Forest conservation through fiscal federalism: lessons from past experience

Prepared for
Fifteenth Finance Commission

Hathinala forest, Renukoot, Uttar Pradesh

Bar headed geese visiting Keethans wet land, Agra, Uttar Pradesh

Baiga woman using dona pattal leaves to make plates, Balaghat, Madhya Pradesh.

Photo credits : Siddharth S Edake, Associate Fellow, TERI

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Acronyms

AFPs	:	Agroforestry Products
AOFFPS	:	Area Oriented Fuel wood and Fodder Projects Scheme
APCCF	:	Additional Principal Chief Conservator of Forests
APO	:	Annual Plan of Operations
ASTRP	:	Association of Scheduled Tribes and Rural Poor in Regeneration of Degraded Forests
BAU	:	Business As Usual
BCTMP	:	Bleached Chemi-Thermo Mechanical Pulp
BPL	:	Below Poverty Line
BT	:	Billion Ton
CA	:	Compensatory Afforestation
CAF	:	Compensatory Afforestation Fund
CAG	:	Comptroller and Auditor General
CAMPA	:	Compensatory Afforestation Fund Management and Planning Authority
CBD	:	Convention on Biological Diversity
CCF	:	Chief Conservator of Forests
CEC	:	Centrally Empowered Committee
CFR	:	Community Forest Rights
CO2	:	Carbon dioxide
CSO		Central Statistical Organization
CSS	:	Centrally Sponsored Schemes
DF	:	Dense Forest
DPR	:	Detailed Project Report
DTE	:	Down to Earth
EFTs	:	Environmental Fiscal Transfers
FAO	:	Food and Agriculture Organization
FC	:	Forest Cover
FC	:	Finance Commission
FCA	:	Forest (Conservation) Act, 1980
FDAs	:	Forest Development Agencies
FIG	:	Forest Interventions in Ganga
FRA	:	Forest Rights Act, 2006
FRI	:	Forest Research Institute
GA	:	Geographic Area
GCF	:	Green Climate Fund
GHG	:	Greenhouse Gas
GIM	:	Green India Mission
GSDP	:	Gross State Domestic Product

GST	:	Goods and Services Tax
GVA	:	Gross Value Added
GVO	:	Gross Value of Output
HLMC	:	High Level Monitoring Committee
IAEPS	:	Integrated Afforestation and Eco-Development Projects Scheme
ICAR	:	Indian Council of Agricultural Research
ICFRE	:	Indian Council of Forestry Research and Education
ICMS-E	:	Imposto Sobre Circulação de Mercadorias e Serviços-Ecológico
IEG	:	Institute of Economic Growth
IFA	:	Indian Forests Act
IFFDC	:	Indian Farm Forestry Development Co-Operative Limited
IIFM	:	Indian Institute of Forest Management
INDC	:	Intended Nationally Determined Contribution
ISFR	:	India State of Forest Report
IUCN	:	The International Union for Conservation of Nature
JFMCs	:	Joint Forest Management Committees
KAPY	:	Krushi Aranya Prothsaha Yojane
LPG	:	Geographical Area Liquefied Petroleum Gas
MDF	:	Moderately Dense Forest
MDWS		Ministry of Drinking Water and Sanitation
MFP	:	Minor Forest Produce
MGNREGA	:	Mahatma Gandhi National Rural Employment Guarantee Act
MGNREGS	:	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoA	:	Ministry of Agriculture
MoEFCC	:	Ministry of Environment, Forest and Climate Change
MoPR	:	Ministry of Panchayati Raj
MoRD	:	Ministry of Rural Development
MoRTH	:	Ministry of Road Transport and Highways
MSP	:	Minimum Support Price
MT	:	Million Tonne
NABARD	:	National Bank for Agriculture and Rural Development
NAPCC	:	National Action Plan on Climate Change
NDC	:	Nationally Determined Contribution
NESAC	:	North Eastern Space Applications Centre
NFHS	:	National Family Health Survey
NFP	:	National Forest Policy
NGC-REDD+	:	National Governing Council for REDD+
NGHM	:	National Green Highway Mission
NGO	:	Non-Governmental organization
NGRBA	:	National Ganga River Basin Authority
NH	:	National Highways

NHAI	:	National Highways Authority of India
NMCG	:	National Mission for Clean Ganga
NMSA	:	National Mission for Sustainable Agriculture
NPV	:	Net Present Value
NTFP	:	Non-timber forest products
NWFP	:	Non-Wood Forest Produce
OECD	:	Organisation for Economic Co-operation and Development
OF	:	Open Forest
PAs	:	Protected Areas
PESA	:	Panchayats (Extension to Scheduled Areas) Act, 1996
PF	:	Protected Forests
PMKSY	:	Pradhan Mantri Krishi Sinchai Yojana
PMUY	:	Pradhan Mantri Ujjwala Yojana
PPP	:	Public Private Partnership
PRI	:	Panchayati Raj Institution
R&D	:	Research and Development
REDD+	:	Reducing Emissions from Deforestation and Forest Degradation
RF	:	Reserved Forests
RFA	:	Recorded Forest Area
RKVY	:	Rashtriya Krishi Vigyan Yojana
SAPCC	:	State Action Plans for Climate Change
SDGs	:	Sustainable Development Goals
SFDs	:	State Forest Departments
SGC-REDD+	:	State Governing Council for REDD+
SMAF	:	Submission on Agroforestry
TC	:	Tree Cover
TERI	:	The Energy and Resources Institute
TNC	:	The Nature Conservancy
ToFs	:	Trees outside Forests
ToR	:	Terms of Reference
UNCCD	:	United Nations Convention to Combat Desertification
UNDP	:	United Nations Development Programme
UNFCCC	:	United Nations Framework Convention for Climate Change
UT	:	Union Territory
VDF	:	Very Dense Forest
WLPA	:	Wildlife Protection Act, 1972
WRI	:	World Resources Institute
XIII FC	:	Thirteenth Finance Commission
XIV FC	:	Fourteenth Finance Commission
XV FC	:	Fifteenth Finance Commission

Executive summary

Rationale for the study

Forest rich States have time and again represented to the Government of India and successive Finance Commissions that their ability to raise tax revenue and provide a standard of living that is comparable with other States is compromised to the extent that they maintain land under forests. The presence of forests also increases the cost of providing services on account of difficult physiographic conditions as well as higher transaction costs associated with obtaining environmental clearances for developmental projects. At the same time, these States have to bear the cost of conserving forests. Past Finance Commissions (XII, XIII and XIV) have acknowledged these constraints, and provided fiscal compensation to States in recognition of ecological services provided by forests and the need to preserve them as our national wealth. Each Finance Commission has used a different approach for designing such transfers, in terms of both the criteria for inter-se distribution to States and the conditionality of use.

Forest-related transfers are an important subject for the Fifteenth Finance Commission. The Terms of Reference (ToR) of XV FC does not mention forests specifically but there are paragraphs which have a bearing on the subject:

- The Commission shall have regard to *the demand on the resources of the Central Government on account of,* inter alia, *climate change commitments* (Para 3. ii). India's NDC lays down targets for creating additional carbon sink through afforestation. This has implication on the extent and nature of afforestation required in the country.
- The Commission shall have regard to *demand on the resources of the State Governments, particularly on account of financing socioeconomic development and critical infrastructure, assets maintenance expenditure, balanced regional development and impact of the debt and liabilities of their public utilities.* (Para 3. iii) States have, time and again, pointed out the fiscal opportunity costs of conservation and maintenance of forests.
- *The Commission may consider proposing measurable performance-based incentives for States, at the appropriate level of Government*, in the area of *Sustainable Development Goals* (Para 4, iii). Forests can help in achieving several SDGs directly and indirectly.

The Energy and Resources Institute (TERI) was awarded a study by the XV FC to analyse the role of inter-Governmental fiscal transfers in promoting sustainable forest management in India, study the experience of past Commission, and accordingly make recommendations for consideration of the XV FC.

With this background, the study aims to analyse and recommend how Finance Commission transfers can be used to promote conservation of forests and afforestation as well as reduce degradation of forests in India, and thereby also contribute to India's global sustainable development and climate change goals.

State of forests: an overview of trends and issues

India has a total forest cover of 7,08,273 Sq.km. Madhya Pradesh, Arunachal Pradesh and Chhattisgarh are the top three States in terms of total forest cover. These are also the top three States in terms of area under dense forests. The share of forests in total geographical area of the country is 21.54%, which is significantly short of the target of 33%. This share is distributed unevenly amongst States, with North Eastern States and Hill States having a higher per centage of their GA under forests. These States' share in national forest cover may not be too high but the share of forests in their own GA can be significant - more than 80% in the case of Mizoram.

There has been an increase of 6600 Sq. km in total forest cover of the country between 2007 and 2017. The maximum increase in total forest cover and tree cover has been seen in Andhra Pradesh, followed by West Bengal, Kerala, Tamil Nadu and Odisha. The maximum loss of forest and tree cover has been observed in Telangana, followed by Nagaland and Mizoram.

India's Nationally Determined Contribution (NDC) aims to sequester an additional 2.5 to 3 billion tons CO_2 equivalent through additional forest and tree cover by 2030. The total carbon stock of the country is 7082 million tonnes (ISFR 2017), with Arunachal contributing to about 14% of the carbon stock, followed by MP (10%) and Chhattisgarh (8%). Current projections suggest that India will be able to achieve less than half the NDC target in the BAU scenario. This target can be attained only through a combination of forest conservation and afforestation based on a landscape approach. This makes tree cover and trees outside forests integral to achieving carbon sequestration targets. At present, only about 2.85% of the total GA is under tree cover, but there is immense potential to increase this.

Forest conservation and afforestation can contribute to several of the SDGs in varying measures. While the impact of forest conservation is fairly evident for SDG 15, 'life on land', action towards forest conservation and climate action (SDG 13), forests can also help in attainment of other SDGs by alleviating poverty, ending hunger, and improving health outcomes not just for communities that live on the fringes of forests, but those in rural and urban contexts which are removed from forests. Conservation of forests is also closely linked to achievement of other SDGs like affordable and clean energy and sustainable consumption and production.

Issues in sustainable management of forests

While India has managed to address deforestation, the degradation of forests remains a concern. Some of the main reasons of behind this are excessive fuel wood collection, unsustainable harvest of forest produce, and overgrazing. The impact of Government initiatives on providing alternatives to fuelwood, in particular LPG, will depend on how these can be scaled up and incentivize users beyond one-time connections.

Most State forest departments grapple with the issue of inadequate human resources and capacity, especially at the field level. This has implications for field level implementation as well as planning of forest governance since the development and implementation of Working Plans depend on good beat and range level information and expertise. Some States have gone without direct recruitment for posts like Range Officers for decades resulting in an inverted pyramid of human resources for forests.

With nearly sixty per cent of total forest cover lying in tribal districts, tribal and forest dwelling communities are an important stakeholder in forest management. Experience of forest rights settlement has been varied across States ranging from 60% to less than 10% of claims being settled. Reports suggest that nearly 200 million people depend on forests for their fuel requirements, as 55% of rural households use wood as cooking fuel. Around 300 million people derive their full or partial sustenance from forests. Joint forest management which was intended to ensure people's involvement in forest management and share benefits has had a limited impact and is marked by inadequate capacity of communities. Issues of capacity, both at the level of the forest departments and the communities will be critical in strengthening forest governance in India.

Federal and legal context of forests

The Constitution of India assigns functions, legislative competence, and fiscal powers for different subject to both Centre and States. Schedule VII, read with Article 246, assigns powers through three Lists: List I, the Union List, covers subjects that serve at a national level; List II, the State List, sets out those areas which are a State's exclusive jurisdiction, subject to other clauses; List III, the Concurrent List, identifies areas where both the Parliament and a State legislature can make laws, subject to central laws prevailing in case of a conflict where there is no scope for a harmonious reading of the provisions. Unlike 'environment' or 'climate change', 'forests' is an explicitly listed item in the federal legislative scheme of the Constitution of India. Constitution of India originally placed forests as a State subject but subsequently changed it to a concurrent subject. This opened up the space for Centre to intervene on matters that related directly to forests. One of the most obvious examples of utilisation of this newly opened space was the Forest Conservation Act of 1980, which is also one of the most far-reaching legislation over forests.

