# Recommendations to the 15th Finance Commission of India for Enriching Current Tax Devolution Formula for Increased Allocations of Funds towards Forests, Environment & Climate Change

**SUBMITTED BY:**
**MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE (MOEFCC), NEW DELHI, GOVERNMENT OF INDIA**

**WITH SUPPRORT OF**

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Forest Survey of India

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Submitted by

**Ministry of Environment, Forest & Climate Change**
**New Delhi, Government of India**

With Support of

**Forest Survey of India**
Dehradun

**Indian Institute of Forest Management**
Bhopal

**IORA Ecological Solutions**
New Delhi

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## Executed by

Indian Institute of Forest Management (IIFM), Bhopal
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## Disclaimer

The views expressed and any errors herein are entirely those of the authors. The views as expressed do not necessarily reflect those of and cannot be attributed to the study advisors, contacted individuals, institutions and organizations involved. The information contained herein has been obtained from various sources including respective tiger reserves, Forest Survey of India, discussions with stakeholders, a review of publications, deliberations in the workshops conducted and are to the best our knowledge accurate. Despite all precautions taken to accurately reflect the information that was collected for this report, any errors pointed out subsequently by any party cannot lead to any liability on the part of the authors. The contents of this report may be used by anyone provided proper citations are used.

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We are indebted to Dr Satish Garkoti, Scientist-E, MoEF&CC and Dr R.P Rastogi Scientist-B, MoEF&CC for their dynamic participation throughout the study period and support in the data collection process, stakeholders and subject expert consultations.

We express our deep thankfulness to our subject expert members viz, Dr Amitabh Kundu, Dean & Professor, JNU (Retired), Ex-Member, Statistical Commission of India & Distinguished Fellow- Research and Information System for Developing Countries (RIS) , New Delhi; Dr Govind Rao, Emeritus Professor, National Institute of Public Finance and Policy (NIPFP) , Ex- Member, 14th Finance Commission of India, Ex-Director, NIPFP, New Delhi & Institute for Social and Economic Change ( ISEC), Bangalore and Dr Rathin Roy Director, National Institute of Public Finance and Policy (NIPFP), Ex-Economic Advisor to the Thirteenth Finance Commission for their direction throughout the execution of the project. Their valuable insights on public policy and involvement with previous finance & statistical commissions, arising from many years of work experience have tremendously helped the project team in shaping the methodology and execution process. Such an all-encompassing exercise within the specified time period would not have been possible without their assistance.

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Additional Principal Chief Conservator of Forests (BFD), Government of Maharashtra, Shri Abdul Ghani Hajam- Chief Conservator of Forests, Central, Government of J&K and providing the necessary detail and suggestions for improving the recommendation.

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प्रगतेः मूलं प्रकृतिः

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पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, भारत सरकार का स्वायत्त संस्थान
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**Dr. Pankaj Srivastava,** IFS
Director

# Preface

## Taking a Step Forward Towards Green India

It gives me great pleasure to introduce the report on 'Recommendations to the 15th Finance Commission of India for Enriching Current Tax Devolution Formula for Increased Allocations of Funds Towards Forests, Environment and Climate Change' funded by the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India.

IIFM has been associated with previous Finance Commissions and had provided recommendations for making a strong case for increased allocation of funds to the forestry sector. In the study for the 13th Finance Commission, the recommendations made were based on the total economic value of forest area in states, opportunity cost lost for maintaining, conserving the same and for restoration of degraded forests. The 14thFinance Commission took cognizance of the need to expand the financing for forestry and resultantly included a 7.5 per cent weightage for the forest sector in the main devolution formula instead of providing a small amount of grants, which led to considerable tax devolution to the states instead of small grants.

The study has made an attempt to develop a balance between devolution of tax for the states based on Forests and Grants-in-aid based on Catchment Area Treatment and Forest Restoration, Pollution Abatement Performance and Climate Change (NDC Goal 5).

I take this opportunity to express my deep gratitude to the Ministry of Environment, Forest and Climate Change (MoEF&CC), New Delhi for trusting IIFM once again and assigning this important study to IIFM in collaboration with FSI, Dehradun and IES, New Delhi. I compliment Dr. (Mrs.) Madhu Verma, Professor, Environment and Developmental Economics and Coordinator, CESM, Dr Subash Ashutosh, DG-Forest Survey of India and Mr. Swapan Mehra CEO, IORA Ecological Solutions and their entire team for their best endeavours along with the support team in bringing out this report.

I am also thankful to the full-fledged support extended by the MoEF&CC, CPCB, Subject Experts, State Forest and Finance Departments and others who actively participated in the regional consultation workshops as without their help this study could not have been actuated. I am also grateful to Shri N.K. Singh, Chairman 15th FC, Shri Arvind Mehta, Secretary 15th FC and other esteemed members of the 15th FC for their detailed deliberations with the delegation and providing useful inputs for the enrichment of this report. I hope the findings of the report will further help in strengthening the policies related to Environment, Forests and Climate Change for sustainable management of natural resources and landscapes.

8/7/19

**Date : 8th July, 2019**
**Place : Bhopal**

**Dr. Pankaj Srivastava**
**Director, IIFM**

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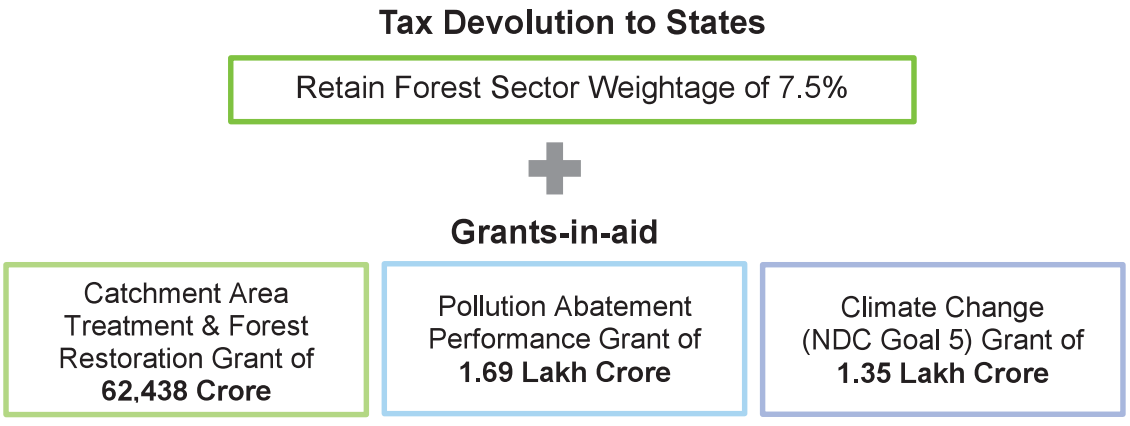
# Contents

## Summary of Recommendations




1. It is proposed to retain the existing allocation of 7.5% weightage in the devolution of Sharable Central Taxes to States based on forest sector. However, distribution of this 7.5% among states will be based on multiple values from forests and not just area under dense forest (MDF and VDF). These are shown in Table 1.

*Table 1 Forest sector based devolution: Indicators*

| Indicator | Weightage | Code |
|---|---|---|
| Total Moderate & Very Dense Forest in the State (Source: FSI) | 50% | FDi |
| Total Recorded Forest Area in State (Source: FSI) | 30% | RFi |
| State's score based on percentage of geographical area of a state under protected area network (Source: FSI) | 10% | PARFi |
| State's score based on planned budgetary allocation to forestry in proportion to total State budget (Source: State budgets) | 10% | BAi |

2. A Pollution Abatement Performance Grant of 1.69 lakh Cr is proposed for incentivising action on pollution abatement.

- 1.69 Lakh Cr of the grant will be earmarked for expenditure on actions for pollution abatement and be distributed over the next three years based on improvement in performance across concentration of particulate matter (PM10), waste management and water quality.

- The State-wise Air Quality Performance scores will be adjusted such that 60% weightage is split between the Indo-Gangetic States (Punjab, Haryana, Uttarakhand, Rajasthan, Uttar Pradesh, Bihar and West Bengal) and 40% weightage between the rest. This adjustment is done keeping in mind, the cost disability faced by these states given their geographical location and phenomenon of re-entrainment of road/desert dust.

- Disbursement of the grant to be coordinated and monitored by MoEFCC on the basis of the below three indicators.

*Table 2: Pollution abatement performance grant - Indicators*

| Indicator | Weightage | Code |
|---|---|---|
| State's Score on Improvement of Particulate Matter (PM10) Performance (Source: CPCB) | 40% | PM10i |
| State's Score on Improvement of Waste Management Performance (Source: Swachh Survekshan) | 40% | WMPi |
| State's Score on Improvement of Water Quality of River Stretches (Source: CPCB) | 20% | WQMi |

3. A Climate Change (NDC Goal 5) Grant of 1.35 Lakh Cr is proposed to support states adapt to climate change as well as incentivize mitigation actions, particularly through increase in Trees outside Forest (TOF).

- The grant will be untied for the first two years and then be conditional to increase in Tress outside Forest (TOF). From the third year onwards, the grant will be contingent on the States removing important farm forestry species from the restricted list.

- Enhancing TOF will play a critical role in achieving India's NDC Goal 5 'to create an additional carbon sink of 2.5 to 3 billion tonnes of CO2eq through additional forest and tree cover by 2030'.

- Distribution of this grant would be based on indicators shown in Table 3 below.

*Table 3: Climate Change (NDC Goal 5) Grant - Indicators*

| Indicator | Weightage | Code |
|---|---|---|
| Total Degraded Land in State (Source: ISRO) | 40% | DAi |
| State's score based on Net Annual Ground Water Availability Per Unit of Area (Source: CGWB) | 40% | GWAi |
| Per-capita income distance from the highest per-capita income | 20% | YDi |

4. A Catchment Area Treatment & Forest Restoration Grant of 62,438 Cr is proposed to support states enhance catchment area forest cover and forest density.

- This grant will also support mitigation actions towards NDC Goal 5 within the forest areas.

- The grant would be untied for the first year and then linked to increase in the states planned budgetary allocation of forestry in proportion to total State budget from the second year onwards

- The total grant amount and distribution between states has been estimated based on cost of restoring degraded forests based on area under forest in river catchment.

*Table 4: Catchment Area Treatment & Forest Restoration – Indicators*

| Indicator | Code |
|---|---|
| Forest cover in catchment area above 10 degree slope | CAT$i$ |

# Chapter I: Background

India ranks 10th among the countries of the world in terms of forest area and is one of the 17 mega-diversity countries in the world, as recognised by the World Conservation Monitoring Centre in 2000. Over the last few decades, India's growth has accelerated at a steady rate. The Indian economy is closely tied with its natural resource base, and it's critical that a balance between development activities and natural resources is maintained.

Rapid development to achieve a higher GDP growth rate has put immense pressure on our natural resources causing major environmental challenges such as degradation of air and water quality, solid waste management, forest degradation, deforestation and climate change. Putting in place environmental safeguards to overcome these challenges are often seen as impediments to a fast-growing economy. However, recognising their role as a catalyst for sustained growth can help prevent substantial financial losses and add significant value to the economy.

The Indian forests play a vital role in sheltering more than 45,500 plant species (including fungi and lower plants) and 91,000 animal species, representing about 7% of the world's flora and 6.5% of the world's fauna. About 26.5% of flora and fauna that occur in India are endemic to the country.[1] A network of 868 Protected Areas (PAs) has been established in India, extending over 162,099.47sq. Km. (5.02% of the total geographic area). This includes 104 National Parks, 550 Wildlife Sanctuaries, 87 Conservation Reserves and 127 Community Reserves.[2]

Several studies have underscored the considerable economic value of goods and services provided by forest ecosystems. A conservative estimate presented in the 2014 report by Indian Institute of Forest Management on Net Present Value of India's forest, valued India's forest at $1.7 trillion (INR 121 Lakh Crores). Sub-national studies have estimated flow value of forest ecosystem services from mountain states like Uttarakhand and Himachal Pradesh ranging from 53,000 crores to 95,000 crores per year.[3] [4] However, most of these ecosystem services are not traded on markets, and the forests are usually undervalued in the global economy. Only 2.99% of India's geographic area is now under very dense forest cover.[5]

Government of India has ratified several international and domestic commitments addressing its environmental challenges. These commitments cannot be met without the support and action by the state governments. However, following through on these commitments will require significant financial resources and prioritisation. States need to be incentivised and supported financially towards achieving these commitments.

The current study aims to re-visit the parameters considered for the allocation formula by the previous Finance Commissions and create a strong basis for increased allocation of devolved tax resources towards forest, environment & climate change, based on the principles of measurability, rewarding good performance and incentivising states with low resources.

## Fiscal Federalism in India

Fiscal federalism, involves financial relations between governments in a federal government system. Fiscal federalism is an integral part of public finance discipline and deals with the division of governmental functions and financial relations among levels of government.

[1] Biodiversity Profile of India, Balasubramanian, A. (2017)

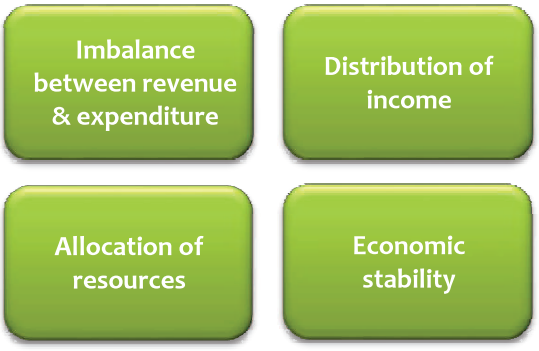
[2] WII ENVIS 2019: http://www.wiienvis.nic.in/Database/Protected_Area_854.aspx

[3] Verma et.al. (2014) Estimating Ecosystem Services Values of Himachal Forests – Revisiting the Value of Forests of Himachal Pradesh

[4] Verma et.al. (2019) Green Accounting of Forest Resources, Framework for Other Natural Resources and Index for Sustainable Environmental Performance for Uttarakhand state & Capacity Building on Environmental Statistics and Green Accounting

[5] Forest Survey of India (2017) India State of Forest Report

According to the fiscal federalism theory, a federal system of government can be efficient and effective at solving problems governments face today e.g.




India has a federal financial system as it has a federal form of government. The basic principle of the federal government is that centre and state governments are independent with respect to each other and have constitutionally demarcated spheres of action. The economics of federalism or 'fiscal federalism' is an area of study in which the principles of economics are applied to the functioning of the public sector in a federal system. It deals with the traditional concerns of the economists – public expenditure and taxation, resource allocation and income distribution in a multilevel public sector organisation.[6]

Federalism in India is characterized by the constitutional demarcation of revenue and expenditure powers among the three levels of government. The Seventh Schedule to the Constitution specifies the legislative, executive, judicial and fiscal domains of Union and State governments in terms of Union, State and Concurrent lists. The Constitution also requires the President to appoint a Finance Commission every five years or earlier, to review the finances of the Union and States and recommend devolution of taxes and grants-in-aid of revenues to them for the ensuing five years.

In India, the Centre collects about 64% of the combined revenue receipts whereas state governments collect only 36%. The Centre incurs around 43% of the combined expenditure while the State incurs 57%. The role of the Finance Commission in India is to act as an arbitrator to undermine the fiscal imbalance between Centre & States and determine the principles of Vertical sharing and Horizontal distribution of budgetary resources in India.

[6] Oates, W. E. (1972, 1977). Fiscal Federalism

The Finance Commission of India also lays down rules and principles by which the Centre provides grants-in-aid to States in specific sectors out of the Consolidated Fund of India. The Commission also considers the matter referred to them by the President of India in the interest of sound finance.

## Vertical and Horizontal Imbalances in Indian Fiscal Federalism

Vertical and horizontal imbalances are common features of most federations including India. A vertical imbalance exists when there is a gap between own spending (total spending minus transfers paid) and own revenue (total revenues minus transfers received) at a given level of government.[7] The fiscal imbalance can also occur, horizontally across the sub-Central units, if benefit taxes are not levied or alternatively, if the existing revenue sources in some jurisdictions are inadequate to finance a given optimum level of public services.

In India, even after optimal degree of decentralization is achieved, the problem of fiscal mismatch between revenue sources and expenditure functions vertically across different layers and horizontally among different jurisdictions. Vertical Imbalance is majorly created over time because of the fiscal gap pertaining to the Union's own revenue and its expenditure in States and State's revenue and its expenditure.

A major source of horizontal imbalances is the differences in the capacity to raise revenues across the states. In developed economies such differences arise largely due to differences in resource endowments and any attempt to transfer funds to poorer jurisdictions might have a cost in terms of lower growth of Gross National Product (GNP). In India, horizontal imbalances across States are due to a number of factors, which include historical backgrounds, differential endowment of resources, and capacity to raise resources. Unlike in most other federations, differences in the developmental levels in Indian States are very sharp.

In an explicit recognition of vertical and horizontal imbalances, the Indian Constitution embodies the following enabling and mandatory provisions to address them through the transfer of resources from the Centre to the States.[8] :

I. Levy of duties by the Centre but collected and retained by the States (Article 268)
II. Taxes and duties levied and collected by the Centre but assigned in whole to the States (Article 269).
III. Sharing of the proceeds of all Union taxes between the Centre and the States under Article 270. (Effective from April 1, 1996, following the eightieth amendment to the Constitution replacing the earlier provisions relating to mandatory sharing of income tax under Article 270 and permissive sharing of Union excise duties under Article 272).
IV. Statutory grants-in-aid of the revenues of States (Article 275)
V. Grants for any public purpose (Article 282).
VI. Loans for any public purpose (Article 293).

In addition to provisions enabling transfer of resources from the Centre to the States, a distinguishing feature of the Indian Constitution is that it provides for an institutional mechanism to facilitate such transfers. The salient feature of the Indian Constitution is that the Constitution recognizes that the assigned revenue powers are inadequate to meet expenditure responsibilities of the State governments and provides for the mechanism to transfer funds from the Union to State governments by way of tax devolution and grants in aid. To effect the transfers on an objective basis, the constitution has provided for setting up a periodic award of Finance Commission in order to regulate the inter-governmental fiscal relations in the country. The functions of the Commission include -

[7] Eyraud and Lusinyan, (2012). Vertical Fiscal Imbalances and Fiscal Performance in Advanced Economies.

