development, in order to understand the possible synergies and trade-offs in subsidy reform.
- x. The Central Ministry of Environment should take the lead in commissioning comprehensive sectoral studies.

Chapter 3

Financing biodiversity: Role of Financial Institutions

1. Background and Objective

The debate over the adverse impact of climate change over past several decades has also begun to focus on the role of biodiversity in providing critical support to life on earth. For example, the economic costs of biodiversity loss and ecosystem degradation have been estimated to be between USD 2 and USD 4.5 trillion (3.3-3.75% of global GDP).⁷⁴

In India, there have already existed extensive constitutional provisions to promote conservation and sustainable use of natural resources and the importance of forests and wildlife conservation is assuming increased importance.⁷⁵ The National Action Plan on Climate Change (NAPCC), which is implemented through eight National Missions has strong focus on Biodiversity conservation. Further, Biodiversity conservation and planned afforestation are stated adaptation and mitigation strategies, respectively, in India's INDCs. Also, India being a signatory to CBD has targets to achieve according to a timeline. Achieving these targets will require considering resources to be spent towards biodiversity.

A preliminary estimate suggests that at least USD 2.5 trillion (at 2014-15 prices) will be required for meeting India's climate change actions between now and 2030 though Strategy-wise finance needs are not available. In India, currently, a majority of biodiversity conservation and management is through initiatives that support biodiversity as a public good through Budget support, supplemented by ODA, Civil Society, CSR etc.⁷⁶ Government financial sources, however, will not be sufficient to meet the estimated funding requirement. A large amount of private capital needs to be mobilized. It, therefore, becomes important to understand the mechanisms through which private capital may be steered towards biodiversity conservation and sustainable activities in general.

A useful schema to categorize the various mechanisms that are being used to promote sustainable use of biodiversity was provided by Bayon, Lovnik and Veening (2000)⁷⁷ and are

⁷⁴ The Economics of Ecosystems and Biodiversity (TEEB), Cost of Policy Inaction Report, 2008

⁷⁵ See GIZ (2014), "The Economics of Ecosystems and Biodiversity India Initiative", Interim Report.

⁷⁶ NIPFP (2017).

⁷⁷ Ricardo Bayon and J. Steven Lovnik and Wouter J. Veening (2000), "Financing Biodiversity Conservation", Sustainable Development Department, Technical Paper Series, Inter-American Development Bank.

reproduced in Box 1. These include policy instruments such as taxes and subsidies that protect biodiversity because it is a public good, or to correct negative externalities from the exploitation of ecosystems. A third category of policy instrument aims to facilitate the flow of private finance into conservation.

Box 1: Financing Mechanisms to Promote Biodiversity

1. **Those that protect biodiversity as a public good:** The typical instruments used here include global and national taxation schemes, grants and subsidies, loans from multilateral organizations and debt related instruments. In India, for example, the Government has provided incentives to state governments to retain forest cover through the 13th Finance Commission as well as the devolution formula of the 14th Finance Commission. At present, various schemes of the MOEF&CC - the National Afforestation Program Scheme (NAP) and the National Mission for a Green India (GIM) - and a number of other central ministries besides various schemes and programs of state governments, are invested in conservation of biodiversity and maintaining 33% of area as forest cover⁷⁸.
2. **Those that require correcting negative externalities that hamper biodiversity conservation:** This includes policy measures such as reforming subsidies that may be causing the damage, tradable permits, user fees/charges, fines for discouraging activities which may be damaging the environment. The other policy instruments include taxes and subsidies to encourage conservation.
3. **Those that can be used to support biodiversity based businesses:** These include measures such as credits and loans to businesses that are "green", providing venture capital funding to such businesses, guarantees and securitization.

Source: Bayon, Lovnik and Veening (2000)

In this report we focus on how private capital may be channeled into activities that conserve biodiversity. We study three related issues.

1. The Global Biodiversity Outlook 3 (released by the UN in 2010)⁷⁹ emphasized on the need for greater use of market incentives to minimize unsustainable resource use. We evaluate the *mechanisms for financing the environment* in general. This includes a discussion of the financing through the recognition of risks, as well as direct financing.
2. We then turn our attention to the *current status of financing for biodiversity*. This includes a discussion of the instruments as well as the projects that are financed by such instruments. We present the constraints that inhibit financing of biodiversity.
3. Finally we present some *suggestions on policy design for improving private financing of biodiversity* in India.

⁷⁸ NIPFP (2017).

⁷⁹ UN CBD 'Global Biodiversity Outlook' (2010) www.cbd.int/doc/publications/gbo/gbo3-final-en.pdf

Towards this end, we conduct an extensive literature survey on the field of green financing as well as biodiversity initiatives around the world. It studies reports of various multilateral agencies as well as examples of successful public private partnerships in the space of biodiversity conservation. The analysis also relies on meetings with stakeholders in the biodiversity sector in India. The stakeholders with whom we had detailed one-on-one meetings are included in Appendix 3. With this analysis, we propose to lay the foundation to formulating policy recommendations that can play an important role in mainstreaming finance for biodiversity.

2. Finance for Environmental Sustainability

The traditional view among financial investors has been that what is good for the environment is not necessarily good for business. As a result, it has been difficult to attract funding for businesses that focus on environmental sustainability. However, over the last decade, there have been three developments that call for a change in the status quo:

1. **Recognition of risks:** There is a growing recognition that all businesses face risks from the environment. These may be physical risks, that may come from direct damage to property owing to environmental factors, or these may also be liability risk, that may arise from who will be held responsible for any disaster from the environment. There may be businesses that have high impacts on the ecosystem (such as mining, construction, oil and gas), as well as businesses that are dependent on biodiversity such as agriculture, fisheries, tourism. As the WEF Report (2010) points out, primary industries such as extractives, forestry, farming and fishing are affected most broadly but no sector escapes untouched by some form of biodiversity risk.⁸⁰ Financial Institutions that are not positioned to identify which companies are most at risk can be exposed to increased risk for default (credit activities), lower investment returns (investment portfolios) or an increase in insurance claims (insurance activities).⁸¹
2. **Direct finance:** There has been a proliferation of *impact investing* where investors care about ESG (environment-social-governance) goals and are keen to move beyond the financial returns metric as the only measure of performance. In certain segments, such as

⁸⁰ Biodiversity and business risk, A briefing paper for participants engaged in biodiversity related discussions at the World Economic Forum Davos-Klosters Annual Meeting, Prepared by Pricewaterhouse Coopers for the World Economic Forum, January 2010.

⁸¹ https://cmsdata.iucn.org/downloads/ivo_bb_report.pdf

the organic food industry, there is a realization that businesses that are good for the environment can also be a commercial opportunity. From a portfolio optimization perspective as well, the "natural resources" asset class has exhibited lower correlation to traditional asset classes, making it an attractive investment vehicle.⁸²

- 3. Adoption of the 2030 agenda for sustainable finance:** The focus on sustainable finance has also increased since the adoption of the 2030 Agenda for sustainable developments, and the agreements reached in December 2015, at the Paris Climate Summit. For these reasons, the interest in *sustainable or green finance* has been on the rise. This represents the positive shift in transition towards sustainability through the financial sector. In the last decade or so a significant progress has been made towards identifying the necessary building blocks which would help shape this transition; and towards raising awareness and mobilizing support for coordinated and concerted efforts from various public, private and international actors in the green finance space. There is a long way to go, and the speed at which this will move forward will depend on the resolve of various actors involved. We begin this section by describing the key players in the market for green finance, and then describe the market for green bonds. We then describe the other examples of private sector participation in green finance with a special focus on biodiversity, and follow that up with developments in India.

2.1 Green Finance: Key Actors and Their Roles

The market for green finance has several stakeholders that influence the fund flow, and deployment. The following actors play an important role.

State: In any financial market, it is the state and the various the regulators that shape the “rules of the game”. The government sets the broad agenda through targets and policy frameworks. Regulators often nudge (and sometimes mandate) regulated entities to invest resources in particular sectors, or recognize risk and returns in a manner that takes into account the impact of the environment. In India, the Central and State governments, and financial regulators such as the *Reserve Bank of India* (RBI), *Securities and Exchange Board of India* (SEBI), the *Insurance Regulatory and Development Authority of India* (IRDAI) and the *Pension Fund Regulatory and Development Authority* (PFRDA) all have a role to play in bringing biodiversity finance center-stage.

⁸² Levin, Ethan and Paul von Steenberg (2017), Making the case for Natural Resources Investing. Available at <https://www.commonfund.org/news-research/blog/post-natural-resources-investing/>

Financial institutions: The most important lenders in any economy, and especially in a bank-dominated financial economy such as that of India are the banks followed by the Non-Banking Finance Companies (NBFCs). These institutions make important decisions about the allocation of capital and can shape how resources flow into various activities on the ground. An example of commitment to green finance by financial institutions includes Bank of America's (BoA) US\$20 billion initiative in 2007, and further increased to US\$125 billion to support the growth of environmentally sustainable business activity to address global climate change.⁸³ In India, several institutions have become active investors in the green bonds space (See Section 2.3).

Investors: Investors in the space of green finance are usually institutional investors such as pension funds, asset management companies, venture capital and angel investors all of whom may have specific ESG mandates and may be interested in investing in specific projects that have huge environmental externalities. Even if investors do not have specific ESG mandates, there may be an interest in investing in the “natural asset class” for portfolio optimization reasons.

International institutions: International financial institutions play an important role in channeling finance into environmental issues. For example, institutions such as the African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, World Bank Group (referred to as the MDBs), and the International Monetary Fund have all been committed to help mobilize the resources to meet the Sustainable Development Goals (SDGs).⁸⁴

Firms: A key player in this market are firms themselves whose business may rest on environmental conservation or who may undertake initiatives for environmental conservation either for cost reasons, or as part of a “Corporate Social Responsibility” mandate. An example is the global mining company, Rio Tinto, which has recognized its impact on biodiversity and the sensitivities of its projects for communities, investors and governments among others. With this understanding it launched a biodiversity strategy in 2004, aiming to achieve Net Positive Impact (NPI) in areas of operations. Other examples in India include efforts by Hindustan

⁸³<https://newsroom.bankofamerica.com/press-releases/environment/bank-america-announces-industry-leading-125-billion-environmental>

⁸⁴<http://www.worldbank.org/en/news/press-release/2015/07/10/international-financial-institutions-400-billion-sustainable-development-goals>

Lever, Ambuja Cements and others to reduce their biodiversity footprint, and invest in supply chains that do so (See Appendix 2 for more details).

As we study the the ways to channel private finance to “green” activities, we must continuously understand what shapes the incentives of all these players and whether policy efforts cause distortions in these incentives that may be the root cause of low funds into green finance in the first place.

2.2 Market for Green Finance

The current market for conservation finance which is estimated to have a potential of USD 200-400 billion consists predominantly of simple debt and equity funds because of their familiarity to investors, and also because they enable project and cash flow aggregation into one common financial vehicle.⁸⁵ Table 1 shows the asset classes and instruments that are currently in use.

Table 1: Finance vehicles

Asset Class	Instrument	Characteristic
Debt	Direct loan	Specific project
	Bonds	Raise funds overall
	Credit enhancement	Address specific risks
Hybrid	Debt/Equity fund	Several projects under one fund
Equity	Private Equity	Direct investments in companies
Grants		Specific projects with no repayments.

Source: Credit Suisse AG and McKinsey Center for Business and Environment (2016)

The most popular of the instruments have been *green bonds*. In a green bond, the issuer publicly commits to using the capital that is being raised to fund "green" projects. These have usually included those relating to renewable energy, and emission reductions. Green bonds typically carry a lower interest rate than the loans offered by the commercial banks and have 5-10 years maturity. Proceeds are raised for specific green projects, but repayment is tied to the issuer, not the success of the projects -- this implies that green bonds are often less risky than conventional bonds.

⁸⁵ Credit Suisse AG and McKinsey Center for Business and Environment (2016), "Conservation Finance From Niche to Mainstream: The Building of an Institutional Asset Class"

The green bond market began around 2007, and has grown by a compound growth rate of 50%. As of 2017, the global issuance of green bonds stood at USD 120-130 billion.⁸⁶ Despite such a rise, it represents only 0.1% of the total global market for debt securities, and continues to be dominated by ESG investors.

Banks continue to play an important role not only in terms of traditional lending but also in a range of intermediary functions and in their role as investors. Direct loans provide access to capital to biodiversity businesses. Sometimes these are provided at a concessionary rate to SMEs that may be good for the environment. Despite these efforts, more needs to be done to attract private capital to support the transition to a sustainable economy. The European Banks Federation has made several recommendations on what needs to be done for promoting Green finance in the economy that include developing a set of minimum standards and disclosure frameworks on green finance, and improvements in regulatory structures that may lead to greater green financing.⁸⁷

2.3 Key Investment Opportunities and Some Examples of Biodiversity Finance

While there have been developments in green finance, most of these have not focused on biodiversity related activities. In this section we describe the activities and investment opportunities within the biodiversity sector, and provide examples of financing vehicles.

A biodiversity business is generally defined as:

“Commercial enterprise aimed at generating profit while conserving biodiversity, using biological resources sustainably and sharing the benefits arising from this use equitably”⁸⁸

Biodiversity businesses that can be financed are divided into five broad areas: agriculture, fisheries and aquaculture, forestry, non-timber forest products and ecosystem services.

⁸⁶ Wim Bartels and Lars Kurznack and Laure Briaut (2016), mainstreaming the green bond market: Pathways towards common standards. Report commissioned to KPMG Sustainability by the French World Wide Fund for Nature ("WWF France") and WWF offices around the world

⁸⁷ European Bank Federation Report: Towards a Green Finance Framework, 28 September, 2017. Available at <https://www.ebf.eu/ebf-media-centre/towards-a-green-finance-framework/>

⁸⁸ Bishop, J., Kapila, S., Hicks, F., Mitchell, P. and Vorhies, F. (2008). Building Biodiversity Business. Shell International Limited and the International Union for Conservation of Nature: London, UK, and Gland, Switzerland. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2008-002.pdf>

According to Rayment and McNeil (2014), there are four kinds of investment opportunities in this space.⁸⁹

- *Certified goods and services*: Citizens across the world, especially in developed markets, are willing to pay a premium for products that have been certified to be environmentally friendly, or organic. The market for such products may be large, as customers in emerging economies such as India and China also start becoming conscious of their environmental footprint and be more willing to pay a premium for such products. If customers can be satisfied of the quality and certainty of the environmental characteristics of the products, then this may be a very good investment opportunity.
- *Biodiversity offset and habitat banking*: These are conservation activities that businesses take to compensate for development impacts elsewhere. The goal here is to achieve a “no net loss” of biodiversity and ecosystem services. In the UK, for example, the Ecosystem Markets Task force has identified that offsets have high potential to mobilize private sector funds towards investment in ecological networks and nature protection.
- *Green infrastructure*: Projects related to green infrastructure involve a strategic use of natural systems in urban and infrastructure planning to secure a range of ecosystem service benefits simultaneously. Activities such as planting trees in cities to mitigate heat, or develop bankside habitats for flood-water management would count as green infrastructure projects. Another example is the “Green Roofs Project” carried out by the European Federation of Green Roof Associations that promotes and finances the installations of green roofs as a form of “green infrastructure”.
- *Payments for ecosystem services (PES) and bio-carbon markets*: These are incentives offered to landowners and farmers in exchange for managing land to provide ecological services. The global market for PES is surging - it is estimated that over 550 PES

⁸⁹ Matt Rayment and David McNeil (2014). Final Report, “B@B Workstream 3: Access to Finance and Innovative Financing Mechanisms”, ICF International, 31 October, 2014. Available at: <http://ec.europa.eu/environment/biodiversity/business/assets/pdf/b-at-b-platform-finance-workstream-final-report.pdf>

programs are active worldwide, in both developed and developing countries, with US\$36-42 billion in annual transactions.⁹⁰

As an example of biodiversity finance, the government of Ghana roped in private financing for biodiversity by signing a lease agreement with a private development company, AIKAN Capital, to transform the Achimota Forest Reserve (which is a large patch of woodland) into an eco-park, known as Accra Eco Park. This has paved a way for restoring conservation activities at forest reserves and turning them into lush green eco-parks.

In another example, the Sabah Government in Malaysia has initiated a project that enables private sector companies working in Malaysia or sourcing products from the country to help restore and protect the existing rainforests in Malaysia. The Government assigned conservation rights (license to issue biodiversity certificates) for a period of 50 years to Malua Biobank. The bank is a multimillion dollar investment from the Eco-Products Fund, which is jointly managed by New Forests and Equator LLC, committing private equity of up to US \$10mn to manage the Malua Forest Reserve (MFR) over next 6 years. More detailed case studies are provided in the Appendix 1.

These examples involve *partnerships between the government and private companies to engage in projects with positive impact on biodiversity*. This suggests that governments will have to play a critical role in creating a policy environment for attracting private capital into natural resource management.

2.4 Green Finance in India

The Indian economy is growing rapidly, and efforts have been made to complement economic instruments for conservation and sustainable use of natural resources. According to more recent estimates, the country needs about USD 4.5 trillion in infrastructure funding by 2040. Of this, nearly USD 200 billion will be required to generate 175GW renewable energy by

⁹⁰ J. Salzman, G. Bennett, N. Carroll, A. Goldstein & M. Jenkins (2018), “The global status and trends of Payments for Ecosystem Services, *Nature Sustainability*, 1, pp: 136-144. Available at: https://www.nature.com/articles/s41893-018-0033-0?WT.mc_id=COM_NSustain_1803_Salzman

2022; USD 7.7 billion for intra-city metro rail networks; USD 667 billion for electric vehicles program; and affordable green housing will need about USD 1 trillion.⁹¹

Traditionally the main source of financing would have been the Development Financial Institutions (DFIs). But these institutions today face capacity constraints to scale-up existing programs. Their experience is also limited to small and medium size projects. The Non-Bank Finance Companies (NBFCs) have played a smaller role in lending for green finance in India relative to the DFIs, and most of their green lending has been to the renewable energy sector. There has been some innovations in green lending by micro-finance institutions (MFIs) but these are also restricted to the clean energy space.⁹²

India has been raising funds through green bonds - almost USD 6 billion have been raised so far. About 62% of the green bond proceeds have been allocated to renewable energy projects, followed by the low carbon transport sector and low carbon buildings accounting for 17.5% and 14% of the proceeds, respectively. Water and waste management projects account for 2.2%.⁹³ Box 2 provides details on issuances by entities based in India.