A number of laws exist that are key to governance of forests in India. These laws range from pre independence era to 2016. The various laws deal with different aspects of management of forests and benefit sharing from forests. The Indian Forest Act, 1927 and the Forest (Conservation) Act, 1980 are the most important laws for forests but other Acts such as the Wildlife (Protection) Act, 1972, Biological Diversity Act, 2002, Forest Rights Act, 2006 have a strong bearing upon governance of forests in India, especially in terms of establishment of Protected Areas and recognition of rights of forest dwelling communities. From the perspective for conservation and payments towards the same, Forest Conservation Act and the Compensatory Afforestation Fund Act, 2016 are the most important. The Acts, read with their Rules and series of Supreme Court orders issued in *T.N. Godavarman Thirumulpad vs Union of India* lay down the scheme of compensatory afforestation and payments towards net present value of forests by the developer, and utilisation of these payments by the States. The overall balance of various Acts tilts in favour of the Centre as most functions and powers of States over forests are subject to approval from Centre. These activities include diversion of forestland, formulation of working plans for management of forests, or utilisation of compensatory afforestation money.

Besides legislation, there are also several policies and programmes that govern forests, both directly and indirectly. While National Forest Policy, National Afforestation Policy, Green India Mission etc. have clear objectives and targets for increasing forest cover and improving its management, there are several non-forestry policies, schemes and programmes that have

goals and provisions that support forest governance, such as Ganga Vriksharopan Abhiyan, National Agroforestry Policy, Green Highways Policy etc. These are especially important in increasing the tree cover outside forests, which are going to be instrumental in achieving the stated NDC objective of creating 'an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030'.

Forest finances and fiscal policy

A detailed analysis of revenue and expenditure of States on account of forestry and wildlife and plantations revealed that revenue from forestry was generally lower than expenditure on forestry. The expenditure for all States combined was three times the revenue of all States on account of forestry and wildlife. This gap was much bigger for some States with large forest cover. The share of forestry in States' own non tax revenue was also noted to be small, being mostly under 4%, except in a few States like Meghalaya, Uttarakhand, Manipur, MP, Andhra Pradesh, and Chhattisgarh.

Transfers pursuant to Finance Commission recommendations are an important source of revenue for States. Since the XII Finance Commission, successive Finance Commissions have aimed at promoting environmental stewardship, with a focus on forest conservation, in States. Each Finance Commission has used a different approach to this end, in terms of both the criteria for inter-se distribution to transfers to States and the conditionality of use. The role of these transfers in addressing the overall fiscal liability of forest-rich States was most significantly addressed by the XIV FC. However, the grants provided by the XII and XIII FC were seen as more effective in augmenting the budgets for forest departments and forestry activities in States. It must, nevertheless, be noted that state level forest sector expenditure data does not show any discernible trend in the period of the XIV FC when compared to the previous Commissions.

States also receive funds from the Centre for forestry activities, mainly through allocations under Central Sector and Centrally Sponsored Schemes (CSS), both directly for forest-sector projects and as components of other projects. Major on-going forest-related CSS include the Green India Mission - National Afforestation Programme, Biodiversity Conservation, Conservation of Aquatic Ecosystems, Conservation of Corals and Mangroves, Forest Fire Prevention and Management Scheme, Integrated Development of Wildlife Habitats, Project Elephant, Project Tiger, and National River Conservation Programme. All the CSS are now divided into Core schemes, Core of the Core Schemes, and Optional Schemes. All major CSS of MoEFCC are designated as Core Schemes. While CSS can be an important source of revenue for sector specific activities, its success depends on actual release and utilisation. As seen in the example of GIM (and to a smaller extent the SMAF), there can be significant deficits between what is budgeted for States under CSS and what is eventually released.

Approximately 5,000 crores lying unutilised with ad hoc CAMPA are seen as a major source of funding for increasing and improving quantity and quality of forests. With the coming into force of Compensatory Afforestation Act, 2016, this money will now be available to States for site specific plantations and to an extent for activities such as assisted natural regeneration, forest management, forest protection, etc. Payments, both compensatory afforestation and net present value, are made on account of forests being lost to non-forest activities making it inherently compensatory in nature and not so much for *additional* forest and tree cover.

International experience with environmental fiscal transfers

Inter-Governmental transfers are an important source of finance for subnational expenditures in many countries, financing approximately 60% of sub-national expenditures in developing countries, and approximately 30% in OECD countries. (UNDP, 2016) Environmental fiscal transfers (EFTs) are fiscal transfers from one level of Government to another which adopt ecological criteria in the formula for determining shares of Governments, such as the extent of forest cover (India), PAs (Brazil, Portugal), national parks (France), or watersheds (Brazil). The experience of other countries in implementing fiscal transfers to promote sustainable forest management can provide useful insights into the design and operationalization of India's fiscal transfers to promote forest conservation.

EFTs have typically been used to compensate for any costs (for example, due to land use restrictions or conservations efforts) incurred in undertaking activities which generate spill over benefits to areas which are beyond the jurisdictional boundaries of the sub-national Government (Broadway and Shah, 2007, Loft et al., 2016).

Different countries have faced different issues in implementing their scheme of EFTs. Experience from other countries underscores the need for defining the purpose of the EFT clearly. Transfers that are inherently compensatory in nature and are unconditional may not be perceived as being for the purposes of forest conservation and therefore not be used to promote conservation. In absence of an obligation to use the transfers for environmental purposes, there is limited incentive to take action towards environment. As observed in the case of Brazil, not earmarking funds for conservation actions can impede the effectiveness of the ICMS-E. May et al (2012) point out that while the ICMS-E has had positive results for conservation, this is dependent on the level of commitment of local Governments and the presence of procedures to ensure the equitable distribution of rewards. A few States in Brazil have also introduced an index which also measures changes in the quality of PAs. Studies suggest that the introduction of the quality index: (i) allows each municipality to influence outcomes according to their conservation related decisions and actions, and (ii) allows the fiscal transfer to act as an incentive and not remain a compensatory mechanism with no direct impact on environmental protection (May et al. 2012, Cassola, 2010). In some cases, for example in Portugal, even without earmarking, lump sum transfers may act as an incentive for conservation where authorities are constitutionally bound to transfer funds.

Other potential issues which have been identified in the implementation of EFTs in other country contexts include the ability of local Governments to absorb potentially large increases in transfers, the lack of indicators on measuring environmental quality improvements, and low awareness about complicated transfer formulae among authorities, as EFTs require strong information sharing and transparency regarding the indicators which are selected and the transfers which are made on the basis of these indicators.

Perspectives from States and other stakeholders

The Study team carried out consultations with States to understand their concerns and demands. Following are some of the perspectives from States, both forest-rich and non-forest rich States.

- The inclusion of forests as a criterion in tax devolution by the XIV FC is a positive step in recognizing and compensating for the fiscal disabilities of states due to forests.
- Most State Forest Departments face budgetary constraints, which adversely affect their capacity to manage forests. State Forest Departments have not gained directly from the inclusion of forests in the tax devolution formula (XIV FC) when compared to the system of earmarked forestry grants by the XII and XIII FCs.
- Earmarking of FC transfers is necessary to compensate and augment state resources for maintenance of forests but the "additionality" of FC funds for the forest sector needs to be ensured so that funding from other sources to the forest department is not reduced due to availability of FC funding. Timely release of funds to forest departments also needs attention.
- Exclusive focus on 'dense forests' does not adequately capture the complexity of forest systems and their governance in different States. Specifically, it is discriminating for States where physiographical conditions can only support open forests, which also provide important ecological services and richly support biodiversity.
- States like Gujarat and Rajasthan felt that forest area may be considered in lieu of forest cover in the distributive criteria. This is an important consideration where physiographical conditions are unfavourable for dense forests. However, other States, particularly those from the NE region, were more inclined towards retaining forest cover as the determining criteria for inter-se allocation of funds.
- Compensation to states for historical forest area or cover is not sufficient to promote environmental conservation. It is also important, in the interest of progressive environmental protection and sustainable development, to recognise and reward the States that have improved quality and quantity of forest cover. Part of FC transfers should be linked to outcome or performance-based indicators.
- Earmarking grants and linking them to specific outcomes of additional carbon sequestration is also critical in view of the need to ensure achievement of India's forest-related NDC targets (2021-30) under the Paris Agreement. There is an urgent need to enhance capability of State governments and the forest administration to meet such targets through earmarked grants.
- It will not be possible to meet the NDC goal through efforts in forest areas alone. Increasing tees outside forests is necessary to meet this objective as well as the national target of increasing forests to 33% of the country's geographical area. Trees outside forests, including agroforestry are also essential for meeting the timber needs of the country and can play an important role in enhancing ecological, employment and food security. Policy and institutional interventions are required to make agroforestry an economically viable option for farmers.

Recommendations for forest related fiscal transfers

It is undisputed and established that maintaining land under forest cover, especially dense forests, is of immense ecological value. Forest cover maintained by States provides critical

ecological services at local level, national level and global level. However, the cost of providing these ecological services is largely local in nature, with States bearing most of the burden in the nature of fiscal disability. Therefore, there is a clear and strong case for compensation to forest rich States through intergovernmental transfers. In light of various demands and concerns of States, the study has developed three key principles to guide such forest related fiscal transfers. These are,

1. Forests provide critical ecological services and States need to be compensated for the opportunity cost of conserving forests,
2. Adequate resources need to be provided to relevant State agencies to support conservation and maintenance of forests and prevent degradation,
3. An appropriately designed and large enough performance-based grant is necessary to incentivize States to contribute to the national NDC target through ecological restoration of degraded forests (along with conservation and where possible, increase in forest area) and an increase in the area under trees outside forests.

Based on these principles, the study recommends that forest related fiscal transfers should take the form of a share in tax devolution as well as an earmarked grant, each serving different objectives.

Forests as a criterion in tax devolution

It is proposed that the Finance Commission may continue with forests as a criterion in tax devolution. The inter se distribution of forest based devolution to States should be based on (a) fiscal disability faced by a State on account of keeping part of its geographical area under forests, and (b) the ecological services contributed by its forests. The proposed formula is given below.

The share of State (i) is given by S_i where

$$S_i = \underbrace{0.5\frac{\left(\frac{RFA}{GA}\right)_i}{\sum_i\left(\frac{RFA}{GA}\right)_i}}_{\text{(a) Fiscal disability}} + \underbrace{0.5\frac{(2DF+OF)_i}{\sum_i(2DF+OF)_i}}_{\text{(b) Ecological services}}$$

Where, subscript `i' denotes the i^{th} State; RFA: Recorded Forest Area; GA: Geographical Area; and DF: Area under Dense Forest Cover, including Very Dense Forest and Moderately Dense Forest.

In the proposed formula, disability is measured in terms of Recorded Forest Area in a State relative to its geographical area. For ecological services, share of a State in the total forest cover of the country is taken as a proxy. It includes forests of all density classes but assigns double weight to dense forests as compared to open forests.

Earmarked grant towards meeting India's NDC target

An earmarked grant is recommended to incentivize States to contribute to the national NDC target by conserving and improving existing forest and increasing area under trees outside forests.

Recognizing that the maintenance of existing forest carbon sinks are as important for the NDCs as creation of additional sinks, the proposed grant should reward States for existing carbon stock of their forests as well as create a performance-based incentive for States to create additional carbon stock.