[8] www.fincomindia.nic.in

I. distribution of the proceeds from sharable taxes
II. provision of grants in aid to the States in need of assistance and
III. measures to augment resource of the State government to supplement the resources of the Panchayats and Municipalities in the States and
IV. Address any other matter referred to the Commission in the interest of sound finance.

The third function was added following the 73rd and 74th amendments to the Constitution in 1992 conferring statutory status to the Panchayats and Municipalities.

## Forest-Environmental Fiscal Federalism in India

Environment in India has not been demarcated as separate entry in the Indian Constitution under any schedule. However, it is interpreted as one of important features in Article 21, Right to life. Though this Article does not explicitly mention the environment, the Supreme Court and the various High Courts of the country have given a wider interpretation to the word "life" in this Article. According to the courts, the right to life includes the right to a living environment congenial to human existence.[9]

Indian States also have responsibility towards environmental protection under the Indian Constitution. The State's responsibility with regard to environmental protection has been laid down under Article 48-A of the Constitution comes under Directive Principles of State Policy "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country".[10] As seen in table 5, land and water are in the State list, whereas forestry and wildlife are on the concurrent list.

Forests are under Concurrent List, which means that both the state and Centre can make laws/policies on the subject but in case of a difference, the law/policies of Centre would prevail. It is conceivable that like other areas of governance and regulation, there exists scope for a degree of federalism in the area of environmental policy-making, regulation and management as well. Since the natural environment, national and international, is inherently variable with local geography and with physical distances measured from any point, it makes sense to postulate or hypothesize that federalism and the entire gamut of environmental management, regulation and preservation will go together.

Forest play a significant role in economic development of the country especially like India where two-thirds of the population lives and works in and around forested areas. Thus, its uniqueness lies in the fact that it comprises both economic services in the form of being a primary sector, supplying various raw materials to be used in other sectors and social services as being a provider of the larger public good in the form of rendering environmental services to the societies at all levels.

[9] http://www.environmentallawsofindia.com/the-constitution-of-india.html.

[10] http://www.environmentallawsofindia.com/the-constitution-of-india.html.

Forest-rich states, in spite of providing significant ecosystem services, are incurring revenue losses. These States also incur heavy expenditure on forest management, providing public good (ecological services) used by other regions without fiscal charges and lag behind in terms of economic growth and human development vis-à-vis many forest sparse States which are either agriculturally or industrially developed or have established a strong tertiary sector.

According to Bahuguna & Bisht[11] (2013), the total economic value of the ecosystem services from Indian Forests has been estimated at 6.96 lakh crore annually, which is approximately 5% of the current GDP and represents the bare minimum approximate values of goods and services generated by forests. The value of forest reflected in the System of National Accounts (SNA) represents less than 10 % of the real value. The contribution of the primary sector to the national income has been diminishing of late. From a share of more than 50% in the 1950s, it has reduced to about 22%. Currently, the agriculture sector is the prime contributor. Flow value of forest ecosystem services from mountain states like Uttarakhand and Himachal range from 53,000 crore to 95,000 crore and if the possession value of land is considered the economic value increase to 6390,882 crore and INR 4, 36,849 crore (IIFM 2016 & 2018). However, since these ecosystem services are not traded on markets, their value goes unrecognized in the global economy.

Another landmark study by the lead author "Economic Valuation of Tiger Reserves in India: A VALUE+ Approach' (Verma et al. 2015)[12] provides quantitative and qualitative estimates for as many as 25 ecosystem services from selected tiger reserves. The study findings indicate that the monetary value of flow benefits emanating from selected tiger reserves range from INR 8.3 to INR 17.6 billion annually. In terms of unit area, this translates into INR 50,000 to INR 190,000 per hectare per year. In addition, selected tiger reserves protect and conserve stock valued in the range of INR 22 to INR 656 billion.

[11] Valuation of Ecosystem Goods and Services from forests in India, V. K. Bahuguna , N. S. Bisht, Volume 139, Issue 1, January 2013

[12] Madhu Verma, (2015), 'Economic Valuation of Tiger Reserves in India: A VALUE+ Approach'

In an economy like India, the role of fiscal transfer gains importance considering that it forms the chunk of the resource transfers related to various social and economic services. This particular mechanism can be tapped to reinforce the forestry sector by providing the much needed financial support at this critical juncture. It is a well-established fact that a number of ecosystem services flow from the forest areas and provides direct and indirect benefits to the country's economy. Therefore, it is essential that due attention is given to forests and natural resources in India, given their vast potential to contribute to the society and economy.

In 2016-17, Gross Value Added (GVA) at current prices for Forestry and Logging sector was estimated to INR 180,465 Crores which is 1.30 percent of the total GVP of India. Indian states on an average spends 2-3 percent of their total State outlays on Forestry, Wildlife, Ecology and Environment. In order to keep up with international and national commitments of India and expenditure in the Forestry, Wildlife, Ecology and Environment, it is important that States have stable tax and non-tax revenue instruments in environmental and natural resource sectors.

Discussions above suggests that a rational environment linked fiscal transfer system should be created to distribute funds based on needs, targets (national and international), linked to performance and environmental efforts and infrastructure, need for capacity building of States and local bodies for improved environmental governanc

*Table 1: Subjects related to environment in the seventh schedule of the Constitution*

| | Entries |
|---|---|
| Union List | Industries |
| | Regulation and development of oil fields and mineral oil resources |
| | Regulation of mines and mineral development |
| | Regulation and development of inter-State rivers and river valleys |
| | Fishing and fisheries beyond territorial waters. |
| State List | Public health and sanitation |
| | Agriculture, protection against pest and prevention of plant diseases. |
| | Land, colonization, water etc. |
| | Fisheries |
| | Regulation of mines and mineral development subject to the provisions of List-I |
| | Industries subject to the provisions of List-I. |
| Common or Concurrent List | Forests |
| | Protection of wild animals and birds |
| | Economic and social planning |
| | Population control and family planning |

## Chapter II: Rationale for the Study

India attained the status of the fastest growing economy in the world last year. This development and rapid industrialisation and urbanisation pose major challenges to sustain and improve the quality of its environment, be it air quality, water quality, solid waste management, maintaining healthy forest cover, mitigating and adapting to climate change. The sustainable management of forest, environment and other natural resources hold a pivotal role for more green and inclusive growth.

| | |
|---|---|
| **1988 National Forest Policy** | • States directed to keep large part of their geographical areas under forest.<br>• 33% under forest cover and 66% for hill and mountainous |
| **1996 SC order restricting green felling** | • The felling of trees in all forests restricted<br>• Does not affect felling in any private plantation comprising of trees |

India has a variety of landscapes within its boundary including hilly, mountainous terrain, desert, coastal, mangroves, plains and islands. It is essential that due attention is given to forests and natural resources in India, given their vast potential to contribute to the society and economy, it is imperative to assess and value them appropriately. With such a large endowment of natural forests and other natural resources ecosystem accounts will provide several important pieces of information in support of policy and decision-making relating to environment and natural resources management, recognizing that the management of these resources are of relevance in economic planning, development and social policy contexts.

India in the light of making a substantial contribution towards sustainable development has made several efforts in the field of valuation and accounting of forest resources, partial implementation of payment for ecosystems and is leading in conducting research work in the area of environment and forests. Extensive work has been done on ecosystem valuation on forest ecosystem services valuation in states like Himachal Pradesh, Uttarakhand, Madhya Pradesh, and Rajasthan as stated in the previous chapter.

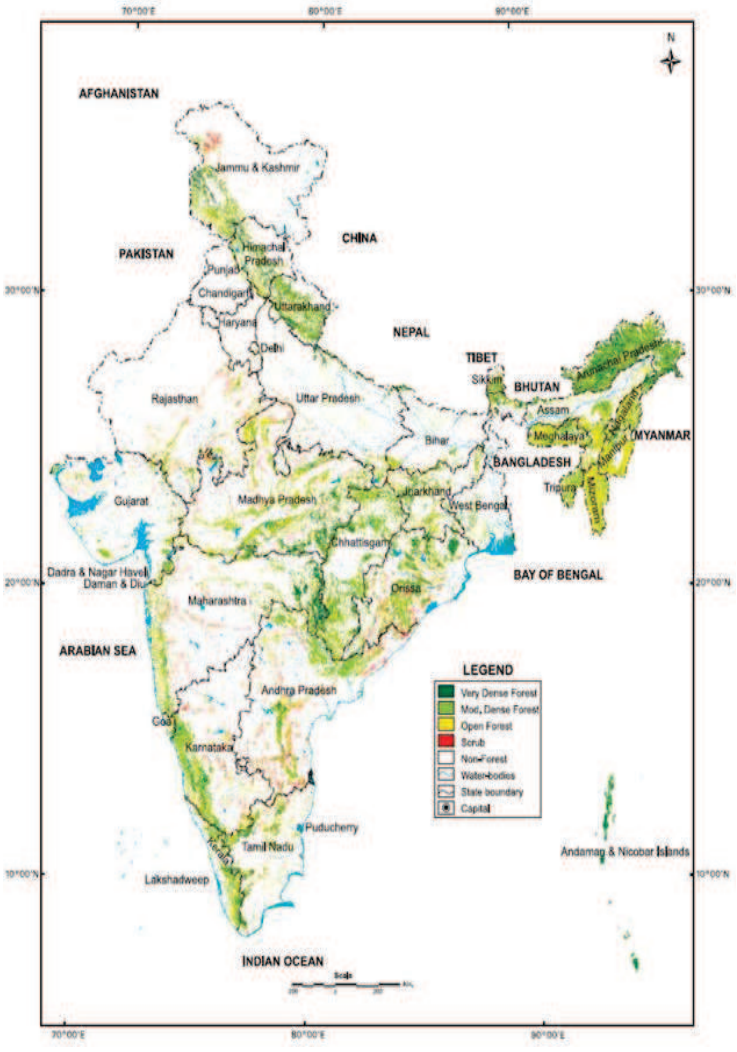



*Figure 1: State of Forests in India*


*Figure 2: Rationale for the Study*

India recognises the need for environmental conservation and climate action and has recently made several domestic and international commitments towards addressing its environmental challenges. In 2015, India adopted the 2030 Development Agenda on the Sustainable Development Goals (SDG). India has developed 12 National Biodiversity Targets and brought out a National Biodiversity Action Plan in 2008 and amended it in 2014, reiterating India's commitment to conservation of biodiversity as a national priority recognising its crucial linkages with the livelihoods and well-being of the people. India has further ratified the Paris Agreement in 2016 and committed to achieving an ambitious Nationally Determined Contribution (NDC) which includes targets on enhancing forest carbon stocks, reducing economy wide emissions and promoting resilience. As party to the United Nations Convention to Combat Desertification (UNCCD) and SDG 15.3, India has set the national Land Degradation Neutrality (LDN) targets. On the domestic front, Government of India has flagships schemes such as National Clean Air Programme, Swachh Bharat Abhiyan, National Action Plan on Climate Change, Green India Mission – National Afforestation Programme, etc.

**India's National and International Commitments**

- India adopted the 2030 Development Agenda or the Sustainable Development Goals
- As party to Convention on Biological Diversity (CBD), India has developed 12 National Biodiversity Targets and brought out National Biodiversity Action Plan
- Signatory to and ratified UN Convention to Combat Desertification (UNCCD)
- Ratified the Paris Agreement in 2016 and committed to achieving an ambitious NDC which includes targets on enhancing forest carbon stocks, reducing economy wide emissions and promoting resilience
- NAPCC and its 8 missions, Integrated Wasteland Development Program (IWDP), Green Highways Policy 2015, Agroforestry Policy 2014, etc.

Achieving these commitments is critical to secure India's long term economic security and to establish India as a global leader in furthering its centuries old ethos of sustainability. Following through on these commitments will require significant financial resources and prioritisation.

As India pursues towards is economic goals, the pollution levels have deteriorated in most of the regions. It is vital for India to take action on minimising the detrimental health impacts due to high levels of air pollution, water pollution and pollution due to solid waste. Figure 3 depicts the volume of untreated water increased rapidly as compared treated wastewater due to the insufficient infrastructure and resources and projections of solid waste generation in urban areas by 2050[13], necessitating financial investments to cope with almost exponential growth of municipal solid waste.

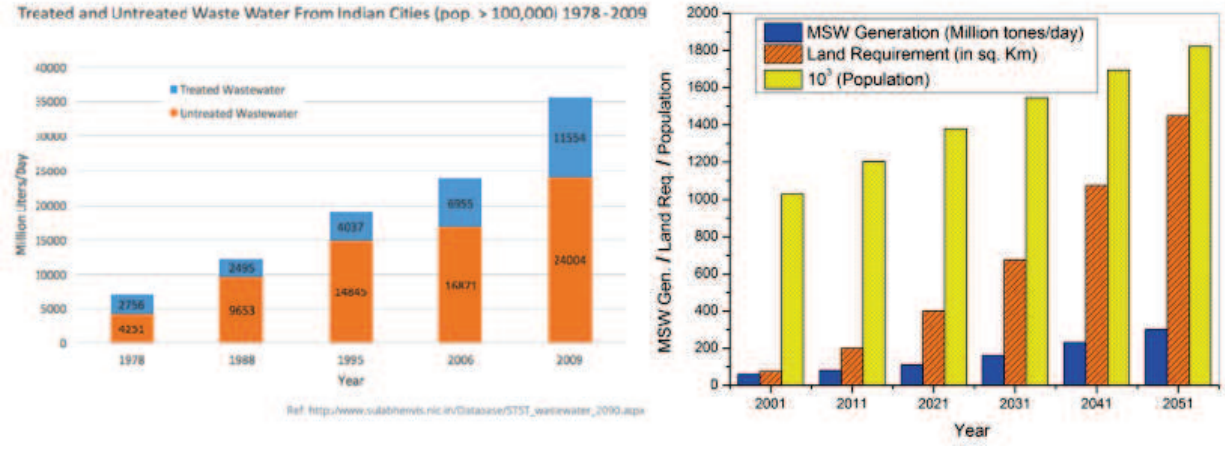



*Figure 3: Status of waste- water Treatment in Indian Cities and solid waste generation in India*

The key challenges to better management of the water quality in India are temporal and spatial variation of rainfall, improper management of surface runoff, uneven geographic distribution of surface water resources. Besides, water quality problems due to treated, partially treated and untreated wastewater discharge from urban settlements, industrial establishments and runoff from irrigation sector are concerning as well and in need of technical remedies. It is reported that in 2018, 351 out of 445 river stretches suffered pollution from multiple sources.[14] Moreover, the condition of lakes is even more appalling than rivers. As per a study conducted by Environmentalist Foundation of India, it was observed that 76 of 85 lakes in India were in severe contaminated. While, the cost of infrastructure to eliminate further contamination of water sources is expected to cost 1.96 lakh crore,[15] it

[13] Rajkumar Joshi and Sirajuddin Ahmed (2016) "Status and challenges of municipal solid waste management in India: A review"

[14] River Stretches for Restoration of Water Quality, Central Pollution Control Board, September 2018

[15] Swachchh Bharat Mission

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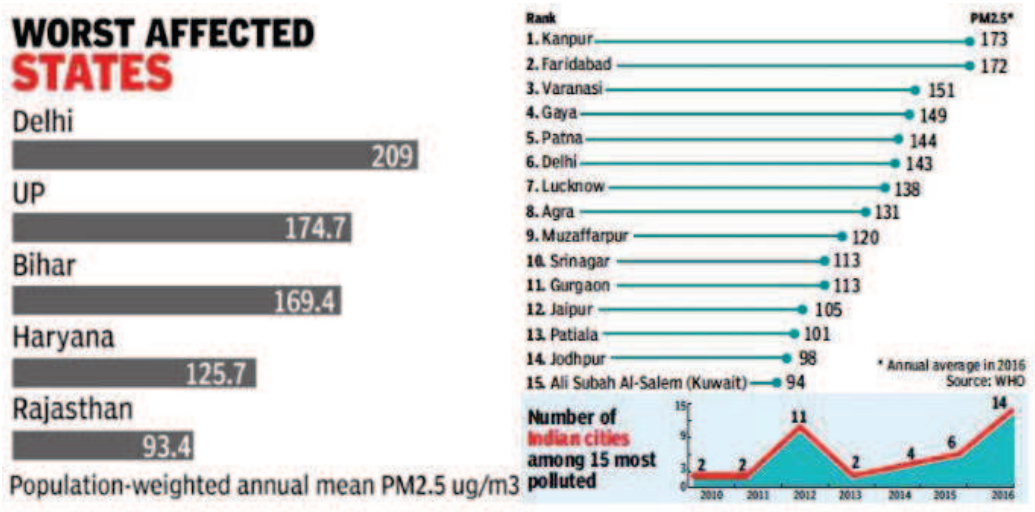



*Figure 4: Polluted cities in the Indo-Gangetic plain*

estimated that continual water scarcity could lead to a loss of 6% to GDP by 2050.[16]

Air pollution is one of the major environmental problem that urban centres in India are experiencing. As per the report of World Health Organisation (WHO) 12 out of the 15 most polluted cities are in India. Figure 4 shows the most polluted cities in India based on PM 2.5 concentration levels and the Indo-Gangetic States affected due to air pollution

According to a study by Indian Institute of Technology, Mumbai (2016), cost of air pollution in Delhi and Mumbai was estimated to be INR 70,000 crore in 2015. In a pan Indian perspective, air pollution alone led to a GDP loss of more than 8.5% in 2013.[17]

The Economic Survey of India (2017) states that currently, India incurs a loss of INR 63,000 - 70,000 Cr annually due to extreme weather events.[18] These losses are disproportionately felt by the agriculture sector. It is estimated that climate change induced vagaries in weather could lead to major crop productivity decrease of 10-40% by 2100.[19] The most adversely affected are usually the most vulnerable

and underserved sections of the society in rural and urban landscape.