Box 2: Green bond issuances by Indian entities

Yes Bank: raised USD 160 million via 10 year green bonds; USD 49 million through a rupee denominated bond on the London Stock Exchange; 7 year green infrastructure bonds (Rs.330 crore) in 2016 for a Dutch development bank on a private placement basis.

Axis Bank: raised USD 500 million (through Senior Unsecured Notes due 2021) at the London Stock Exchange in 2016.

IDBI Bank: raised USD 350 million via a five year Reg S Green Bond issue at a fixed coupon of 4.25 per cent at the Singapore Stock Exchange.

NTPC: listed the world's first Indian green masala bond and first masala bond by a quasi-sovereign issuer on the London Stock Exchange. The listing raised INR 20 billion.

From an institutional perspective as well, the regulators in India have started making progress towards improving green finance.

⁹¹ Kaku Nakhate (2018), "Building India's green finance ecosystem", LiveMint, 20th June. <https://www.livemint.com/Opinion/IDGSpHG4X82xsefy8OjYOP/Building-Indias-green-finance-ecosystem.html>

⁹² Sanjoy Sanyal and Frederik Elsinger (2016), Enabling SME access to finance for sustainable consumption and production in Asia: An overview of finance trends and barriers in India, adelphi-SWITCH ASIA. http://www.switch-asia.eu/fileadmin/user_upload/Publications/2016/Green_Finance_Study_-_2016_-_India.pdf

⁹³ Climate Bonds Initiative India update

Box 3: Institutional Developments on Green Finance in India

Reserve Bank of India: Formulated the 2007 Corporate Social Responsibility, Sustainable Development and Non-Financial Reporting guidelines for commercial banks. Is in the process of formulating a road map for green banking in India by looking into various aspects of green finance.

The Securities and Exchange Board of India (SEBI): issued disclosure requirements for the issuing and listing of green debt securities.

The Federation of Indian Chambers of Commerce & Industry (FICCI): has set up a Green Bond Markets Development Council to bring together senior representatives from the industry.

The Companies Act, 2013 has mandated companies to invest in Corporate Social Responsibility (CSR) initiatives which include environmentally sustainable activities.

The Reserve Bank of India (RBI): As early as 2007, the Reserve Bank of India had come out with guidelines for “Corporate Social Responsibility, Sustainable Development and Non-Financial Reporting” in consultation with public and private sector banks in India. These were voluntary and meant as guidance to all commercial banks. More recently, however, the RBI is in the process of formulating a road map for green banking in India by looking into various aspects of green finance.

The Securities and Exchange Board of India (SEBI): In India, SEBI (Issue and Listing of Debt Securities) Regulations, 2008 (ILDS) govern the public issuance and listing of debt securities. In May, 2017, SEBI issued a circular on public issue and listing of green debt securities as well as privately placed green debt securities that should be followed in addition to the ILDS regulations.⁹⁴

The Federation of Indian Chambers of Commerce & Industry (FICCI): has set up a Green Bond Markets Development Council to bring together senior representatives from the industry. The aim of the council is to propose solutions towards the development of a green bonds market in India and enable capital market flows into clean energy.⁹⁵

3. What ails biodiversity finance?

While green finance has been on the rise, the same cannot be said of finance specifically for biodiversity. In this section we analyze the problems in biodiversity finance.

⁹⁴https://www.bseindia.com/downloads/whtsnew/file/SEBI%20_Cir_Green_Debt_Securities.pdf

⁹⁵<https://www.climatebonds.net/2016/10/mumbai-india-green-bonds-council-holds-first-meeting-new-group-convened-ficci-and-climate>

Box 4: Problems in biodiversity finance

Externalities: One of the largest market failure in biodiversity finance is the lack of internalization of such costs of environmental degradation. As commercial business does not internalize the costs of harm to biodiversity through their activities, it appears to be yielding better returns to investors.

Search costs: There exists a search problem between biodiversity related projects and investors with investible funds. Investors find it difficult to track and evaluate investible opportunities

Information asymmetry: There is a lack of clarity about whether a particular activity is “Green”, or “Beneficial for Biodiversity”. Uncertainty about the nature of the activity and its impact on biodiversity make potential investors reluctant to invest.

Scalability: Reports suggest that only a few projects are scalable beyond a USD 5 million threshold. Project size often remains small, and is therefore, uneconomical from the perspective of large institutional investors.

3.1 Externalities

Ecosystems services such as clean air, water, mitigation of natural disturbances, waste decomposition, maintenance of soil fertility, pollination provide huge positive externalities for human societies. As an example, a wetland may provide flood control, absorbing high waters and gradually releasing water over time. It may also filter and retain nutrients and pollutants thereby providing cleaner water downstream. Research has shown that increasing the number of species in a system tended to increase system productivity.⁹⁶

Degradation of ecosystems results in significant impact on an economy through its every day effects on access to water, food, clean air, health, labour productivity. For example, research on Indian manufacturing has shown that output decreases at high temperatures by 1-3 percent per degree Celsius owing to a decrease in productivity of labour.⁹⁷

Environmental degradation also affects economies through the increasing occurrence of natural disasters that cause much damage and destruction. The National Oceanic and Atmospheric Administration (NOAA) has reported that the average amount of extreme weather events exceeding USD 1 billion each in the last five years has doubled since 1980. As an example of damage, an unprecedented heatwave in Moscow in 2010 is estimated to have cost

⁹⁶ Tilman D, Wedin D, Knops J (1996) Productivity and sustainability influenced by biodiversity in grassland ecosystems. *Nature* 379: 718–720; Naeem et. al. (1994), Empirical evidence that declining species diversity may alter the performance of terrestrial ecosystems. *Philosophical Transactions: Biological Systems*, 347(1321).

⁹⁷ Sudarshan, Anand and Meenu Tewari (2016), The economic impacts of temperature on industrial productivity: Evidence from Indian manufacturing. Available at <https://www.econstor.eu/handle/10419/176296>

almost 1% of Russia's GDP.⁹⁸ India is particularly vulnerable to natural disasters, especially flood risks, owing to rapid urbanization.⁹⁹

As global warming increases, and the risks of extreme weather conditions goes up, they will have adverse implications for businesses. It is hard to not see the impact of environmental factors on commercial viability of firms, and consequently on credit worthiness of borrowers and the balance sheet of lenders. For example, natural disasters can have huge consequences for banks who have large exposures in the impacted areas. These events also have dramatic consequences for the insurance sector. In fact, the UN-backed Economics of Environment and Biodiversity (TEEB) initiative, has estimated the annual cost of biodiversity loss at between USD 2 - 4.5 trillion, representing approximately 7.5% of global GDP.¹⁰⁰

One of the largest market failure in biodiversity finance is the lack of internalization of such costs. From the point of view of a commercial business, it does not internalize the costs of harm to biodiversity through their activities. As a result traditional businesses always appear to be yielding better returns to investors. From the investor's perspective, environmental risks appear long term and do not get factored into potential default rates.

Solving this externality first requires a valuation of natural capital so that it begins to get reflected in the market price. This is difficult to do as it is hard to conceptualize an ecosystem production system and actually measure the contribution of the ecosystem to economic outputs. Businesses themselves will get impacted by environmental degradation, and need to include these effects in their cost-benefit analysis before undertaking economic activity.¹⁰¹ Financial institutions will have to adhere to "green guidelines and standards" for lending, and investment decisions, to be able to correctly evaluate the associated risks.

⁹⁸ <https://www.dw.com/en/heat-wave-could-cost-russia-almost-1-percent-of-gdp/a-5887442>

⁹⁹ <https://www.livemint.com/Politics/DgqDMAedJKYw3lttuMHGMN/India-at-highest-flood-risk-with-urban-expansion-analysis-s.html>

¹⁰⁰ The Economics of Ecosystems and Biodiversity for Business (2010) <http://www.teebweb.org/Portals/25/Documents/TEEB%20for%20Business/TEEB%20for%20Bus%20Exec%20English.pdf>

¹⁰¹ Niyati Dangi and Rakesh Shejwal (2017), "Valuing Natural Capital: Applying the Natural Capital Protocol", YES Global Institute.

3.2 Search Costs

There exists a search problem between biodiversity related projects and investors with investible funds. It is costly to track and evaluate investible opportunities. Given the relative novelty of this sector, project developers are not able to show a track record in developing cash-flow generating projects. On the other side of the transaction, investors also are unable to move beyond the narrow investability criteria and fail to structure and develop vehicles with different risk-return profiles.¹⁰²

3.3 Information Asymmetry

A key market failure in the biodiversity space is that of information asymmetry. There is a lack of clarity about whether a particular activity is “Green”, or “Beneficial for Biodiversity”. As pointed out by a KPMG Report in 2016, the market for green bonds is

“...still too diversified which makes it more burdensome and complex to develop standards effectively, with many different types of issuers, many potential categories of eligible projects, and a wide variety of related criteria and potential measures for the environmental impact of the bond...”

This implies that the market for biodiversity is not standardized - there are too many players doing different things and measuring impact in different manner. If investors are uncertain about whether particular activities are indeed relevant from a biodiversity view point, or are unable to measure the impact of their investments, then entities may find it difficult to invest in projects.¹⁰³ This issue was raised by the EU High Level Expert Group on Sustainable Finance which recommended that the European Commission set up a shared EU classification system for sustainable activities.¹⁰⁴

3.4 Scalability

One of the key problems in the biodiversity space is the difficulty in scalability of projects. Reports suggest that only a few projects are scalable beyond a USD 5 million threshold.

¹⁰² Credit Suisse AG and McKinsey Center for Business and Environment (2016), "Conservation Finance From Niche to Mainstream: The Building of an Institutional Asset Class"

¹⁰³ Wim Bartels and Lars Kurznack and Laure Briaut (2016), mainstreaming the green bond market: Pathways towards common standards. Report commissioned to KPMG Sustainability by the French World Wide Fund for Nature ("WWF France") and WWF offices around the world

¹⁰⁴ EU High Level Expert Group on Sustainable Finance: Financing a Sustainable European Economy, Final Report, 2018.

Scalability also becomes a problem when projects require training a large number of people, for example, in agriculture or fisheries to give up standard practices and move to organic farming. As a result, the project size often remains small, and is therefore, uneconomical from the perspective of large institutional investors.¹⁰⁵

4. Way Forward

In this section we outline the steps the government may take to promote a market for biodiversity finance.

- a. **Set clear policy objectives and strategy**
- b. **Clear policy on ECC risks**
- c. **Improve measurement**
- d. **Improve financial disclosures**
- e. **Capacity building in financial institutions**
- f. **Capacity building for biodiversity business**
- g. **Set up an expert group**

4.1 Clear Policy Objectives and Strategy

One of the first task for policy is to lay down clear objectives on biodiversity. As has been seen from the Latin American and the Caribbean experience, *“people can mobilize when targets are clear and can be tracked transparently in the near term.”*¹⁰⁶

For example the state of Acre in Brazil clearly recognized that the state had an eminently forest-linked economy and thus made a deep commitment to preserving the forest. This then led the way to *the use of planning tools such as ecological economic zoning through a broad-based consultation and participation process resulting in maps that help regulate land use and classify regions for targeted support programs.*

The government of Mexico also designed conservation policies and programs that included territorial planning at regional and local level, voluntary conservation areas, certified forest

¹⁰⁵ OCED (2016), "Green financing: Challenges and opportunities in the transition to a clean and climate-resilient economy", OCED Journal: Financial Market Trends, Volume 2016/2

¹⁰⁶ Expanding Financing for Biodiversity Conservation: Experiences from Latin America and the Caribbean, Environment & Water Resources, Occasional Paper Series, the World Bank, 2012. Available at: <http://www.worldbank.org/content/dam/Worldbank/document/LAC-Biodiversity-Finance.pdf>

areas, wildlife management reserves; and mainstreamed conservation goals in public policies and programs.

Policy uncertainties get reduced when governments and regulators are able to send strategic policy signals and frameworks, thereby accelerating the development of green finance. The setting of clear policy goals also provides the impetus to build networks for sharing information and knowledge on the linkages between environmental factors and financial risks.

India is particularly weak on this front. Despite having a NAPCC and more recently INDCs, it has not been able to formulate a coherent national strategy on climate finance. As a result, there is lack of coordination in accessing climate finance and delivering it to priority interventions.¹⁰⁷ Similarly, a plan for biodiversity finance is lacking.

Set clear policy objectives: The government of India needs to set out its policy goal and broad strategy for biodiversity finance. The strategy should take into account the level of preparedness in various sectors, and identify those that still need subsidies as opposed to those that will take off with a few regulatory fixes. The strategy should contain exact policy objectives, the targets that need to be achieved, and the time-frames involved. The government should also show a commitment to internalizing the externalities through taxes to level the playing field between “polluting” and “non-polluting” industries for further financial flows.

4.2 Consistent Policy Making

It is possible that government policies in other sectors inhibit its goals on biodiversity. For example, it may be that policies in the agriculture sector, such as fertilizer subsidies, promote the use of chemical fertilizers that damage the soil and also increase the pesticide content in the final produce, thus causing harmful effects on biodiversity. Similarly, it is possible that the legal drafting of the Forests Acts, may hinder the development of a sustainable industry around forest produce. If there is legal and regulatory uncertainty in the treatment of certain products (for example bamboo), the industry participation will not be forthcoming. The government should follow up its policy objective on biodiversity finance with a review of all laws and regulations such that they are aligned with the larger policy objective.

¹⁰⁷ Dave Steinbach, et.al. (2014), Enhancing India’s readiness to access and deliver international climate finance, RICARDO-AEA.

4.3 Public Private Partnerships

As discussed in Section 2.3, and described in detail in Appendix 1, several of the successful initiatives at bringing private capital to the cause of biodiversity has been through *partnerships between the government and private companies*.

An example of such a public private partnership is the *Atlantic Forest Fund in Brazil*. This is a financial and operational mechanism developed by the Brazilian Biodiversity Fund, at the request of the State Secretary of Environment. By 2010, the FMA had already invested R\$14.5 million in the state's protected areas thereby improving the financial sustainability of its existing protected areas system.¹⁰⁸

Another example, also from Brazil is the PPP Peter Lund Cave Route that aims to structure a single, singular national and international tourist track, aligning the unique natural and cultural elements of the karst region. This project is a partnership between the Secretary of State for Environment and Sustainable Development (SEMAD), Forest State Institute (IEF) and Public-Private Partnership Central Unit with a focus on management, conservation and operation of three protected areas.¹⁰⁹

India should consider setting up such public private partnerships to conserve its forests and ecosystems. These should flow from the priorities set up in the policy objectives discussed in the previous sections.

4.4 Clear Policy on ECC Risks

Traditionally credit risk has only been concerned with balance sheet measures. It should now take into account environmental risks as well. *The impetus for this can come from regulation which should require banks and other financial institutions to explicitly acknowledge environmental risks in their decision making frameworks*. A beginning has been made internationally through Basel norms already. For example, paragraph 510 of Basel III (Pillar1) requires banks to appropriately “*monitor the risk of environmental liability arising in respect of the collateral, such as the presence of toxic material on a property.*”

¹⁰⁸ Expanding Financing for Biodiversity Conservation: Experiences from Latin America and the Caribbean, Environment & Water Resources, Occasional Paper Series, The World Bank, 2012. Available at: <http://www.worldbank.org/content/dam/Worldbank/document/LAC-Biodiversity-Finance.pdf>

¹⁰⁹ <http://blogs.worldbank.org/ppps/environmental-conservation-tourism-and-economic-development-avant-garde-brazilian-solution-through>

Critics, however, argue that these cover mainly “transaction-specific risks”, and do not constitute broader macro-prudential or portfolio-wide risks for the banks.¹¹⁰

Examples of ECC policies by Central Banks

- i. **Bangladesh Central Bank:** Environmental Risk Management Guidelines provides detailed technical guidance on environmental risk and its management.
- ii. **China Banking Regulatory Commission:** Requires banks to take an active role in considering environmental risks in their credit decisions.
- iii. **Banco Central do Brasil:** encourages banks to have environmental and social policies that are “relevant” and proportionate to their activities based on the bank’s size and position in the banking sector, and its business model. It also encourages banks to assess their individual exposures to carbon risk.

However, the recognition has led several Central Banks to put in place frameworks to deal with environmental and systemic risks.

An example of such an initiative is the “Environmental Risk Management Guidelines” for banks and financial institutions published by the Bangladesh Central Bank in 2011, which provides detailed technical guidance on environmental risk and its management.

The Green Credit guidelines issued by the China Banking Regulatory Commission in 2012 (followed by additional guidance in subsequent years) is another example where the regulator has taken the lead in requiring banks to take an active role in considering environmental risks in their credit decisions.¹¹¹

In 2014, Brazil’s central bank adopted a policy of encouraging banks to have environmental and social policies that are “relevant” and proportionate to their activities based on the bank’s size and position in the banking sector, and its business model.¹¹²

¹¹⁰ Kern Alexander, Thomas Strahm and Alexandra Balmer, “Stability and Sustainability in Banking Reform: Are environmental risks missing in Basel III”. Available at <http://www.unepfi.org/fileadmin/documents/StabilitySustainability.pdf>

¹¹¹ Barbara Kuepper, Profundo Tim Steinweg, Aidenvironment Gabriel Thoumi, 2017. Sustainable Banking Initiatives: Regulators’ Role in Halting Deforestation. China Reaction Research.

¹¹² Greening Banking Policy: In support of the G20 Green Finance Study Group. Available at http://unepinquiry.org/wp-content/uploads/2016/09/10_Greening_Banking_Policy.pdf

The banking regulator in India should include environmental risk aspects as an integral part of the supervisory framework and consider them within the revisions of the assessment methodology of the Basel Core Principles for Effective Bank Supervision.¹¹³ It could require banks to assess all “material risks” in its capital assessment process, and incorporate forward-looking models that incorporate environmental impacts (both positive and negative) into their stress-testing frameworks.¹¹⁴

4.5 Improve Measurement

To be able to utilize economic instruments for conservation, there needs to have a good basis of policy relevant valuations of biodiversity, natural resources, and ecosystem services. To scale valuation efforts to national level, sustained long term efforts are needed to develop more rigorous methods, identify data needs and ways to collect the needed information.¹¹⁵

The government, along with regulatory agencies, should create a taxonomy for biodiversity that would allow for comparability across standards, labels, products and jurisdictions.