The proposed grant thus, has two components (a) grant for maintenance of carbon stock of existing forest; and (b) outcome/performance-based incentive linked to increase in carbon stock which a State can realize through different ways available to it- increase in area under forest and trees outside forests, and restoration of degraded forests.

The grant is recommended to be distributed amongst States as per the formula detailed below.

The share of State (i) is given by S_i where

$$S_i = \underbrace{0.3\,\frac{CS_i}{\sum_i CS_i}}_{\text{(a)}} + \underbrace{0.7\,\frac{Max\left(0, \left(\frac{\Delta CS_i}{CS_i^{T=0}}\right)\right)}{\sum_i \left(Max\left(0, \left(\frac{\Delta CS_i}{CS_i^{T=0}}\right)\right)_i\right)}}_{\text{(b)}}$$

(a) Reward for existing carbon stock of forests and trees outside forests

(b) Incentive for creating additional carbon sinks through forests and trees outside forests

Where, subscript `i' denotes the i^{th} State; CS: Carbon Stock; **Δ** is the change in the parameter within brackets between the initial (T=0) and final years (T=T). As the objective of the grant is enhancement in forests/carbon sequestered, a higher weight to the second component is justified. Accordingly, weights in 30:70 ratio can be considered. The final decision on this should be taken based on sensitivity runs using different weights once the 2019 ISFR report is available.

Estimation of parameters in the formula: It is proposed that in the first year of the grant (2020), component (a) may be estimated for 2019, the year of the latest ISFR before the XV FC period. In the interest of verifiability, stability, and predictability of data, a 4 year moving or dynamic cycle of measurement is recommended for component (b), synchronised with ISFR reports. The first calibration can take place in 2022 based on data for 2017-2021 and the second in 2024 based on moving data of 2019-2023

Grant value: A simple extrapolation shows that 1.07 BT of CO2 equivalent of carbon pool will be created between 2015 and 2030, leaving a gap of 1.43BT with respect to the NDC commitment. Based on cost norms from Green India Mission (GIM), this will require an investment of Rs 135000 crore over the next 10 years (accounting for inflation), or roughly Rs 67500 crores over the period of the XV FC. Assuming that Central and State governments will mobilise resources from multiple resources for meeting this target, Finance Commission

can recommend Rupees 50,000 crores to be provided to States as earmarked grants spread over five years. Besides the earmarking of FC grants, on-going National Green Mission and CAMPA may need to be re-oriented to meet this objective

Conditionality of use: The grant is proposed to be earmarked and conditional. It is recommended that at least 40% of the grant should be used for forestry and related activities while 60% should be earmarked for agro-forestry and other interventions that can contribute to the achievement of the NDC target. Accordingly, at least 40% should flow to the forest department in each State while the remaining can be allocated among agencies responsible for agroforestry and other specific interventions as per the discretion of State Governments.

To be eligible for the grant, the State would need to fulfil the following two conditions:

1. All Forest Working Plans/Schemes must be current and approved, those prepared post 2014 must be as comply with the 2014 code;
2. Each State must prepare a strategy and action plan for promoting agroforestry and social forestry that addresses the bottlenecks discussed earlier, including R&D, development and provision of quality planting material and nursery accreditation, price support instruments and mechanisms, transport and marketing infrastructure in remote areas, monitoring, certification and review processes, etc. Each State must provide a detailed proposal along with the budget for implementing the action plan

1. Introduction and overview

Context

The study examines how inter-Governmental transfers can be designed as an effective instrument to promote forest conservation and afforestation. The study also provides a set of recommendations, for consideration of the Fifteenth Finance Commission, on how the fiscal federal architecture can be used to promote the conservation of forests and afforestation and reduce the degradation of forests in India, and thereby also contribute to India's global sustainable development and climate change commitments.

The study draws on analysis of available data, programmes and policies and extensive stakeholder consultations at the State, regional and national levels as well as learning from international experience.

This study contributes to several parts of the Terms of Reference (ToRs) of the Fifteenth Finance Commission. In particular, it responds to the following sections of the ToR:

- *The Commission may consider proposing measurable performance-based incentives for States, at the appropriate level of Government*, in the area of *Sustainable Development Goals (SDGs)*, among others (Para 4, iii). The SDGs are a comprehensive set of seventeen developmental goals which were endorsed by several countries, including India, at the United Nations (UN) General Assembly in 2015. Goal 15 specifically aims to "Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss". The sustainable management of forests and trees is also directly and indirectly linked to the achievement of several other SDGs in India. These linkages are discussed is more detail in the next section.
- The ToRs also require the Commission *to consider the demand on the resources of the Central Government on account of,* inter alia, *climate change commitments* (Para 3. ii). India's climate change commitments not only lay down targets for renewable energy and reduction in the emissions of greenhouse gases, and creating additional carbon sink through afforestation. This has implication on the extent and nature of afforestation required in the country.
- To the extent that several States have, time and again, pointed out the fiscal opportunity costs of forest conservation, the study also has a bearing on ToR 3 (iii) which deals with the *demand on the resources of the State Governments, particularly on account of financing socioeconomic development and critical infrastructure, assets maintenance expenditure, balanced regional development and impact of the debt and liabilities of their public utilities.*

Forests and Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a set of 17 goals, which were agreed upon by the members of the United Nations in 2015, and represent a global consensus on the development agenda for 2030.[1]

Forest conservation efforts can contribute to several of the SDGs in varying measures. While the impact of forest conservation is fairly evident for **SDG 15**, 'life on land', action towards forest conservation can also help achieve the SDGs relating to ending poverty (**SDG 1**), eliminating hunger (**SDG 2**), achieving good health and well-being (**SDG 3**), clean water and sanitation (**SDG 6**) industry, innovation, and infrastructure (**SDG 9**), and climate action (**SDG 13**). Figure 1 schematically maps SDGs to which forests and trees contribute directly or indirectly.

At the same time, forest conservation efforts can be supported through the achievement of certain SDGs, especially on affordable and clean energy (**SDG 7**) and sustainable consumption and production (**SDG 12**).

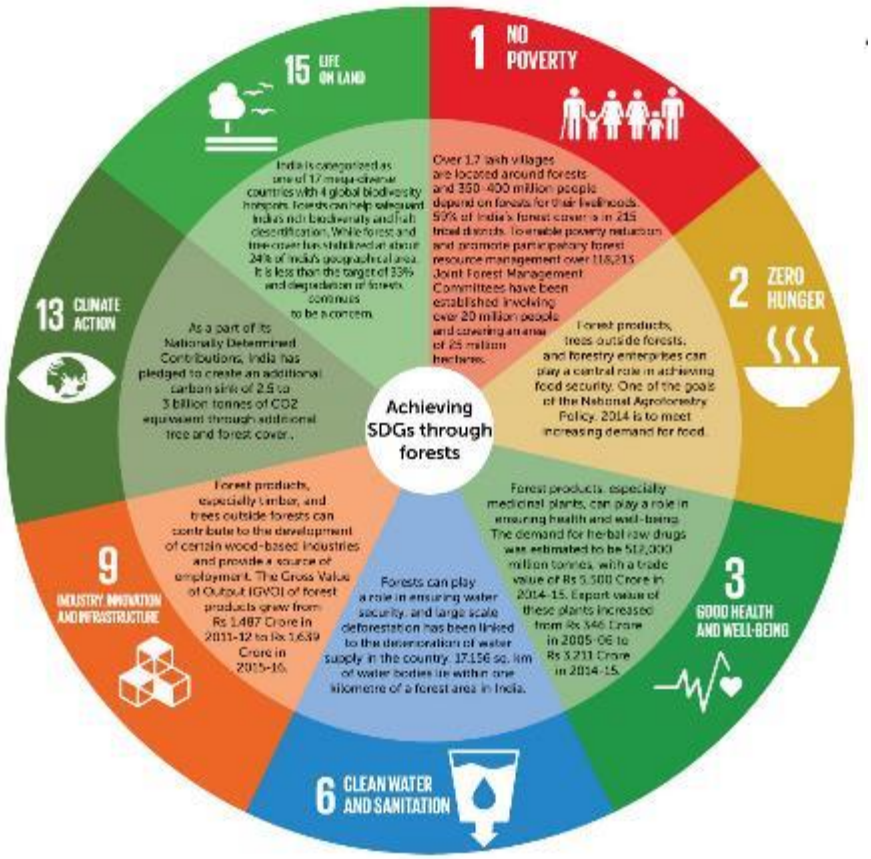


Figure 1 : Achieving SDGs in India through forest conservation

Source: MoEFCC (2018), CSO (2018), ISFR (2017), MoEFCC (2015), NAP (2014), MDWS (2010), MoEFCC (2009), National Forest Policy (1952), MoEFCC (n.d.), National Medicinal Plants Board (n.d.)

[1] https://sustainabledevelopment.un.org/sdgs

Forest conservation, afforestation and reducing degradation are central to achieving the targets established under SDG 15, life on land, and SDG 13, climate action. Relevant targets (and their indicators) of SDG 15 are outlined in **Table 1,** below.

Table 1: Relevant targets and indicators of SDG 15: Life on Land

Target	Indicator
15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.	Forest area as a proportion of total land area Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	Progress towards sustainable forest management
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.	Proportion of land that is degraded over total land area
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.	Red List Index
15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.	Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020
15A Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
15B Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.	Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems

Source: https://sustainabledevelopment.un.org/sdg15

In India, while forest and tree cover increased marginally (by 1%) between 2015 and 2017, to 24.39% of the country's geographical area, (ISFR, 2017) it remains less than the target of 33% which was introduced by the National Forest Policy, 1952 and continued in subsequent Policies, including the National Forest Policy, 1988. Forests are also seen to play a key role in halting desertification and securing biodiversity in India, which is one of the world's 17

megadiverse countries and also home to 4 biodiversity hotspots.[2] Forest degradation continues to be an issue of concern in India, primarily due to large-scale dependence on forests for firewood and fodder. Several aspects of this degradation are discussed in Chapter 2. Therefore, the sustainable management of forests is a prerequisite for achieving the targets under SDG 15.

Forests are also directly relevant for the achievement of the targets under **SDG 13**, on climate action. Target 13.2 aims to integrate climate change measures into national policies, strategies, and planning, and an indicator to measure the progress on this target is the "number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)." As a part of its Nationally Determined Contributions submitted to UNFCCC, India has pledged to create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional tree and forest cover.

Apart from Goals 15 and 13, there are others SDGs which are impacted by the extent and quality of forests in India. There is a linkage between forests and SDG 1 on poverty reduction, both in terms of the role of forests in meeting the needs of forest-dependent communities and the impact of this dependence on the sustainability of forests, particularly in the 1.5 lakh plus villages that are located in and around forests. According to the Ministry of Environment, Forest and Climate Change, approximately 350 – 400 million people in the country are dependent on forests for their livelihoods.[3] People depend on forests for firewood for cooking (and at times for sale), timber, non-timber forest produce, edible fruits, tubers, medicinal plants, fodder and areas where livestock can graze, material for agricultural purposes and the construction of their homes, among others.[4] In particular, historically marginalized tribal communities tend to be located in forest rich areas, and are often dependent on forest produce for subsistence and livelihood.[5] The 215 districts which are identified by the Government of India as a part of the Integrated Tribal Development Plan, have a recorded forest area of 421,170 hectares, which is approximately 59% of the total recorded forest area of the 633 districts across India which were surveyed for the ISFR, 2017.