Climate change is one of the greatest problems that today world is facing, be it the health impacts due to increase in the pollution level, weather extremities causing loss to human lives and agriculture or future effects of sea level rise and ozone depletion. It has a significant implication on the state/countries economy when it comes to mitigating the impact of climate change and implementing adaptation programmes at the ground level.

[16] Dr. S. Janakarajan (2018). Urgent need for 'green accounting' and 'green GDP.

[17] http://documents.worldbank.org/curated/en/781521473177013155/pdf/108141-REVISED-Cost-of-PollutionWebCORRECTEDfile.pdf

[18] https://www.indiabudget.gov.in/budget2017-2018/es2016-17/echapter.pdf

[19] http://164.100.47.193/lsscommittee/Agriculture/16_Agriculture_55.pdf

Climate change impacts agriculture 4-9 per cent each year, which presumably causes about 1.5 per cent loss in GDP[20] as agriculture sector contributes 15 per cent to India's total GDP. A study commissioned by the MoEFCC estimated the cost of Desertification, Land Degradation and Drought (DLDD) in India at 2.5% of India's GDP in 2014-15, or USD 48.8 billion.[21] 82% of this total cost is on account of land degradation and 18% due to land use change.

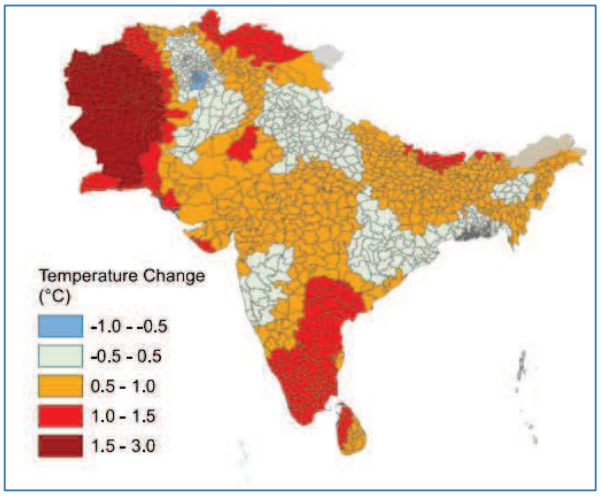



*Figure 5: Temperatures have increased significantly between 1951 and 2010*

Forests, environment and climate change issues have been an integral part of previous Terms of References (ToRs) given to the Finance Commission of India. The commission recognises the importance of the need to manage forests, environment and climate change for enabling sustainable development and thereby conducts studies on these issues for recommendations (e.g. High Conservation Value Forests: An Instrument for Effective Forest Fiscal Federalism in India - A study by IIFM Bhopal for 14th Finance Commission).

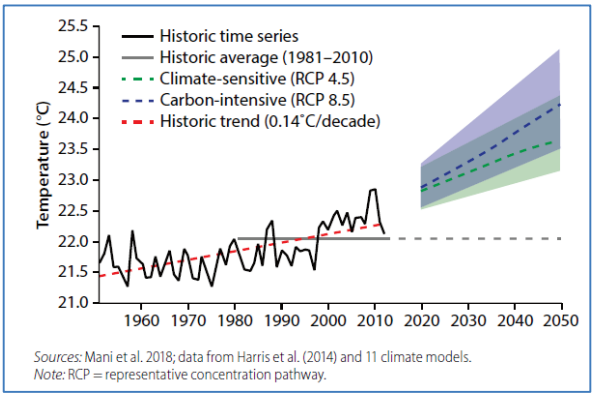



*Figure 6: Temperature projections based on the mean of the eleven climate model*

[20] CSE Article May 2017 by Subhojit Goswami "Climate change impact on agriculture leads to 1.5 per cent loss in India's GDP"

[21] TERI (2018) Economics of Desertification, Land Degradation and Drought in India Vol I: Macroeconomic assessment of the costs of land degradation in India

# Chapter III: Allocations by Previous Three Finance Commissions & Current Finance Commission's ToR for Environment, Forest & Climate Chang

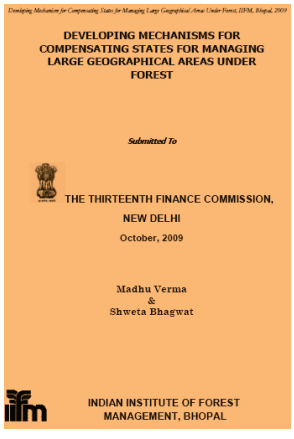
## 12th Finance Commission of India

The 12th Finance Commission was appointed by the then President of India, Dr APJ Abdul Kalam on 1st November 2002 under the Chairmanship of Dr C. Rangarajan. The commission submitted its recommendations to the parliament for the period of 2005-06 to 2009-2010. The committee recommended that the share of the States in the net proceeds of shareable central taxes to be 30.5 per cent during 2005-10 (during 2000-05 it was 29.5%). The income distance criterion was first used by 12th FC, measured by per capita GSDP as a proxy for the distance between states in tax capacity. After this substitution is made, the procedure implicitly applies a single average tax-to-GSDP ratio to determine fiscal capacity distance between states.

Several states represented their cases subsequent to the restrictions placed by the Supreme Court on exploitation of forest wealth, the forests have become a net liability for the states rather than a source of revenue. The 11th FC had recommended preparation and implementation of scientific work plans for management of forests for the country as a whole. States pointed out that maintenance of the forest area as per the working plan had become a problem due to financial constraints. Hence, requested separate grants which should be provided to them for maintenance of forests.

The 12th FC of India recognized the importance of forests and allocated grants-in-aid of INR 1000 crore to states for maintenance of forest area. This amount was distributed among the States based on their forest area. It further indicated that this additional grant should be spent on preservation of forest wealth and it should result in increased expenditure to the extent of this grant in addition to the normal expenditure of the forest department. However, the 12th FC's grants-in-aid as compensation for created fiscal disabilities was just based on recorded forest area in each state and no quality aspects were considered. The total amount allocated for each state was distributed over 5 equal instalments over five years (2005-2010). In such allocation process the States having larger absolute area received more compensation than smaller States which had high percentage of their geographical area under forest and had high density forest as well.

## 13th Finance Commission of India




To broaden such single parameter approach, the 13th Finance Commission of India awarded a study to IIFM to 'Developing Mechanism for Compensating States for Managing Large Geographical Areas Under Forest' wherein various formulae were developed to incorporate protected areas, economic values, disability factors, opportunity cost, restoration cost among others but the eventual formula used by the 13th Finance Commission for allocation again considered the area under forest cover with an added parameter of canopy density. This again created discrepancies in allocation, as for States in the arid region, it is impossible to have high canopy density forests despite such forests having unique role in forest ecosystems, whereas the North-Eastern States would have very high density concentration. This is simply due to the difference in the bioclimatic zones that made the allocation somewhat skewed (Verma et al. 2014).

The 13th Finance Commission submitted its recommendations in Parliament for the period of 2010-11 to 2014-15. The share of States in net proceeds of shareable central taxes was increased from 30.5 to 32 percent in each of the financial years from 2010-11 to 2014-15. The 13th Finance Commission of India allocated grants-in-aid for protection of forest aimed to reward for contributing to the ecology and biodiversity of India, as well as compensate States for the opportunity loss on account of keeping areas under forest. They tried to advance a step further from the 12th Finance Commission by including canopy density along with area under forest cover. However, this too created discrepancies in allocation, as for states in the arid region it is impossible to have high canopy density forests despite these having a unique role in forest ecosystems, whereas the north-eastern states would have very high density concentration. Thus due to difference in the bioclimatic zones, the allocation was somewhat skewed.

**Major Recommendations by 13th FC**

- An amount of INR 5000 crore is recommended as forest grant for the award period.
  - 25 per cent of the grants in the last three years were for preservation of forest wealth.
- An incentive grant of INR 5000 crore was recommended for developing grid-connected renewable energy based on the states' achievement in renewable energy capacity addition from 1st April, 2010 to 31st March, 2014.
- An amount of INR 5000 crore was recommended as water sector management grant for four years

Forest Grants of INR 5000 Crore was recommended by the 13th Finance Commission for five years. The objectives of the grant were to provide the resources for conservation, to control and manage the past declines in the quantum and quality of area under forest, and to provide fiscal resources by which the State can enable alternative economic activities as a substitute for economic disability imposed by forest coverFurther, a large portion (75%) of the forest grant under the 13th Finance Commission was freed for use as a development resource for the States. The grant was distributed over five years and kept untied for the first two years. For the remaining three years of the award period, the release of the grant was linked to the number of approved working plans for the forest divisions of the state.

**13th FC ToR Environmental reference**

ToR Point No. 6: In making its recommendations, the Commission shall have regard, among other considerations, to:

(viii) **The need to manage ecology, environment and climate change consistent with sustainable development;**

(x) the need for ensuring the commercial viability of irrigation projects, power projects, departmental undertakings and public sector enterprises through various means, including levy of user charges and adoption of measures to promote efficiency.

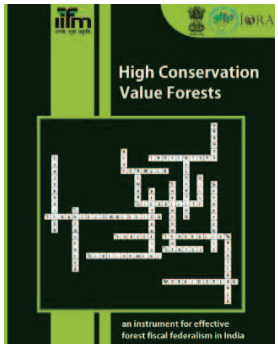
The 13th Finance Commission also recommended INR 5000 crore incentive grant for generation of grid electricity from renewable sources. The incentive was based on states' achievement in renewable energy capacity addition in MW between 1 April 2010 and 31 March 2014. In addition, there was also INR 5000 crore incentive grant for water sector management. These were conditional to setting up Water Regulatory Authority in the state and achieving minimum level of recovery of water charges. They were tied for use in water sector maintenance expenditure.

### 14th Finance Commission of India

Under the chairmanship of Dr Y. V. Reddy, the 14th Finance Commission submitted its recommendations for the period 2015-16 to 2020-21. One of the major recommendation by the committee was to enhance the share of the states in the central divisible pool from the current 32% to 42%. This radical increase is the largest ever increase in vertical tax devolution since the 12th Finance Commission. In addition to this The 14th FC also proposed a new horizontal formula for the distribution of the states' share in divisible pool among the states.

Forests, environment and climate change issues have been an integral part of previous Terms of References (ToRs) given to the Finance Commission of India. The Commission recognises the importance of the need to manage forests, environment and climate change for enabling sustainable development and cost disabilities that states face to conserve the forests.

Recognising this gap, the 14th Finance Commission commissioned a study to the Indian Institute of Forest Management, Forest Survey of India & IORA Ecological Solutions to improve upon the existing allocation formula that can balance the distribution of grants among the States based on the quality of their forests. The resultant study made an effort to modify the allocation formula for grants-in-aid to different states used in the 13th Finance Commission of India and allocations were recommended using High Conservation Value forests (HCVF) index scores to duly reflect multiple values of forests.




High Conservation Value Forests Index was an index, on the basis of a number of indicators relating to three types of factors – natural endowment, actions undertaken to conserve this endowment and cross-cutting factors, assessed the importance of forests in each state and allocated scores. These scores allocated to each indicator for each states which finally adds up to form an index that evaluates a relative importance of forests in each State (Verma et al. 2014). The HCVF Index was a reflection of the ranking of the forests of all the states, considering the important values contained in them. It comprised of 13 indicators listed in the table 6 below.

**14th FC ToR Environmental reference**

ToR Point No. 6: In making its recommendations, the Commission shall have regard, among other considerations, to:

(vi) The level of subsidies that are required, having regard to the need for sustainable and inclusive growth, and equitable sharing of subsidies between the Central Government and State Governments;

(viii) The need for insulating the pricing of public utility services like drinking water, irrigation, power and public transport from policy fluctuations through statutory provisions; and

(x) The need to balance management of ecology, environment and climate change consistent with sustainable economic development

*"We believe that large forest cover provides huge ecological benefits, but there is also an opportunity cost in terms of area not available for other economic activities and this also serves as an important indicator of fiscal disability. We have assigned 7.5 per cent weight to the forest cover."*

*- 14th Finance Commission Recommendations (para 8.27)*

*Table 2: HCVF Indicators*

| Factor | Indicators | Code |
|---|---|---|
| E | Proportion of geographical area under recorded forests | FAGA |
| | Canopy Density of Forest Areas | FCD |
| | Area under High Altitude Forests (Altitude >= 2000mtr) | HAF |
| | Number of endemic floral species | EMICFL |
| | Number of endemic faunal species | EMICFA |
| | Area under wetlands inside forests | WET |
| A | Proportion of recorded forest areas designated as protected areas | PARF |
| | Proportion of recorded forest areas which are natural forests | NFRF |
| | Diversion of recorded forest area between 1980-2012 | DIV |
| | Average patch size of forests | PATCH |
| C | Growing stock (in forests) per unit area | GS |
| | Intensity of regeneration | REG |
| | Area under wildlife corridor | CORR |

The above study also proposed improvement in the formula used by the 13th Finance Commission for allocation of forest grant by incorporation of HCVF scores as per table 7.

*Table 3: HVFC Scores*

**Formula used by the XIII Finance Commission**

$$G_i = \frac{\left[\left\{\frac{F_i}{\sum F_i} + R_i\right\} \times \left\{1 + \left(\frac{M_i + 2H_i}{A_i}\right)\right\}\right]}{\sum_{i=1}^{n}\left\{\frac{F_i}{\sum F_i} + R_i\right\} \times \left\{1 + \left(\frac{M_i + 2H_i}{A_i}\right)\right\}}$$

| | |
|---|---|
| $G_i$ | Share for state *i* |
| $A_i$ | Geographical area of state *i* |
| $F_i$ | Total forest cover of state *i* |
| $M_i$ | Moderately dense forest area of state *i* |
| $H_i$ | Highly dense forest area of state *i* |
| $R_i$ | $max\left[0, \left\{\frac{F_i}{A_i} - \frac{\sum F_i}{\sum A_i}\right\}/100\right]$ |
| $n$ | Number of States i.e. 28 |

**Suggested formula for the XIV Finance Commission by incorporating the HCVF Index Score**

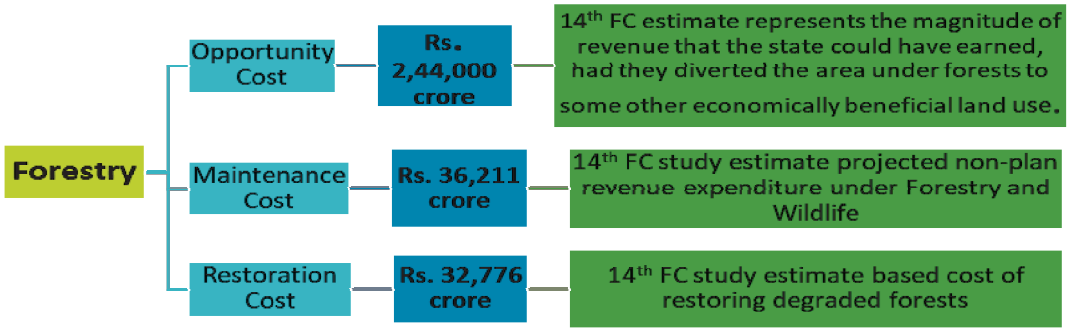
$$G_i = \frac{\left(\left[\left\{\frac{F_i}{\sum F_i} + R_i\right\} \times \left\{1 + \left(\frac{M_i + 2H_i}{C_i}\right)\right\}\right] + \frac{HCVF_i}{\sum HCVF_i}\right)}{\sum_{i=1}^{n}\left(\left[\left\{\frac{F_i}{\sum F_i} + R_i\right\} \times \left\{1 + \left(\frac{M_i + 2H_i}{C_i}\right)\right\}\right] + \frac{HCVF_i}{\sum HCVF_i}\right)}$$

| | |
|---|---|
| $G_i$ | Share for state *i* |
| $A_i$ | Geographical area of state *i* |
| $F_i$ | Total **recorded forest area** of state *i* |
| $M_i$ | Moderately dense forest area of state *i* |
| $H_i$ | Highly dense forest area of state *i* |
| $R_i$ | $max\left[0, \left\{\frac{F_i}{A_i} - \frac{\sum F_i}{\sum A_i}\right\}/10\right]$ |
| $C_i$ | **Forest cover of state *i*** |
| $HCVF_i$ | **High conservation value forest index of state *i*** |
| $n$ | Number of States i.e. 28 |

In order to keep track of the effects of allocations received due to forest sector on forests, the study also proposed regular monitoring of forest health as well as expenditures on conservation, protection and policy measures for ease of doing business in forestry section by each state with the Ministry of Environment, Forest and Climate Change being the nodal agency for such monitoring.

Apart from the HCVF index, the study also recommended significantly increasing the quantum of the grant to compensate States for the opportunity cost or fiscal disability due to forest area. It provided state-wise estimates of total opportunity cost (INR 2,44,000 Cr), maintenance cost (INR 36,211 Cr) and restoration cost (INR 32,776 Cr) due to forests present within states as depicted in the following diagram.

*Figure 7 Estimates of opportunity cost or fiscal disability*




The 14th Finance Commission, resultantly, for the first-time, incorporated forest cover into the main formula for the allocation of the single, divisible pool of taxes among the states. The 7.5% weightage given to forest cover by the 14th Finance Commission, based on principles of opportunity cost or fiscal disability due to forest cover, led to tax devolution of 2.96 Lakh Crore, an amount similar to what was suggested by the study. Weightages accorded for Horizontal Devolution Formula in the 13th and 14th Finance Commissions are shown in Table 6.