This would include clear definitions on what would constitute biodiversity projects, guidance on how to make assessments of projects from sustainability point of view, provide assurances that investment proceeds are indeed channeled to “biodiversity” projects, and allow for the comparison of the effectiveness of such investments.

The measurement of financial flows into biodiversity would also help in evaluating the impact on biodiversity: and help in assessing the progress that has been made on the “greening” of the financial system. For example, the China Bank Association has made progress towards measuring the volume and efficiency of green loans, while the Central Bank in Turkey has initiated the development of a reporting template.¹¹⁶ Such an initiative may be considered by the Indian regulators as well.

Better measurement of biodiversity exposures and risks would enable investors to understand: the exposure of various portfolios to environmental risks, and help them design

¹¹³ European Banks Association, 2017. Green Finance Framework. Available at <https://www.ebf.eu/wp-content/uploads/2017/09/Geen-finance-complete.pdf>

¹¹⁴ See supra 27

¹¹⁵ The Economics of Ecosystems and Biodiversity India Initiative, Interim Report Working Document, Ministry of Environment, Forests and Climate Change, Government of India

¹¹⁶ UN Environment, 2017. Green Finance: Progress Report. The Inquiry into the Design of a Sustainable Financial System, United Nations Environment Program (UN Environment).

strategies that are better aligned towards their ESG goals. This would increase the confidence of market participants when they participate in biodiversity related activities.

4.6 Improving Financial Disclosures

Closely tied to the notion of measurement is that of improving disclosures, as they directly feed into the goals of measurement. A key component of incorporating ECC risks is the requirement that business and investors make financial disclosures that not only focus on the short and medium term, but also on the long term. This is important from the perspective of evaluating the ECC risks appropriately.

- i. It is important to develop a common disclosure framework on ECC risks and performance.
- ii. Internationally, the Financial Stability Board sponsored the Task Force on Climate-Related Financial Disclosure (TCFD).
- iii. The Task Force provides *both the means by which financial measurement can be used to catalyze market developments, and, an opportunity to establish a common global framework for Green Finance.*
- iv. A similar effort may be undertaken on Biodiversity Related Financial Disclosures (BRFD).
- v. The experience of firms that have voluntarily signed up for the TCFD under the UNEP Finance Initiative should be monitored, and lessons on implementation of the TCFD should feed into the development of the BRFD.

4.7 Capacity Building in Financial Institutions

A key player in channeling finance into biodiversity related activities will be the financial institutions themselves. There needs to be an effort to develop capacity within the DFIs and banks to be able to increase coverage of biodiversity related activities and develop bankable projects to attract investment. GCF provides for Pipeline development support which can be informed by the priorities set out in the country work program (Mehta, Goodman and Pandey (2015 a). This may be done by developing internal capacity through creation of groups at the institution level to focus on biodiversity related activities, and also creating mechanisms to coordinate with research institutions to develop bankable projects.¹¹⁷

Mehta, Goodman and Pandey (2015 b) identifies a number of specific barriers to private sector investment in mitigation and adaptation projects that the private Sector Facility (PSF) of the

¹¹⁷ Dave Steinbach, et.al. (2014), Enhancing India’s readiness to access and deliver international climate finance, RICARDO-AEA.

GCF is designed to address. A key barrier, among others, is inadequate capacity of DFIs. The study recommends that the Fund may support capacity building of DFIs by funding local initiatives and supporting the expansion of institutions that lead efforts to address climate change -- in order to increase the coverage of climate related activities and to develop bankable projects to leverage further investment.

- i. The possibility of leveraging existing relationships with multilateral funds such as the Global Environmental Facility or the Clean Technology Fund, to lend to specific projects should be explored.
- ii. NABARD¹¹⁸ and SIDBI became the accredited entities in India from public sector in the context of GCF¹¹⁹. The private sector entities nominated by the government are YES Bank, IDFC Bank and IL&FS Environmental Services. Other institutions should be encouraged to go down this path, and develop downstream projects in the area of biodiversity.
- iii. Relevant authorities/groups/forums authorities, together with international financial institutions and the private sector, should enlarge capacity-building platforms, for example to discuss the effects of the green transformation on credit risks and trainings.
- iv. The Sustainable Banking Network and the Principles for Responsible Investment represent good examples of capacity-building platforms (G20, 2016).

4.8 Capacity Building for Biodiversity Businesses

Capacity building for biodiversity based businesses is equally important as both the financial sector and businesses have a role to play in developing a pipeline of projects. There are a number of general activities that governments and others can undertake to support the creation and development of biodiversity-based businesses. Entrepreneurs face similar challenges as they attempt to start-up, develop and expand their biodiversity based businesses. It therefore

¹¹⁸ NABARD and SIDBI have been accredited as Direct Access Entity (DAE) of Green Climate Fund for channelizing resources under this NABARD has also been accredited as National Implementing Entity for Adaptation Fund :

http://timesofindia.indiatimes.com/articleshow/63247678.cms?utm_source=contentofinterest&utm_medium=te xt&utm_campaign=cppst

¹¹⁹ So far, one project from India on “Installation of Ground Water Recharge System” in Odisha has recently been approved by the GCF for \$34 million. Another proposal on coastal areas has already been submitted to the GCF Secretariat and several more projects are in the pipeline.

Mehta, Goodman and Pandey (2015 a), Green Climate Fund: Roadmap for Indian financial institutions, Verco, United Kingdom.

Mehta, Goodman and Pandey (2015 b), Readiness activities to help India access and best use climate finance, including the Green Climate Fund, Verco, United Kingdom.

makes sense to help them learn from each other's' experiences and capitalize on the mistakes and achievements of others.

Recognizing the need for capacity building and training, the Bio Trade Initiative (see www.biotrade.org) promoted by UNCTAD, with the support of the CBD Secretariat and other organizations, represents an integrated approach to stimulating investment and trade in biological resources.

Brazil: Creating Biotechnology “Centers of Excellence”

The creation of biotechnology industry “centers of excellence”, and the infrastructure that goes with it, is often a precondition to the establishment of value for biodiversity. One interesting example of this is the case of PROBEM in Brazil.

PROBEM-Amazonia (the Brazilian Program of Molecular Ecology for the Sustainable Use of Biodiversity in Amazonia) features the establishment of a \$60 million Biotechnology Industrial Center (BIC) in the Manaus Free Trade Zone. The objective of this center is to attract investment (both national and foreign) into regional biotechnology businesses in the areas of pharmaceutical products, cosmetic materials, food products, environmentally-friendly pesticides, enzymes of biotechnological interest, essential oils, antioxidants, natural dyes and fragrances.

PROBEM operates by providing monetary and fiscal incentives to people and industries willing to invest in biotechnology and help create biotechnology industries in Manaus.

Some of the incentives include: 10-year income tax exemptions, value-added tax exemptions for products made in the Amazon using agricultural raw materials and plant extracts from the region, import tax exemptions on foreign goods destined to be consumed or used for manufacturing in Manaus and/or re-exported, export tax exemption for all products manufactured in the Free Zone that are exported, sales tax exemption on consumer goods and consumption, including taxes on energy, fuels, transportation and communications services, capital gains tax exemption on certain items and concessionary prices on lands for companies to install manufacturing plants. The provision of these types of incentives may be a way to capture more of the value-added from biodiversity-based businesses in Latin America and the Caribbean.

Source: Bayon Lovnik and Veening (2000)

4.9 Set up an Expert Group

A High Level Expert Group was established by the European Commission in 2016 to help to develop an overarching and comprehensive EU roadmap on sustainable finance.

Such an expert body needs to be set up to develop strategies on ways to improve biodiversity finance. One of the objectives of this group should be think about recommendations for incentivizing long term green infrastructure financing.

The European Banking Federation, for example, makes specific prudential recommendations related to capital requirements for risk exposure, or treatment of promotional loans linked to green finance etc.

The costs and benefits of such incentives need to be considered in the Indian context. It is possible that if prudential requirements on lending to green assets are reduced, this might incentivize finance into such activities.

Appendix I: Case studies

Ecotourism

Ecotourism is defined as a responsible travel to areas that conserve the environment, sustain the well-being of the local people and their culture. Ecotourism is an effective way to help safeguard a country's resources while promoting socio-economic development and empowerment of local communities. Ecotourism fills the growth of the local economy with revenues generated from it. Eco-tourism differs from tourism in the sense that usually tourism is described as a business of providing services for tourists. Tourism is not concerned about climate change, and might cause pollution, unsustainable construction destroying the ecosystem as tourism is only with an aim to earn profits.

However, even eco-tourism comes with its share of hurdles, since ecotourism entails visiting unexplored areas, it can be unsafe at times. Thus many concerned travelers opt for traditional tours in popular places that are usually safe. Also, the fact that it is expensive in nature when compared to mass tourism. As a result only the well-heeled can afford it. Moreover, eco-tourism requires trained tourist guides such that they themselves do not cause harm to the ecosystem.

An attempt has been made by the **Ghana government** to resolve such issues. Ghana with its sunny equatorial climate and fertile well-watered soils sustain an enchanting selection of wildlife, ranging from elephants to monkeys and marine turtles to crocodiles, along with hundreds of colorful birds and butterfly species.

In Feb 2016, Forestry Commission of Ghana signed a lease agreement with a **private development company, AIKAN Capital**, to transform an Achimota Forest Reserve (which is a large patch of woodland) into an eco-park, known as Accra Eco Park. The Achitoma Forest Reserve has lost around 150ha of land since its inception in 1930, as a result of urban development. The lease agreement allows AIKAN Capital to design, build and operate the facility for 10 years.

The mega development by AIKAN capital will comprise of the construction of amusement parks, orchards, arboretum, wildlife safaris, museums, eco-commercial enclaves and eco-lodges and will not affect the natural vegetation as much as possible. It will also involve a spiritual enclave to cater for spiritual/worship activities that bring more than 180,000 people annually to the Achimota Forest. High seating capacity conference rooms are also set to be

constructed outside the main forest area. The estimated cost of the project will be around \$1.2bn.

AIKAN capital will earn revenue from the **user charge** that will be charged from the tourists who come to visit the Accra Eco Park, taking a step forward for environmental conservation.¹²⁰

1. Green Commodities Program

The major challenges in the production of Green commodities has been the weak organization of the smallholders producing such commodities and also the lack of property rights given to them. There existed no certification via the government to these smallholders, making their groups vulnerable and their produce susceptible to market fluctuations. Thereby, producing green commodities had little scope and held little incentive for these smallholders.

Green Commodities Program is thus a combined public and private effort to transform the commodity sector. This program aims to bring together various stakeholders of the targeted commodity sector at country level to address its structural problems. Usually these are some of the highly traded commodities with substantial social and environmental impacts. Some initiated programs are on palm oil, coffee, soy, beef and dairy.

The UNDP in this context, approached the Indonesian State and has developed a Palm Oil Platform, FoKSBI (Forum Kelapa Sawit Berkelanjutan Indonesia). The State's relationship then evolved with Indonesian Palm Oil Pledge (IPOP). The Roundtable on Sustainable Palm Oil (RSPO) has been developed to bring legality and transparency in the palm oil chain and improve livelihoods of smallholders.

Recently, the Indonesian Government has started the process of recognizing smallholders working for palm oil, by certifying them. The Indonesian Ministry of Agriculture and UNDP began the process of pilot testing the guidelines for small-holders certification, using Indonesian Sustainable Palm Oil (ISPO). In 2015, ISPO, a mandatory Government led scheme was launched to formalize the Palm Oil smallholders. This led to providing assistance such as land titles and capacity building to the smallholders. The initiative is both to help low income oil palm farmers increase their productivity and improve the sector's environmental management.

2. Biodiversity certification

¹²⁰“Emerging Ecotourism in Ghana Makes Headway.” *Oxford Business Group*, 31 Jan. 2017, oxfordbusinessgroup.com/analysis/ghana%E2%80%99s-emerging-ecotourism-segment-making-headway-wild-card

Biodiversity certification is a streamlined biodiversity assessment process for areas marked for development at the strategic planning stage. The process identifies areas of high conservation value at a landscape scale. These areas can be avoided and protected while identifying areas suitable for development. The problem with such pledge to restoration and conservation by investors has been that they do not know whether their money is going through the right channel or not and whether their funds would actually be used for long term investments in conservation activities.

- i. The Sabah Government in Malaysia has initiated a project that enables private sector companies working in Malaysia or sourcing products from the country to help restore and protect the existing rainforests in Malaysia. This is known as the Malua Biobank, which is a joint venture between the Malua Bio Bank Company (Malua Wildlife Habitat Conservation Bank Inc.) and Sabah State Government.
- ii. The Sabah Government that has assigned conservation rights (license to issue biodiversity certificates) for a period of 50 years to Malua Biobank. The bank is a multimillion dollar investment from the Eco-Products Fund, which is jointly managed by New Forests and Equator LLC, committing private equity of up to US \$10mn to manage the Malua Forest Reserve (MFR) over next 6 years.

Malua Biobank that generates biodiversity conservation certificates. By purchasing the certificates, buyers can make a credible long term contribution to forest conservation and agree that they do not support logging activities in forests.¹²¹ Further, bio-banking enables ‘biodiversity credits’ to be generated by landowners and developers who commit to protect biodiversity values on their land through bio-banking agreement. These credits can then be sold to philanthropic or government organizations, using the market to achieve natural resource management on private land. Revenue from the sale of credits go to covering the costs of management during the set up phase and endowing a perpetual charitable trust.

Buyers and sellers of credits are free to negotiate the credit price, however on the first sale of credits, the proceeds from the sale must be sufficient to cover the Total Fund Deposit, that involves expenses associated with managing the biobank site (cost of implementing

¹²¹ Halley, Meril ,(2015), *Case Study on New Forest’s Malua BioBank Initiative*, Industrial Agriculture and Ape Conservation

management actions, condition of vegetation, configuration of site) and other recurring costs (such as annual reporting fee, insurance, land rates).

Moreover, TZ1 Limited is a leading provider of registry services to the voluntary carbon market and has been selected as the global registry for the Malua Biobank's Biodiversity Conservation Certificates. It provides a secure, online facility enabling efficient issuance, housing, ownership transfer and retirement of Biodiversity Conservation Certificates. TZ1 is the first biodiversity registry of its kind in the world.

Appendix 2: Financing Biodiversity

Businesses cannot function if there is no biodiversity. Since this simple understanding is often missing, it is important to first connect the dots. The survival of all manufacturing setups, irrespective of the sector, depends on ecosystem services and biodiversity as inputs to production.¹ This is particularly true in case of agriculture, fisheries, horticulture, oils and gas, pulp and paper, cosmetics, mining, construction, pharmaceuticals and waste treatment. Other businesses also impact ecosystems services subsequently through process emissions, industrial waste and other extractive and exploitative functioning.

To drive investments from businesses, we must simplify business linkage with biodiversity. CSR and sustainability professionals in corporate sector many times come from communications, HR and marketing backgrounds, hence, deconstructing the ‘biodiversity and business’ linkage as much as possible will help financing biodiversity more meaningfully. This will enable the practitioners contextualize biodiversity investments, making a business case in front of their respective Boards and contribute to the larger development goals such as, Sustainable Development Goals 13, 14 or 15.

There are certain core questions that need to be asked first, when it comes to understanding the role of the private sector in financing biodiversity. These include:

A. How many corporates actually understand the linkage between ecosystem services and business?

B. How many businesses want to invest in biodiversity; afforestation and/or agro-forestry related projects either as an integrated part of business or as a standalone.

C. Even if they do, what is the level of maturity of their investments in terms of:

- Project scope – Is it big, medium or low?
- Time commitment – Is it long-term, medium and short?
- Geographically - Is it in areas abundant in biodiversity or where there are biodiversity losses?
- Complexity - Is it inter-linked to other development issues and SDGs?
- Potential impact - Is it clearly defined with monitoring and evaluation frameworks, project goals and milestones, leading to tangible benefits to communities and overall business?

The good news is that many corporates are already doing that. They are working on projects that contribute towards biodiversity enhancement, sometimes without even directly making those linkages. Let us look at some of these case scenarios.

Financing biodiversity as a business

The theme of World Economic Forum at Davos in 2018 was ‘Creating a Shared Future in a Fractured World’. Recognizing the impact of business as usual, large corporations and governments across the world are redefining “growth” to reduce overall resource footprint and promote sustainable consumption. This includes energy and water use efficiencies, less wastage and pollution during production, promotion of sustainable use or consumption and inclusion of rural poor towards equitable distribution of ecosystem benefits in the value chain. Many banks, for example, lend money to large projects by corporations if they clearly demonstrate increase in both shareholder as well as stakeholder value.

Testing the environmental, biodiversity and climate stress of lending portfolios helps banks safeguard themselves from natural capital risks. Many commercial banks and development sector banks like The World Bank, International Finance Corporation, Asian Development Bank have integrated environmental and social risks with credit risks. In order to reflect these risks in the cost of the capital lending realistically, they are recalibrating the loan pricing.

The World Bank itself is one of the largest international financiers of biodiversity conservation and sustainable use with a portfolio of 241 projects worth over US\$1.25 billion in the 10 years from FY2006 to 2016.² Through the application of its safeguards policies, recently updated to strengthen development outcomes, the World Bank also integrates biodiversity concerns into all of its investment projects. Here closer home in India, the report titled ‘Valuing Natural Capital: Applying the Natural Capital Protocol’ by Yes Bank, provides key insights on the potential impact of natural capital valuation on a company’s balance sheet thereby establishing a business case.

For example, University of Southampton, UK reported that, “the diesel exhausts interfered with the floral odors that help bees locate flowers for sipping nectar.”³ This in particular can be critical area to look at when lending to extractive companies.

Similarly, accounting of free biodiversity and ecosystem services is also gaining popularity among corporate sector. With increasing pressure on natural resources, we are already facing real situations like no water availability in South Africa. This means that basic services such

as clean water, access to energy and raw material availability will become more expensive in years to come. Add to this, heightened instances of natural disasters such as floods, tornadoes, etc. are making companies incorporate such environmental (loss) accounting into their balance sheet.