As an example, Target 1.4 aims to "ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic

[2] Ministry of Environment, Forest, and Climate Change (2001) India Nation Action Programme To Combat Desertification In The Context Of United Nations Convention To Combat Desertification Volume-I Status Of Desertification, http://www.moef.nic.in/sites/default/files/national-action-programme-to-combat-desertification.pdf
Ministry of Environment, Forest, and Climate Change (n.d.) India's Forests And REDD+, http://www.ignfa.gov.in/photogallery/documents/REDD-plus%20Cell/Modules%20for%20forest%20&%20Climate%20Change/10.%20Reading%20material/8.%20India's%20Forests%20And%20REDD+%20by%20MoEFCC.pdf

[3] Ministry of Environment, Forest, and Climate Changes (2009) Asia-Pacific Forestry Sector Outlook Study II Working Paper No. APFSOS II/WP/2009/06 India Forestry Outlook Study http://www.fao.org/docrep/014/am251e/am251e00.pdf

[4] MoEFCC (nd) http://www.moef.nic.in/sites/default/files/redd-bk3.pdf

[5] Ministry of Skill Development and Entrepreneurship, https://www.msde.gov.in/assets/images/Notification/Tribal%20People%20Planning%20Framework.pdf

services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance" by 2030. Access to natural resources is central to achieving livelihood security for those communities which live on the fringes of forests. One of the objectives of the Joint Forest Management programme was to promote community-based and community-led forest management in order to improve access to the varied ecosystem services that forests provide. Village level JFM Committees develop micro-plans with the support of State forest departments to ensure that communities dependent on forest resources have a say in decisions made about the use of forest resources and share benefits therefrom. Currently, over 118,213 JFMCs have been established involving over 20 million people and covering an area of 25 million hectares.[6]

Target 2.1 (of **SDG 2**, zero hunger) seeks to "end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round" by 2030. Progress on this target will be measured by the prevalence of undernourishment. Forest products and forestry enterprises can play a central role in achieving nutritional security. As the Draft National Forest Policy, 2018 points out, non-timber forest products can play a role in ensuring food security for forest dependent communities.[7] Trees outside forests can also play a significant role in achieving food and nutrition security, in addition to providing employment. One of the goals of the National Agro-forestry Policy, 2014 is to meet increasing demand for food, in addition to increasing tree cover outside forests.[8]

Forest products, especially medicinal plants, can play a role in ensuring health and well-being (**SDG 3**) of forest dependent communities and others, through indigenous systems of medicines as well as the development of modern medicines which are plant based. There are currently 1178 plants which have been classified as medicinal plants by the National Medicinal Plants Board of the Government of India.[9] These plants are used across various systems of medicine include allopathic, Ayurveda, Siddha, Unani, and Sowa-rigpa as well as community-specific practices for healthcare. In 2014-15, the demand for herbal raw drugs was estimated to be 512,000 million tonnes, with a trade value of Rs 5,500 crore including for export purposes, consumption by domestic industries, as well as rural households.[10] Export value of these plants increased from Rs 346 crore in 2005-06 to Rs 3211 crore in 2014-15, indicating the growing demand globally.[11]

Forests can also play a role in ensuring water security, and the achievement of **SDG 6** (clean water and sanitation). Large scale deforestation has been linked to the deterioration of water

[6] Ministry of Environment, Forest and Climate Change, Government of India (2018) http://www.moef.nic.in/sites/default/files/India%20National%20REDD%2B%20Strategy%20released%20on%2030.08.2018.pdf

[7] Ministry of Environment, Forest and Climate Change, Government of India (2018) Draft National Forest Policy, 2018 http://www.moef.nic.in/sites/default/files/Draft%20National%20Forest%20Policy%2C%202018.pdf

[8] National Agroforestry Policy, 2014, http://www.indiaenvironmentportal.org.in/files/file/Agroforestry%20policy%202014.pdf

[9] National Medicinal Plants Board, https://www.nmpb.nic.in/sites/default/files/Brochure%20VCSMPP.pdf

[10] National Medicinal Plants Board, https://www.nmpb.nic.in/sites/default/files/Brochure%20VCSMPP.pdf

[11] National Medicinal Plants Board, https://www.nmpb.nic.in/sites/default/files/Brochure%20VCSMPP.pdf

supply in the country.[12] Further, as the ISFR, 2017 points out, approximately 17,156 sq. km of water bodies lie within one kilometer of a forest area in the country. Between 2005 and 2015, the extent of these water bodies has increased by 2,647 sq. km. (ISFR, 2017).

Forest products, especially timber, also play an important role in the development of certain wood-based and related industries. Access to timber can help achieve the outcomes envisaged under **SDG 9**, on industry, innovation, and infrastructure. Forest products are classified into: (a) major products, including industrial wood (timber, round wood, match and pulpwood) and fuel wood (firewood and charcoal wood) and (b) non timber forest produce (NTFP) comprising a large number of wild growing forest material such as bamboo, fodder, lac, sandalwood, honey, resin, gum, tendu leaves, among others.[13] The Gross Value of Output (GVO) of forest products grew from Rs 1487 crore in 2011-12 to Rs 1639 crore in 2015-16.[14] Interestingly, the share of industrial wood in the GVO grew from 50% to 55% over this period, while the share of fuel wood and NTFP declined.[15] As the State of the Forest Report 2017 points out, forests as well as trees outside forests (for example on block plantations, on private lands, farm lands, etc.) can play a significant role in meeting the demand for timber in the country.[16] As the National Agroforestry Policy, 2014 recognizes, trees outside forests can also be an important source of income.[17]

There are also a few SDGs, in particular **SDG 7**, access to affordable and clean energy, which can contribute to forest conservation. The extraction of fuel wood is one of the key drivers of deforestation in India, and stems largely from the lack of access to affordable energy sources for those communities which live on the fringes of forests.[18] Approximately 66% of households in India depend on solid biomass, including firewood, crop residue and cow dung as the primary fuel for cooking. In addition to causing deforestation, this also causes indoor air pollution because of the incomplete combustion of biomass.[19] According to the Government of India, the use of improved cook stoves could reduce fuel wood consumption by 30%, and each rural family could save up to 300 kg of fuel wood annually, offsetting emissions of approximately 58.2 mtCO_2 equivalent.[20]

Thus, conservation of forests can help achieve several SDGs, from those relating to life on land and climate change, to those on ending poverty and hunger. While the role of forest conservation in meeting targets relating to SDG 13 and SDG 15 is evident, forests can also

[12]Ministry of Drinking Water and Sanitation (201) https://mdws.gov.in/sites/default/files/RuralDrinkingWater_2ndApril_0_0.pdf

[13] Central Statistical Organization, Government of India (2018) http://www.mospi.gov.in/sitzs/default/files/publication_reports/Final1Brochure_30july2018.pdf

[14] Central Statistical Organization, Government of India (2018) http://www.mospi.gov.in/sites/default/files/publication_reports/Final1Brochure_30july2018.pdf

[15] Central Statistical Organization, Government of India (2018) http://www.mospi.gov.in/sites/default/files/publication_reports/Final1Brochure_30july2018.pdf

[16] India State of the Forest Report, 2017 http://fsi.nic.in/forest-report-2017

[17] National Agroforestry Policy, 2014, http://www.indiaenvironmentportal.org.in/files/file/Agroforestry%20policy%202014.pdf

[18] Ministry of Environment, Forests and Climate Change (2018) National REDD+ Strategy, http://www.moef.nic.in/sites/default/files/India%20National%20REDD%2B%20Strategy%20released%20on%2030.08.2018.pdf

[19] Press Information Bureau, Government of India, http://pib.nic.in/newsite/PrintRelease.aspx?relid=177870

[20] Ministry of Environment, Forest and Climate Change, National REDD+ Strategy, http://www.moef.nic.in/sites/default/files/India%20National%20REDD%2B%20Strategy%20released%20on%2030.08.2018.pdf

play a central role in lifting people out of poverty, ending hunger, and improving health outcomes not just for communities that live in forests or on the fringes of forests, but also those in rural hinterland and urban areas which are distant from forests.

Forests and India's Nationally Determined Contributions

India ratified the Paris Agreement on 2 October 2016, and communicated its Intended Nationally Determined Contribution (INDC)[21] to the UNFCCC (United Nations Framework Convention for Climate Change) for the period 2021 to 2030.[22] India's INDCs were framed, *keeping in view its development agenda, particularly the eradication of poverty coupled with its commitment to following the low carbon path to progress and being sanguine about the unencumbered availability of clean technologies and financial resource from around the world*. The INDCs are summarised in Box 1.

Box 1 : India's INDCs

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

Source: UNFCCC- https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf

On the mitigation side, the INDCs (now NDCs) include three key goals, namely:

i. Reduce the emissions intensity of its GDP by 33 to 35 % by 2030 relative to 2005 levels;

ii. Achieve around 40% cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030;

[21] The INDC is treated as first NDC.

[22] Government of India, India's Intended Nationally Determined Contribution, India's submission to UNFCCC (2015), 29

iii. Create an additional carbon sink of 2.5 to 3 billion tons of CO_2 equivalent through additional forest and tree cover by 2030;

The last of these is directly relevant to the subject of this exercise. India's submission also noted that in order to achieve these contributions, India would continue with its on-going interventions, enhance existing policies and launch new initiatives in identified priority areas. For the forest-NDC, the relevant priority areas that are identified include the *full implementation of Green India Mission and other programmes of afforestation.*[23] India's submission notes that initiatives like Green India Mission (GIM) aim to further increase the forest/tree cover to the extent of 5 million hectares (mha) and improve quality of forest/tree cover on another 5 mha of forest/non-forest lands along with providing livelihood support. The GIM is expected to enhance carbon sequestration by about 100 million tonnes CO2 equivalent annually. The submission also identifies the role of other policies in augmenting afforestation efforts, specifically identifying National Agro-forestry Policy, REDD-Plus policy, Joint Forest Management, National Afforestation Programme and devolution of funds under Compensatory Afforestation to States. It also recognizes more recent initiatives such as the Green Highways (Plantation & Maintenance) Policy to develop 140,000 km long "tree-line" along both sides of national highways.

Some of these programmes are discussed in later chapters. Although an evaluation of these programmes is beyond the scope of this study, it merits attention that the projected addition to carbon stock (based on reported data for 2015 and 2017) shows that India will achieve less than half the NDC target of additional 2.5 BT of CO_2 equivalent of carbon stock by 2030, if 2015 is considered as the initial year.[24] **Figure 2** depicts CO_2 equivalent of carbon stock of forests (billion tonnes): BAU vs NDC Target. Clearly, there is a need to examine how this target will be met, including a review of current and additional funding.

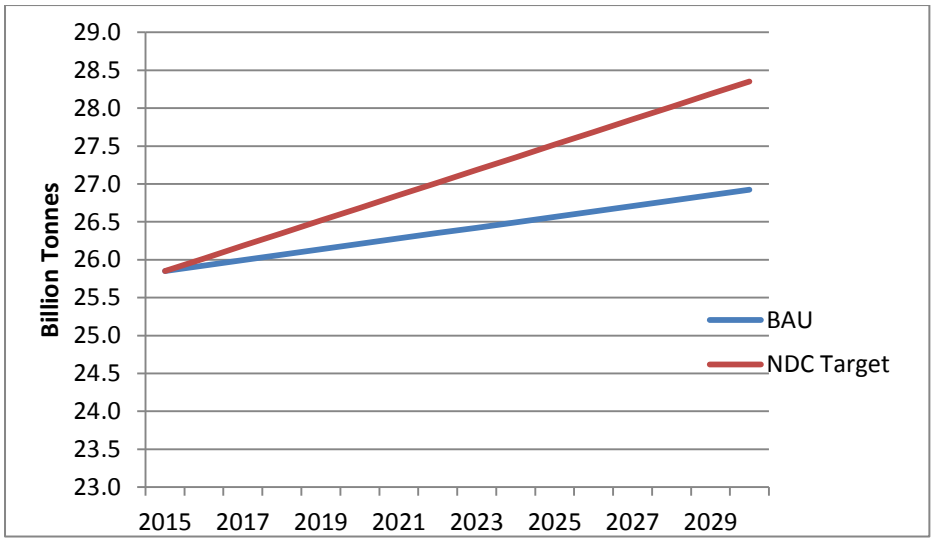


Figure 2 : CO_2 equivalent of carbon stock of forests (billion tonnes): BAU vs NDC Target
Source: Calculated by authors using data from ISFR, 2017

[23] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf

[24] Annual increase of carbon stock between 2015 and 2017 is 71.5 MT of CO_2 eq. (SoFR 2017 data). Even taking the

Objective and approach

This study aims at analysing the role of Finance Commission transfers in enhancing the quantity and quality of forests in India, and thereby also contributing to fulfilment of India's international commitments with respect to the SDGs and the NDCs.