*Table 4 Weightages accorded for Horizontal Devolution Formula in the 13th and 14th Finance Commissions*

| Horizontal Devolution Formula in the 13th and 14th Finance Commissions | | |
|---|---|---|
| **Variable** | **Weight Accorded** | |
| | **13th FC** | **14th FC** |
| Population (1971) | 25 | 17.5 |
| Population (2011) | 0 | 10 |
| Fiscal capacity/Income Distance | 47.5 | 50 |
| Area | 15 | 10 |
| Forest Cover | 0 | 7.5 |
| Fiscal discipline | 17.5 | 0 |
| **Total** | 100 | 100 |

Keeping the above goals in mind, the 15th Finance Commission's TORs seek to identify principles to resource these goals and commitments suitably. The 15th Finance Commission also seeks to evolve beyond just forests, to include environmental quality (air, water and waste) and climate change mitigation and adaptation. Through recognition of the recommendations mentioned herein, the 15th Finance Commission could be the definitive change agent that solves the pollution, forest and climate change.

Through the current study, the team seeks to continue the work done for the last two Finance Commissions of India in furthering the cause of environmental conservation and sustainable development. The study aims to re-visit the parameters considered for the allocation formula to address essential developments such as India's commitments to the United Nation's Sustainable Development Goals, the UNFCCC Paris Agreement and India's Nationally Determined Contributions (NDC), National and State Level Action Plan on Climate Change as well as several Government programmes such as Swachh Bharat Abhiyan and National Clean Air Programme, etc.

The UN led international community of 193 Countries pledged to the Sustainable Development Goals (SDGs), at the UN Sustainable Development Summit in September 2015 in New York. To help achieve the SDGs, developing country governments like India need to mobilise revenue to invest in schools, healthcare, infrastructure and the environment, for Climate Action, Natural Resources like Land, Water etc. This is where Environmental Fiscal Reform (EFR) can play an important role.

The goal of the study is to create a strong basis for increased allocation of devolved tax resources towards forest, environment & combatting climate change, based on the principles of measurability, rewarding good performance and incentivising states with low resources.

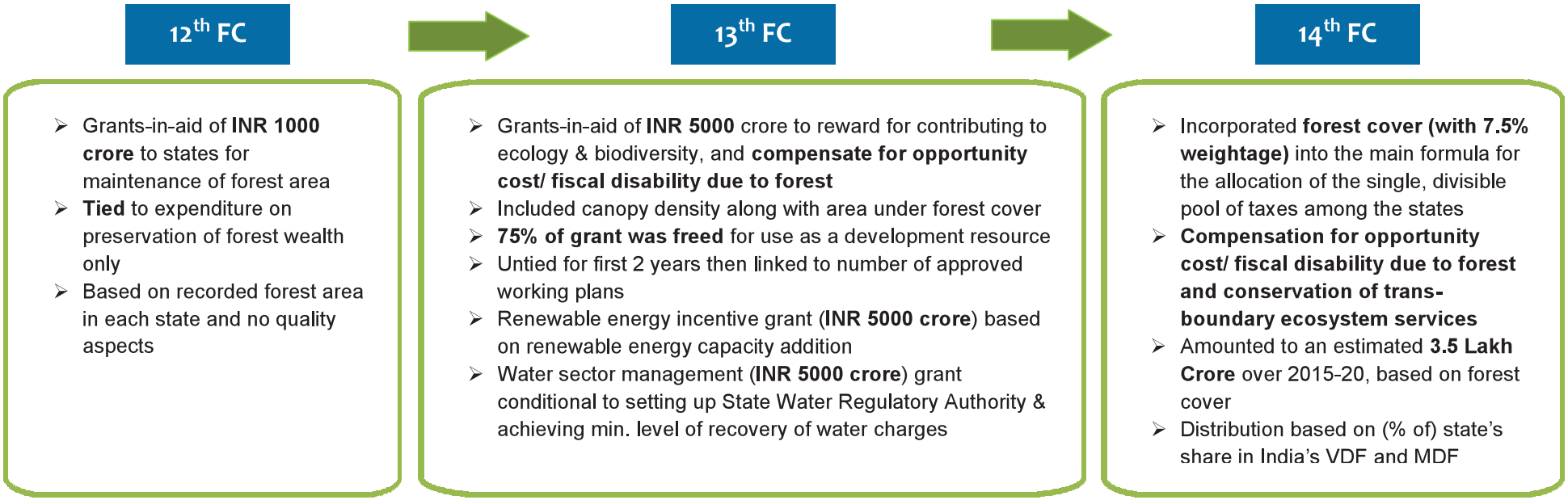



*Figure 8: Summary of allocation by previous finance commission to forestry and environment sector*

## 15th Finance Commission ToR

### Relevant Points from 15th Finance Commission Terms of Reference

- *"The Commission may consider proposing **measurable performance-based incentives for States,** at the appropriate level of government, in following areas:*

*(iii) Achievements in implementation of flagship schemes of Government of India, disaster resilient infrastructure, **sustainable development goals,** and quality of expenditure;*

*(ix) **Progress made in sanitation, solid waste management** and bringing in a behavioural change to end open defecation."*

- *"While making its recommendations, the Commission shall have regard, among other considerations, to the demand on the resources of the Central Government on account of, inter alia, climate change commitments."*

  (ToR, para 4, iii and ix)

- *While making its recommendations, the Commission shall have regard, among other considerations, to the demand on the resources of the Central Government particularly on account of defence, internal security, infrastructure, railways, climate change, commitments towards administration of UTs without legislature, and other committed expenditure and liabilities*

  (ToR, para 3, ii)

### Project Objectives

1. Identifying indicators to include (i) forest, (ii) environmental quality and (iii) climate change mitigation, adaptation and vulnerability of states for enriching current tax devolution formula
2. Developing a measurable performance-based framework for aggregating all identified indicators
3. Validating framework through varied stakeholder consultations across India
4. Demonstrating framework through State-level estimates primarily via literature review, interaction with experts, interactions with MoEFCC officials, officials from CPCB and Municipal bodies, regional consultation workshops, experts workshops, and draft recommendations presentations to the FC.

### Key Outputs

- Recommendations to 15th Finance commission and formulae for devolution of taxes to address the forestry, environmental and climate change challenges of India, geared towards achieving our various sustainability objectives, notably the NDC and SDG commitments
- Report and Power-Point presentations on the methodology, process, stakeholder feedback, the formulae and devolution estimates, measurability framework.

## Chapter IV: Methodology and Principles for Devolution and Grants

The Fifteenth Finance Commission's ToR focusses on a "measurable performance-based incentives" for rewarding states for their efforts to benefit forest, environment and climate change.

Whole range of indicators were identified based on literature review and data availability for each of the states. The SDG indicators plays an important role in the framework as well. Efforts are made to link such SDGs to the three major components (forest, environment & climate change) that gave as inputs for enriching the 15th Finance Commission Allocation Formula. The figures below show the broad framework considered for each of the three components.

A total of three stakeholder consultations along with consultation with public finance experts were conducted in order to finalize the recommendation. Suggestions were sought from the organisation like CPCB, FSI etc. A summary of the stakeholder consultation conducted is shown in the figure below.

The framework, indicators and formulae for allocation was modified time to time as per the suggestions sought during the consultation process. The final recommendations were then presented in front of review committee at MoEFCC for finalization.

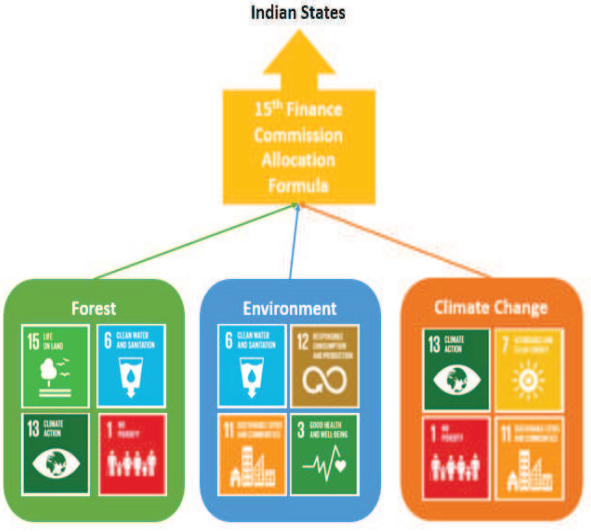



*Figure 8: Three major components and their SDG link*

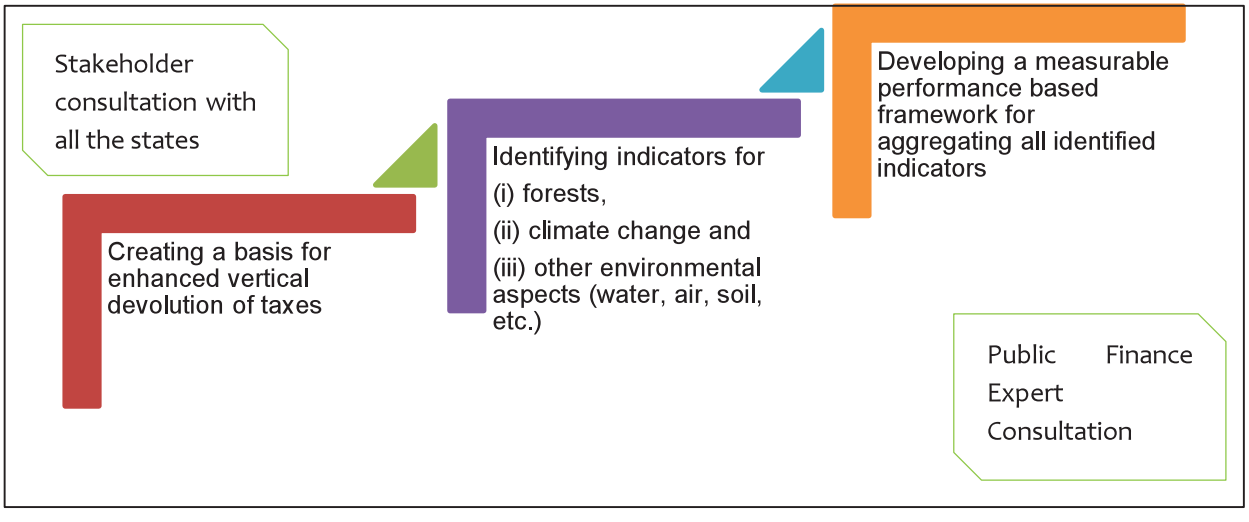



*Figure 9: Broad Methodology*


*Figure 10: Stakeholder Consultations*

## Principles for Devolution and Grants

### Cost disability due to forest cover

As per the mandate of the 1988 National Forest Policy, many states are directed to keep large part of their geographical areas under forests. In addition, policy shift from commercialization to conservation and its reinforcement by judicial directives, particularly the 1996 SC order restricting green felling, has reduced and in some cases significantly, revenues that states can derive from forest land. For instance, in Arunachal Pradesh share of forest revenue in total state revenue fell from 60% during 1991-96 to under 2% in the years following the 1996 SC order.

On account of both the interventions, these forest-rich states, in spite of providing significant ecosystem services, are incurring revenue losses. Furthermore, these states incur heavy expenditure on forest management and cater the ecological services which are used as public goods by other regions without fiscal charges. These states, despite having abundant forest-wealth, lag behind in terms of economic growth and human development vis-à-vis many forest sparse states which are either agriculturally or industrially developed or have established a strong tertiary sector.

Thus, there is a strong case for compensation to forest-rich states to neutralize the deficiency in fiscal capacity that emerges on account of conservation of forests, which need to be conserved and expanded for their critical ecological services, many of which are trans-boundary. Keeping this in mind, it is proposed to retain the existing allocation of 7.5% weightage in the devolution of Sharable Central Taxes to States based on forest sector.

However, while giving due weight to the quality of forests, the compensation mechanism must recognize the situation of states that cannot support high density forests due to natural physiographical conditions but face a fiscal disability nonetheless in maintaining open forests which are also ecologically important. Hence, distribution of this 7.5% among states should be based on multiple values from forests and not just forest cover under MDF and VDF.

### Pollution abatement & Indo-Gangetic states cost disability

Actions decreasing air pollution, water pollution and improving waste management practices are to be considered on high priority. There should be appropriate support for high priority areas and incentive for positive actions, without creating any perverse incentives (for polluters). Hence, a performance linked pollution abatement grant is proposed.

The formula developed for air pollution grant has a special case, wherein higher weightage is given to states in the Indo-Gangetic Plain (IGP). This is based on the reasoning that ambient air quality in states falling within the Indo-Gangetic air shed suffer an inherent disadvantage due to their geographical location and phenomenon of re-entrainment of road/desert dust.

Winter months in the IGP are characterised by weak ambient wind flow and temperature inversions. While weak ambient wind flow prevents the dissipation of pollutant emissions, temperature inversion tends to trap pollution, thereby increasing the pollutant concentrations.

A study by IIT Delhi analysing wind flow conditions, ambient air quality and emission for two mega-cities (Delhi and Mumbai) found a positive correlation between stagnant wind conditions and ambient levels of pollutants.[22] It showed that climatic conditions of Delhi favour high atmospheric pollution potential. Further, this study demonstrated that higher pollution potential for an urban airshed could lead to poorer air quality even with lower emissions (Delhi) in comparison to a city with lower pollution potential and higher emissions (Mumbai).

The IGP is essentially landlocked. According to Sachchidananda Tripathi, senior scientist at IIT-Kanpur, the Himalayas prevent polluted air from escaping to the north creating the so called "valley effect". Other studies have pointed out that the formation of low pressure troughs across this region causes winds to converge, resulting in trapping of local and trans-boundary pollution.

Summer months have winds sweeping in from the south India and through the Himalayas to converge in the IGP. This carries with it polluted air from south and central India as well as from Nepal and other polluted areas in the North. During the winter months, winds from the west and north-east converge in the IGP coupled with stagnation and temperature inversion leads to accumulation of pollutants.

The Indus-Ganga belt is the world's largest stretch of uninterrupted alluvium deposits. As fertile as alluvium is, it is composed of loose unconsolidated particles. Thus, dry alluvial soil significantly contributes to the phenomenon of re-entrainment of dust.

The very few source apportionment studies that have been carried out for the cities situated in the Indo-Gangetic basin point out that the relative proportion of dust exceeds the contribution from anthropogenic sources. It would be worthwhile to note how the relative contribution of dust changes with seasonal variation. The IIT-Kanpur source apportionment study for Delhi reveals that while dust accounts for 40 per cent of total PM10 in summer, it accounts for only 13 per cent in winter.[23] Widespread dust events are a common phenomenon in the northern part of the country during summers. There is no denying the fact that wind–blown dust contributes significantly to the pollution problem, but this should not divert our attention and efforts from devising solutions to curb anthropogenic emissions.

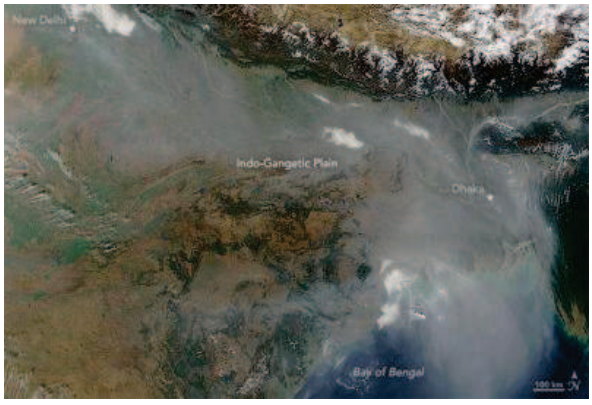



*Figure 11: Satellite image from January 2016 shows haze over the Indo-Gangetic Plain (source: NASA)*

[22] Mohan, M. & Bhati, S. (2012) Wind Flow Conditions as an Indicator to Assimilative Capacities of Urban Airsheds towards Atmospheric Pollution Potential. Civil & Environmental Engineering, pp.1–6.

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## Resources for states' contributions to achieving commitments

As mentioned earlier, Government of India has several international and domestic commitments addressing its environmental challenges. These commitments cannot be met without the support and action by the state governments. However, following through on these commitments will require significant financial resources and prioritisation. States need to be incentivised and supported towards achieving these commitments.

Economic Survey of India (2015-16) suggests that at least USD 2.5 trillion at 2014-15 prices will be required for meeting India's climate change action under NDC between now and 2030. The cost of reclaiming degraded land in India has been estimated at INR 2.94 Lakh Crore.[24] Upgrading to Green Public Transport in India would need INR 4 Lakh Crores (CSTEP, 2016). India's NBAP needs 1.1 Lakh Crores (BIOFIN, 2018). As per CPCB, deploying STPs across the country needs INR 2.8 Lakh Crore. Conservative cost of restoring degraded forests in India is INR 68,000 Crores. It is widely agreed that current resources are not sufficient to achieve these commitments. As per current trends we will underachieve our NDC Goal 5 target by 1.1 billion tonnes of $CO_2$.

Keeping the above in mind, conditional grants-in-aid directed towards helping states contribute towards achieving these commitments have been proposed.

[24] TERI (2018) Economics of Desertification, Land Degradation and Drought in India Vol I: Macroeconomic assessment of the costs of land degradation in India


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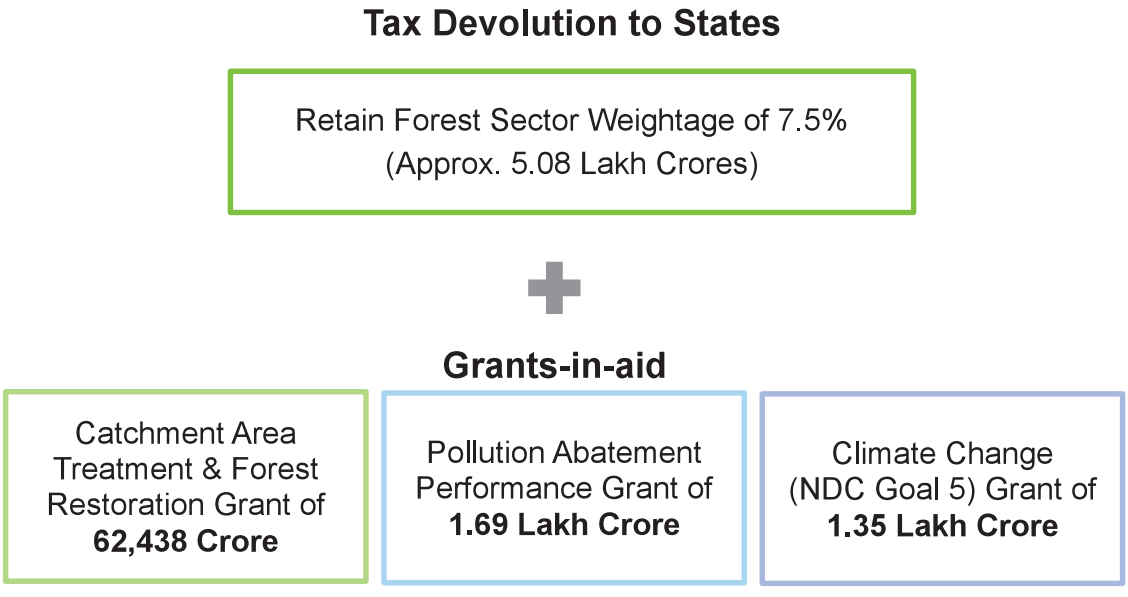
Marine Drive Mumbai

## Chapter V: Recommendations for Devolution & Grants-in-Aid

The following sections detail the proposed formulae for each of the three Grants-in-aid proposed to the 15th Finance Commission post series of consultations as documented in Annexure 3.