A detailed cost-benefit analysis entailing valuation of ecosystem services is thus the foremost requirement, something that organizations like International Union for Conservation of Nature (IUCN) and The Economics of Ecosystems and Biodiversity (TEEB) are aiming to do among corporations. It is also important that banks, stock exchanges and market mechanisms are used effectively for obtaining funds for large biodiversity conservation projects such as, landscape restoration. The financial market-based mechanisms can be an important linkage in this regard. Sustainability indices, such as Dow Jones Sustainability Index (DJSI), etc. emphasize the need to focus on environmental sustainability and ecosystem services in that sense.

Corporate sector is increasingly thinking of sustainability as a corporate strategy for their market positioning and meeting their long-term goals. Interesting ideas that will help them embed their longer-term goals and bottom lines in sustainability will help a long way in generating funds for biodiversity restoration. Point in case is Unilever's Sustainable Living Plan (USLP).

Forests are second only to the oceans as the largest global store of carbon, and support 80% of terrestrial biodiversity across the globe. FMCG major, Unilever is protecting one million trees in two of the world's most threatened areas, Brazil and Indonesia, with special emphasis on reducing deforestation and forest degradation, restoring forest areas, promoting sustainable forest management and increasing tree stocks in agricultural landscape.⁴ Its collaboration with Roundtable for Sustainable Palm Oil (RSPO) and Rainforest Alliance are successful ways to finance initiatives that conserve biodiversity as part of business.

Financing biodiversity where such investments help towards the company's core business

For tourism sector, especially related to wildlife and nature, habitat loss is a big concern. The existing wildlife corridors in our own country are fragmented. At this rate, soon only individual islands will remain. Even though the 'wild' might learn to adapt, both wildlife tourism and the need for fuel wood for local communities from the forests will still continue to increase. These are the real issues, linked to poverty and survival, which will continue to impact biodiversity. Poverty can undermine biodiversity; biodiversity loss and the resulting degradation of ecosystems can in turn exacerbate poverty.⁵ these issues need to be tackled with solid

partnerships, investments and rethinking from both the government and the private players – none of which will be easy without true commitment.

The report titled ‘Biodiversity, Nature-Based Tourism, and Jobs’ by World Bank, highlights similarly the importance of balancing the need to generate sufficient economic benefits for local communities in order to create incentives to cease consumptive uses, while also preventing the tourism venture from exceeding the carrying capacity of the site and harming conservation.⁶

While these sector linkages can help finance biodiversity, the biggest threat for biodiversity, however, is the extractive industries. Most of the biodiversity impact happens at the raw material extraction, because of which mining companies now invest in biodiversity as part of business sustainability. Adherence to environmental norms honestly with timely impact assessments, especially for those in steel, power, mineral mining sector helps avoid any negative impacts from the beginning.

Global mining companies like Rio Tinto, recognize its impact on biodiversity and the sensitivities of its projects for communities, investors and governments among others. With this understanding they launched their biodiversity strategy in 2004, aiming to achieve Net Positive Impact (NPI) in areas of operations. This is achieved by the “Mitigation Hierarchy” approach:

- Avoiding unacceptable impacts to biodiversity
- Reducing the impacts that may occur
- Restoring impacted ecosystems
- Compensating for residual impacts through offsets
- Seeking additional opportunities to contribute to local conservation

As a resource-intensive business, biodiversity conservation is important to long-term resource strategy for Ambuja Cements. It is the first cement company to be assured ‘water positive’. They have a risk matrix and monitoring system in place to monitor changes in biodiversity conditions. They not only restore and reuse mined outlands, but also integrate biodiversity post-closure stage. They have a risk matrix used to prioritize financial investment in biodiversity conservation efforts.

Additionally, companies scan their supply chain to see if their suppliers of raw material are near any protected area or encroached wildlife sanctuary; or if any agri-plantations linked supplier (e.g., rubber, cotton, palm oil etc.) are a replacement of the forests providing critical habitat to wildlife. This would then call for appropriate measures to offset such impacts.

To that effect, the Aditya Birla Group has a complete Biodiversity Management System (BMS) as part of its sustainability model. It helps the conglomerate to future proof itself through the supply chains. Biodiversity is included in their responsible stewardship pillar. They approach biodiversity management plan post screening, inventorization, impact identification, quantification and evaluation as per biodiversity technical standards.

The other sector where financing biodiversity as a business makes sense is those dependent on agro-forestry. Under its agri-business, ITC worked with its sourcing farmers in the Kalyanpura catchment in Rajasthan - moisture stressed and drought-prone region, which impacted productivity. Absence of irrigation facilities further made livelihood dependent on farming highly vulnerable. The soil erosion rate was alarming, leading to a complete loss of topsoil. A collective watershed development programme undertaken in partnership with Government of Rajasthan, Foundation for Ecological Security (FES) and local villagers, not only protected livelihood and but also enhanced biodiversity in the region.

Financing biodiversity through CSR activities

Companies today are increasingly working on the idea of Creating Shared Value (CSV) in communities. For example, businesses in coastal areas, understand the impacts on corals and deep-sea marine life as a critical part of business operations. It is no surprise thus that companies like Tata Steel have embedded SDGs in the corporate policy itself, especially the ones related to biodiversity. Their biodiversity policy's goal is to achieve a net positive impact on biodiversity and the ecosystem, with a biodiversity management plan in each of their operations.

Tata Chemical's soda ash plant is located in Mithapur in Gujarat. Here the waters of the Gulf of Kutch host a marine sanctuary. The whale shark is listed as endangered per the Wildlife (Protection) Act in May 2001. However, the fishermen would hunt the whale shark due to lack of awareness, instead of protecting it and creating an environment conducive for it to breed. Recognizing this threat, Tata Chemicals as part of its CSR, in collaboration with Wildlife Trust of India, Coast Guard, the Indian Navy, the Ministry of Environment and Reefwatch jointly launched a conservation awareness programme for the whale shark project and financial

assistance programme for the fishermen in the community. Major fishing harbors and ports along the Gujarat coastline were successfully covered through this programme, helping such public advocacy programmes gain greater momentum and wider outreach. In the second phase, along with Gujarat State Forest Department and the National Institute of Oceanography the understanding of the project was further expanded to undertake research for whale shark and corals protection in the area, along with a study to understand tourism opportunities in the region. As on March 2013, more than 350 whale sharks⁷ have been saved in the last nine years, since the launch of the programme.

India has a long coastline, which needs to be protected along with its biodiversity including mangroves. In another effort, ONGC and Bombay Natural History Society collaborated to restore vast stretches of mangroves in Gandhar area of Gujarat by planting over 1.7 million mangrove saplings. “This saved the oil and gas wells of ONGC from damage by erosion. This has also provided employment to about 150 people in the area. Along with restoration, ONGC has also been working in creating awareness about mangrove conservation among coastal communities in Maharashtra and Gujarat. This also includes schools and colleges.”⁸

The largest privately managed belt of Mangroves in Mumbai is supported by the Soonabai Pirojsha Godrej Foundation. This is the first such mangrove area in India to formally adopt ISO14001 standards for Environment Management Systems. The vast tract of unique mangrove forests conserved and protected by Godrej in Mumbai, demonstrates how industry and nature could well exist in harmony with each other.

From bigger projects of resource use efficiencies and promoting sustainable consumption, to smaller projects of biodiversity enhancement that include themes like pollination, migratory birds, beeking, urban farming, edible landscaping (as opposed to well-manicured lawns) etc. – all of these account for biodiversity investments led by corporations. Companies like Apollo Tyres are actively working on similar themes as part of its CSR for biodiversity enhancement. From pond rejuvenation to apiculture and organic kitchen gardens and mangroves restoration, all of it is being financed through CSR.

Conclusion

TEEB pegs annual cost of biodiversity at close to 3 trillion dollars. This is much more than what major sectors of economy earn collectively in a year. The planet belongs to all and this

web of life should not be eroded. Life support systems through biodiversity such as clean water purified by a wetland, medicines from nature's basket of free services etc. are a result of billions of years of evolution. Biodiversity loss means loss of nature's free services. We must at all times, thus, remember why we need biodiversity and how we can save it.

Destabilizing ecosystem means more natural disasters and inability to deal with droughts, floods, famines, hurricanes and man-made climate change and pollution. This would mean more money being spent in response to these calamities (especially for poor) and threats of global warming mitigation – both by governments and corporations.

Everyone needs to survive on one planet with its limited resources. Corporations are aligning themselves in accordance with a strategy ensuring long-term sustainability along with the continued benefit of free ecosystem services. Conservation must be profitable, making urban centres self-reliant along with long-term rural inclusion and equitable resource use. This can happen with solid private and public partnership and financing models.

For India in particular what this translates to is perhaps re-adoption of the Gandhian model of development in business allowing for stakeholder trusteeship and cooperation (more than competition), smaller ecological footprint; along with poverty alleviation, inclusion and equitable development of rural India. Even for international businesses outsourcing their supply chains to India, we need to join hands in this endeavour for a balanced approach towards profitability, social justice and biodiversity conservation.

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Appendix 3: Details of Meetings with Stakeholders

The Climate Bond Initiative (CBI): The CBI has been an active participant in the green bonds space, and is at the forefront of developing standards for green bonds. It is also actively engaged in the policy process in India on the issue of green bonds. The meetings were useful to understand the issue from a policy perspective.

Yes Bank: which is one of the leading financial institutions on green financing in India, and has also come out with a report on valuing natural capital. The meetings were useful to understand the issues from the perspective of a lender in the financial sector.

Tilda Hain India: which is part of the Celestial Hain global group, and engages in sustainable rice farming. They have recently started a Project ‘PASS’ that has engaged farmers across the state of Haryana to shift from using chemical fertilizers and pesticides to using bio fertilizers and achieved substantial gains in reducing pesticide residue in their rice crop. The meetings were useful to understand the challenges in undertaking sustainable agriculture from the perspective of a business.

WWF: is an international organization with a mission to take forward the agenda of environmental protection. The India office of the WWF works towards addressing the common goal of conserving biodiversity, sustainably using natural resources and maintaining ecosystems and ecosystem services for the survival of wildlife and people depending on them. The meeting with WWF led to a discussion on the differences between the “risk” side and the “opportunity” side of biodiversity. The risks side emphasizes the need to factor in the exposure to biodiversity risks, while the opportunity side focuses on how to use biodiversity for business. The meeting also led to an understanding of WWF activities in this space - include infrastructure and water. The idea suggested by them was that for infrastructure projects like roads (for example), mitigation requirements need to be built into the project itself. Similarly, sovereign funds with EGS mandates should be brought into investing in infrastructure in India. WWF also indicated that they are working on a report to identify the challenges to “early green tech innovation” in India.

CSR consultant (Ms. Kanika Pal): The discussion with a professional CSR consultant helped understand that businesses are actually undertaking several initiatives that have a positive impact on biodiversity, without really classifying them as “related to biodiversity”. A note written by Ms. Pal is attached in Appendix 2.

ICICI Bank: has traditionally been in the space of “conservation” in its role as a Development Finance Institution (DFI) prior to its turning into a private bank. The conversation with ICICI Bank was useful to understand the constraints faced by the bank in lending to biodiversity businesses - these include the fact that project sizes are very small, and the expected cash flows imply that interest’s rates for such projects would be high. The bank typically looks at a five year loan cycle, but this is too short for biodiversity related projects, making lending unviable. Defaults on such projects add to the NPAs of the bank, making it reluctant to commercially lend to such projects. However, it has been very active in concessional lending through “*grant assistance*” to biodiversity related activities since the early 1990s.

Council on Energy, Environment and Water (CEEW): The meeting with CEEW helped us understand the concept and working of Zero Budget Natural Farming (ZBNF) adopted in Andhra Pradesh, where the focus is rather on going back to the traditional means and measures of producing crops. “Zero Budget” refers to zero net cost of production of crops which accrues to the concept of minimizing the cost of inputs used by the farmers and using locally available inputs. It appears that villages in Andhra adopting ZBNF are on a trajectory to success, accruing to farmer’s income welfare (due to reduced cost of inputs). Practices similar to ZBNF have been attempted in Indonesia, where HHP (Hadiputranto, Hadinoto & Partners) Law Firm has advised BNP Paribas (a bond structuring entity) and ADM capital on structuring a *Sustainability bond*, which will help finance a sustainable natural rubber plantation on 90,000 hectares of land. The meeting also led to a discussion on the potential to utilize bamboo plantations, as an extremely useful raw material for creating environment friendly spaces, ditching timber and conserving trees. For private entities to invest in and fund biodiversity projects, the importance of the following was recognized by CEEW: a) Role played by the *values* that people attach to the ecosystem services, for our country to grow sustainably, b) existence of a “*shadow price*” for ecosystem services, for the private sector to carry out cost-benefit analyses of funding such projects and c) robust *monitoring systems* for quality-check of the produce.

Chapter 4

Mainstreaming Biodiversity in Sustainable Development

1. What Does the Mainstreaming of Biodiversity in Development Policy Mean?

The concept of mainstreaming was included in article 6(b) of the Convention on Biological Diversity¹²², 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 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 governments, business, or international organizations 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 the key public and private actors that impact and/or rely on biodiversity, so that it is conserved and sustainably used both locally and globally;
- b) Relating to production sectors, such as agriculture, fisheries, forestry, tourism, and mining; and
- c) Mainstreaming might also refer to including biodiversity considerations in flagship programs of countries such as Poverty Reduction, Food Security, Employment Guarantee Programs; and global programs such as Sustainable Development Goals.

Mainstreaming biodiversity can take place and/or can be pursued in different settings and scales e.g., ecosystem¹²³, landscape¹²⁴; 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.

¹²²Article 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>

¹²³ 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).

¹²⁴ 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.

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).

2. Need for Biodiversity Mainstreaming

Biodiversity is at the center of many economic activities, particularly those related to crop and livestock agriculture, forestry, and fisheries. Globally, nearly half of the human population is directly dependent on natural resources for its livelihood, and many of the most vulnerable people depend directly on biodiversity to fulfill their daily subsistence needs.¹²⁵

Even then, biodiversity objectives remain weakly integrated in government, business and community services. This means that development and land use that takes place on about 85% of land that lies outside protected areas (e.g. tourism, mining, agriculture, forestry, fisheries) continues to undermine biodiversity, often through habitat conversion and fragmentation.¹²⁶ Many a times, biodiversity and ecosystem service goals are viewed as distinct from, and sometimes even contradictory to, the goals of development and growth.¹²⁷

The need to mainstream biodiversity could stem from one or more of the following:

- (i) Country experiences of the 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 with respect to reforming subsidies with harmful effects on biodiversity and ecosystems;
- (iv) Challenges with respect to strengthening financial and institutional support for promotion of biodiversity promoting policies.
- (v) Mainstreaming is seen as an important tool for changing the value structures of key stakeholders.

3. What Does The Literature Say About the Mainstreaming of Biodiversity?

The following observations — based on a review of literature and views of International Forums — provide an insight on why mainstreaming of biodiversity is needed (box below) and what are the policy instruments available for mainstreaming biodiversity; and measuring and assessing the outcomes (Tables 1 and 2).

OECD Development Assistance Committee (DAC): Policy Statement on Integrating Biodiversity and Associated Ecosystem Services into Development Co-operation (OECD, 2010b).

¹²⁵ Biodiversity and the 2030 Agenda for Sustainable Development, Technical Note, CBD

¹²⁶ Mainstreaming Biodiversity in Development Policy and Planning: A review of Country Experience, Biodiversity and Livelihoods Group International Institute for Environment and Development, 2002

¹²⁷ Mainstreaming Biodiversity Conservation: A Framing Paper for the Scientific and Technical Advisory Panel of the Global Environment Facility,

A number of other actors in the international development co-operation arena also support the mainstreaming of biodiversity and ecosystem services into development. These include international governmental organizations, such as the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the International Union for the Conservation of Nature (IUCN), the Global Environment Facility (GEF).

The Hague Ministerial Declaration: “The most important lesson of the last ten years is that the objectives of the CBD 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”¹²⁸.

Scientific and Technical Advisory (STAP) panel of GEF: Yet another view on need for mainstreaming biodiversity stems from a theoretical perspective in a world where awareness among stakeholders about the significance of 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.

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.¹²⁹

UNDP and UNEP, 200): 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.

STAP: 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.¹³⁰

Table 1: Policy Instruments for Mainstreaming Biodiversity and Development

Policy Instrument	Examples
Legal/regulatory approaches	
Regulations governing use	Nature protection and conservation such as the establishment of protected areas; forest management; prohibitions and restrictions on

¹²⁸ The Hague Ministerial Declaration from the Conference of the Parties (COP 6) to the Convention on Biological Diversity, 2002

¹²⁹ 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>

¹³⁰ Mainstreaming Biodiversity In Practice : A STAP Advisory Document

	use; permits and quotas such as for logging and fishing
Laws governing access	Ensuring that the poor and traditional and indigenous communities have clear and enforceable property rights over the land, resources and ecosystem services upon which they live and depend
Spatial planning	Integrated land, water and living resources management (such as the ecosystem approach)
Planning requirements	Making the use of environmental impact assessments (EIA) and strategic environmental assessments (SEA) compulsory (see Table 3 for more details)
Economic instruments	
Price-based instruments	Environmental Fiscal Reform e.g. Taxes, fees and charges such as taxes on pesticide use, fees for natural resource use and access to national parks, reform of environmentally harmful subsidies
Biodiversity offsets	Last step in the environmental impact mitigation hierarchy to offset residual negative environmental impacts of activities in e.g. mining, energy, pulp and paper sectors
Information/education and other instruments	
Voluntary agreements	Between businesses, civil society and government for nature protection and conservation, voluntary offset schemes
Eco-labelling and certification	Forest Stewardship Council; Rainforest Alliance
Green public procurement	Using certificated products to guide procurement, e.g., of sustainably harvested timber

Source: OECD (2015), *Biodiversity and Development Cooperation*

Table 2: Measurement and Assessment Tools for Mainstreaming Biodiversity and Ecosystem Services

Tool	Examples
Ecosystem accounting	Use of System of Environmental-Economic Accounting (SEEA) - Experimental Ecosystem Accounting in national statistical systems can help to integrate the value of biodiversity and ecosystem services into traditional accounting frameworks
Biodiversity indicators	Indicators can help assess the health of biodiversity and ecosystem services and whether this is improving or declining. Examples of

	indicators include marine fish stocks, forest cover, threatened species and species abundance
Economic valuation	The Wealth Accounting and the Valuation of Ecosystems (WAVES) programme, co-ordinated by the World Bank, is an example of a programme supporting partner countries to economically value ecosystems, e.g. in terms of services such as protection against natural disasters, jobs
Planning and project assessment	The following tools can be used to assess the possible impact that a plan or a project could have upon biodiversity, and how these may be managed: <ul style="list-style-type: none"> • Strategic Environmental Assessment • Environmental Impact Assessment • A manual developed by GIZ called Integrating Ecosystem Services into Development Planning
Sector assessment	Targeted Scenario Analysis can be used for mainstreaming biodiversity and ecosystem services into production sectors
Budget assessment Public Environmental Expenditure Review	Public Environmental Expenditure Review (IIED, 2008) ¹³¹

Source: OECD (2015), *Biodiversity and Development Cooperation*

3.1 Experiences of other Countries in Mainstreaming Biodiversity in Various aspects of Development Policy

3.1.1 Brazil

Brazil is the most biologically diverse country in the world. It is classified at the top among the world's 17 megadiverse countries. Brazil was one of the first South American countries to fully adopt a National Biodiversity Strategy. In 2006, through a participatory process, a set of 51 national biodiversity targets to be implemented by 2010, was approved by the National Biodiversity Commission (CONABIO). Brazil's 2020 biodiversity targets were adopted in September 2013 and are aligned with the Aichi Biodiversity Targets.¹³² Various measures taken by Brazil for mainstreaming biodiversity in various sectors of the economy are presented in Table below¹³³:

¹³¹IIED (2008), "Public Environmental Expenditure Review (PEER)", Profiles of Tools and Tactics for Environmental Mainstreaming, www.unpei.org/sites/default/files/dmdocuments/Introduction_to_PEER_IIED.pdf, last accessed 21 October 2014.