The study is motivated by the following areas of inquiry:

1. What is the state of forests in India, and its underlying drivers?
2. What are the principles that have guided and should guide inter-Governmental fiscal transfers for achieving forest conservation and afforestation, generally in the context of a federal country like India, and specifically in the context of the objectives of the Central and State Governments in India?
3. What has been the impact of alternative forms of forest-related Finance Commission transfers in the past, with respect to the above principles and from the perspective of different stakeholders, e.g. State Government, State forest departments, NGOs etc.? Is there a diversion in the viewpoints of stakeholders?
4. Following from above, which instrument should be used- tax devolution or grants-in-aid- for effectively encouraging States towards forest conservation and afforestation. Or, is a mix of instruments needed to serve different objectives? In the case of a grant, should there be earmarking for use or agency, and should grant disbursal be linked to performance based indicators? If so, what should be the most appropriate indicators? In either case, which parameters should determine the inter-se shares of States, keeping in mind the overarching principles behind transfers.
5. Does India's forest-related NDC commitment necessitate the need to introduce or strengthen certain aspects or approaches in the current policy, institutional and funding landscape? What bearing do these instruments have on fiscal transfers?
6. Are there experiences from other countries that can offer lessons?

The following approach was followed in undertaking the study and in attempting to answer the above questions.

1. Study the incentives created by alternative forms of forest-related transfers as provided by the XII, XIII and XIV Finance Commissions, through the following:
    a. Analysis of forest quantity and quality indicators,
    b. Comparison of recommended transfers and actual releases to States based on fulfilment of grant conditionality and/or other factors.
    c. Impact on the revenues and expenditures of select State forest departments.
    d. Extensive interactions with stakeholders (e.g. Government agencies involved in forest related R&D, forest-surveys, policy making and implementation at the national, State and sub-State level, NGOs working in the forestry sector, experts, etc.) at the State, regional and national level.
2. Review and analysis of relevant National Acts and laws, Constitutional provisions, Central and States programmes and policies, as well as memoranda submitted by States to past and current Finance Commissions;

3. Study of international experience with respect to the design and impact of integrating performance-based forest indicators in inter-Governmental fiscal transfers;
4. Based on 1-3 above, recommend, for the consideration of the XV FC, how fiscal transfers to States can promote forest conservation and afforestation. These recommendations include principles that should underlie the design of transfers, the actual form of transfers and the parameters to determine the relative share of States, as well as the conditionality of use in the case of a grant.

The analysis in the study was based on data compiled from multiple sources. These include the Ministry of Finance, Reserve Bank of India, Ministry of Environment and Forests, State and Divisional Forest Departments, Ministry of Agriculture, Ministry of Tribal Affairs, State Finance Departments; State Finance Commission reports, Forest Survey of India, websites and documents of different forestry and related schemes and programmes etc.

Extensive stakeholder consultations were carried out in the course of the project through one-one meetings as well as workshops and roundtables. The major interactions undertaken in Dehradun, Delhi and Hyderabad are listed in **Table 2.**

In addition, the project team visited three States – **Arunachal Pradesh, Assam and Chhattisgarh** - for detailed discussions with various departments, particularly the finance department, State and divisional forest departments, agriculture department etc., on various aspects of fund flows for forest-related activities in States as well as to understand the underlying issues.

Table 2: Stakeholder Interactions

	Event	Venue and Date	Participating Organizations
1	Meeting on the impact of FC award for the forestry sector	TERI, New Delhi, 10 May, 2018	Indian Institute of Forest Management (IIFM), Institute of Economic Growth (IEG), The Nature Conservancy (TNC), TERI, Independent forestry experts
2	Expert consultation on FC transfers for forestry	TERI, New Delhi, 19 July, 2018	TNC, World Resources Institute (WRI), GIZ, Uttarakhand Rajya Gramin Evam Palayan Ayog, Independent Experts, TERI
3	TERI-ICFRE Multi-stakeholder consultation on forest conservation through fiscal federalism	ICFRE, Dehradun, August 31, 2018	Forest departments of Gujarat, Haryana, Himachal Pradesh, Madhya Pradesh, Meghalaya, Nagaland, Odisha, Punjab, Rajasthan, and Uttarakhand. XV Finance Commission, Ministry of Environment, Forest, and Climate Change (MoEFCC), ICFRE, Forest Research Institute, Forest Survey of India, GIZ, IEG, National Remote Sensing Centre, TNC, TERI
4	TERI- Telangana Forest Department multi-stakeholder	Aranya Bhavan, Hyderabad	Forest departments of Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Telangana, and West Bengal, Finance

	Event	Venue and Date	Participating Organizations
	consultation on forest conservation through fiscal federalism.	October 9, 2018.	department of Karnataka, National Green Highways Mission, National Remote Sensing Centre, IEG,Tata Institute of Social Sciences, Metastring Foundation, Tata Trusts, TNC, Centre, WRI, TERI
5	Stakeholder Consultation on Harnessing the Potential of Trees Outside Forests to Meet India's NDC Commitment	TERI, New Delhi, 27th November 2018	MoEFCC, Ministry of Agriculture & Farmers Welfare, Forest Research Institute, Forest Departments of Punjab, Karnataka, Uttar Pradesh, Haryana, Ministry of Road Transport and Highways, Haryana Forest Development Corpn., ICRAF, U.S. Agency for International Development , TNC Centre, Pragati Biotechnologies, World Resources Institute, FAO, IFFDC, CII-CESD, ICAR-CAFRI-Jhansi, MoRD, DAC & FW, Haryana Plywood Manufacturers Association, Sarvabhauma Forestry & Environmental Consultancy Services, IEG, TERI

The proceedings of these events are attached as Annexure I, II & III of the Report

Structure of the report

The Report comprises the following sections. It analyses the status and trends with respect to the forest and tree cover at the national and State level and critically analyses the main issues underlying these trends (Chapter 2). It examines the federal system in India as it applies to forests and wildlife as well as the major legislations, policies and programmes that provide the governance framework for forests in India (Chapter 3). It specifically narrows on the funding landscape for forestry activities sin India, examining fiscal transfers provided by previous Commissions as well the funding available through various Central schemes in addition to the State budgetary provisions (Chapter 4). It also looks at international policies and practices relevant to sustainable forest management, specifically analysing the role of fiscal transfers in promoting sustainable forest management in different countries (Chapter 5). Finally, based on the collective inference from the foregoing analysis, it proposes and discusses the main recommendations for consideration of the Fifteen Finance Commission (Chapter 6).

2. State of forests: an overview of trends and issues

Introduction

Forests cover around thirty percent of the earth's surface and function as most important terrestrial carbon sinks, serve as important habitat for biodiversity conservation, provide a range of important ecological services. They are critical in sustaining livelihood and economic opportunities, particularly in developing countries (See Figure 3).

In India, forests are home to 80 percent of the country's biodiversity (FAO, 2010) About 27.14 percent of fuel wood is extracted unsustainably from the forest (FSI 2011) and the dependence of biomass consuming livestock on forest is about 37 percent as per ISFR 2011.

Figure 3 : Environmental services provided by forests
Source : FAO, 2016a

As per the FAO Global Forest Resource Assessment 2015, India ranks tenth globally in terms of area under forests (Table 3). The top ten countries account for around 67 percent of the global forest area (ISFR, 2017).

Table 3: Top ten countries globally in terms of forest area- 2015.

S. No	Country	Forest area (000 ha)	% of country area	% global forest area
1	Russian Federation	814931	48	20
2	Brazil	493538	58	12
3	Canada	347069	35	9
4	United States of America	310095	32	8
5	China	208321	22	5
6	Democratic Republic of the Congo	152758	65	4
7	Australia	124751	16	3
8	Indonesia	91010	50	2
9	Peru	73973	58	2
10	India	70682	22	2
	Total	**26869**	**48**	**67**

Source: ISFR, 2017

For the period of 2010-2015, India is also listed among the top 10 countries reporting the largest annual net gain in forest area (Table 4).

Table 4: Top ten countries reporting the largest annual net gain in forest area, 2010-2015

S. No	Country	Annual forest area net gain	
		Area (thousand ha)	Rate (%)
1	China	1542	0.8
2	Australia	308	0.2
3	Chile	301	1.9
4	United States of America	275	0.1
5	Philippines	240	3.5
6	Gabon	200	0.9
7	Lao People's Democratic Republic	189	1.1
8	India	178	0.3
9	Viet Nam	129	0.9
10	France	113	0.7

Source: ISFR, 2017

In this chapter, we examine major trends with respect to forests at the national and State level in India, as well as highlight the major drivers of these trends and the underlying challenges in the sustainable management of forests in the country.

The following section discusses the status of forests and tree cover by density class at the national and State levels. The next section analyses trends in forest and tree cover over the past decade or so. The next section on issues related to protected areas in the country. This is followed by a discussion on the overlap between tribal areas and forest cover in the country. The final section discusses major challenges in the sustainability of forests in India, including issues related to the achievement of India's NDC commitment with respect to forest and tree cover.

Status of area under forest and tree cover

The total forest cover of the country is estimated to be 7,08,273 Sq.km, constituting 21.54 percent of the total geographic area (GA) of the country as per the India State of Forests Report, 2017. Tree cover is estimated at 93815 sq. km which is 2.85 percent of the country's GA. In total, the forest and tree cover thus constitutes 8, 02,088 Sq. km or 24.39 percent of the country's GA (ISFR, 2017). However, existing forest area falls short of the national target of 33% area under forests. See Box 3 for a discussion on this issue.

In terms of density classes (see Box 2), the latest FSI assessment shows that the area under Very Dense Forest is 98,158 Sq. km (13.86 % of total forest cover), under Moderately Dense Forest is 3,08,318 Sq. km (43.53 %) and under Open forest is 3,01,797 Sq. km (42.61 %) (Figure 4)

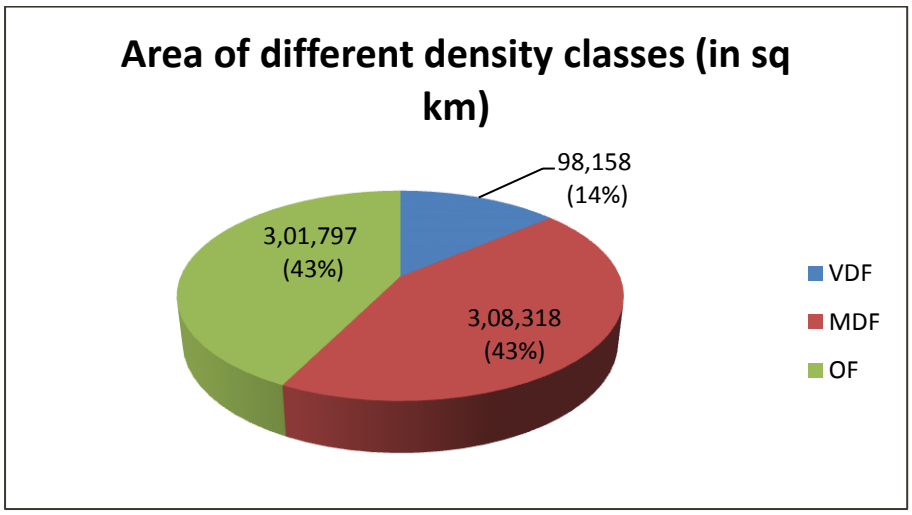


Figure 4 : Percent area under different density classes
Source : ISFR, 2017

Box 2 : Definitions used by the Forest Survey of India (ISFR, 2017)

Forest Cover : Forest Cover refers to all lands more than one hectare in area, with a tree canopy density of more than 10 percent irrespective of ownership legal status and land use. Such lands may not necessarily be a recorded forest area. It also includes orchards, bamboo and palm. Tree cover comprises of tree patches outside the recorded forest area exclusive of forest cover and less than the minimum mappable area (1 ha).