- Recorded forest areas which includes grasslands, mangroves and wetlands present within forest boundaries but not represented by a density centered forest cover approach
- Areas designated as protected areas which reflects action by states to conserve important ecosystems
- State's budgetary allocation of forestry in proportion to State budget




### Proposed formula for Forest Sector based Tax Devolution

It is proposed to **retain the existing allocation of 7.5% weightage** in the devolution of Sharable Central Taxes to States based on forest sector. The projected devolution over 5 years (2020-2024) is 5.08 lakh crore.[25]

However, distribution of this 7.5% among states will be based on multiple values from forests and not just area under dense forest (MDF and VDF). Internalizing these concerns, it is proposed that apart from the existing area under dense forest, the distribution will also be based on:

All proposed indicators are published biennially by Forest Survey of India in the India State of Forest Report, except budgetary allocation available annually.

The weights given to each of the four indicators vary with area under MDF and VDF still being the most important carrying 50% weightage. The indicators and their respective weights can be seen in 7

*Table 5 Forest sector based devolution: Indicators*

| Indicator | Weightage | Code |
|---|---|---|
| Total Moderate & Very Dense Forest in the State (Source: FSI) | 50% | FDi |

[25] Based on the revised projection in union budget 2017-18 and expected growth in tax collection as 14.4%, projected shareable Central taxes to the States for 2017-18 is INR 7,88,093 crores

| | | |
|---|---|---|
| Total Recorded Forest Area in State (Source: FSI) | 30% | RFi |
| State's score based on percentage of geographical area of a state under protected area network (Source: FSI) | 10% | PARFi |
| State's score based on planned budgetary allocation to forestry in proportion to total State budget (Source: State budgets) | 10% | BAi |

The proportion for each state will be determined based on the following formula:

Share of State =

$$\left[0.5\left(\frac{FDi}{\sum FDi}\right) + 0.3\left(\frac{RFi}{\sum RFi}\right) + 0.1\left(\frac{PARFi}{\sum PARFi}\right) + 0.1\left(\frac{BAi}{\sum BAi}\right)\right] * 100$$

## Proposed Pollution Abatement Performance Grant

A Performance Grant of 1.69 Lakh Crores (approx. 2.5% of pool) is proposed for incentivising actions on pollution abatement. The grant will be earmarked for expenditure on actions for pollution abatement and setting up the required pollution related infrastructure.

To develop uniform monitoring of air and water pollution across states, a minimum pollution monitoring infrastructure has been suggested in consultation with the Central Pollution Control Board (CPCB). The grant is untied for the first two years of the 5 year 15th Finance Commission period (except in case of air pollution grant where 75% is untied for the second year and 25% is performance based) and thereafter based on the state's performance across all the three indicators 1.01 Lakh Crores of the grant would be distributed over the next 3 years based on improvement in performance across concentration particulate matter (PM10), waste management and pollution stretches across major rivers for water quality. Disbursement of the grant to be coordinated and monitored by MoEFCC on the basis of the below 3 indicators (Table 6) and formula.

*Table 6 Pollution abatement performance grant - Indicators*

| Indicator | Weightage | Code |
|---|---|---|
| State's Score on Improvement of Particulate Matter (PM10) Performance (Source: CPCB) | 40% | PM10i |
| State's Score on Improvement of Waste Management Performance (Source: Swachh Survekshan) | 40% | WMPi |
| State's Score on Improvement of Water Quality of River Stretches (Source: CPCB) | 20% | WQMi |

The proportion for each state will be determined based on the following formula:

Share of State =

$$\left[0.40\left(\frac{PM10i}{\sum PM10i}\right) + 0.40\left(\frac{WMPi}{\sum WMPi}\right) + 0.20\left(\frac{WQMi}{\sum WQMi}\right)\right] * 100$$

The State-wise Air Quality Performance scores will be adjusted such that 60% weightage is split between the Indo-Gangetic States (Punjab, Haryana, Uttar Pradesh, Uttarakhand, Bihar, West Bengal and Rajasthan) and 40% weightage between the rest. This adjustment is done keeping in the cost disability faced by these states given their geographical location and the phenomenon of re-entrainment of road/desert dust.

MoEFCC, through the CPCB, will be the nodal agency for the annual analysis. The grant would be used for pollution abatement measures, such as:

- Air pollution control equipment
- MSW collection and transport
- Sanitary landfills
- Material processing and recovery facilities
- Waste to energy facilities
- Sewage Treatment Plants
- Industrial emissions
- Transition to EV including the procurement of the electric buses and building related infrastructure
- Measures to control agricultural residue burning
- IEC and behavioural change

## Proposed Climate Change (NDC Goal 5) Grant

Exposure to climate change is serious threat to the development and progress of states. It affects each state differently based on physiographical conditions and vulnerability across sectors. Such exposure imposes fiscal disability on states in terms of loss and damage due to climate change as well as cost of adaptation.

A Climate Change Grant of 1.35 Lakh Crore (approx. 2% of pool) is proposed to support states adapt to climate change as well as incentivize mitigation actions, particularly through increase in Trees outside Forest (TOF). Distribution of this grant would be based on indicators shown in Table 7.

*Table 7 Climate Change (NDC Goal 5) Grant - Indicators*

| Indicator | Weightage | Code |
|---|---|---|
| Total Degraded Land in State (Source: ISRO) | 40% | DAi |
| State's score based on Net Annual Ground Water Availability Per Unit of Area (Source: CGWB) | 40% | GWAi |
| Per-capita income distance from the highest per-capita income | 20% | YDi |

The proportion for each state will be determined based on the following formula:

Share of State =

$$\left[0.4\left(\frac{DAi}{\sum DAi}\right)+0.4\left(\frac{GWAi}{\sum GWAi}\right)+0.2\left(\frac{YDi}{\sum YDi}\right)\right]*100$$

The grant will be untied for the first two years. From the third year onwards, the grant will be contingent on the States removing important farm forestry species from the restricted list and the share of grant allocated will be based on the increase in Trees outside Forest (TOF). This is to incentivize climate change mitigation actions by states. Enhancing TOF will play a critical role in achieving India's NDC Goal 5 'to create an additional carbon sink of 2.5 to 3 billion tonnes of CO2eq through additional forest and tree cover by 2030'.

Change in TOF growing stock will be assessed based on FSI's India State of Forest Reports.

*Table 8 Proportion of Climate Change Grant released based on TOF*

| Change in TOF growing stock (million cum) | | Proportion of state's share in grant released |
|---|---|---|
| Increase | >10% | 100% |
| | 7-10% | 90% |
| | 5-7% | 80% |
| | 3-5% | 70% |
| | 0-3% | 60% |
| No change | 0 | 50% |
| Decrease | 0-3% | 40% |
| | 3-5% | 30% |
| | 5-7% | 20% |
| | 7-10% | 10% |
| | >10% | 0% |

This grant would be used for activities such as avenue plantations, agroforestry, plantations along highways, canals, rail tracks, meadows, barren land, pastures, etc. The MoEFCC will monitor states' performance on helping achieve NDC targets and encourage positive climate actions such as climate tagging of state budgets.

### Proposed Catchment Area Treatment & Forest Restoration Grant

A Forest Restoration Grant of 62,438 Crore is proposed to support states enhance catchment area forest cover and forest density. While the Climate Change (NDC Goal 5) grant is directed towards enhancing carbon sinks outside forest areas, this grant will also support mitigation actions towards NDC Goal 5 (create additional carbon sink of 2.5-3 billion $tCO_2$) within the forest areas. This grant seeks to increase in forest cover in the catchment areas of major rivers across the country in a bid to enhance carbon stocks, biodiversity, while reducing soil runoff, flooding and augmenting water resource.

The grant is distributed across states based on the following indicator:

*Table 9 Catchment Area Treatment & Forest Restoration - Indicators*

| Indicator | Code |
|---|---|
| Forest cover in catchment area above 10 degree slope | CAT$i$ |

The grant is untied in the first year and linked to increase in the states planned budgetary allocation of forestry in proportion to total State budget from the second year onwards (Table 10).This is to discourage the practice of state governments pruning the state budget for forestry on the basis of central budgets/grant.

The proportion for each state will be determined based on the following formula:

Share of State =

$$\left[\left(\frac{CATi}{\sum CATi}\right)\right] * 100$$

*Table 10 Proportion of Catchment Area Treatment & Forest Restoration Grant released based on State's planned budgetary allocation of forestry in proportion to total State budget*

| Change in State's planned budgetary allocation of forestry in proportion to total State budget | | Proportion of state's share in grant released |
|---|---|---|
| Increase | >10% | 100% |
| | 5-10% | 90% |
| | 1-5% | 70% |
| No Change | 0% | 50% |
| Decrease | 1-5% | 30% |
| | 5-10% | 10% |
| | >10% | 0% |

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## Glossary of Technical Terms

**Divisive pool:** The divisible pool is that portion of gross tax revenue which is distributed between the Centre and the States. The divisible pool consists of all taxes, except surcharges and cess levied for specific purpose, net of collection charges.

**Environmental Fiscal Reform:** A range of taxation or pricing instruments that can raise revenue, while simultaneously furthering environmental goals. This is achieved by providing economic incentives to correct market failure in the management of natural resources and the control of pollution (World Bank)

**Fiscal capacity/Income distance:** The income distance criterion was first used by Twelfth FC, measured by per capita GSDP as a proxy for the distance between states in tax capacity.

**Fiscal discipline:** Fiscal discipline as a criterion for tax devolution was used by Eleventh and Twelfth FC to provide an incentive to states managing their finances prudently.

**Grants-in-aid:** Horizontal imbalances are addressed by the Finance Commission through the system of tax devolution and grant in- aid, the former instrument used more predominantly. Under Article 275 of the constitution, Finance Commissions are mandated to recommend the principles as well as the quantum of grants to those States which are in need of assistance and that different sums may be fixed for different States. Thus one of the pre-requisites for grants is the assessment of the needs of the States.

**Lentic Water Bodies:** Freshwater ecosystems are classified into two groups (based on flow) as, lentic and lotic ecosystems. The term Lentic Water bodies is for stationary water bodies or relatively still water bodies. This includes ponds, lakes and wetlands.

**Tax Devolution:** One of the core tasks of a Finance Commission as stipulated in Article 280 (3) (a) of the Constitution is to make recommendations regarding the distribution between the Union and the states of the net proceeds of taxes. This is the most important task of any Finance Commission, as the share of states in the net proceeds of Union taxes is the predominant channel of resource transfer from the Centre to states.

**Trees Outside Forests:** Trees on land not defined as forest and other wooded land. Includes: trees on land that fulfils the requirements of forest and other wooded land except that the area is less than 0.5 ha; trees able to reach a height of at least 5 m at maturity in situ where the stocking level is below 5 percent; trees not able to reach a height of 5 m at maturity in situ where the stocking level is below 20 percent; scattered trees in permanent meadows and pastures; permanent tree crops such as fruit-trees and coconuts; trees in parks and gardens, around buildings and in lines along streets, roads, railways, rivers, streams and canals; trees in shelterbelts of less than 20 m width and 0.5 ha area. Source: FAO (2001)

## List of Acronyms

| | |
|---|---|
| $CO_2$ | – Carbon Dioxide |
| CGWB | – Central Ground Water Board |
| CPCB | – Central Pollution Control Board |
| CBD | – Convention on Biological Diversity |
| DLDD | – Desertification, Land Degradation and Drought. |
| EFR | – Environmental Fiscal Reform |
| EV | – Electric Vehicles |
| GDP | – Gross Domestic Product |
| GNP | – Gross National Product |
| GVA | – Gross Value Added |
| HCVF | – High Conservation Value Forests |
| IGP | – Indo-Gangetic Plain |
| IEC | – Information Education Communication |
| IIFM | – Indian Institute of Forest Management |
| ISRO | – Indian Space Research Institute |
| MoEFCC | – Ministry of Environment Forests and Climate Change |
| FC | – Finance Commission |
| MDF | – Moderately Dense Forest |
| NDC | – Nationally Determined Contributions |
| PA | – Protected Areas |
| PM10 | – Particulate Matter of size 10 micron |
| SDG | – Sustainable Development Goal |
| TOF | – Trees outside Forests |
| ToR | – Terms of Reference |
| UNFCCC | – United Nations Framework Convention for Climate Change |
| VDF | – Very Dense Forests |

# Annexure 1

## Indicator meta-tables

### Indicators for Forest Sector based Tax Devolution

| | |
|---|---|
| **Indicator Code** | FDi |
| **Indicator** | Total Moderate & Very Dense Forest in the State |
| **Indicator weightage** | 50 % |
| **Formula** | ((State's VDF + MDF forest cover)/India's Total Recorded Forest Area in State)*100 |
| **What It Measures** | Extent of dense forest from the total forest area in the state. Doesn't include forest under the category of 'Open Forest (OF)' by assuming it to be degraded forests. |
| **Unit of Measurement** | Percentage (%) |
| **Measurement interval** | Biannually |
| **Data Source** | Forest Survey of India (FSI) |
| **Year of Publication** | Indian State of Forest Reports (IFSR) 2017 |

| | |
|---|---|
| **Indicator Code** | RFi |
| **Indicator** | Total Recorded Forest Area in State |
| **Indicator weightage** | 30% |
| **Formula** | [(State's Recorded Forest Area)/India's Total Recorded Forest Area] * 100 |
| **What It Measures** | Recorded forest area mainly consists of Reserves Forests and Protected Forests which has been notified under the provision of Indian Forest Act, 1927 or its counterpart State Acts. RFA may also include such areas, which have been recorded as forests in the revenue records or have been constituted so under any state Act or local laws. |
| **Unit of Measurement** | Percentage (%) |
| **Measurement interval** | Biannually |
| **Data Source** | Forest Survey of India (FSI) |
| **Year of Publication** | Indian State of Forest Reports (IFSR) 2017 |

| | |
|---|---|
| **Indicator Code** | PARFi |
| **Indicator** | State's score based on percentage of geographical area of a state under protected area network |
| **Indicator weightage** | 10% |
| **Formula** | (State's Protected Area/State's Geographical Area)*100 |
| **What It Measures** | A protected area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values. (IUCN Definition 2008)<br>The values have been classified into 5 score bands based on percentile. |
| **Unit of Measurement** | Percentage (%) |

| | |
|---|---|
| **Measurement interval** | Annually |
| **Data Source** | Wildlife Institute of India (ENVIS) |
| **Year of Publication** | 2017/2018 |

### Indicators for Catchment Area Treatment & Forest Restoration Grant

| | |
|---|---|
| **Indicator Code** | $\boldsymbol{OFi}$ |
| **Indicator** | State's area under open forest |
| **Factor** | $\mathbf{16355}$ Inflation adjusted NAP cost norms for Aided Natural Regeneration 200 *plants/hectare) |
| **Formula** | $\boldsymbol{OFi} * \mathbf{16355}$ |
| **What It Measures** | Area under forest with canopy density in between 10-40 % |
| **Unit of Measurement** | Area |
| **Measurement interval** | Biannually |
| **Data Source** | Forest Survey of India (FSI) |
| **Year of Publication** | Indian State of Forest Reports (IFSR) 2017 |

| | |
|---|---|
| **Indicator Code** | $\boldsymbol{Scrubi}$ |
| **Indicator** | State's area under scrub forest |
| **Factor** | $\mathbf{28684}$ Inflation adjusted NAP cost norms for Artificial Regeneration (1100*plants/hectare) |
| **Formula** | $\boldsymbol{Scrubi}*. \mathbf{28684}$ |
| **What It Measures** | All forest lands with poor tree growth mainly of small stunted trees having canopy density less than 10 %. |
| **Unit of Measurement** | Area |
| **Measurement interval** | Biannually |
| **Data Source** | Forest Survey of India (FSI) |
| **Year of Publication** | Indian State of Forest Reports (IFSR) 2017 |

| | |
|---|---|
| **Indicator Code** | Δ WQM |
| **Indicator** | State's Score on Improvement of Water Quality of River Stretches Score |
| **Weightage** | 35% |
| **Formula** | (State's WQM score/Total of all WQM scores)*100 |
| **What It Measures** | Change in number and volume of polluted river stretches across pollution categories (1-5) |
| **Measurement interval** | Annually |
| **Data Source** | CPCB |
| **Year of Publication** | 2018 |