¹³² <https://www.cbd.int/countries/profile/default.shtml?country=br>

¹³³ OECD (2015), "Conservation and sustainable use of biodiversity", in *OECD Environmental Performance Reviews: Brazil 2015*, OECD, Paris.

Table 3: Measures taken for Mainstreaming Biodiversity in Brazil

Sectors	Measures Taken	Description
Agriculture	Family Production Socio-environmental Development Programme (Proambiente)	Awards farmers and ranchers with up to one-third of the minimum wage when they use more environmentally sound practice.
	Low Carbon Agriculture Programme	Provide subsidised credits for implementing good environmental practices. While the focus of the programme is on reducing GHG emissions, it contributes to mitigating the impact on biodiversity.
Forestry	Concession to promote sustainable forest management for timber production	<p>The law allows federal, state and municipal governments to grant, through a bidding process, the legal right for private companies to harvest timber and non-timber forest products, provided that the forest is sustainably managed.</p> <p>The selection of concessionaries is based on best price offers and on technical criteria such as lowest environment impact and highest social benefits.</p>
	Timber Certification	<p>Two certification systems:</p> <ul style="list-style-type: none"> • Brazilian Programme for Forest Certification bound to the Programme for the Endorsement of Forest Certification Schemes • Forest Stewardship Council
	National Plan for Native vegetation Recovery	<ul style="list-style-type: none"> • Promote large-scale forest restoration. • Projects recovery for at least 125,000 km² within 20 years.
Fishery and Aquaculture	Sectoral Plan for Sea Resources	<p>Focus on evaluation, monitoring and conservation of marine biodiversity. For 2012-15, this initiative was to include:</p> <ul style="list-style-type: none"> • establishing monitoring programmes for marine species, • continuing the assessment and monitoring of mangrove areas and protected areas containing coral reefs, • increasing the number of conservation plans for marine threatened species • expanding the total marine protected areas to 4% of Brazil's territorial waters and exclusive economic zone

3.1.2 Spain

Spanish coastal waters possess a high level of biological diversity, with the southern Iberian Peninsula being especially important in terms of biodiversity and endemic species. In the last decades, Spanish biodiversity has suffered a significant decrease, with between 40-60% of assessed species included in some threatened category.¹³⁴ The Spanish 2011 Millennium Ecosystem Assessment showed that management of ecosystems and biodiversity based primarily on the designation of protected areas and species conservation has not been sufficient to stop biodiversity degradation. The need for biodiversity policies that go beyond the realm of protected areas has been accepted in Spain and is now enshrined in all recent key biodiversity legislative documents. The following table shows measures taken by Spain for mainstreaming biodiversity in various sector.¹³⁵

Table 4: Measures taken for Mainstreaming Biodiversity in Spain

Sectors	Measures Taken	Description
Agriculture	Agri-environment Payments	<ul style="list-style-type: none"> • Payments for agricultural practices that are beneficial for climate change and environment. • Practices include diversification of crops and maintaining permanent grassland and ecologically important area.
	National Strategic Plan for Rural Development	The Plan allocates almost 40% from European Agricultural Fund for Rural Development (EAFRD) to promote integration of environmental and biodiversity conservation activities into rural areas ¹³⁶ .
	Spanish Comprehensive Plan of Action to Promote Organic Farming (2007-10),	Established priority areas of development that have improved product knowledge, consumption and marketing.
Tourism	Plan Future	<ul style="list-style-type: none"> • Established in 2009 with budget EUR 1.9 billion. • Designed to improve the tourist offer with regard to sustainability, accessibility, quality and infrastructure through low-interest loans for small tourism-related businesses with repayment terms of 5-12 years.
	Plan RenovE	Focused on improvements in energy efficiency and environmental conservation of tourism establishments.

¹³⁴ <https://www.cbd.int/countries/profile/default.shtml?country=es>

¹³⁵ OECD (2015), “The conservation and sustainable use of the marine and terrestrial environment”, in *OECD Environmental Performance Reviews: Spain 2015*, OECD Publishing, Paris.

¹³⁶ Activities involve afforestation of agricultural land and compensation for loss of profits after adopting biodiversity-friendly agricultural practices or investments; desertification mitigation; and forest fire prevention.

	Tourism Infrastructures Modernisation Fund	Help municipalities modernise infrastructure and tourism accommodation, particularly in coastal areas.
	Sectoral Plan for Biodiversity and Nature Tourism (2014-2020)	Provides a framework for collaboration among all stakeholders (both public and private) to promote nature-based tourism that integrates biodiversity considerations. Develop ecotourism within the Natura 2000 Network, while ensuring conservation of the sites.

3.1.3 Integrating Biodiversity in Budgets: Case of Mozambique and Indonesia

Mozambique

Public environmental expenditure reviews (PEERs) and climate public expenditure and institutional reviews (CPEIRs) are tools several countries are using to assess and track expenditures. These reviews can be undertaken on a regular basis or institutionalized within the public financial management process to provide regular data to track expenditures. Some countries are moving from simply tracking quantity of expenditures to also tracking the quality of expenditures in terms of impacts and results. Generating information to track climate expenditures effectively and maintaining financial records in the system of national accounts can serve to build a robust climate financing framework. The latter can be instrumental in accessing global climate funds.

PEERs and CPEIRs, combined with economic evaluations of the benefits of pro-poor environmental sustainability and the costs of environmental unsustainability, have proven to be very effective in influencing ministries of finance to attach a higher priority to ENR.

Strategic dissemination of assessment findings opened a window of opportunity to enhance the role of the Ministry of Finance in mainstreaming poverty-environment in Mozambique. The ministry promptly appointed two environmental focal points. The ministry and the focal points are following up on one of the PEER’s key recommendations:

To enhance the use of environment and climate codes in budget processes. For the 2014 budget process, the ministry established a new budget classification code related to climate change.

Also, the environment ministry has decided to test the feasibility of using a wider range of the available codes— including codes related to land management and physical and environmental planning—to better facilitate measuring progress towards achievement of development goals.

Source: UNDP_UNEP Poverty-Environment Initiative, 2017

Indonesia

In July 2014, Indonesia's Ministry of Finance approved Decree No.136/2014 on Guidelines for Annual Planning and Budgeting of Line Ministry. The decree makes the Budget Tagging for Climate Change Mitigation system mandatory for seven line ministries (agriculture, energy, transport, industry, public works, forestry and environment) covered under the National Action Plan for Reducing Greenhouse Gas Emissions.

An online application and thematic budget coding system for tagging mitigation, adaptation and biodiversity activities and expenditures have been developed by the Directorate General of Budget, and two trainings have been conducted in its use.

A training was organised for the Ministry of Finance with a view to get its buy-in. Subsequently, a technical training was organised for representatives from the seven line ministries. The training was designed to anticipate the final budget consultation of line ministries for the 2015 fiscal year, when the tagging system is expected to be applied in the budget. To ensure a higher level of buy-in, the minister of finance also held a meeting with the seven line ministries in November 2014.

Source: UNDP_UNEP Poverty-Environment Initiative, 2017

3.1.4 Mainstreaming in Development Planning: Using Mainstreaming Matrix

Mozambique

Mozambique's central and sector ministries are encouraged to have environmental focal points. Today, 15 ministries—including the Ministry of Finance—have appointed such focal points. During the preparation process of the sector annual economic and social plans which include the sector budget, the Ministry for Coordination of Environmental Affairs invites these focal points to environment unit meetings.

These meetings have become a routine part of the annual planning conducted by the ministry and the sectors and have ensured the inclusion of poverty-environment-related objectives/activities in sector plans and budgets.

One tool used for reviewing sector plans and budgets is the cross-cutting mainstreaming matrix launched by the Ministry of Planning and Development in 2011. The matrix includes guidance on the mainstreaming of eight issues, including the environment and gender.

According to the Department of Planning at the Ministry for Coordination of Environmental Affairs, many sector ministries, including the Ministry of Defence, now recognize their own responsibility in promoting pro-poor sustainable development and why it is beneficial to sector targets.

Source: UNDP_UNEP Poverty-Environment Initiative, 2017

3.1.5 Mainstreaming of Biodiversity in Key ODA Providing Countries: Skewed Performance

Development co-operation providers take a range of approaches to mainstreaming biodiversity and ecosystem services into their own policies and programmes, to ensure that biodiversity is taken into account in all activities. While some providers have environmental policies that do not explicitly treat biodiversity as a cross-cutting theme across their programmes (e.g. Denmark, New Zealand, Portugal, Spain, Sweden), others have a specific environmental policy where biodiversity and ecosystem services are recognized as key a component (e.g. Austria, Finland, Ireland, Japan, Norway). Several providers now have a stand-alone strategy or policy for biodiversity and ecosystem services (e.g. Austria in addition to its environmental policy, Belgium, European Union, France, Germany, United States) (CBD, 2014d).

3.1.6 Biodiversity Share in Externally Aided Projects in India: Some Observations

Biodiversity attributable flows (grants and debt) through external sources range from Rs. 1228 cr. to Rs. 1658 cr. during the period 2009-10 to 2015-16. Biodiversity share in total EAP was 5-7 % while in grants it was 1-2 percent. Better integration of biodiversity issues in social sector projects can potentially help increase the share of biodiversity conservation in EAP (NIPFP, 2017).

MoEF&CC and MoA are the main recipients of the aid which has largely been used for NRM and Sectoral Mainstreaming.

In this context 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 India¹³⁷). Given this mainstreaming of biodiversity in ODA appears to be low.

4. Mainstreaming Biodiversity in National/Sub-national Schemes and Policies in India

It would be seen from Tables 1 and 2 presented above that a range of policy instruments and assessment and measurement tools can be used for mainstreaming biodiversity into development vision, programs, and policies.

Mainstreaming biodiversity can take place and/or can be pursued in different settings and scales e.g., ecosystem, landscape; at various level of governance such as local, national or sub-national 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.

¹³⁷ OECD DAC Statistics Aid to Biodiversity <http://www.oecd.org/dac/environment-development/Biodiversity-related%20aid%20Flyer%20-%20October%202014%20FINAL.pdf>

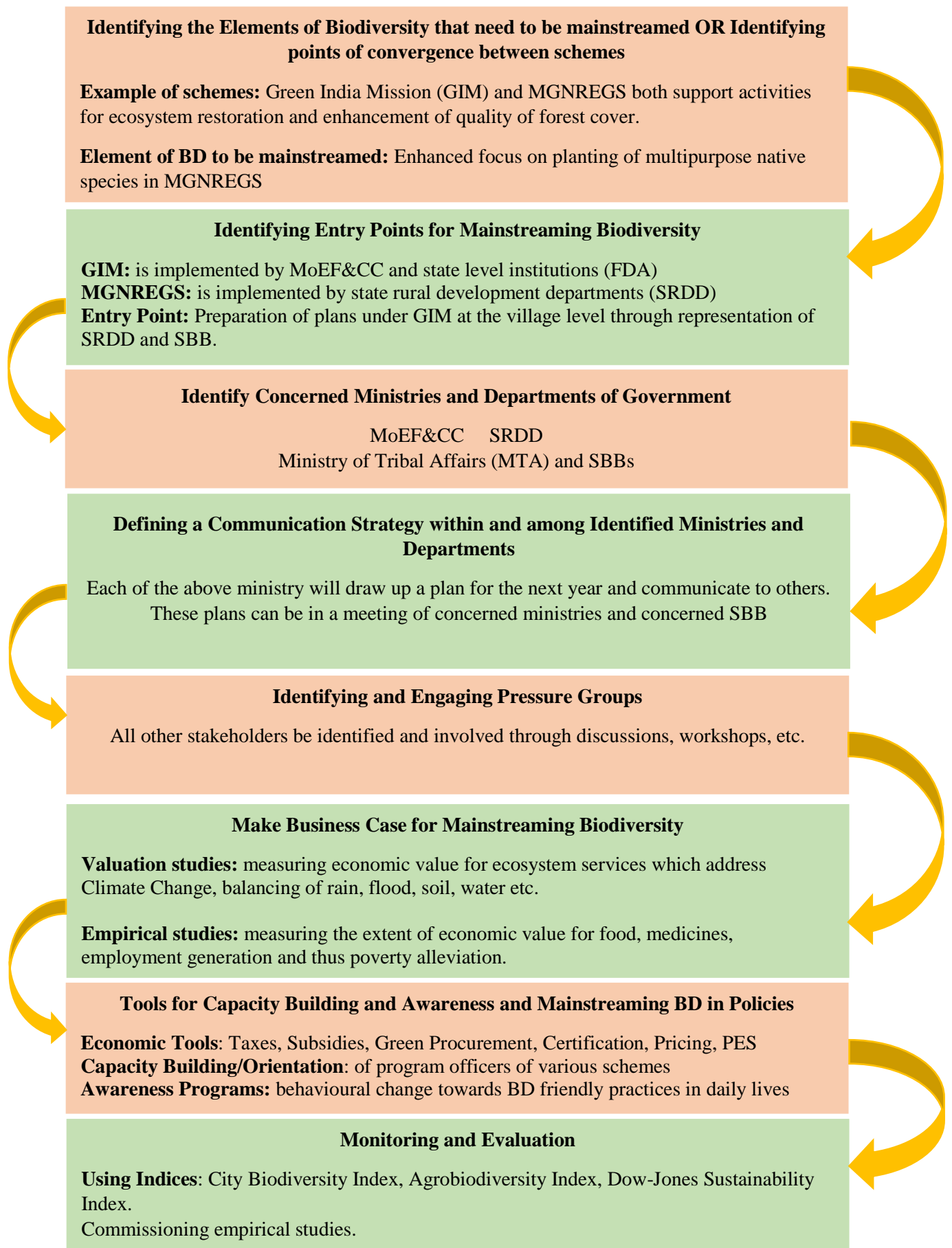
In this chapter we present a broad framework for mainstreaming biodiversity using examples of relevant programs and institutions in India. We then identify entry points and appropriate instruments for mainstreaming in two important economic sectors: Agriculture, and Forests and Wildlife in India. Given the limited scope of this chapter this exercise is the outcome of desk research and some broad stroke consultations with relevant stakeholders. We feel this exercise will need to be done case-by-case and should involve wide ranging and detailed stakeholder consultations. Outcomes of such an exercise will pave the way for policy level interventions and the potential benefits of working collaboratively across governance and disciplinary boundaries.

4.1 Steps in Mainstreaming Biodiversity

Mainstreaming of biodiversity in a policy/program/ scheme can be done at three levels:

- a. In the process of framing a policy
- b. During the process of detailed operating design of a scheme/program including financial provisions.
- c. At the level of implementation and monitoring and evaluation of a scheme/program.

Figure 1: Steps in Mainstreaming Biodiversity in National/Sub-national Schemes and Policies



- 1. Identify the Elements of Biodiversity that need to be mainstreamed:** Identifying the components of the scheme/mission/programme that need to be tweaked or better informed. Program and Institutional review (PIR) can provide useful ideas in this context. Examples of biodiversity elements in this context would be; Enhanced focus on planting of multipurpose native species in MGNREGS.

Identify which biodiversity-relevant programmes/expenditures need up-scaling or modification in their design in order to optimize the benefits from the investment. The line ministry should also decide whether there is a need for down-scaling an existing biodiversity-dedicated programmes/ expenditures.