Density Classification within Forest Cover

- **Very Dense Forest (VDF) :** All lands with tree canopy density of 70 percent and above
- **Moderately Dense Forest (MDF)** : All lands with tree canopy density of 40 percent and more but less than 70 percent.
- **Open Forest (OF) :** All lands with tree canopy density of 10 percent and more but less than 40 percent.

Tree Cover : Tree cover comprises of tree patches outside the recorded forest area exclusive of forest cover and less than the minimum mappable area (1 ha) and upto 0.1 ha. Such small patches comprising of block, linear and scattered trees are not delineated as forest cover during interpretation of satellite data. The areas of scattered trees are computed by notional numbers".

Box 3 : A discussion on the national target of 33% geographical area under forests

The first official record of the prescribing one-third area under forest cover can be found in the first National Forest Policy of independent India in 1952. The prescription has been incorporated and reiterated in several Government policies and documents subsequently.

The 1952 Policy drew heavily from the colonial forest policy of 1894. It aimed at reorienting the forest policy taking note of current needs[1] and had a focus on sustained supply of timber and other forest produce[1], it expanded the scope of state forest policy to checking denudation and erosion in forests and establishing treelands for the 'amelioration of physical and climatic conditions'. The **1952 Forest Policy** suggested that '*India as whole, should aim at maintaining one-third of its total land area under forests*'. It further prescribed a larger percentage of 60% under forests for the Himalayas, the Deccan and other mountainous tracts liable to erosion. It prescribed 20 per cent for areas where erosion is not serious, e.g., in plains.

The first **Five Year Plan** also took note of the fact that India's forest cover at that time, approximately 18 – 20 per cent, was much lower a proportion as compared to other countries, and the need for maintaining one third area under forest cover as envisaged in the **Forest Policy Resolution** of May 12, 1952. The prescription to keep one third or 33 per cent of land under forest was retained in the **Forest Policy of 1988**. While it retained the national goal to be one-third, it prescribed a little higher goal for hilly and mountainous regions, that is, two-third of the area. The higher target for these areas was to 'prevent erosion and land degradation and to ensure the stability of the fragile eco-system'.

In 1992, **National Conservation Strategy and Policy Statement on Environment and Development** recognised that a mission mode is needed to ensure the 33 per cent target of forest cover for the country. Towards this, the Strategy lists action points for increasing forest cover and conserving the existing forests through, inter alia, massive afforestation and social forestry programmes; restriction on diversion of forest lands for non-forest uses and compensatory afforestation where such diversion cannot be avoided; land banks for undertaking compensatory afforestation; and involving local individuals and communities.

One of the four Expert committees for forests constituted in 1997 was the **Expert Committee to review the National Forest Policy 1988**, and its implementation constituted under the chairmanship of Mr. C. D. Pandya, IGF (Retd.) The Committee did not propose any major change in the Forest Policy and found the goal of one third of total land area of the county under forest/tree cover to be 'realistic, necessary and based on pragmatic consideration'. The Ministry of Environment and Forests constituted the first **National Forest Commission** in 2003[1] to review the working of the forest and wildlife sector in India, which submitted its report in 2006. The Commission in its recommendations endorsed the National forest Policy prescription of one-third of the landmass of India under tree cover, with 60% in the Himalaya.

The **draft Forest Policy of 2018** has retained the same target.

Distribution of target among States

As evident from above, the prescribed one-third area under forest cover is an overall average for the country. From the first time it appeared in the Forest Policy and Resolution of 1952, it has been clear that some regions have to maintain a greater proportion of land under forests. It stated, *"to maintain an overall average, it is essential that States better suited for the growth of trees should help to make good the deficiency in those parts where climatic and edaphic factors militate against tree growth."*. The 1952 Policy recommended 60 per cent in Himalayas, the Deccan and other mountainous tracts liable to erosion as 'an insurance against denudation'.

Subsequent Policy documents retained the differentiated targets and increased it marginally for hilly and mountainous regions, that is, to one third or 66 per cent. The idea of different targets for different regions/ecosystems, as mentioned in 1988 Forest Policy, seems to be to 'prevent erosion and land degradation and to ensure the stability of the fragile eco-system.'

No clear, scientific basis for the targets has been recorded in the policy. Background to 1952 Forest Policy and the First Five Year Plan made references to forest cover in other countries and inadequate forest cover in India. There are no fixed or international standards for area under forest cover. Countries or provinces set targets reforestation, tree cover, checking deforestation, etc. from time to time. Joshi et al note that the target was meant to be merely an instructive guide to increase the forest cover in the country. The target, especially the higher target for hilly regions has been criticised and questioned from time to time as unscientific or unfair. However, the target has remained unchanged and continued to be incorporated and endorsed in all Government policy documents over the years. While one of the rationales, as suggested by the 1988 Forest Policy, was to ensure stability of fragile ecosystem, it must be noted that many fragile and important ecosystems, such as wetlands, are left out of this prescribed target.

The target of keeping one third of total area under forest cover is a policy prescription. It does not have a regulatory impetus or is not incorporated in any legislation. However, owing to its incorporation in policies and reports over the years, it is seen as more than a suggestion, but a clear target to be achieved by the country.

Forest and tree cover in States and UTs

Table 5 shows the current status of area under forest by density class and tree cover in the States and Union Territories of India.

Table 5: Area under forest by density class and tree cover in States and Union Territories

(Area in sq. km)

S. No	State/Union Territory	Geographic Area	VDF	MDF	OF	Total	Tree cover	FC+TC
1	Andhra Pradesh	162968	1957 (1.2%)	14051 (8.6%)	12139 (7.4%)	28147 (17.3%)	3753 (2.3%)	31900 (19.6%)
2	Arunachal Pradesh	83743	20721 (24.7%)	30955 (37.0%)	15288 (18.3%)	66964 (80.0%)	807 (1.0%)	67771 (80.9%)
3	Assam	78438	2797 (3.6%)	10192 (13.0%)	15116 (19.3%)	28105 (35.8%)	1496 (1.9%)	29601 (37.7%)
4	Bihar	94163	332 (0.4%)	3260 (3.5%)	3707 (3.9%)	7299 (7.8%)	2263 (2.4%)	9562 (10.2%)
5	Chhattisgarh	135191	7064 (5.2%)	32215 (23.8%)	16268 (12.0%)	55547 (41.1%)	3833 (2.8%)	59380 (43.9%)
6	Delhi	1483	6.72 (0.5%)	56.24 (3.8%)	129.45 (8.7%)	192.41 (13.0%)	113 (7.6%)	305.41 (20.6%)
7	Goa	3702	538 (14.5%)	576 (15.6%)	1115 (30.1%)	2229 (60.2%)	323 (8.7%)	2552 (68.9%)
8	Gujarat	196022	378 (0.2%)	5200 (2.7%)	9179 (4.7%)	14757 (7.5%)	8024 (4.1%)	22781 (11.6%)

S. No	State/Union Territory	Geographic Area	VDF	MDF	OF	Total	Tree cover	FC+TC
9	Haryana	44212	28 (0.1%)	452 (1.0%)	1108 (2.5%)	1588 (3.6%)	1415 (3.2%)	3003 (6.8%)
10	Himachal Pradesh	55673	3110 (5.6%)	6705 (12.0%)	5285 (9.5%)	15100 (27.1%)	822 (1.5%)	15922 (28.6%)
11	Jammu &Kashmir	222236	4075 (1.8%)	8579 (3.9%)	10587 (4.8%)	23241 (10.5%)	7815 (3.5%)	31056 (14.0%)
12	Jharkhand	79714	2598 (3.3%)	9686 (12.2%)	11269 (14.1%)	23553 (29.5%)	2922 (3.7%)	26475 (33.2%)
13	Karnataka	191791	4502 (2.3%)	20444 (10.7%)	12604 (6.6%)	37550 (19.6%)	5713 (3.0%)	43263 (22.6%)
14	Kerala	38863	1663 (4.3%)	9407 (24.2%)	9251 (23.8%)	20321 (52.3%)	2959 (7.6%)	23280 (59.9%)
15	Madhya Pradesh	308245	6563 (2.1%)	34571 (11.2%)	36280 (11.8%)	77414 (25.1%)	8073 (2.6%)	85487 (27.7%)
16	Maharashtra	307713	8736 (2.8%)	20652 (6.7%)	21294 (6.9%)	50682 (16.5%)	9831 (3.2%)	60513 (19.7%)
17	Manipur	22327	908 (4.1%)	6510 (29.2%)	9928 (44.5%)	17346 (77.7%)	220 (1.0%)	17566 (78.7%)
18	Meghalaya	22429	453 (2.0%)	9386 (41.8%)	7307 **(32.6%)**	17146 (76.4%)	657 (2.9%)	17803 (79.4%)
19	Mizoram	21081	131 (0.6%)	5861 (27.8%)	12194 (57.8%)	18186 (86.3%)	467 (2.2%)	18653 (88.5%)
20	Nagaland	16579	1279 (7.7%)	4587 (27.7%)	6623 (39.9%)	12489 (75.3%)	379 (2.3%)	12868 (77.6%)
21	Odisha	155707	6967 (4.5%)	21370 (13.7%)	23008 (14.8%)	51345 (33.0%)	3993 (2.6%)	55338 (35.5%)
22	Punjab	50362	8 (0%)	806 (1.6%)	1023 (2.0%)	1837 (3.6%)	1622 (3.2%)	3459 (6.9%)
23	Rajasthan	342239	78 (0%)	4340 (1.3%)	12154 (3.6%)	16572 (4.8%)	8266 (2.4%)	24838 (7.3%)
24	Sikkim	7096	1081 (15.2%)	1575 (22.2%)	688 (9.7%)	3344 (47.1%)	35 (0.5%)	3379 (47.6%)
25	Tamil Nadu	130058	3672 (2.8%)	10979 (8.4%)	11630 (8.9%)	26281 (20.2%)	4671 (3.6%)	30952 (23.8%)
26	Telangana	112077	1596 (1.4%)	8738 (7.8%)	10085 (9.0%)	20419 (18.2%)	2669 (2.4%)	23088 (20.6%)
27	Tripura	10486	656 (6.3%)	5246 (50.0%)	1824 (17.4%)	7726 (73.7%)	215 (2.1%)	7941 (75.7%)
28	Uttar Pradesh	240928	2617 (1.1%)	4069 (1.7%)	7993 (3.3%)	14679 (6.1%)	7442 (3.1%)	22121 (9.2%)

S. No	State/Union Territory	Geographic Area	VDF	MDF	OF	Total	Tree cover	FC+TC
29	Uttaranchal	53483	4969 (9.3%)	12884 (24.1%)	6442 (12.0%)	24295 (45.4%)	767 (1.4%)	25062 (46.9%)
30	West Bengal	88752	2994 (3.4%)	4147 (4.7%)	9706 (10.9%)	16847 (19.0%)	2136 (2.4%)	18983 (21.4%)
31	Andaman & Nicobar	8249	5678 (68.8%)	684 (8.3%)	380 (4.6%)	6742 (81.7%)	35 (0.4%)	6777 (82.2%)
32	Chandigarh	114	1.36 (1.2%)	13.82 (12.1%)	6.38 (5.6%)	21.56 (18.9%)	10 (8.8%)	31.56 (27.7%)
33	Dadra& Nagar Haveli	491	0	80 (16.3%)	127 (25.9%)	207 (42.2%)	30 (6.1%)	237 (48.3%)
34	Daman & Diu	112	1.4 (1.3%)	5.82 (5.2%)	13.27 (11.8%)	20.49 (18.3%)	10 (8.9%)	30.49 (27.2%)
35	Lakshadweep	32	0	17.04 (53.3%)	10.06 (31.4%)	27.1 (84.7%)	2 (6.3%)	29.1 (90.9%)
36	Pondicherry	480	0	17.6 (3.7%)	36.07 (7.5%)	53.67 (11.2%)	27 (5.6%)	80.67 (16.8%)
	Total	3287239	98158.4 8 (3.0%)	308317.52 (9.4%)	301797.23 (9.2%)	708273.23 (21.5%)	93815 (2.9%)	802088.23 (24.4%)