## Indicators for Pollution Abatement Performance Grant

| | |
|---|---|
| **Indicator Code** | Δ WMI |
| **Indicator** | State's Score on Improvement of Waste Management Performance |
| **Weightage** | 40% |
| **Formula** | (State's WMI score/Total of all WMI scores)*100 |
| **What It Measures** | Based on Swachh Survekshan Index<br>• Part 1: Service Level Progress<br>• Part 2A: Independent Valuation<br>• Part 2B: Direct Observation<br>• Part 3: Citizen Feedback |
| **Unit of Measurement** | Score (Max marks: 4000) |
| **Measurement interval** | Annually |
| **Data Source** | MoHUA |
| **Year of Publication** | 2019 |

| | |
|---|---|
| **Indicator Code** | Δ WMI |
| **Indicator** | State's Score on Improvement of Waste Management Performance |
| **Weightage** | 40% |
| **Formula** | (State's WMI score/Total of all WMI scores)*100 |
| **What It Measures** | Based on Swachh Survekshan Index<br>• Part 1: Service Level Progress<br>• Part 2A: Independent Valuation<br>• Part 2B: Direct Observation<br>• Part 3: Citizen Feedback |
| **Unit of Measurement** | Score (Max marks: 4000) |
| **Measurement interval** | Annually |
| **Data Source** | MoHUA |
| **Year of Publication** | 2019 |

| | |
|---|---|
| **Indicator Code** | Δ PM10 |
| **Indicator** | State's Improvement on Particulate Matter (PM10) Performance |
| **Weightage** | 40% |
| **Formula** | Population Weighted Annual Average Concentration of PM10 in the previous year - Population Weighted Annual Average of Concentration of PM10 in the current year)/ Population Weighted Annual Average Concentration of PM10 in the previous year |
| **What It Measures** | Percentage improvement in population weighted |
| **Measurement interval** | Annually |
| **Data Source** | CPCB |

## Indicators for Climate Change (NDC Goal 5) Grant

| | |
|---|---|
| **Indicator Code** | DAi |
| **Indicator** | Total Degraded Land in State |
| **Weightage** | 40% |
| **Formula** | (Total Degraded Land in State/Total Degraded Land in State)*100 |
| **What It Measures** | Total degraded land = Vegetation degradation + Water erosion + Wind erosion + Salinity + Water logging + Frost Shattering + Mass Movement + Manmade + Barren/Rocky + Settlement |
| **Unit of Measurement** | Percentage (%) |
| **Measurement interval** | 10 years |
| **Data Source** | Page 22-23, Desertification and Land Degradation Atlas of India by Indian Space Research Organisation |
| **Year of Publication** | 2016 (Based on IRS AWiFS data of 2011-13) |

| | |
|---|---|
| **Indicator Code** | GWAi |
| **Indicator** | State's score based on Net Annual Ground Water Availability Per Unit of Area |
| **Weightage** | 40% |
| **Formula** | (State's score based on Net Annual Ground Water Availability Per Unit of Area /Total of all score based on Net Annual Ground Water Availability Per Unit of Area )*100 |
| **What It Measures** | State's Net Annual Ground Water Availability(mcm)/States Area (km2)<br>Net Annual Ground Water Availability= Annual Replenishable Ground Water Resource - Natural Discharge during non-monsoon season<br>Where,<br>Annual Replenishable Ground Water Resource = Recharge During Monsoon Season (Recharge from rainfall + Recharge from other sources) + Recharge During Non-Monsoon Season (Recharge from rainfall + Recharge from other sources). The values have been classified into bands based on percentile. |
| **Unit of Measurement** | Percentage (%) |
| **Measurement** | Annual |
| **Data Source** | Page 45-46, Ground Water Year Book – India 2016-17, CGWB |

## Annexure 2

### Minimum Air Quality Monitoring Norm (CPCB)

| Population (Census 2011) | Min. no. of manual station under NAMP | Min. no. of proposed CAAQMS | Total |
|---|---|---|---|
| 1,00,000-<br><5,00,000 | 1-Background<br>2- Residential /Commercial | 1- Residential | 4 |
| 5,00,000-<br><10,00,000 | 1-Background<br>2- Residential /Commercial | 1- Residential<br>1- Traffic dominant area<br>1- Commercial | 6 |
| 10,00,000-<br><50,00,000 | 1-Background<br>2- Residential /Commercial | 2- Residential<br>1- Traffic dominant area<br>1- Commercial<br>1- Industrial area | 8 |
| ≥50,00,000 | 1-Background in upwind direction<br>1-Background in downwind direction<br>2- Residential /Commercial | 4- Residential<br>3- Traffic dominant area<br>3- Commercial<br>2- Industrial area | 16 |

### Minimum Water Quality Monitoring Norm (CPCB)

**Rivers:** Baseline & impact monitoring stations considering the total river-line length in the state and habitations along

**Ground water:** At least 2 locations in each district of the state

Locations on **sub tributaries** of major rivers, other perennial rivers, medium and minor rivers.

1 or 2 locations on each **Lentic water bodies** (Lakes, Tanks, Ponds)

**Inland Coastal waters** i.e. crecks, estuaries, beaches, sea water, coastal rivers etc.

River locations **downstream of towns and Urban agglomerations** (U.A) having population of 10,000 and more

# Annexure 3: Ministerial & Regional Consultations

## Ministerial and First Regional Consultation Workshop

**Ministerial and First Regional Consultation Workshop**

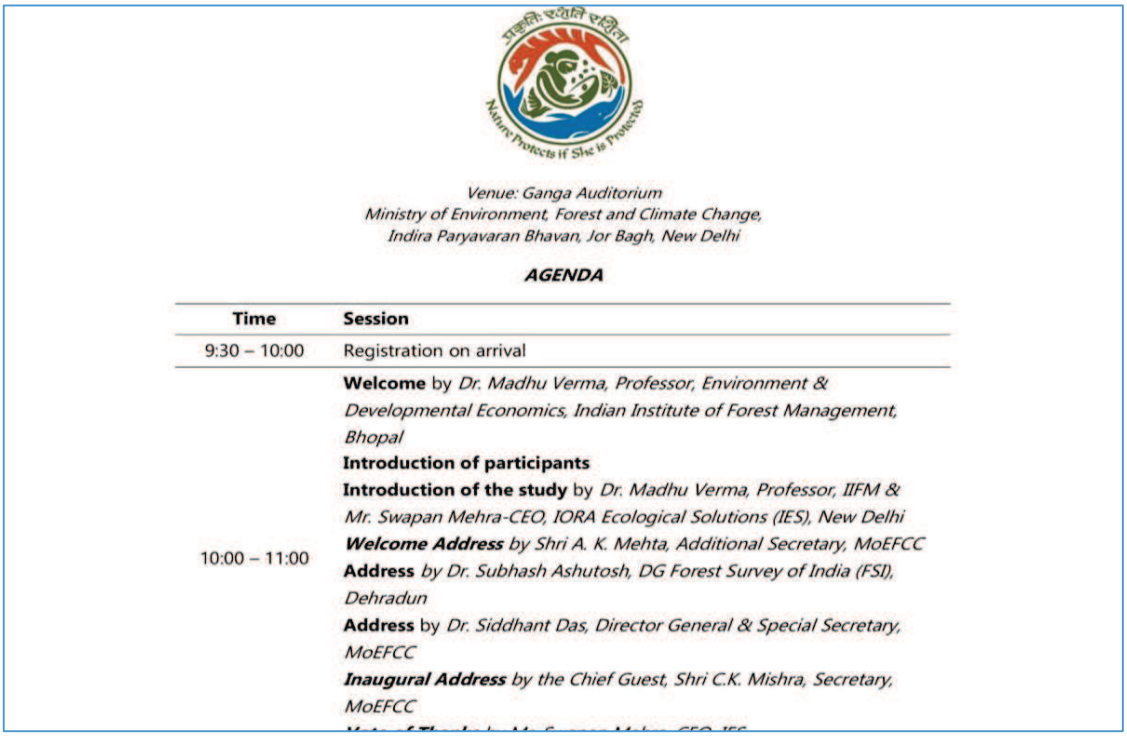
***"Recommendations to 15th Finance Commission (FC) of India for Enriching Current Tax Devolution Formula for Increased Allocations of Funds towards Forest, Environment & Climate Change" supported by MoEFCC***

**19th December, 2019**

*Venue: Ganga Auditorium*
*Ministry of Environment, Forest and Climate Change,*
*Indira Paryavaran Bhavan, Jor Bagh, New Delhi*

***AGENDA***

| Time | Session |
|---|---|
| 9:30 – 10:00 | Registration on arrival |
| 10:00 – 11:00 | **Welcome** by *Dr. Madhu Verma, Professor, Environment & Developmental Economics, Indian Institute of Forest Management, Bhopal*<br>**Introduction of participants**<br>**Introduction of the study** by *Dr. Madhu Verma, Professor, IIFM &* *Mr. Swapan Mehra-CEO, IORA Ecological Solutions (IES), New Delhi*<br>***Welcome Address*** *by Shri A. K. Mehta, Additional Secretary, MoEFCC*<br>**Address** *by Dr. Subhash Ashutosh, DG Forest Survey of India (FSI), Dehradun*<br>**Address** by *Dr. Siddhant Das, Director General & Special Secretary, MoEFCC*<br>***Inaugural Address*** *by the Chief Guest, Shri C.K. Mishra, Secretary, MoEFCC*<br>***Vote of Thanks*** *by Mr. Swapan Mehra, CEO, IES* |
| 11:00-11:30 | **Health Break** |
| 11:30-11:50 | **Consideration for Recommendations to 15th Finance Commission-views of the expert :** Chair –Shri A.K. Mehta, *Additional Secretary, MoEFCC*<br>**Dr. Amitabh Kundu -** Dean & Professor, JNU (Retired), Distinguished Fellow-RIS, New Delhi |
| 11:50 – 13:10 | **Suggestions by States on key issues for consideration in Environment, Forest and Climate Change Sector :** Chair –Shri A.K. Mehta, *Additional Secretary, MoEFCC*<br>*Open Discussion* |
| 13:10 – 14:00 | **Lunch** |



*Venue: Ganga Auditorium*
*Ministry of Environment, Forest and Climate Change,*
*Indira Paryavaran Bhavan, Jor Bagh, New Delhi*

***AGENDA***

| Time | Session |
|---|---|
| 9:30 – 10:00 | Registration on arrival |
| 10:00 – 11:00 | **Welcome** by *Dr. Madhu Verma, Professor, Environment & Developmental Economics, Indian Institute of Forest Management, Bhopal*<br>**Introduction of participants**<br>**Introduction of the study** by *Dr. Madhu Verma, Professor, IIFM & Mr. Swapan Mehra-CEO, IORA Ecological Solutions (IES), New Delhi*<br>***Welcome Address*** *by Shri A. K. Mehta, Additional Secretary, MoEFCC*<br>**Address** *by Dr. Subhash Ashutosh, DG Forest Survey of India (FSI), Dehradun*<br>**Address** by *Dr. Siddhant Das, Director General & Special Secretary, MoEFCC*<br>***Inaugural Address*** *by the Chief Guest, Shri C.K. Mishra, Secretary, MoEFCC* |

### 1st Regional Consultation Workshop

The 1st Regional Consultation Workshop was conducted on 19th December, 2018 at the Ministry of Environment, Forest and Climate Change, New Delhi. Arunachal Pradesh, Haryana, Himachal Pradesh, Sikkim and West Bengal participated in the consultations and provided with following key suggestions:

1. West Bengal: Most of the indicators in HCVF are static indicators which would not change much. Other dynamic indicators such as increase in TOF, treatment of TOF area and wildlife conservation.
2. A more detailed note needs to be prepared with all technical details and data sources.
3. Himachal Pradesh PCB: Previously no grant or devolution of taxes has been released to HP PCB. Income of the Board is decreasing every year and function of the Board increasing due to certain laws/judgements of NGT, etc. Water cess income has stopped since implementation of GST.
4. Himachal Pradesh: Retain 7.5% weight which should be based on 4 indicators:
    - 25% - Area classified as forest
    - 25% - Canopy density (dense and moderate)
    - 25% - Protected area network
    - 25% - Loss of revenue for the state from forest, calculated as ((Volume that can be extracted – Actual volume extracted) x weighted average of rates))
5. States preferred sectoral grants over devolution.
6. North eastern (NE) states lack climate and environmental data. So no climate model can be applied as an indicator and be expected to cover NE states.
7. No robust data for environmental and climate change indicators, unlike forest, so include these two as a grant with part of the grant directed towards building monitoring.

8. West Bengal: Take absolute area under forest cover (as per FSI) as indicator and not as a percentage of state's geographical area.

9. Sikkim:
   - Amount of land under forest, not just forest cover should be taken as a priority indicator.
   - Indicators selected should be taken from sources like the State of Forest Reports.
   - Add an indicator which takes into account the amount budgeted by state govt. to forest conservation. Increased budget to forest would result in increased devolution in the long run. However, since the amount to be devolved is decided once before the start of the commission, this won't be dynamic.

**List of Participants**

1. Shri C.K. Mishra, Secretary, MoEF&CC, New Delhi
2. Dr Siddhanta Das, Director General & Special Secretary, MoEF&CC, New Delhi
3. Shri Anil Kumar Jain, Additional Secretary, MoEF&CC, New Delhi
4. Shri Arun Kumar Mehta, Additional Secretary, MoEF&CC, New Delhi
5. Shri Praveen Garg, Additional Secretary & Financial Adviser, MoEF&CC, New Delhi
6. Shri Satish Gargoti, Scientist E, MoEF&CC, New Delhi
7. Shri. Jigmet Takpa – Joint Secretary, MoEFCC. New Delhi
8. Dr.A.C Verma – Commissioner, Govt. of Arunachal Pradesh
9. Dr.Rabindra Kumar – PCCF (Env.&Cc), Govt.Of Arunachal
10. Shri. A.K Shukla – PCCF (ENV & CC), Govt. Of Arunachal Pradesh
11. Dr. Subhash Ashutosh – DG, FSI
12. Dr. A.D Bharadwaj – Deputy Controller, HPPCB
13. Shri S.R.Dongre – Advisor (Finance), Gov. Of Arunachal Pradesh
14. Shri Suneesh Buxy – DG-Rt, MoEFCC
15. Shri Sanjay Pandey – CCA, MoEFCC
16. Shri Rakesh Sood – APCCF (Finance) HP Forest Dept.
17. Smt Geeta Menon – Joint Secretary, MoEFCC, New Delhi
18. Shri Shoyabahmed Kalal – Deputy Director, MoEFCC, New Delhi
19. Shri James Mathew – DDG (Stats), MoEFCC, New Delhi
20. Shri M.S Negi – Adg(Wc), MoEFCC, New Delhi
21. Shri D.K Sinha – Igf(So), MoEFCC, New Delhi
22. Shri Abhay Pant – OSD, Himachal Pradesh
23. Smt. Monalisa Dash – Add. Resident Commissioner, Govt. Of Sikkim
24. Shri Vivek Saxena – CCF, Gurugram, Haryana
25. Shri T.V.N Rao – Addl.PCCF, West Bengal
26. Shri B.B Barman – Advisor, MoEFCC
27. Shri Vivek Vyas – National Consultant, UNCCD
28. Dr. Amitabh Kundu, Subject Expert
29. Dr. Madhu Verma, Study Lead and Professor, IIFM Bhopal
30. Shri Swapan Mehra, CEO, IORA Ecological Solutions, New Delhi
31. Dr. Sumana Bhatacharya, Team Member, IORA Ecological Solutions, New Delhi
32. Dr. Monojit Chakraborty, Team Member, IORA Ecological Solutions, New Delhi
33. Kunal Bharat, Team Member, IORA Ecological Solutions, New Delhi
34. Prabhakar Panda, Team Member, IIFM Bhopal
35. Ms. Tanvi Bongale, Team Member, IORA Ecological Solutions, New Delhi
36. Sumit Anand, Team Member, IIFM Bhopal

## Second Regional Consultation Workshop

### Second Regional Consultation Workshop

***On***

***"Recommendations to 15th Finance Commission (FC) of India for Enriching Current Tax Devolution Formula for Increased Allocations of Funds towards Forest, Environment & Climate Change" supported by MoEFCC***

**17th January, 2019**

***Venue: Medhavi (Room no. 108)***
***Indian Institute of Forest Management, Bhopal***

***AGENDA***

| Time | Session |
|---|---|
| 9:30 – 10:00 | Registration on arrival |
| 10:00 – 10:30 | **Welcome**: *Dr. Madhu Verma, Professor, IIFM & PI 15th FC Study*<br>**Introduction of participants**<br>**Introduction to IIFM & its activities:** Dr Sandeep Tambe, Professor & Chairperson MDP<br>**Address:** *Dr. Pankaj Srivastava, Director IIFM*<br>**Introduction of the study & background:** *Dr. Madhu Verma, Professor, IIFM & PI 15th FC Study*<br>**Inaugural Address:** *Chief Guest, Shri Indu Kumar Pande, Ex- Chief Secretary-Uttarakhand, Advisor-Finance, Government of Uttarakhand*<br>***Vote of Thanks:*** *Mr. Swapan Mehra, CEO, IORA Ecological Solutions & Co-PI 15th FC Study* |
| 10:30 – 11:00 | **Presentation on Proposed Recommendations by the MoEFCC to the 15th Finance Commission of India**: *Dr. Madhu Verma and Mr. Swapan Mehra*<br>***Chair:*** *Shri Indu Kumar Pande, Ex- Chief Secretary-Uttarakhand, Advisor-Finance, Government of Uttarakhand*<br>***Co-Chair:*** *Dr. BMS Rathore, Managing Director-M. P Rajya Van Vikas Nigam Ltd.*<br>*Group Photo* |
| 11:00-11:30 | **Health Break** |

| | |
|---|---|
| 11:30 – 13:00 | **Suggestions by States on key issues for consideration in Environment, Forest and Climate Change Sectors:**<br>***Chair*** *– Mr. Indu Kumar Pande, CS (Retd.), Adviser-Finance, Government of Uttarakhand*<br>***Co-Chair****- Dr. BMS Rathore, Managing Director-M. P Rajya Van Vikas Nigam Ltd.* |
| 13:00 – 14:00 | **Lunch** |
| 14:00-15:00 | **Guided discussion on key issues for consideration in Environment, Forest and Climate Change Sectors:**<br>***Chair*** *– Dr. Suhel Akhtar, Additional Chief Secretary, (Forest & Environment), Government of Manipur*<br>***Co-Chair-*** *Dr. Sanjay Kumar, Principle Chief Conservator of Forest (HoFF) –Government of Jharkhand* |
| 15:00 – 15:30 | **Summary of Discussion***: Dr. Madhu Verma , PI 15th FC Study*<br>**Remarks**: *Mr. Indu Kumar Pande, CS (Retd.), Adviser-Finance, Government of Uttarakhand*<br>**Vote of Thanks***: Mr. Swapan Mehra, Co-PI 15th FC Study* |
| 15:30 – 16:00 | **High Tea** |

Facilitating Study Team Members: Mr. Prabhakar Panda, Mr. Kunal Bharat, Mr. Sumit Anand (IIFM-IORA Research Support Team Members)

### 2nd Regional Consultation Workshop

The 2nd Regional Consultation Workshop was conducted on 17th January, 2019 at the Indian Institute of Forest Management, Bhopal. Jammu & Kashmir, Jharkhand, Odisha, Madhya Pradesh, Maharashtra, Manipur, Rajasthan and Uttarakhand participated in the consultations and provided with following key suggestions:

1. Finance Commission generally follows a mix 3 types of disbursements:
    - Tax devolution (untied & cyclical)
    - Revenue deficit grants (untied)
    - Sectoral grant
2. Recommendations by the FCs is strictly governed by the Terms of Reference for the FCs. The ToR of the 14th FC didn't have any scope for sectoral grants. The ToR of the 15th FC doesn't touch upon this topic so whether or not there would be sectoral grants by the 15th FC remains a grey area. However, the 15th FC ToR does emphasize "measurable performance based incentives"
3. Could include the following into the criteria:
    - Catchment forest as an indicator in the 7.5% devolution
    - Trees outside Forest (ToF) should be included as an indicator in the 7.5% devolution
    - Annual groundwater availability indicator should include spring water source too.
4. Highlighted the cost disability borne by hilly states.
5. Flipside of imposing too many conditions on grant which would be the procedural delays leading to only 40-50% of the grant actually getting disbursed

6. Forestry budget shrinking over the years. Hence, there is a need for sectoral grants and other strong measures.

7. Wise to ask for a combination of sectoral grant and devolution.

8. The reason Forest Departments of various states couldn't benefit under the 14th FC was lack of information and the fact that they were used to receiving forest sector grants under the 12th and 13th FC, due to which they failed to pressurize the state governments for increased budgetary allocations towards forest.