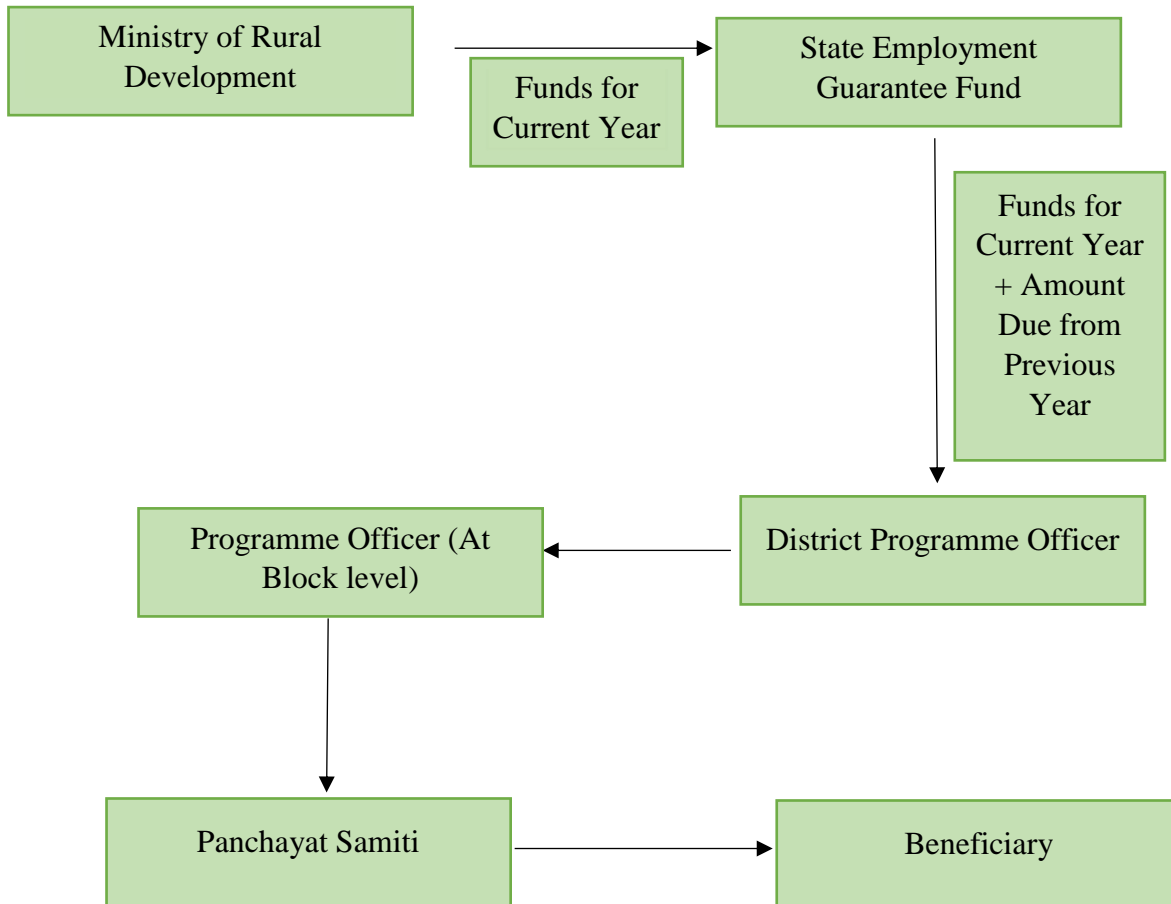
- 2. Identify Entry Points for Mainstreaming Biodiversity: Potential entry points would generally be either a scheme/mission/programme (e.g. GIM, MGNREGS) or a sector (e.g. agriculture), a development objective (e.g. poverty alleviation).**
 - a. The schemes/programs/missions may be at national level, state level or local level. In the case of biodiversity, particular sectors where policy coherence for development issues may occur are: fisheries, agriculture, forestry, tourism etc. Targeting the national cross-sectoral scheme like MGNREGS, Smart Cities Mission will be most effective in integrating the biodiversity in core decision making processes. However, it might also be the most challenging to do because of the large scale at which the schemes are being implemented and large number of decision makers and stakeholders involved.
 - b. The Intended Nationally Determined Contribution (INDC) could also be an entry point for such mainstreaming, given two out of eight INDCs are related to biodiversity directly and two are related indirectly. For example: One of the strategy of INDC is -- to create additional carbon sink through additional forest and tree cover by 2030. This directly relates to biodiversity conservation and would involve determining the species to be planted, identifying areas where plant diversity needs to be conserved etc. Existing schemes in this context would be GIM and National Afforestation Programme.
 - c. The National Action Plan for Climate Change (NAPCC) is another good entry point for such mainstreaming, given that its two missions, National Mission for Sustaining the Himalayan Ecosystem and National Mission for Green India relate directly to biodiversity conservation.

3. Identify Concerned Ministries, Departments of Government to be involved in the Process and Defining a Communication Strategy: MoEF&CC has the mandate of working towards conservation of biodiversity. Depending upon the identification done in Steps 1 and 2, other relevant ministries/institutions need to be identified. Thereafter, a strategy needs to be decided on how the concerned departments may be brought together for effective communication. The channels of communication will be horizontal as well as vertical.

- a. **Horizontal channel** implies communication among all concerned institutions. For example, the mandate for National Mission for Sustaining the Himalayan Ecosystem is with Department of Science and Technology. Thus, for bringing the concerns related to biodiversity conservation into the decisions related to the mission, it is necessary to establish coordination between the Conservation and Survey Division of MoEF&CC; and the Department of Science and Technology (of Ministry of Science and Technology). This has been done by appointing G.B. Pant Institute of Himalayan

Environment and Sustainable Development (an autonomous institute of MoEF&CC) as Nodal Agency for Forest Resources and Plant Biodiversity task Force.

- b. **Vertical channel** implies communication across multiple levels within an institution as well as among institutions at national, state and district level. This can be illustrated by the Fund Transfer Mechanism of MGNREGS as follows:



4. Identifying and Engaging the Pressure Groups and other Stakeholders: An essential ingredient for strong biodiversity and development planning and policy is a multi-stakeholder approach that is inclusive, transparent and built on trust (Roe et al., 2011; Redpath et al., 2013; Sayer et al., 2013). Such an approach acknowledges that trade-offs are possible, and that different stakeholders perceive them differently; a constructive engagement will ensure that stakeholder needs and concerns are considered, fostering joint ownership of the plan, programme, policy or project. For additional inputs and for achieving a majority view/consensus engagement with the relevant stakeholders through a series of workshops, consultation, round-table discussions is important.

5. Make a Business Case for Mainstreaming Biodiversity: Credible studies on physical measure of biodiversity as well as economic values of biodiversity is to meaningful engagement with policymakers and such that the informed policy decisions can be made for conservation of biodiversity. We will, in particular, need the following:

- a. **Valuation studies:** measuring economic value for ecosystem services which address Climate Change, balancing of rain, flood, soil, water etc.
- b. **Empirical studies:** measuring the extent of economic value for food, medicines, employment generation and thus poverty alleviation.

6. Select Appropriate Tools for Mainstreaming: Tools for mainstreaming may range from economic instruments to awareness and capacity building instruments to help achieve mutually reinforcing biodiversity and development outcomes and safeguard against unintended negative outcomes. They apply to all stages of decision- and policy-making, and include the necessity to build strong governance, institutions and legal frameworks to support good decision-making. They also include approaches to ensure open, multi-stakeholder dialogue as well as those to compensate negatively affected local communities. Finally, adopting a landscape or other ecosystem approach, use of a precautionary approach and more broadly pursuing policy coherence can help to address trade-offs and maximize benefits.

- a. **Economic Tools:** Taxes, Subsidies, Green Procurement, Certification, Pricing, financial market interventions, PES etc.
- b. **Capacity Building/Orientation:** institutional capacities at all levels need to be strengthened for better design and implementation.
- c. **Awareness Programs:** for behavioral change towards BD friendly practices in daily lives.

7. Monitoring and Evaluating the Mainstreaming Process: Various indices may be used for this purpose such as agrobiodiversity index, city biodiversity index, Dow-Jones Sustainability Index.

4.2 Mainstreaming Biodiversity in India's Intended Nationally Determined Contribution (INDC): Identifying Entry Points

Under the UN Framework Convention on Climate Change (UNFCCC) Intended Nationally Determined Contributions (INDCs) are the primary means for governments to communicate internationally the steps they will take to address climate change in their own countries. They

reflect each country's ambition for reducing emissions, taking into account its domestic circumstances and capabilities.

Following are India's INDCs in response to COP decisions 1/CP.19 and 1/CP.20 for the period 2021 to 2030 (see *India's Intended Nationally Determined Contribution: Working Towards Climate Justice*)¹³⁸.

1. To put forward and further propagate a healthy and **sustainable way of living** based on traditions and **values of conservation and moderation**.
2. To adopt a **climate friendly and a cleaner path** than the one followed hitherto by others at corresponding level of economic development.
3. To **reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level**.
4. To achieve about **40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources** by **2030** with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).
5. To **create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent** through additional forest and tree cover by **2030**.
6. To **better adapt** to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.
7. To mobilize **domestic and new & additional funds** from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.
8. To **build capacities**, create domestic framework and international architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies.

¹³⁸<http://www4.unfccc.int/ndcregistry/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf>

Table 5: Mainstreaming Biodiversity in INDCs: Examples of Entry Points

INDCs	Entry Points for Biodiversity Mainstreaming
<p>To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.</p>	<ul style="list-style-type: none"> • Smart Cities Mission • Atal Mission for Rejuvenation and Urban Transformation (AMRUT) <p>Both the schemes have provision for protection of sensitive natural environment and development of green spaces and parks by adopting climate resilient policies and regulations.</p> <p>This has an important implication for urban biodiversity. <i>Biodiversity related elements will include the plant varieties to be planted, conservation of existing plantations especially large old trees are critical feeding and nesting sites for a huge range of animals in urban areas.</i></p> <p>Rejuvenation of urban ponds and water sources provide an ecosystem for biodiversity, catchment for rain water, and relief during droughts and heatwaves.</p>
<p>To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.</p>	<ul style="list-style-type: none"> • Green India Mission • National Afforestation Programme • National Agro-forestry Policy • Joint Forest Management • REDD-Plus Policy <p><i>Biodiversity mainstreaming elements include: identification of species to be planted, post plantation care strategy.</i></p>
<p>To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.</p>	<p>Agriculture – Biodiversity mainstreaming will include: <i>greater focus on organic farming¹³⁹, reduced subsidies on fertilisers and pesticides.</i></p> <p><i>National Mission on Sustainable Agriculture and National Agroforestry Policy are two important entry points for mainstreaming biodiversity.</i></p>

¹³⁹ Organic farms have between 46 and 72 percent more semi-natural habitats and host 30 percent more species and 50 percent more individuals than non-organic farms. (<https://www.fibl.org/en/themes/biodiversity.html>)

INDCs	Entry Points for Biodiversity Mainstreaming
	<p>Water Resources – Conservation of rivers, lakes and such water bodies is necessary for conservation of freshwater biodiversity.</p> <p><i>National Plan for Conservation of Aquatic Ecosystems</i> should be included in implementation of this strategy of INDC.</p>
	<p>Himalayan Region –</p> <p><i>National Mission for Sustaining the Himalayan Ecosystem</i> addresses the issues related to Himalayan Ecosystem. <i>This mission is ideal for pilots of mainstreaming biodiversity.</i></p>
	<p>Coastal Region – Three entry points –</p> <ul style="list-style-type: none"> • <i>Integrated Coastal Zone Management</i> • <i>Mangroves for Future</i> • <i>Island Protection Zone</i>
	<p>Health – 90% of India’s medicinal plant diversity is found in forests. Thus, <i>Health Mission</i>, recently approved to be launched under NAPCC should be an ideal candidate for mainstreaming biodiversity.</p>

5. Mainstreaming Biodiversity in Sectoral Policies

There are seven economic sectors that are important for biodiversity, all under the mandate of different ministries. All the ministries are, to some extent, involved in the implementation of NBAPs and NAPCCs. Thus, even though, it seems as if Biodiversity is under the mandate of Ministry of Environment, Forests and Climate Change, there needs to be a strong co-ordination among relevant ministries and departments. The following table shows biodiversity relevant sectors and the corresponding Ministries.

Table 6: Biodiversity Relevant Economic Sectors and Respective Ministries

Economic Sectors	Ministries
Tourism	Ministry of Tourism
Forestry and Wildlife	Ministry of Environment, Forests and Climate Change
Mining	Ministry of Mines Home
Water and Sanitation	Ministry of Water Resources, River Development and Ganga Rejuvenation
Energy	<ul style="list-style-type: none">• Ministry of Power• Ministry of Petroleum and Natural Gas
Fisheries	Department of Animal Husbandry, Dairying and Fisheries (DADF), Ministry of Agriculture and Farmers' Welfare
Agriculture	Ministry of Agriculture and Farmers' Welfare

5.1 Mainstreaming Biodiversity in Agriculture

Agriculture is one of the most important sectors for mainstreaming biodiversity. Agriculture provides a range of benefits for biodiversity such as carbon storage, rural landscape, and resilience to natural disasters (flooding, landslide, fire and snow damage), as well as pollination and soil functionality (OECD, 2018)¹⁴⁰. In India, agriculture forms the centre of economic well-being of people.

5.1.1 Case for Mainstreaming Biodiversity in Agricultural Sector

Agricultural sector depends on biodiversity and also has an impact on biodiversity. Agriculture derives essential services such as soil, water, pollination, nutrient recycling, and genetic diversity from biodiversity. At the same time, agricultural fields provide habitat to various species of birds, rodents and insects, and provides other services like carbon-sequestration, prevention of soil erosion.

In addition to these positive impacts, agriculture impacts biodiversity in a negative way as well.

- i. Excessive use of agro-chemicals leads to soil degradation, pollution of waterbodies and catchment systems, and may contribute to higher greenhouse gas emissions.
- ii. Farms on which high levels of chemicals used are marked by low biodiversity (including low agro-biodiversity). In some cases, high level of chemical utilization has negative impact on the wildlife and biodiversity values within the landscape.

Examples:

- a. It also has an adverse impact on organisms that are useful for biodiversity, such as earthworms.

¹⁴⁰ OECD (2018), Mainstreaming Biodiversity for Sustainable Development, OECD Publishing, Paris. <https://doi.org/10.1787/9789264303201-en>

- b. Bird populations are directly affected by poisoning from organophosphate which leads to detrimental changes in behaviour. Insecticides reduce the number of insects which are important food sources for birds.¹⁴¹
- c. It has been documented that certain pesticides, when introduced to aquatic environments, cause a decline in species diversity in aquatic organisms and predatory insects. In Europe, it has been found that a 42% loss in species richness occurs due to pesticide exposure, even when such exposures are at concentrations deemed environmentally safe by current legislation.¹⁴²
- iii. Focus on modern breeds of crops has led to erosion of genetic diversity of crops, livestock varieties and their wild relatives. India possesses unique crop diversity¹⁴³ which is under threat from continuing adoption of modern HYVs (High Yielding Varieties), changes in land use and agricultural practices.¹⁴⁴

5.1.2 Aligning Existing Schemes and Policies with the Objective of Biodiversity Conservation

It should be first identified clearly, in what specific ways agriculture puts pressure on biodiversity. Then it should be ensured that the objectives of sustainable use of biodiversity resources are mainstreamed in the policies and schemes of agriculture. India has, to some extent, accounted for biodiversity conservation in its *National Mission for Sustainable Agriculture* through its target: “*To conserve natural resources through appropriate soil and moisture conservation measures*”. The mission focuses on organic farming, which excludes the use of chemical pesticides, fertilizers, and, thus, is beneficial for biodiversity. Research suggests that organic farms generally have 30% higher species richness and 50% higher abundance of organisms than conventional farms.¹⁴⁵ Other schemes related to agricultural sector also have important components which relate to biodiversity are in the table below. However, there is need greater focus on biodiversity related elements in Agricultural policies; and it is equally important to institutionalize this process.

¹⁴¹ Pesticides and the Loss of Biodiversity: How Intensive Pesticide Use Affects Wildlife Populations and Species Diversity, Pesticide Action Network Europe, 2010

¹⁴² <https://www.beyondpesticides.org/programs/wildlife>

¹⁴³ About 166 species of crops including 25 major and minor crops may have been domesticated and have developed significant unique diversity in the country. At least 320 species of wild relatives of crop plants are also known to occur in India.

¹⁴⁴ Mainstreaming agricultural biodiversity conservation and utilization in agricultural sector to ensure ecosystem services and reduce vulnerability, GEF Project (Id – 5137), India, 2015

¹⁴⁵ Impact of Organic Farming on Biodiversity, Martina Bave, Frank Bavec, April 2015.

Table 7: Schemes of Agricultural sector with Elements of Biodiversity Conservation

Schemes	Type of Instrument	Description of Schemes	Components Related to Biodiversity Conservation
Soil Health Management	Regulatory	Soil cards are issued to farmers which carry crop-wise recommendations of nutrients and fertilisers required for the individual farms. The idea is to help farmers in improving productivity through judicious use of inputs.	<p>Parampragat Krishi Vikas Yojana (PMKY):</p> <ul style="list-style-type: none"> Promote commercial organic production through certified organic farming. Promotion of pesticide residue free produce.
Rashtriya Krishi Vikas Yojana – Remunerative Approaches for Agriculture and Allied Sector Rejuvenation ¹⁴⁶ (RKVY – RAFTAAR) Allied Sector	Regulatory	RKVY-RAFTAAR aims at making farming a remunerative economic activity through strengthening the farmers’ effort, risk mitigation and promoting agri-business entrepreneurship.	<p>Focus on Bio-Fertilisers and Organic Farming:</p> <ul style="list-style-type: none"> Setting up of mechanized Fruit/Vegetable market and Agro-waste compost production unit. Promotion of Organic Inputs (Manure, Vermi-compost, Bio-fertilizers, Liquid/Solid, Waste Compost, Herbal extracts etc.) <p>Natural Resource Management:</p> <ul style="list-style-type: none"> Soil & Water conservation activities (Terracing, Gully Control Measures, Spill Ways, Check Dams, Spurs, Diversion Drains, Protection Walls etc.) <p>Agriculture Mechanization:</p> <ul style="list-style-type: none"> Use of Solar Energy in Agriculture i.e. Solar pump sets, Solar dryers, solar energy in green house etc.
National Agro-forestry Policy, 2014 ¹⁴⁷	Regulatory		<ul style="list-style-type: none"> Protecting and stabilizing ecosystems Promoting resilient cropping and farming systems to minimize the risk during extreme climatic events. Achieving the target of increasing forest/tree cover to promote ecological stability, especially in the vulnerable regions.