Figures in parenthesis indicate per cent in total GA of State/UT
Source: ISFR, 2017

The following observations can be made on the basis of the above:

- Among the top States in terms of forest cover are Madhya Pradesh (highest area under forest cover, 77,414 Sq. km), followed by Arunachal Pradesh (66, 964 Sq. km) and Chhattisgarh (55,547 Sq. km).
- States that have the largest area under dense forests (Very dense forest and moderately dense forest) include Arunachal Pradesh (largest area under dense forest, 51,676 Sq. km), followed by Madhya Pradesh (41,134 Sq. km) and Chhattisgarh (39,279 Sq. km).
- In Madhya Pradesh, which has the largest area under forest cover among the States and UTs, 47 percent of the forest cover is under open forest. The share of open forests in other States with high forest cover is- 22.8 percent in Arunachal Pradesh, 29.3 percent in Chhattisgarh, 45 percent in Odisha and 42 percent in Maharashtra. The maximum percentage of open forest is reported for Rajasthan (73.3 percent). The relative composition of forests under different density classes in States is an outcome of a variety of factors including climatic, edaphic and a range of physiographic conditions as well as developmental and demographic pressures.
- Some States like the NE States of Manipur, Meghalaya, Mizoram, Tripura, Nagaland, as well as others like Uttarakhand, Kerala and Goa, may each constitute only about 2-3% of the national forest cover, but have significant share of their own GA (around 75% for the NE States and 45-60% for others) under forest cover.

Forest cover vs forest area

It is also important to make the distinction between forest cover as estimated through satellite imagery and recorded/notified forest area on ground. (See Box 4 for the definition of forest cover)

Box 4 : Forest Area

> The term 'Forest Area' (or recorded forest area) generally refers to all the geographic areas recorded as forest in Government records. Recorded forest areas largely comprise of Reserved Forests (RF) and Protected Forests (PF), which have been constituted under the provisions of Indian Forest Act, 1927 or its counterpart State Acts. Besides RFs and PFs, the recorded forest area may include all such areas, which have been recorded as forests in the revenue records or have been constituted so under any State Act or local laws. Recorded forest may have blank areas with tree density less than 10%such as degraded lands, wetlands, rivers, riverbeds, creeks in mangroves, snow-covered areas, glaciers and other snow covered areas, alpine pastures, cold deserts, grasslands etc.

Source: ISFR, 2017

Table 6: Recorded Forest Area and Forest Cover in States/ Union territories

State/ Union Territory	Geographical Area (Sq.km.)	Recorded Forest Area (Sq.km.)	Forest cover (Sq.km.)
Andhra Pradesh	162968	37258	28147
Arunachal Pradesh	83743	51407	66964
Assam	78438	26832	28105
Bihar	94163	6877	7299
Chhattisgarh	135192	59772	55547
Delhi	1483	102	192
Goa	3702	1225	2229
Gujarat	196244	21647	14757
Haryana	44212	1559	1588
Himachal Pradesh	55673	37033	15100
Jammu & Kashmir	222236	20230	23241
Jharkhand	79716	23605	23553
Karnataka	191791	38284	37550
Kerala	38852	11309	20321
Madhya Pradesh	308252	94689	77414
Maharashtra	307713	61579	50682
Manipur	22327	17418	17346
Meghalaya	22429	9496	17146
Mizoram	21081	5641	18186
Nagaland	16579	8623	12489
Odisha	155707	61204	51345
Punjab	50362	3084	1837
Rajasthan	342239	32737	16572

State/ Union Territory	Geographical Area (Sq.km.)	Recorded Forest Area (Sq.km.)	Forest cover (Sq.km.)
Sikkim	7096	5841	3344
Tamil Nadu	130060	22877	26281
Telangana	112077	26904	20419
Tripura	10486	6294	7726
Uttar Pradesh	240928	16582	14679
Uttaranchal	53483	38000	24295
West Bengal	88752	11879	16847
Andaman & Nicobar	8249	7171	6742
Chandigarh	114	35	22
Dadra & Nagar Haveli	491	204	207
Daman & Diu	111	8	20
Lakshadweep	30	0	27
Pondicherry	490	13	54
Total	**3287469**	**767419**	**708273**

Source: ISFR 2017

ISFR notes that assessment of forest cover within and outside RFA is not possible without geo-referenced digitised boundaries. Since digitised RFA boundaries are available for 16 States only, green wash area is used as a substitute for RFA for the remaining States.

The ISFR Assessment of 2017 shows that the top 5 States in terms of the recorded forest area and the total forests cover are the same, though their relative positions vary- Madhya Pradesh, Maharashtra, Odisha, Chhattisgarh and Arunachal Pradesh are the top 5 in terms of forest area; and Madhya Pradesh, Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra are the top 5 in terms of forest cover.

Table 6 shows that the total forest cover (708273 sq. km) in the country is about 8 percent lower than total recorded forest area (RFA) (767419 sq. km). However, this difference is not uniform across States. As can be seen from Table 6, in some States like Andhra Pradesh, Rajasthan, Gujarat, Maharashtra, MP, and UP, forest cover is less than the forest area while in most NE States like Arunachal Pradesh, Assam, Meghalaya, Mizoram, Nagaland, Tripura as well as some other States such as West Bengal, Tamil Nadu, Kerala, and Goa, the opposite is true.

This distinction has important implication for land use change in States. As mentioned in Box 4, forest area is a legal and administrative category defined as forests, irrespective of the canopy density. This includes areas declared as forests under IFA or recorded as forests in revenue records. Some areas that comprise deserts and scrubs in Rajasthan and Gujarat, and snow-capped mountainous regions in Uttarakhand are declared or recorded as forest areas, even though they may not fall under the definition of forest cover as per ISFR. This is one of the reasons that recorded forest area in these States is much higher than forest cover (see Table 6). Higher forest cover than forest area in NE States like Arunachal Pradesh, Meghalaya, Mizoram, Nagaland could also be due to the land use and ownership pattern of land in these States, where communities own a large part of land, including forest bearing land. Even in terms of land under PA, these States have very few areas declared as PAs despite existence of dense forests and rich reservoirs of biodiversity.

RFA is also a matter of Government decision, than the actual existence of forests. For example, Himachal Pradesh, in 1952 declared all of its wasteland and common land as undemarcated protected forests vide a State Government notification.[25] This is the reason RFA (37033 sq. km) in Himachal Pradesh is nearly double of forest cover (15100 s km) in the State.

Tree cover in States and UTs

Table 7 below gives the area under Tree Cover in different States and UTs as well as the percentage of geographical area that this represents. It shows that the State with maximum area under tree cover is Maharashtra (9831 Sq. km) followed by Rajasthan (8266sq km) and Madhya Pradesh (8073 sq. km). Overall, tree cover represents only about 2.85% of the total geographical area of the country. As a percentage of its own geographical area, only two States (Goa and Kerala) have more than 5% land under tree cove, followed by State like Gujarat, Haryana, J&K, Jharkhand, Maharashtra, Punjab, Tamil Nadu etc. UTs, such as Daman & Diu, Chandigarh and Lakshadweep, have a higher per centage of their GA under tree cover.

Table 7: Area under Tree Cover in States and UTs

State/UT	Area (in sq. Km)	As % of State's geographical area
Andhra Pradesh	3753	2.30
Arunachal Pradesh	807	0.96
Assam	1496	1.91
Bihar	2263	2.40
Chhattisgarh	3833	2.84
Goa	323	8.73
Gujarat	8024	4.09
Haryana	1415	3.20
Himachal Pradesh	822	1.48
Jammu &Kashmir	7815	3.52
Jharkhand	2922	3.67
Karnataka	5713	2.98
Kerala	2959	7.61
Madhya Pradesh	8073	2.62
Maharashtra	9831	3.19
Manipur	220	0.99
Meghalaya	657	2.93
Mizoram	467	2.22
Nagaland	379	2.29
Odisha	3993	2.56
Punjab	1622	3.22
Rajasthan	8266	2.42
Sikkim	35	0.49

[25] Notification no. Ft 43-241-A/49-2

State/UT	Area (in sq. Km)	As % of State's geographical area
Tamil Nadu	4671	3.59
Telangana	2669	2.38
Tripura	215	2.05
Uttar Pradesh	7442	3.09
Uttaranchal	767	1.43
West Bengal	2136	2.41
Delhi	113	7.62
Andaman & Nicobar	35	0.42
Chandigarh	10	8.77
Dadra& Nagar Haveli	30	6.11
Daman & Diu	10	8.93
Lakshadweep	2	6.25
Pondicherry	27	5.63
Total	93815	2.85

Source: ISFR, 2017

Trends in forest and tree cover

An increase of 6600 Sq. km has been observed in the forest cover at the national level since the last (2015) assessment, with three States namely Andhra Pradesh, Karnataka and Kerala having contributed the most to this increase. Most of this increase has been attributed to plantation and conservation activities both inside the forests and outside the recorded forest areas. As compared to 2015 assessment, tree cover in the country has increased by 1,243 Sq. km.

In order to assess longer term trends in forest cover in India, the decadal change in the forest cover has been assessed between 2007-2017. The year 2007 was selected since it marks the beginning of the use of an enhanced methodology for mapping and interpreting satellite data. Hence, it is the earliest year for which the forest cover assessment can be compared with the latest FSI 2017 assessment. See Table 8 for changes in forest cover mapping over the years (2005, 2009 and 2011).

Table 8: Forest cover mapping over the years

FSI Report	Data	Sensor	Spatial resolution	Scale	Minimum Mappable Unit (ha)	Mode of interpretation
FSI Report, 2005	2004	IRS-1D LISS III	23.5 m	1:50000	1	Digital
FSI Report, 2009	2006	IRS-P6-LISS III	23.5 m	1:50000	1	Digital
FSI Report, 2017	2015-16	IRS P6-LISS III & IRS-Resourcesat-2 LISS III	23.5 m	1:50000	1	Digital

Source: ISFR, 2017

As per the analysis done from 2007 to 2017, the total forest cover and tree cover of the country has increased by 18,305 Sq.km, an increase of about 2.3% in the last decade. The results are shown in Table 9.