9. Uttarakhand has asked for two grants for:

    - Forest Fire
    - Development of wildlife and buffer to prevent man-animal conflict

10. Under 14th FC various planned schemes have been done away with, which made states like Uttarakhand net losers since what they received from these schemes was approximately 3000 crores and what they received under 14th FC was 500 crores

11. With the abolishment of Water Cess or being subsumed under GST, State Pollution Control Boards have lost an important source revenue

12. Other indicators suggested:

    - Man-animal conflict is a pan India issue which needs tremendous resources.
    - Linear projects (roads & canals) are affecting wildlife movement. NGT has asked states for mitigation measures which require additional resources. There is also strong resistance from NHAI since they don't want to bear the cost of the mitigation measures.
    - Eco-tourism can be an important source of funding for protected areas.
    - Consider changing "% protected area of reserve forest area of state" indicator to "% protected area of geographical area of state"

13. The challenge with selecting indicators for the recommendation lies between granularity vs acceptance.

14. Revise the indicator "State's budgetary allocation of forestry in proportion to State budget" to "State's planned budgetary allocation of forestry in proportion to State budget". This will avoid including CAMPA funds which comes from state budgets too by taking only planned budgetary allocation to forestry sector.

15. Majority of the climate vulnerability studies by states are unreliable and should not be used as source of information or indicators for the proposed recommendations. The possibility of including effect of unsustainable agricultural practices on groundwater should be looked into for the climate change grant

16. Higher weightage to land degradation and less to income distance in the climate change grant

## List of Participants

1. Shri IK Pande-Ex- Chief Secretary, Uttarakhand Adviser Finance Government Of Uttarakhand"
2. Dr Suhel Akhtar- Additional Chief Secretary, (Forest & Environment) Government of Manipur"
3. Shri Anurag Bajpai- Chief Conservator of Forest, (Wildlife) Government of Manipur"
4. Dr A.K. Pathak - Additional PCCF (Plan, Programme & Afforestation)
5. Dr Sanjay Kumar- Principal Chief Conservator of Forests & HoFF, Government of Jharkhand
6. Shri BMS Rathore- Managing Director, - M.P Rajya Van Vikas Nigam Ltd
7. Shri Nitin Kakodkar- Additional Principal Chief Conservator of Forests (BFD), Government of Maharashtra
8. Dr RP Rastogi- Scientist-B, MoEFCC, New Delhi
9. Shri Abdul Ghani Hajam- Chief Conservator of Forests, Central, Government of J&K
10. Shri. J.K Mohanty - Principal Chief Conservator of Forests & HoFF, Government of Madya Pradesh
11. Dr Pankaj Srivastava, Director IIFM Bhopal
12. Dr Madhu Verma, Study Lead and Professor, IIFM Bhopal
13. Shri Swapan Mehra, CEO, IORA Ecological Solutions, New Delhi
14. Shri. Pushkar Singh- APCCF Madhya Pradesh
15. Dr Advait Edgaonkar- Asst Professor IIFM, Bhopal
16. Dr Amitabh Pandey- Asst. Professor IIFM, Bhopal
17. Dr Madhu Raj Jain, Asst Professor IIFM, Bhopal,
18. Mr. Kunal Bharat, Team Member, IORA Ecological Solutions, New Delhi
19. Mr. Prabhakar Panda, Team Member, IIFM Bhopal
20. Mr. Sumit Anand, Team Member, IIFM Bhopal
21. Ms. Charu Tiwari, Team Member, IIFM Bhopal
22. Mr. Zuhail Thatey, Team Member, IIFM Bhopal

## Third Regional Consultation Workshop

### Third Regional Consultation Workshop

***On***

***"Recommendations to 15th Finance Commission (FC) of India for Enriching Current Tax Devolution Formula for Increased Allocations of Funds towards Forest, Environment & Climate Change" supported by MoEFCC***

**30th January, 2019**

***Venue: 8th Floor, Conference Hall, Aranya Bhawan, Karnataka Forest Department***

***AGENDA***

| Time (Hours) | Session |
|---|---|
| 09:30 – 10:00 | Registration on arrival |
| 10:00 – 10:30 Inaugural | **Welcome**: *Dr. Madhu Verma, Professor, IIFM & PI 15th FC Study*<br>**Introduction of participants**<br>**Introduction of the study & background:** *Dr. Madhu Verma, Professor, IIFM & PI 15th FC Study*<br>**Inaugural Address:** *Chief Guest, Shri Punati Sridhar, Principal Chief Conservator of Forests (HoFF), Karnataka* |
| 10:30 – 11:00 **Technical Session I** | **Presentation on Proposed Recommendations by the MoEFCC to the 15th Finance Commission of India**: *Dr. Madhu Verma and Mr. Swapan Mehra*<br>***Chair:*** *Shri Punati Sridhar, Principal Chief Conservator of Forests (HoFF), Karnataka*<br>***Co-Chair:*** *Shri G. Anantha Ramu, Principal Secretary (EFS & D Department), Andhra Pradesh* |
| 11:00-11:30 | ***Group Photo***<br>**Health Break** |

| | |
|---|---|
| 11:30 – 13:00<br>**Technical Session II** | **Suggestions by States on key issues for consideration in Environment, Forest and Climate Change Sectors:**<br>***Chair*** *– Shri Prashant Kumar Jha, Principal Chief Conservator of Forests (HoFF), Telangana*<br>***Co-Chair****- Sri. B. Kalyan Chakravarthy, IAS, Director General, EPTRI* |
| 13:00 – 14:00 | **Lunch** |
| 14:00-15:30<br>**Technical Session III** | **Guided discussion on key issues for consideration in Environment, Forest and Climate Change Sectors:**<br>***Chair*** *– Shri Mudit Kumar Singh, Principal Chief Conservator of Forests (HoFF), Chhattisgarh Forest Department,* |
| 15.30 – 16:00<br>**Valedictory** | **Summary of Discussion:** *Dr. Madhu Verma , PI 15th FC Study*<br>**Remarks**: *Shri Punati Sridhar, Principal Chief Conservator of Forests (HoFF). Karnataka*<br>**Vote of Thanks:** *Mr. Swapan Mehra, Co-PI 15th FC Study* |
| 16:00 – 16.30 | **High Tea** |

Facilitators : Mr. Prabhakar Panda, Mr. Kunal Bharat, Mr. Sumit Anand (IIFM-IORA Research Support Team Members)

### 3rd Regional Consultation Workshop

The 3rd Regional Consultation Workshop was conducted on 30th January, 2019 at Aranya Bhavan, Bangalore. Karnataka, Andhra Pradesh, Telangana, Chhattisgarh, Tamil Nadu, Mizoram, Andaman & Nicobar Islands and MoEFCC Regional Office authorities participated in the consultations and provided with following key suggestions:

1. Reliability of figures from quoted studies needs to be checked.
2. State govt. will always give preference to devolution over sectoral grants.
3. However, Forest Depts budgets shrinking. Karnataka FD gets 0.75% of the state budget.
4. Central govt. must regulate flow of funds to the forest and environment sector through grants.
5. Unless we have dedicated grants for specific issues, they cannot be addressed.
6. 14 FC met has been able to meet its intended goal since the 7.5% was given in lieu of opportunity cost lost and not meant just for forest sector.
7. Extent of rain fed agriculture should be considered. Or instead of GW take rain fed agriculture.

8. Grants should be a **non-lapsable pool**, utilised only for the sector even after FC period and not be re-appropriated to other sectors if not utilised.
9. The entire 7.5% devolution should not be depicted as compensation for opportunity cost but instead part should also be for investment in maintenance and enhancements.
10. Balance of the two principles 1) Opportunity cost and 2) Maintenance and restoration cost.
11. Development of human and physical infrastructure and Biodiversity needs to find mention in 7.5%
12. Focus should be to address degraded forest areas since it is a growing nation-wide problem.
13. For some states, reason for grant is to look for funds to address forest degradation so VDF and MDF are not the best indicators.
14. Region specific formulas could be looked at (cluster based approach)
15. Retain protected areas and forestry budget allocations as indicators.
16. States with PAs and good forest cover need to be given priority.
17. States need to be provided resources for meeting India's NDC targets (Goal 5).
18. Formula should be "Simple and intuitive"
19. Recorded Forest Area should be taken as an indicator as retaining forest area should be a priority. Forest growth can only occur if area remains.
20. Small islands grant could be argued for.
21. Green bonus as additional compensation for retaining forest cover.
22. Degraded forest and degraded and should be distinguished to avoid overlap between forest based devolution and climate change grant.
23. Grant or incentive for food waste.
24. Nomenclature:
    - "Degraded Area" to "Degraded Land"
    - "Climate change adaptation grant for forest, agriculture and water sectors"

### List of Participants

1. Shri Punati Sridhar -PCCF & HoFF, Karnataka Forest Department
2. Shri B. Kalyan Chakravarthy-IAS, Director General, EPTRI Hyderabad
3. Shri Mudit Kr. Singh -PCCF & HoFF, Chhattisgarh Forest Department
4. Shri M. Prudhvi Raju -PCCF (Products), Telangana Forest Department
5. Dr. K. Kire -APCCF, EF&CC Department, Government of Mizoram
6. Smt. P. Rajeshwari -APCCF (P&B), Tamil Nadu Forest Department
7. Dr. Avinash M. Kanfade -MoEF&CC, Regional Office Bangalore
8. Shri Brijesh Kumar Dikshit- APCCF (Projects), Karnataka Forest Department
9. Shri Ajay Misra -APCCF (Development), Karnataka Forest Department
10. Shri Rajiv Ranjan -APCCF (P&R), Karnataka Forest Department

11. Smt. Anita S. Arekal -APCCF (Social forestry), Karnataka Forest Department
12. Shri Puneeth Pathak APCCF (EWPRT), Karnataka Forest Department
13. Shri Jagmohan Sharma APCCF (Forest Conservation), Karnataka Forest Department
14. Smt. Seema Garg APCCF (Vigilance), Karnataka Forest Department
15. Shri R. K. Srivastava APCCF (NAP & Bamboo Mission), Karnataka Forest Department
16. Shri H. Hanumathaiah Consultant (Finance), Karnataka Forest Department
17. Shri S.H.K Murti ACF, Department of Environment & Forest,Govt. of Andaman & Nicobar Islands
18. Shri Nishant Pandey Research Officer, Finance Department, Government of Chhattisgarh
19. Dr. Rajesh Prasad Rastogi Scientist-B, Ministry of Environment, Forest and Climate Change
20. Dr. Madhu Verma, Study Lead and Professor, IIFM Bhopal
21. Shri Swapan Mehra, CEO, IORA Ecological Solutions, New Delhi
22. Mr. Kunal Bharat, Team Member, IORA Ecological Solutions, New Delhi
23. Mr. Prabhakar Panda, Team Member, IIFM Bhopal
24. Mr. Sumit Anand, Team Member, IIFM Bhopal

### Expert Consultation Meeting Summary

Following points were made by the three experts in the consultation meeting.

1. Wherever we are proposing grant, prove:
   - There is no existing centrally sponsored scheme addressing the same issues in the sector
   - Advantage of addressing issue through a grant from 15FC rather than creating a new centrally sponsored schemes.
2. In forestry sector allocation indicators, budgetary allocation should not be included.
3. There was general agreement on the indicators part of the climate change grant except income distance which should not be included
   - Agreed with conditionality of TOF but it should be supported with research showing impact of increase in TOF on land degradation and groundwater.
   - Instead of Income distance "per capita consumption of consumer - durables could be used.
4. Alternatively, it was suggested to link climate change with disaster grant based on state vulnerability index.
5. Proposed pollution abatement grant has some have unresolved issues
   - Interstate externalities
   - Spill over
   - Existing CSS schemes with similar objectives e.g. Swach Bharat Abhiyan, Clean Ganga
   - Setting up uniform monitoring infrastructure among states

### List of Participants

1. Dr Amitabh Kundu, Subject Expert
2. Dr M. Govind Rao, Subject Expert
3. Dr Rathin Roy, Subject Expert
4. Dr. Madhu Verma, Study Lead and Professor IIFM, Bhopal
5. Dr R.P Rastogi, Scientist B MoEFCC, New Delhi
6. Mr. Kunal Bharat, Team Member, IORA Ecological Solutions, New Delhi
7. Mr. Prabhakar Panda, Team Member, IIFM Bhopal

8. Mr. Sumit Anand, Team Member, IIFM Bhopal
9. Ms. Tanvi Bongale, Team Member, IORA Ecological Solutions, New Delhi
10. Dr. Monojit Chakraborty, Team Member, IORA Ecological Solutions, New Delhi

## Lead Authors

**Dr.(Mrs) Madhu Verma**

A Biological Science graduate with Masters, MPhil and PhD in Economics, Madhu works as a Professor of Environment and Developmental Economics and Coordinator for the Centre for Ecological Services Management, Indian Institute of Forest Management, Bhopal, India. She has been a Visiting Professor at the University of Massachusetts, Amherst and a Visiting Scholar at the University of California, Berkeley, USA (2001) and a Lead International Fellow (2007) and a Fulbright Fellow (2012) at the Institute of Sustainable Solutions, Portland State University, USA. She mainly does action and policy research in the areas of valuation and environmental modelling of forest, wetland and agro-ecological ecosystems and biodiversity; green accounting; PES, livelihoods economics; conservation finance. In her career of 34 years she has worked with various Ministries and Commissions of the Government of India and several national and international funding and research organizations. She has been Chapter Co-author in Millennium Ecosystem Assessment (MA) and The Economics of Ecosystems and Biodiversity (TEEB) studies and now Expert Group member and a Lead Author in Chapters for the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). She has several publications to her credit and her many research recommendations have been internalized in the decision-making process of the government and helped in creation of conservation instruments.

**Mr. Swapan Mehra**

Mr. Swapan Mehra is an environmental finance and policy expert, proficient in designing and implementing projects and policy interventions in forestry, biodiversity conservation, and climate change mitigation and adaptation. After completing an Advanced Diploma in Forest Management from the Indian Institute of Forest Management (IIFM), Bhopal, he worked with some of the largest carbon finance firms in the world.

In 2009, he set up IORA, an environmental policy advisory group that provides implementable solutions in the areas of carbon finance, forestry and biodiversity conservation and new market mechanisms for emission reduction. He has co-authored India's National REDD+ Strategy and also led the development of REDD+ pilots in 5 Indian states. He was involved in the development of REDD+ MRV systems in India as part of USAID India's Forest PLUS Programme.