¹⁴⁶ Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR) Operational Guidelines 2017-18 to 2019-20, Department of Agriculture, Cooperation & Farmers welfare Ministry of Agriculture & Farmers Welfare
http://rkvy.nic.in/static/download/pdf/RKVY_14th_Fin_Comm.pdf

¹⁴⁷ National Agro-forestry Policy, 2014, Government of India, Department of Agriculture and Cooperation, Ministry of agriculture

National Agricultural Policy, 2000 ¹⁴⁸	Regulatory		The Policy states that improving the quality of land and soil, rational utilisation and conservation of water, and sensitizing the farming community to environmental concerns would receive high priority.
KUSUM (Kisan Urja Suraksha Evam Utthan Mahabhiyan) ¹⁴⁹	Regulatory	It will: <ul style="list-style-type: none"> • Provide 27.5 lakh solar pumps (17.50 lakh standalone + 10 Lakh Grid-connected) • Help farmers install total 10 GW of Solar Power Plants of intermediate capacity of 0.5 to 2 MW each. • Envisages 50,000 Grid-connected tube-wells/lift irrigation and drinking water projects. 	Installation of solar power plants and pumps will reduce dependence on diesel and other fossil fuel as a source of energy.
National Project on Organic Farming	Regulatory	Aims to enable the spread of organic farming, including through low-cost certification systems, support for research and market development, technical capacity building for stakeholders, awareness building, and publicity	<ul style="list-style-type: none"> • Organic farming contributes to mitigating the greenhouse effect and global warming through its ability to sequester carbon in the soil.¹⁵⁰ • Every link in the organic food supply chain is geared towards maintaining and, wherever possible, increasing the diversity of plants and animals.¹⁵¹
Seed Certification	Labelling and Certification	Ensure the acceptable standards of seed viability, vigour, purity and seed health.	Ensures the genetic diversity in agriculture, by incentivising farmers to conserve and maintain variety of high yielding seeds.

5.1.3 Need for Alternative Instruments for Mainstreaming Biodiversity in Agriculture

According to a recent Ernst & Young report ‘*The Indian Organic Market: A New Paradigm in Agriculture*’, India holds ninth place in organic agriculture among 178 countries; due to an increase in area under organic production (CAGR of 6% during 2010-11 to 2015-16 which is estimated to grow at a rate of 8% -10% till 2020). The states of Madhya Pradesh, Maharashtra, Rajasthan, Telangana, Odisha, Karnataka, Gujarat and Sikkim had a combined share of 90% of the organic certification in 2015-16.

Yet challenges remain in making agriculture environment friendly. The local consumption of organic produce is still at a nascent stage with a market share of less than 1%. In non-metro cities, people are unaware of the difference between conventional farm products and organic

¹⁴⁸ http://agritech.tnau.ac.in/sustainable_agri/susagri%20%20india_policies.html

¹⁴⁹ <https://www.financialexpress.com/economy/kusum-scheme-all-about-pm-modis-rs-1-4-lakh-crore-solar-power-scheme-for-farmers/1194616/>

¹⁵⁰ <http://www.fao.org/organicag/oa-faq/oa-faq6/en/>

¹⁵¹ https://ec.europa.eu/agriculture/organic/consumer-trust/environment_en

farm products. They are often confused between natural products and organic products¹⁵². The cost of organic products is also high which discourages middle and lower income classes from buying these products. An estimate suggests that the switch to organic products is likely to cost an additional Rs 1,200 to 1,500 per month for a family. This implies that market for organic products is mostly restricted to affluent classes.

In spite of focus on promoting bio-fertilizers, the 29th report of Parliamentary Standing Committee (2016), *“Impact of Chemical Fertilizers and Pesticides on Agriculture and Allied Sectors in the Country”* states that 42% of India’s districts use 85% of the chemical fertilizers. It also states that excessive use of fertilizers has led to a decline in soil fertility. The reason for such a situation is the skewed subsidy policy in favour of fertilizers. Thus, even though, the government is promoting use of chemical free agriculture, it is simultaneously providing subsidies on fertilizers and pesticides which make conventional farming more lucrative than organic farming.¹⁵³

Therefore, there is a need for adopting other instruments for mainstreaming biodiversity in agricultural sector.

Table 8: Proposed Instruments for Mainstreaming Biodiversity in Agriculture

Instrument category	Instrument type	Implementation
Economic	Taxes	Lower taxes on eco-friendly, organic and certified products
		Lower taxes on inputs used in the production of organic products
	Subsidy	Phase out of subsidy on chemical pesticides, fertilisers
		Phase out of subsidy on diesel.
		Subsidies on inputs used in production of organic products
		Subsidy on solar pumps and other environment friendly sources of irrigation and power
	Fines/Penalties	Heavy penalties on burning of agricultural waste.
		Penalty for use of prohibited agrochemicals for any (production, sale or consumption) purpose
Agri-environment Payments	<ul style="list-style-type: none"> • Introduce rationed water use in agriculture by fixing quantitative ceilings on per hectare use of both water and electricity. • Farmers should be rewarded with cash incentives equivalent to unused units of water/power at the rates of their domestic resource costs in case they use water or electricity less than the ceiling fixed for them. • This will encourage farmers to use drip irrigation and other on-farm water management techniques to enhance production per drop of water. 	

¹⁵² Organic food products are produced, manufactured and handled using organic means defined by certifying bodies, whereas, natural food simply refers to food items that are not chemically altered or synthesized in any form.

¹⁵³ <https://www.downtoearth.org.in/news/42-of-india-s-districts-use-85-of-its-chemical-fertilisers-55267>

	Minimum Support Price	Increase minimum support price on crops which need lesser water and fertilisers to grow. Bring crops other than rice and wheat in the public distribution system to make MSP on other crops effective.
Regulatory	Ban	Ban on pesticides and insecticides which have been classified as Class-I (extremely hazardous) by World Health Organisation.
	Regulations	Regulating depth of tube wells, bore wells
		Regulations regarding minimum distance between two tube-wells
	Water Bill	Enactment of National Water Framework Bill, 2016
Green Procurement Programme	For maintaining buffer stock, preference to: <ul style="list-style-type: none"> • Organic Products • Crops that are require less water for irrigation This will encourage the farmers to shift to organic farming and farming those crops that are less water intensive.	

Notes:

1. GST on bio-pesticides, organic manure, and bio-fertilizers is as high as 18%¹⁵⁴, leading to an increase in price of final products while GST on chemical-based fertilizers is 12%¹⁵⁵. This makes organic products less competitive and attractive to the consumer.
2. In Punjab, Haryana and Western UP, an estimated 35 million tonne of rice paddy is burnt in late October leading to poor air quality in Delhi-NCR¹⁵⁶.
3. The Centre has reviewed use of 66 pesticides, recommending ban on 13 of them from 2018 and phasing out of 6 others by 2020.¹⁵⁷
4. The remaining pesticides out of 66 reviewed by the Centre will continued to be used till next review. The use of these pesticides should be reviewed at the earliest.
5. Draft National Water Framework Bill, 2016 was circulated to all the States/Union Territories and the concerned Central Ministries for obtaining their comments. The nine States Gujarat, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh have furnished their comments on this draft Bill.¹⁵⁸
6. Rationed water use is suggested by Commission on Price Policy for Kharif Crops (2015-16).
7. While the government promises minimum support prices for 23 crops, in practice, it procures mostly paddy and wheat – both food grains that it can channel into the public distribution system for economically disadvantaged people.¹⁵⁹

¹⁵⁴https://www.business-standard.com/article/economy-policy/assochem-seeks-review-of-18-gst-on-bio-fertilisers-organic-manures-117071200758_1.html

¹⁵⁵<https://www.livemint.com/Politics/KQOY1h7dQrkOdbQKrMAI2M/GST-rate-Fertilizers-to-come-12-tax-slab-prices-likely-to.html>

¹⁵⁶https://economictimes.indiatimes.com/articleshow/62695952.cms?utm_source=contentofinterest&utm_medium=te xt&utm_campaign=cppst

¹⁵⁷<https://timesofindia.indiatimes.com/india/7-deadly-pesticides-world-has-banned-used-in-india/articleshow/61138491.cms>

¹⁵⁸<http://pib.nic.in/newsite/PrintRelease.aspx?relid=169806>

¹⁵⁹<https://scroll.in/article/885312/explained-the-increase-in-minimum-support-prices-for-14-crops-and-what-it-means-for-farmers>

5.2 Mainstreaming Biodiversity in Forestry and Wildlife

5.2.1 Importance of Forests in Economic Development

Forests are an important source of livelihood for locals. Most of the tribal population of India live in forest fringe areas and tend to have a close economic link with the forests. It is estimated that more than 30 crore people rely upon forests and forest lands for products such as fuel-wood, fodder and NTFP. An even greater number of people rely upon forests for ecosystem services.¹⁶⁰ These people depend upon forest for a variety of goods and services. These include collection of edible fruits, flowers, tubers, roots and leaves for food and medicines; firewood for cooking (some also sale in the market); materials for agricultural implements, house construction and fencing; fodder (grass and leave) for livestock and grazing of livestock in forest; and collection of a range of marketable non-timber forest products. With reduction in the area under forests and degradation of forest resources, the livelihood of these people takes a hit.

5.2.2 Forests and Biodiversity

Indian forests also represent one of the 12 mega biodiverse regions of the world. India has 4 of world's 34 global biodiversity hotspots and encompasses 15 of WWF's global 200 eco-regions. According to latest estimates, India has at least 45,000 plant species and 91,000 animal species, including 60,000 insect species and 3,000 fish species. These species represent a significant percentage of the world's total diversity, including 14% of all avian species, 12% of all fish species, over 8% of all mammalian species, and 8% of all reptilian species. Endemism is extremely high. There are 4,045 endemic plant species, 156 endemic reptilian species, 110 endemic amphibian species, and 69 endemic bird species.¹⁶¹

Forests also play a vital role in water conservation as trees and other vegetation reduce run-off and increase percolation of water into soil thereby improving the water regime in the area. Therefore, retaining and enhancing forest cover in critical watershed areas improves sustained river flows besides flood regulation.¹⁶²

Forests are also home to medicinal plants. India is the world's second largest exporter of medicinal plants after China. World Health Organization estimates that almost 65% of India's population depends upon traditional medicines for sustenance and healthcare needs.

A growing forest captures carbon from the atmosphere and a mature forest is a store house of carbon – another reason why it is always desirable to conserve old forests.

¹⁶⁰ Green Agriculture: Transforming Indian Agriculture for Global Environmental benefits and the Conservation of Critical Biodiversity and Forest Landscapes, GEF Project (Id - 9243), India, 2018

¹⁶¹ Green Agriculture: Transforming Indian Agriculture for Global Environmental benefits and the Conservation of Critical Biodiversity and Forest Landscapes, GEF Project (Id - 9243), India, 2018

¹⁶² <http://fsi.nic.in/isfr2017/isfr-forest-cover-2017.pdf>

5.2.3 Aligning Existing Schemes and Policies with the Objective of Biodiversity Conservation

Policy instruments to mainstream biodiversity in the forestry sector include instruments that integrate biodiversity considerations into the management practices of production forests and those that promote forest conservation and restoration. Some schemes with significant components focusing on conservation of biodiversity are presented in Table 9. In implementing these schemes technical and policy inputs and support from expert institutions will help improve biodiversity outcomes of these schemes.

Table 9: Schemes related to Forest Sector with Elements of Biodiversity Conservation

Measures Taken	Type of Instrument	Description
National Mission for Sustaining Himalayan Ecosystems	Regulatory	It aims to conserve biodiversity, forest cover, and other ecological values on the Himalayan region. ¹⁶³
National Mission for Green India	Regulatory	It aims at protecting, restoring and enhancing India's diminishing forest cover and responding to climate change by a combination of adaptation and mitigation measures. ¹⁶⁴ Biodiversity related elements: <i>Which species to be planted, in which area the plantation need to be done so that the habitats of wild animals is not disturbed, and other such concerns.</i>
Protected Areas (PAs)	Regulatory	A network of 668 PAs has been established, extending over about 4.90% of the total geographic area comprising: <ul style="list-style-type: none"> • 102 National Parks, • 515 Wildlife Sanctuaries, • 47 Conservation Reserves and • 4 Community Reserves.¹⁶⁵
Certification of Forests	Labelling and Certification	In India <i>Network for Certification and Conservation of Forests (NCCF)</i> was established in 2015 to establish a country specific forest certification scheme and promote responsible forest management in the Country.
Wildlife Conservation Scheme	Regulatory	Integrated Development of Wildlife Habitats Project Tiger Project Elephant

¹⁶³ <http://www.knowledgeportal-nmshe.in/NAPCC.aspx>

¹⁶⁴ <http://www.knowledgeportal-nmshe.in/NAPCC.aspx>

¹⁶⁵ <http://www.envfor.nic.in/sites/default/files/protected-area-network.pdf>

6. Way Forward

General Observations:

1. The systematic integration of biodiversity in development processes is called biodiversity mainstreaming. Mainstreaming means integrating or including actions and embedding considerations into policies, strategies, and practices irrespective of whether these are led by the government or private sector.
2. Mainstreaming biodiversity can take place and/or can be pursued in different settings and scales e.g., ecosystem, landscape; at various level of governance such as local, national or sub-national 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.
3. This chapter has developed a broad framework for mainstreaming biodiversity using examples of relevant programs and institutions in India. The framework also identifies the entry points and appropriate instruments for mainstreaming biodiversity in two important economic sectors: Agriculture, and Forests and Wildlife in India.

Status of mainstreaming in India:

1. A recent report (NIPFP, 2017) on Biodiversity Expenditure Review shows that biodiversity has been mainstreamed into sectoral programs, NAPCC as well as INDCs in India. However, during the consultations it was brought out that all of it may not be due to a conscious effort towards mainstreaming biodiversity especially in sectoral schemes and programs. Therefore there is no feedback available on whether these have produced intended outcomes and what more and different needs to be done to improve biodiversity outcomes. Specific suggestions on this are given below.
2. BD share in total EAP is 5-7 % while in grants it is 1-2 percent. Better integration of biodiversity issues in social sector projects can potentially help increase the share of biodiversity conservation in EAP.

Specific Suggestions:

1. Given the limited scope of this chapter, the framework and analysis presented in the chapter is the outcome of desk research and some broad stroke consultations with relevant stakeholders. We feel this exercise should be done case-by-case (for each scheme, program, and policy) which would also involve wide ranging and detailed stakeholder consultations. Outcomes of such an exercise will pave the way for policy level interventions and the potential benefits of working collaboratively across governance and disciplinary boundaries.
2. It is important that systematic steps are taken to mainstream biodiversity conservation across relevant policy sectors. It is not a viable idea, anymore, to assign biodiversity conservation to a single ministry. Within the MoEF&CC these are significant opportunities for improving coherence and co-ordination among different activities. *It is absolutely necessary to commission a study of CAMPA (which is a significant and*

regular source of dedicated financial resources) activities for mainstreaming biodiversity.

3. In order to develop the effective strategies, institutional coordination and cooperation are important. Co-production of knowledge in decision making is key. *The case in point here is ABS. It is absolutely critical that economic sectors dependent on biodiversity (Pharma, chemicals, health food etc.) develop policies appreciative of the fact while it is important to address short term cost concerns, it is equally important to take into account the long term business risks. There is need for appropriate strategies and instruments to reiterate that conservation of biodiversity will contribute significantly towards hedging their future business risk factors.*
4. A critical step in any approach needs will be to achieve policy coherence. This includes making a high-level commitment to policy coherence, and establishing working practices and co-ordination mechanisms to work between ministries on the elaboration and implementation of policies. This should be followed by putting in place an effective monitoring, analysis and reporting system on the outcomes of these policies.
5. Policies that support biodiversity and ecosystem services operate in a system where other policies are pre-existing. These policies may be undermined by certain sectoral policies, owing to their interaction with other development policies thus resulting in negative impact on outcomes. Policy coherence aims to minimize such adverse impacts.
6. More research is needed to develop and strengthen the evidence base for how to best use various approaches, tools and practices to minimize trade-offs and maximize benefits across biodiversity and development objectives.
7. There is need for a formal forum for sharing experience with the tools and good practices available for successful mainstreaming, and developing indicators to improve monitoring and evaluation to improve understanding of the effectiveness of biodiversity-related development interventions and of the relative performance of different mainstreaming approaches.
8. Finally, social equity is crucial. Thus there is need to think long-term and address the needs of forest dwellers in direct conservation programs such as: Protected Areas and Afforestation. 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.

Chapter 5

Biodiversity Expenditure: All State BER and CSR at National Level

Detailed biodiversity expenditure review (BER) for the state of Maharashtra in India; as well as detailed estimates of biodiversity expenditure for a sample of large central public sector companies has been done (See NIPFP Report, 2017¹⁶⁶). In this chapter, estimates of all state BER in India and CSR at the national level is presented.

1. Estimation of All - State biodiversity attributable expenditure in India using modified attribution factors. And projection of expenditure for future years.

Objectives:

1. To estimate All-State biodiversity attributable expenditure in India using modified attribution factors for FY 2009-10 to 2015-16.
2. And make projections for 2018-19 to 2021-22

Background: This exercise is based on NIPFP study (NIPFP, 2017) on BER for the state of Maharashtra. That is to say that BER includes central schemes, state schemes, district schemes, CAMPA, and FC grants.

Data set and Methodology: Extrapolation for states is done using estimated total biodiversity attributable expenditure in the state of Maharashtra as a per cent of GSDP of Maharashtra as well as total expenditure of Maharashtra. Projections of biodiversity attributable expenditure are done till 2022 (See Tables 1-2; and Figures 1-2 below). It is assumed that these factors hold for other Indian states.

Estimates are provided in both the nominal and real terms. However, would like to suggest that nominal numbers be used for the exercise at hand.