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| | Over the years, he has won many awards and fellowships including FICCI Young Business Leader, LEAD International Fellow in 2011 and Donella Meadows Fellowship by the Balaton Group. |
|  | **Dr. Subhash Ashutosh**<br><br>Dr. Subhash Ashutosh belongs to 1986 batch of Indian Forest Service in Assam-Meghalaya cadre. Served in Government of Meghalaya in different capacities in the Forest Department and held the position of PCCF till recently. He specializes in the field of Remote sensing and GIS applications in forest management in the last 20 years and has served two deputation tenures at Forest Survey of India (FSI) as Deputy Director and Joint Director. He also served as Professor in IGNFA, Dehradun for three years.<br><br>He was the principal investigator of the National Natural Resource Management System (NNRMS) project 'Forest Type Mapping of India'. The project resulted in the first ever nation-wide mapping of forest types of India according to the Champion & Seth classification (1968) depicting 178 forest types on 1:50,000 scale also prepared Atlas showing state wise forest types of India. He authored about 28 papers including few publications in the international journals. He also authored one book titled 'Scientific Grouping of Forest Types of India' and widely travelled to different countries for presenting papers and attending meetings. |
| **Contributing Authors** | |
|  | **Mr. Ashwin A S** is an expert in the field of forestry and climate change with an in-depth understanding and practical experience in technical evaluation, development and implementation of projects on Forestry and Climate Change. He is a Master of Science in Forestry (Management and Economics) from Forest Research Institute, Dehradun (an institute under the Ministry of Environment and Forest, Government of India) and is a qualified QMS (ISO 9001:2008) internal auditor and EMS (ISO 14001:2004) lead auditor. He is a member of the Afforestation/Reforestation Working Group at UNFCCC and is also a panel member of the Climate Smart Agriculture program under the Gold Standard and is an External Expert for forestry sector of TUV NORD. |
|  | **Mr. Kunal Bharat** is an interdisciplinary researcher working at the intersection of environmental economics, spatial data science and systems modelling for natural resource management and climate change mitigation and adaptation since 2014. His expertise lies in using data-driven tools such as scientific modelling, geospatial analysis and environmental finance instruments for biodiversity and ecosystem conservation. He is a graduate in Economics from St. Xavier's college and a Post Graduate in Environmental Studies and Natural Resource Management from TERI University, New Delhi. He was also awarded a DAAD (German Academic Exchange Service) scholarship for his Master's thesis. |

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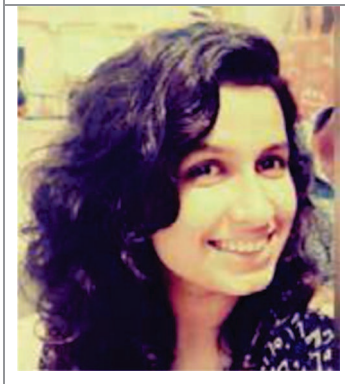
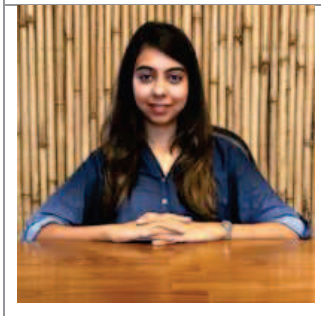
|---|---|
|  | **Mr. Prabhakar Panda** is currently working as Special Project Associate at the Centre for Ecological Services Management (CESM), IIFM Bhopal. He has more than 4 years of research and consultancy experience in the environment domain with major focus on Natural Resource Management. and Accounting, Forest Certification, Environmental Impact Assessment, Urban- Waste Water and Solid Waste Management. Prabhakar has a Bachelor's degree in Environmental Engineering and Postgraduate Diploma in Forestry Management from IIFM. |
|  | **Mr. Sumit Anand** is working as Project Associate at the Centre for Ecological Services Management (CESM), IIFM, Bhopal, which acts as an interdisciplinary centre to address crucial policy issues on ecosystem management. He has Post-Graduate in Geoinformatics from TERI SAS. He has worked on several multi-lateral projects dealing with landscape restoration, ecosystem services and livelihoods and water resource management at IIFM, WRI and IWMI. His research interests and publications include remote sensing and GIS application in water resources, valuation of ecosystem services, wetland degradation and biodiversity conservation. |
|  | **Ms. Charu Tiwari** is an Environment Management professional having three years of experience working in Protected Areas, Ecological Economics, Natural Resource Accounting, Green GDP, Policy Analysis and Advocacy, Ecosystem Conservation and Payment for Ecosystem Services. She is working as Special Project Associate at the Centre for Ecological Services Management (CESM), Indian Institute of Forest Management (IIFM), Bhopal, since 2016. She completed Post Graduate Diploma in Forestry Management (PGDFM) in the class of 2014-16 with specialization in Environment Management module from Indian Institute of Forest Management (IIFM). Area of interest include Natural Resource Management, Protected Areas Ecology, Climate Change, Ecosystem Services and Ecological Economics, Environment Policy, Urban Ecology and Sustainable Development Goals (SDGs). |
|  | **Ms. Sonia Cyrus Patel**, a London School of Economics (LSE) postgraduate in Environmental Economics and Climate Change has over 3 years of work experience across the not for profit and private sector. Her areas of work interest include climate change mitigation and adaptation, natural capital valuation, and business sustainability. As a key team member of IORA's Climate Change portfolio she has worked on both climate change adaptation and mitigation policy projects spanning across different sectors and governance levels sponsored by bilateral/multilateral bodies, Government of India, State Government Departments and Public Sector Undertakings (PSUs). |

## About the Organizations

### MoEFCC (Ministry of Environment, Forest and Climate Change, New Delhi)

The Ministry of Environment, Forest and Climate Change (MoEFCC) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programs.

The primary concerns of the Ministry are implementation of policies and programs relating to conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programs, the Ministry is guided by the principle of sustainable development and enhancement of human well-being.

The Ministry also serves as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), and International Centre for Integrated Mountain Development (ICIMOD) and for the follow-up of the United Nations Conference on Environment and Development (UNCED). The Ministry is also entrusted with issues relating to multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and of regional bodies like Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Co-operation (SAARC) on matters pertaining to the environment.

### IIFM (Indian Institute of Forest Management, Bhopal)

Centre for Ecological Services Management (CESM) at Indian Institute of Forest Management IIFM

Established in 1982, the Indian Institute of Forest Management is a sectoral management institute, which constantly endeavours to evolve knowledge useful for the managers in the area of Forest, Environment and Natural Resources Management and allied sectors. It disseminates such knowledge in ways that promote its application by individuals and organizations. The mandate of IIFM is appropriately reflected in its mission statement, "to Provide Leadership in Professional Forestry Management Aimed at Environmental Conservation and Sustainable Development of Ecosystems."

IIFM is a registered society under the Societies Registration Act at Bhopal. The Hon'ble Minister for Forests and Environment, Government of India is the President of the Society. The members of the society consist of State Forest Departments, State Forest Development Corporations, Ministries of Human Resource Development, Finance, Forest and Environment, Rural Development at the centre, and Forest-based Industries. The mandate of IIFM is appropriately reflected in its mission statement: "To Provide Leadership in Professional Forestry Management Aimed at Environmental Conservation and Sustainable Development of Ecosystems". The Institute prides itself in having a multi-disciplinary faculty which is a mix of academicians and practising forest officers in the following nine faculty areas:

- Communication and Extension Management
- Ecosystem and Environment Management
- Environment and Developmental Economics
- Financial Management
- Human Resource Management
- Information Technology and Quantitative Techniques
- Marketing Management
- Sociology and Community Development
- Technical Forestry

CESM is a centre of excellence established in 2007 at the Indian Institute of Forest Management with a mission to conduct action and policy research for ecosystem services management. The goal of the centre is to function as a think tank to generate a useful database and an appreciation for ecosystem services, their physical assessment, valuation and

establish incentive-based mechanisms to promote conservation. The centre has contributed significantly to many important policy decisions in the area of forest and natural resource management in the country.

### IIFM's Contribution to Valuation and Accounting Studies Since 2000 and Major Studies Conducted under the Centre of Ecological Services Management, IIFM, Bhopal (Established in 2007)

- Economic Valuation of Forests of Himachal Pradesh – Introduction of CLEV (Compensation for the Loss of Ecological Values) an Ecological Cess Instrument (2000) -HPFD
- Revision of NPV Rates of Forest Diversion – Fixing Charge for Forest Diversion (2014)-MoEFCC
- Protected Area – Wetland Valuation – Providing Value of Carbon from PA Wetlands (2014)-MoEFCC
- Estimating Ecosystem Services Values of Himachal Forests – Revisiting the Value of Forests of Himachal Pradesh (2014) -HPFD
- Guidelines of Cost Benefit Analysis for Forest Diversion (2014) – MoEFCC
- High Conservation Value Forests (2013-2014) – 14FC
- Economic Valuation of Tiger Reserves in India (2013-15) – NTCA
- Regional Research to Inform the High Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011-20 for the South Asia Region (2013-14) – CBD-WCMC
- Co-author National REDD+ Policy and Reference Documents (2014)-MoEFCC
- Co-author in the International TEEB (The Economics of Ecosystems and Biodiversity) 2007-2010- UNEP
- Evolved and Set Up TEEB India Study (2010-12) - MoEFCC
- Expert Member and Lead Author - IPBES (Inter-Governmental Platform on Biodiversity and Ecosystem Services) – Ongoing Since 2013 – UNEP
- Building Regional and Technical Capacity for Economic Valuation of Tiger and Leopard Landscapes in Selected Tiger and Snow Leopard Range Countries for Global Tiger Forum (2015-16)

### Ongoing Valuation and Accounting Studies at CESM

- Economic Valuation of Ten Additional Tiger Reserves in India for National Tiger Conservation Authority, MoEFCC, GOI (2016-17)
- Forest Resource Accounting and Valuation of Economic Contribution of Forests and Protected Areas in Rajasthan and Capacity Building on Environmental Statistics and Green Accounting for Rajasthan Forest Department (2016-17).
- Review of Existing ecosystem accounting initiatives & literature in India, including biophysical assessments, and economic valuation of ecosystem services and overview of available data sources, organized by ecosystem service and type of account for: UNDP, India for THE UNSD, UNEP & CBD project on Natural Capital Accounting & Valuation of Ecosystem Services (2018)
- Consensus Building and Development of Action Plans for Joint Bangladesh-India Sundarbans Management (2018) for the International Water Association, The Netherlands.

## FSI (Forest Survey of India, Dehradun)

Forest Survey of India (FSI), is a premier national organization under the union Ministry of Environment and Forests, responsible for assessment and monitoring of the forest resources of the country regularly. In addition, it is also engaged in providing the services of training, research and extension. Established on June 1, 1981, the Forest Survey of India succeeded the

"Preinvestment Survey of Forest Resources" (PISFR), a project initiated in 1965 by Government of India with the sponsorship of FAO and UNDP.

The main objective of PISFR was to ascertain the availability of raw material for establishment of wood based industries in selected areas of the country. In its report in 1976, the National Commission on Agriculture (NCA) recommended for the creation of a National Forest Survey Organization for a regular, periodic and comprehensive forest resources survey of the country leading to creation of FSI. After a critical review of activities undertaken by FSI, Government of India redefined the mandate of FSI in 1986 in order to make it more relevant to the rapidly changing needs and aspirations of the country. The main objectives of FSI are as given below:

1. To prepare State of Forest Report biennially, providing assessment of latest forest cover in the country and monitoring changes in these.
2. To conduct inventory in forest and non-forest areas and develop database on forest tree resources.
3. To prepare thematic maps on 1:50,000 scale, using aerial photographs.
4. To function as a nodal agency for collection, compilation, storage and dissemination of spatial database on forest resources.
5. To conduct training of forestry personnel in application of technologies related to resources survey, remote sensing, GIS, etc.
6. To strengthen research & development infrastructure in FSI and to conduct research on applied forest survey techniques.
7. To support State/UT Forest Departments (SFD) in forest resources survey, mapping and inventory.
8. To undertake forestry related special studies/consultancies and custom made training courses for SFD's and other organisations on project basis.

### Major Publications

- The State of Forest Reports, which are published biennially, provide a comprehensive account of the Forest Cover Scenario of the Country to different user groups. They are of great importance for Policy Planners, Managers, Researchers, and Academicians etc. The SFR-2003, the ninth in the series, released in July 2005 furnishes information on forest & tree cover and many other vital parameters of forestry.
- The Reports on Inventory and Wood Consumption Studies, which are taken up for Specific Forest/Non-Forest Areas, furnish valuable information on growing stock, status of regeneration, incidence of grazing, incidence of fire etc. and are largely used by State Forest Departments.
- Designing of NFI for Sri Lanka
- Methodology Document for NFI of Sri Lanka
- E-Green Watch
- QGIS Manual

## IORA Ecological Solutions, New Delhi

IORA Ecological Solutions Pvt. Ltd. is an environmental advisory group with expertise in natural resource management. The company was incorporated under the Companies Act, 1956 (No. 1 of 1956) of the Government of India as a Private Ltd. Company in 2009.

IORA's multi-disciplinary expertise in policy advisory and scientific research alongside the firm's proven ability to design and implement projects across the globe, enables us to offer an integrated and effective platform for large-scale resource management projects leading to our emergence as a domain leader in India. IORA applies a systems approach to support the goals of sustainable forest management. We use innovative technological solutions such as geospatial analysis and scientific modelling for planning, policy making and implementation. Our forestry finance platform

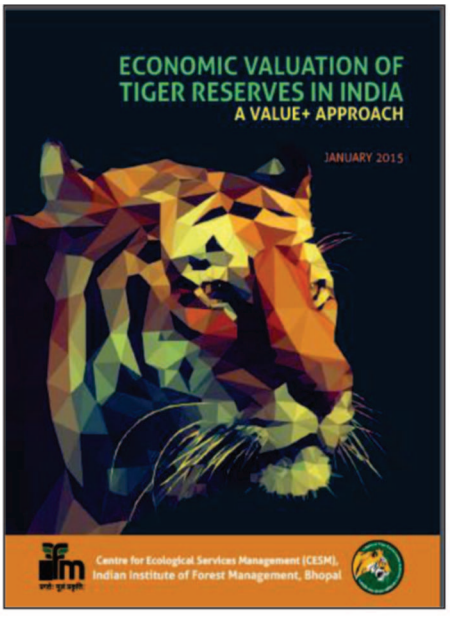
leverages resources to accelerate investments towards deployment of inclusive actions that promote sustainability.

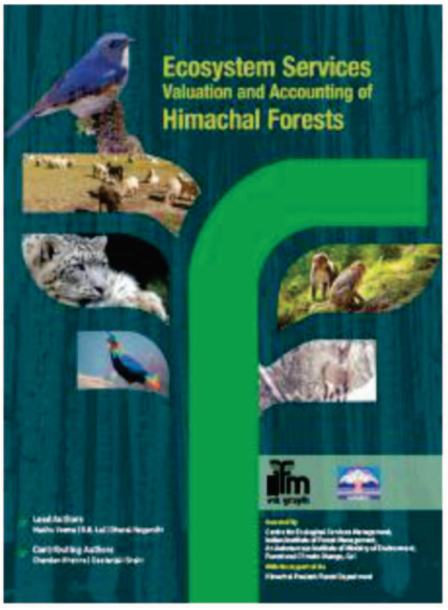
### IORA's Thematic Areas of Work

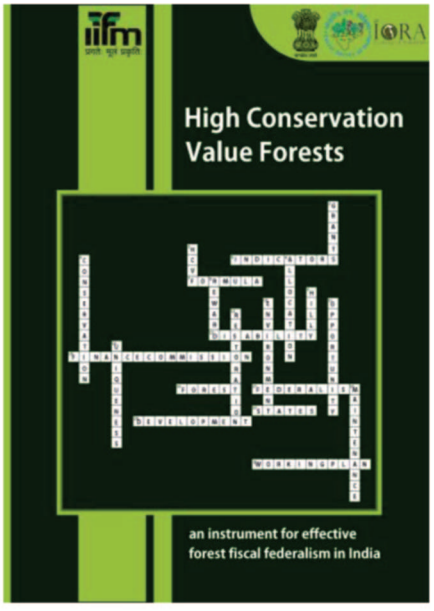
- Forestry & Land Use
- Remote Sensing & GIS
- Biodiversity & Ecosystem Services
- Climate Change

### IORA's Contribution to Natural Resource Management

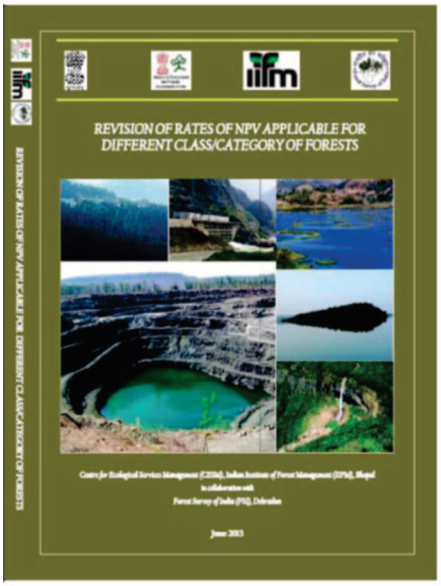
- Pioneers in REDD+ in India with projects in 7 landscapes including first sub-national jurisdictional REDD+ and VCS landscape based REDD+
- Developed the first REDD+ methodology as per Verified Carbon Standard from South Asia.
- Developed national frameworks and policy for forest carbon assessment, valuation and REDD+.
- Co-authors National REDD+ Policy and reference documents
- Forest Resource Accounting and Sustainable Environmental Performance Index (SEPI) for State of Uttarakhand (Partnered with IIFM)
- Study on High Conservation Forest (HCVF) for the 14$^{th}$ Finance Commission of India (Partnered with IIFM)
- Economic Valuation of Tiger Reserves in India (Partnered with IIFM)
- TIFAC Forest Carbon Accounting Studies (Partnered with IIFM)
- Contributors to TEEB India study
- Spatial Assessment of Invasive Species in the State of Sikkim to mitigate their impact on Forest Ecosystems and Biodiversity
- Developed Incentive Mechanisms for Agro-biodiversity Conservation and Use (Biodiversity International)
- Developed International Standard for Biodiversity Offsets (IUCN Global)
- Developed a Biodiversity Finance framework for Private Sector in India in partnership with UNDP/MOEFCC
- Business and Biodiversity: Estimations of Investment in India (UNDP BIOFIN)



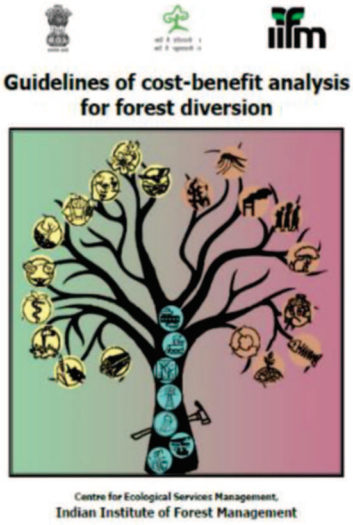




## *Studies conducted by CESM IIFM*







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