¹⁶⁶ NIPFP Report (2017), Mapping National and International Flow of Funds for Conservation of Biodiversity with Special Focus on Maharashtra Province in India

**Table 1: Estimates of biodiversity Attributable Expenditure: All States
(Based on GSDP)**

Estimates of biodiversity Attributable Expenditure: All States (Rs. Crore)			
	Year	Real	Nominal
Actuals	2009-10	13804.85	18665.89
	2010-11	13173.02	18703.59
	2011-12	29251.60	29251.60
	2012-13	22370.28	24145.22
	2013-14	22037.82	25257.93
	2014-15	16140.30	19115.02
	2015-16	19238.92	23256.79
Projections	2016-17	21577.09	24142.52
	2017-18	22113.62	24521.15
	2018-19	22650.15	24899.78
	2019-20	23186.68	25278.41
	2020-21	23723.21	25657.04
	2021-22	24259.74	26035.67

Figure 1: Biodiversity expenditure (Based on GSDP)

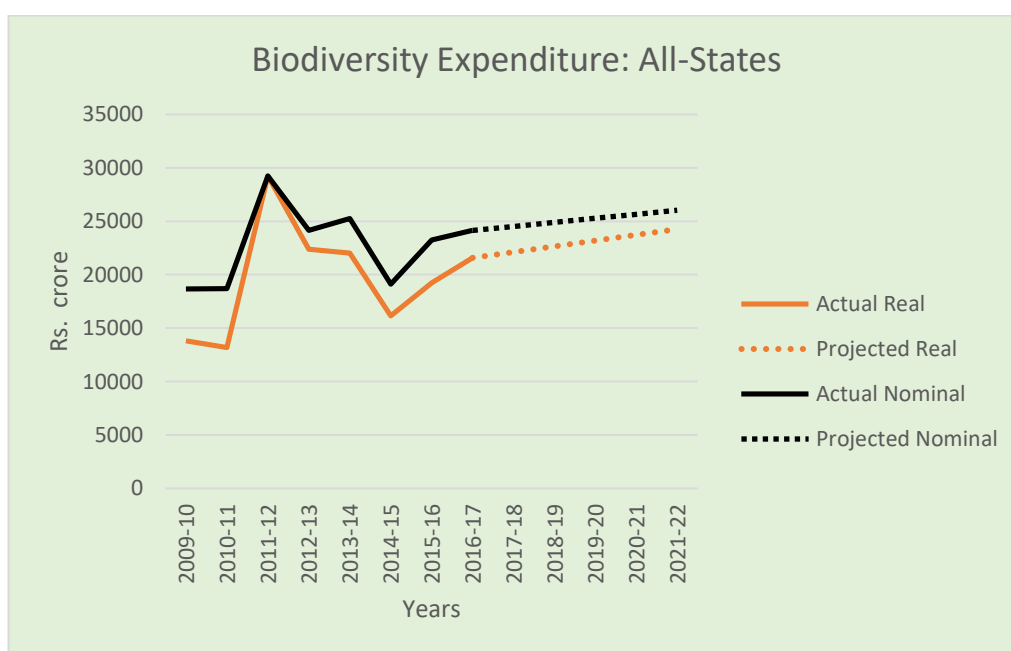
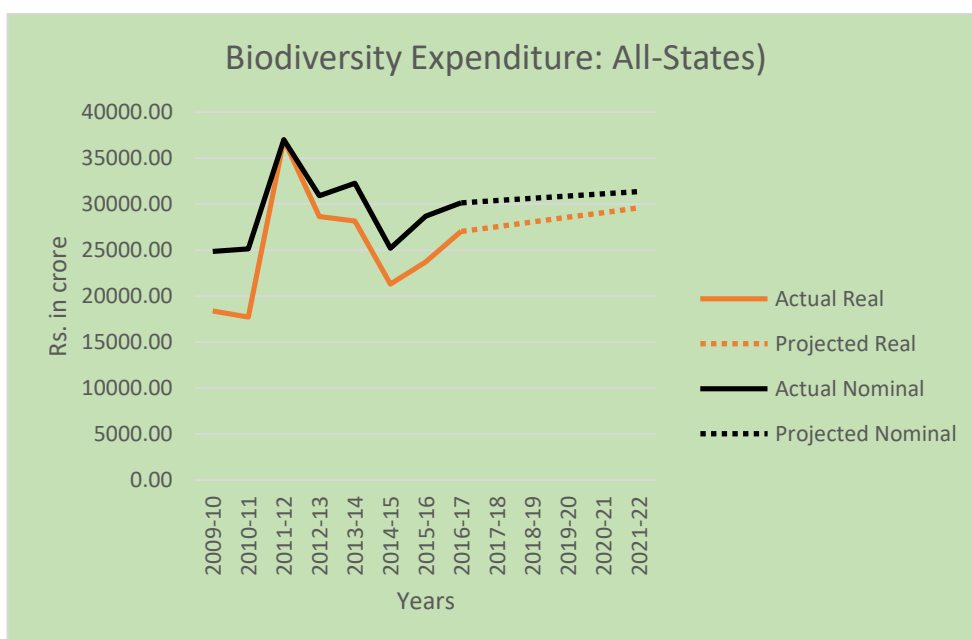


Table 2: Estimates of biodiversity Attributable Expenditure: All States (Based on total expenditure of the state)

Estimates of biodiversity Attributable Expenditure: All States (Rs. Crore)			
	Year	Real	Nominal
Actuals	2009-10	18383.14	24856.32
	2010-11	17718.18	25156.99
	2011-12	36994.81	36994.81
	2012-13	28647.76	30920.78
	2013-14	28160.12	32274.81
	2014-15	21298.36	25223.72
	2015-16	23726.04	28681.01
Projections	2016-17	27040.37	30142.26
	2017-18	27553.02	30388.24
	2018-19	28065.67	30634.22
	2019-20	28578.32	30880.20
	2020-21	29090.97	31126.18
	2021-22	29603.62	31372.16

Figure 2: Biodiversity expenditure (Based on total expenditure of the state)



2. Mapping Expenditure on Biodiversity Conservation through Corporate Social Responsibility

Objectives:

1. To estimate potential CSR¹⁶⁷ in India – bring out the big picture of CSR fund flow in India – since FY 2013-14 and make projections for few years.
2. To estimate the share of biodiversity expenditure in potential CSR, using the estimates of share of biodiversity related expenditure in total actual CSR based on a sample of large CPSEs.

Background: Chapter 4 of the above referenced report provides estimates of CSR and non-CSR biodiversity and sustainability expenditure in respect of a sample of CPSEs for which primary data was collected. Based on these estimates extrapolations were done for 97 CPSEs along with projections of CSR for a few years.

The key objective of the present exercise is to estimate the potential¹⁶⁸ CSR for the corporate sector as a whole i.e. the size of the CSR pool in India.

Data Set and Methodology:

CMIE data has been used for this study. CMIE provides data on net profits of companies – which is key to estimation of CSR– for various years. Number of companies in CMIE data set varied from about 37,000 to 38,000 during the study years. Using the stipulation of net profit of Rs. 5 crore in a given financial year (in the Section 135 of the Companies Act), companies that fall under the purview of the CSR were identified. This data set was used in further analysis.

(i) Estimating potential CSR:

Potential CSR in year $Y_n = \text{Average PBT of } (Y_n - 1, Y_n - 2, Y_n - 3) \times 2\%$

Where Y_n is the year of calculation

(ii) Estimating share of biodiversity in potential CSR:

Share of Biodiversity in CSR¹⁶⁹ = Potential CSR in year $Y_n \times 2.97\%$

(i) Projecting potential CSR

¹⁶⁷ The Companies Act, 2013 (Companies Act) along with the Companies Corporate Social Responsibility Policy Rules, 2014 (CSR Rules) mandate and regulate social spending by companies. As stipulated in the Section 135 of the Companies Act, companies having net worth of Rs. 500 crore or more, or a turnover of Rs. 1000 crore or more, or net profit of Rs. 5 crore or more in a given financial year are mandated to spend at least 2% of its average net profit for the immediately preceding three financial years on CSR activities.

¹⁶⁸ Potential CSR is defined as the CSR expenditure/funds when compliance with CSR provisions is 100 per cent. This may be at variance with the actual CSR expenditure.

¹⁶⁹ The factor of 2.97 % is biodiversity attributable share of CSR expenditure estimated in a study of 24 large CPSEs based on primary data. See NIPFP Study Report (2017)

Projections are done for FY 2018-19 to 2021-22 using Trend Analysis and CAGR methods; results are presented in Tables 1 and 2, respectively.

Results:

Table 1: Estimates of potential CSR and share of biodiversity (Rs. crore)

Projections using Trend Analysis		
Year	Potential CSR	Biodiversity Share
2013-14	15245.38	452.79
2014-15	16411.94	487.43
2015-16	17783.62	528.17
2016-17	18342.55	544.77
2017-18	19203.80	570.35
2018-19	20351.69	604.45
2019-20	21336.44	633.69
2020-21	22321.18	662.94
2021-22	23305.93	692.19

Figure 1: Potential CSR based on estimates in Table 1

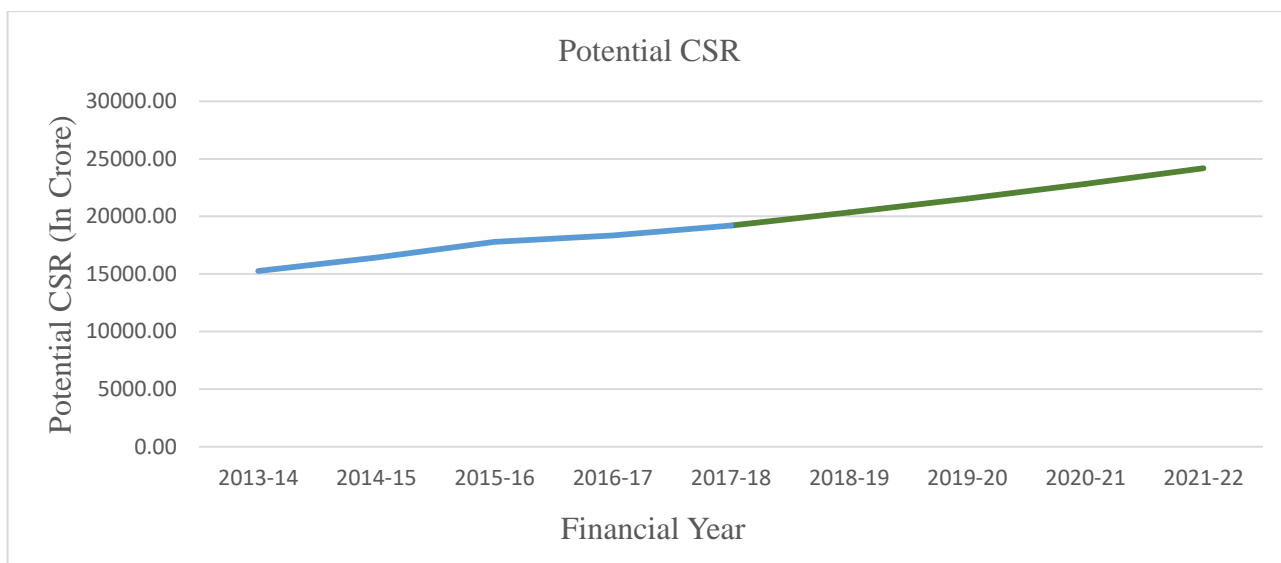


Figure 2: Biodiversity share based on estimates in Table 1

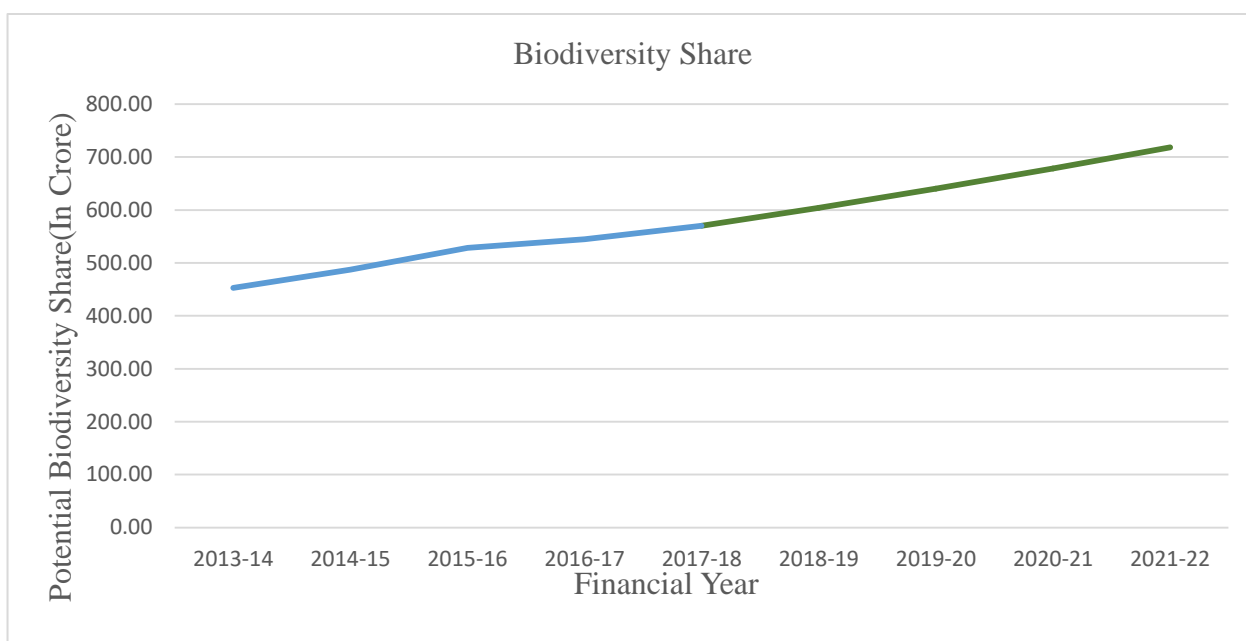


Table 2: Estimates of potential CSR and share of biodiversity (Rs. Crore)

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

Figure 3: Potential CSR based on estimates in Table 2

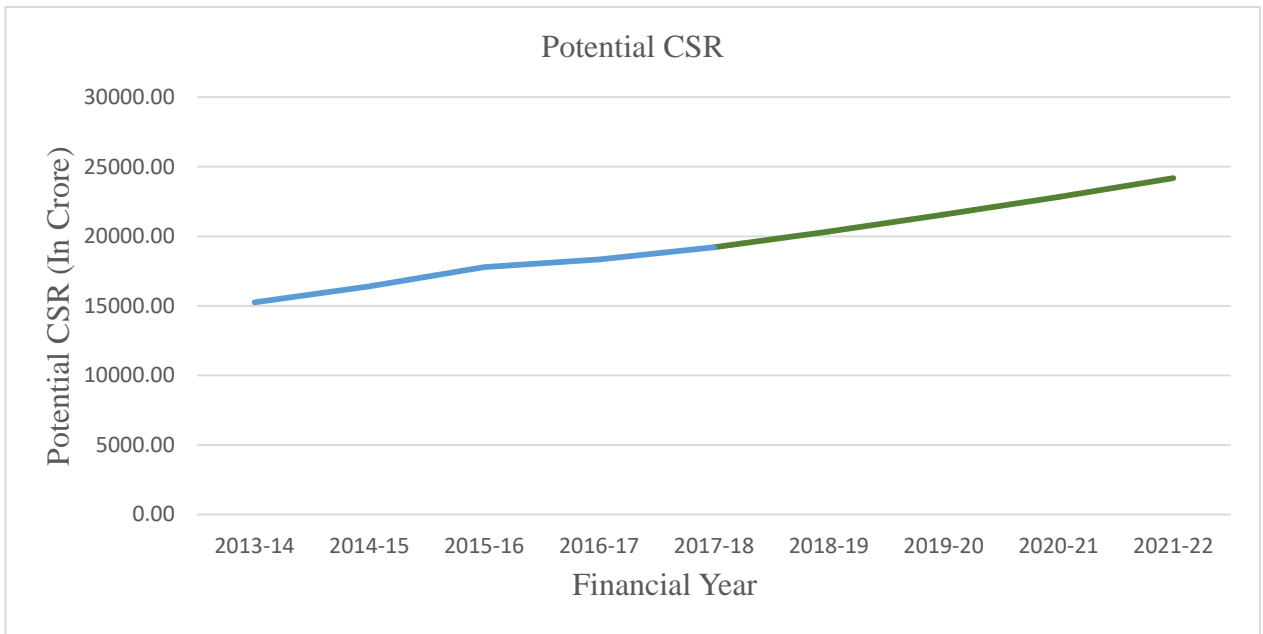
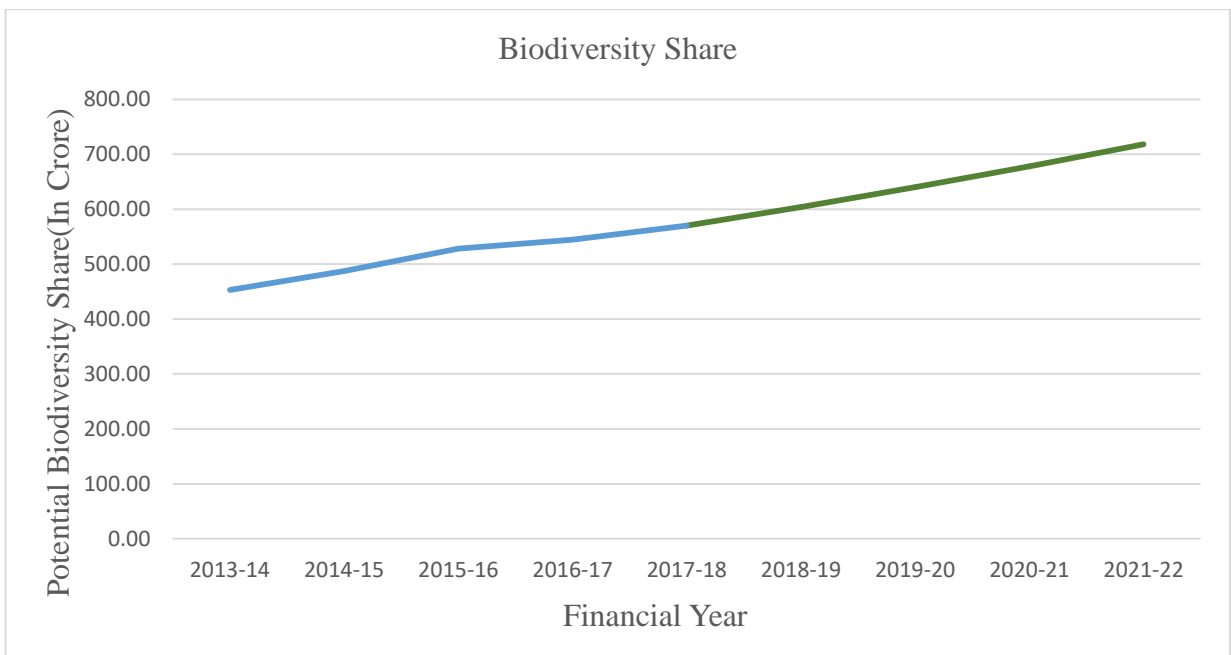


Figure 4: Biodiversity share based on estimates in Table 2



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