Table 9: Change in Forest and Tree Cover: 2007 and 2017

State/UT	Change in FC (sq. km)	Change in TC (sq. km)	Total Change (sq. km)
Andhra Pradesh	5285	-526	4759
	(23.12)	(-12.29)	(17.53)
Arunachal Pradesh	-389	215	-174
	(-0.58)	(36.32)	(-0.26)
Assam	413	-94	319
	(1.49)	(-5.91)	(1.09)
Bihar	495	-232	263
	(7.28)	(-9.30)	(2.83)
Chhattisgarh	-323	-194	-517
	(-0.58)	(-4.82)	(-0.86)
Goa	78	37	115
	(3.63)	(12.94)	(4.72)
Gujarat	137	-366	-229
	(0.94)	(-4.36)	(-1.00)
Haryana	-6	6	0
	(-0.38)	(0.43)	(0.00)
Himachal Pradesh	432	184	616
	(2.95)	(28.84)	(4.02)
Jammu &Kashmir	555	1051	1606
	(2.45)	(15.54)	(5.45)
Jharkhand	659	-110	549
	(2.88)	(-3.63)	(2.12)
Karnataka	1360	30	1390
	(3.76)	(0.53)	(3.32)
Kerala	2997	158	3155
	(17.30)	(5.64)	(15.68)
Madhya Pradesh	-286	1202	916
	(-0.37)	(17.49)	(1.08)
Maharashtra	32	365	397
	(0.06)	(3.86)	(0.66)
Manipur	66	23	89
	(0.38)	(11.68)	(0.51)
Meghalaya	-175	115	-60
	(-1.01)	(21.22)	(-0.34)
Mizoram	-1054	295	-759
	(-5.48)	(171.51)	(-3.91)
Nagaland	-975	79	-896
	(-7.24)	(26.33)	(-6.51)
Odisha	2790	442	2348
	(5.75)	(-9.97)	(4.43)
Punjab	173	-77	96
	(10.40)	(-4.53)	(2.85)
Rajasthan	536	-8	528
	(3.34)	(-0.10)	(2.17)

State/UT	Change in FC (sq. km)	Change in TC (sq. km)	Total Change (sq. km)
Sikkim	-13	15	2
	(-0.39)	(75.00)	(0.06)
Tamil Nadu	2943	-297	2646
	(12.61)	(-5.98)	(9.35)
Telangana	-1821	-243	-2064
	(-8.19)	(-8.34)	(-8.21)
Tripura	-347	44	-303
	(-4.30)	(25.73)	(-3.68)
Uttar Pradesh	338	-389	-51
	(2.36)	(-4.97)	(-0.23)
Uttaranchal	-200	102	-98 (-0.39)
	(-0.82)	(15.34)	
West Bengal	3853	-322	3531
	(29.65)	(-13.10)	(22.85)
Delhi	15.41	-10	5.41
	(8.71)	(-8.13)	(1.80)
Andaman & Nicobar	80	-9	71
	(1.20)	(-20.45)	(1.06)
Chandigarh	4.56	-1	3.56
	(26.82)	(-9.09)	(12.71)
Dadra& Nagar Haveli	-4	3	-1
	(-1.90)	(11.11)	(-0.42)
Daman & Diu	14.49	1	15.49
	(241.50)	(11.11)	(103.27)
Lakshadweep	1.1	-2	-0.9
	(4.23)	(-50.00)	(-3.00)
Total	17709.1	596	18305.1
	(2.56)	(0.64)	(2.34)

Source: ISFR, 2007, 2017

Figures in parenthesis indicate percent change between 2007 and 2017

The Table shows that West Bengal, Kerala, Tamil Nadu and Odisha have seen among the largest increase in FC, while States like Chhattisgarh, MP and NE States of Arunachal, Mizoram and Nagaland have seen large decreases. The change in TC shows that Madhya Pradesh has observed the maximum increase, followed by Jammu and Kashmir and Maharashtra (365 sq. km). Andhra Pradesh (post division) has observed the maximum loss in the tree cover followed by Odisha and Uttar Pradesh. Overall, West Bengal, Kerala, Tamil Nadu and Odisha have done well.

Table 10 below shows the forest cover and tree cover under different density classes at the national level.

Table 10: National forest cover and tree cover under different density classes.

(Area in sq. km)

Year of assessment	VDF	MDF	OF	Total	FC+TC
2007	83510	319012	288377	690899	783783
2011	83471	320736	287820	692027	782873

Year of assessment	VDF	MDF	OF	Total	FC+TC
2013	83502	318745	295651	697898	789165
2015	85904	315374	300395	701673	794245
2017	98158	308318	301797	708273	802088

Source: ISFR, 2009, 2011, 2013, 2015 and 2017.

As can be seen from the Table 10 and Figures 5-8, between 2007 and 2017, VDF increased by 8.06%. At the same time MDF have decreased by 1.7% while OF increased by 2.27%. However, in absolute terms, the decrease in MDF and increase in OF are significant. In order to understand how one density class may have converted to another, a change matrix has been generated from the years 2007 to 2017 indicating the change in the extent of forest cover across density classes (Table 11).

This is graphically represented in figures below.

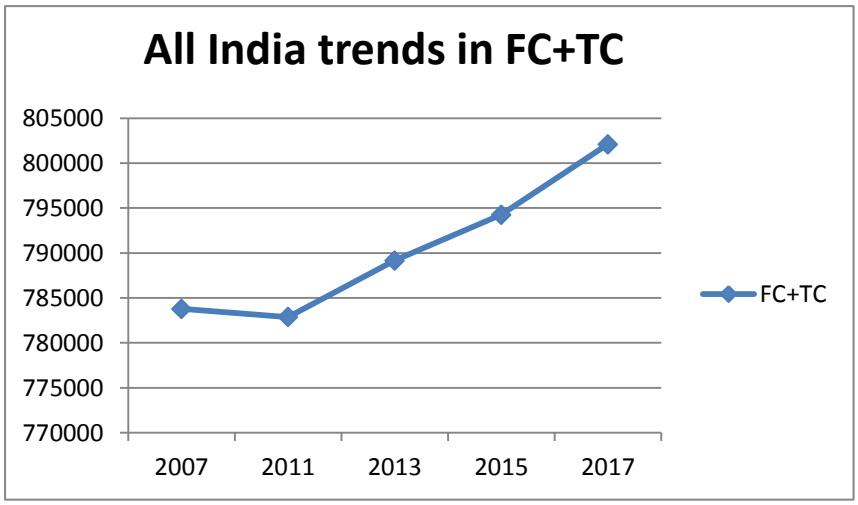


Figure 5 : Change in FC+TC at national level from 2007 to 2017
Source: ISFR, 2009, 2011, 2013, 2015 and 2017

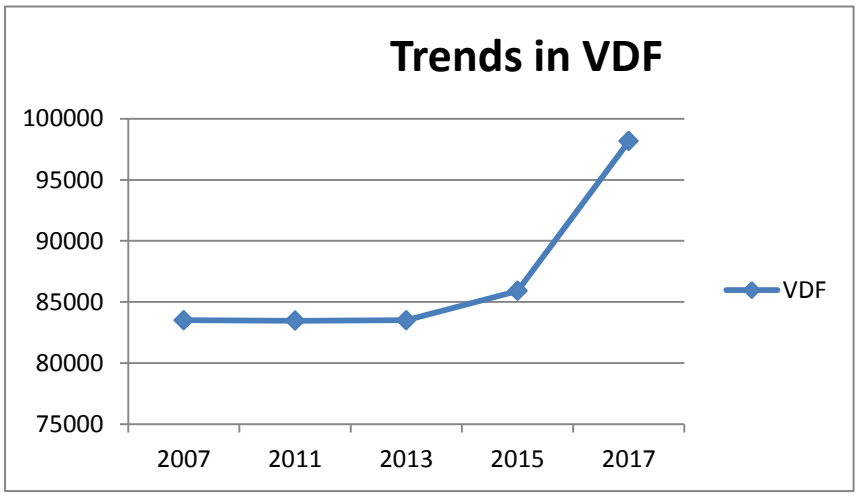


Figure 6 : Change in VDF at national level from 2007 to 2017
Source: ISFR, 2009, 2011, 2013, 2015 and 2017

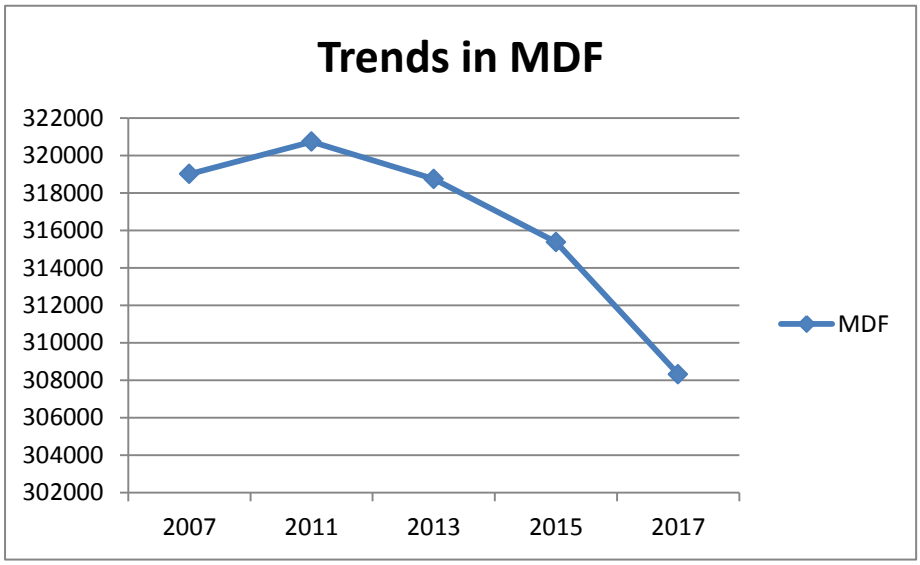


Figure 7 : Change in MDF at national level from 2007 to 2017
Source: ISFR, 2009, 2011, 2013, 2015 and 2017

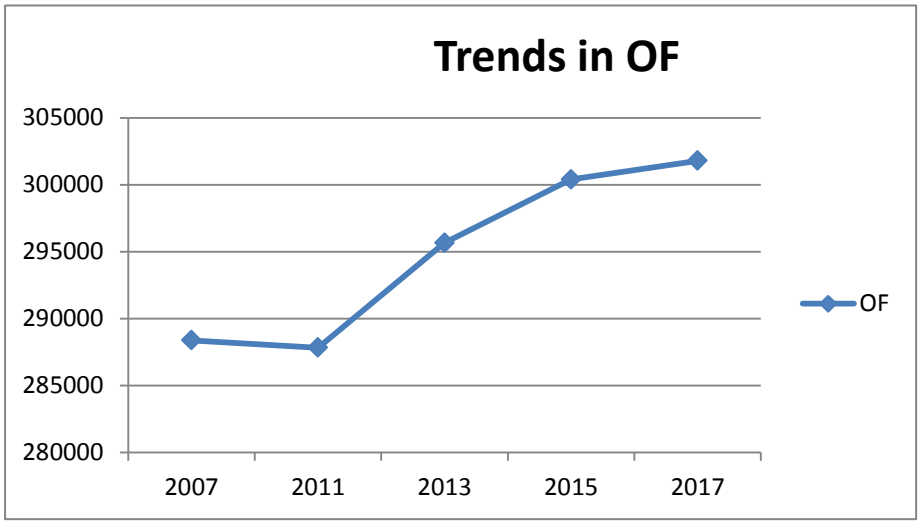


Figure 8 : Change in OF at national level from 2007 to 2017
Source: ISFR, 2009, 2011, 2013, 2015 and 2017

Table 11: Changes in forest cover by density class at the national level during assessment years

(Area in sq. km)

Forest cover change in Sq. km	2005-2007	2009-2011	2011-2013	2013-2015	2015-2017	Total forest change from 2007-2017
VDF to MDF	-127	-229	-255	-623	-3,380	-4614
VDF to OF	-45	-21	-45	-145	-357	-613
MDF to VDF	+220	+311	+433	+2897	+12,183	+16,044
MDF to OF	-1948	-1903	-1,786	-2,438	-11,210	-19285

Forest cover change in Sq. km	2005-2007	2009-2011	2011-2013	2013-2015	2015-2017	Total forest change from 2007-2017
OF to VDF	+35	+20	+4	+362	+1,337	+1758
OF to MDF	+1821	+2929	+820	+2580	+17,928	+26078

Gain	+
Loss	-

Source: ISFR, 2009, 2011, 2013, 2015 and 2017

The Table shows the following:

- A total of 16044 sq. km of MDF got converted to VDF and 1758 Sq. km of OF to VDF. Also, about 26078 sq. km of OF got converted to MDF. The conversion to higher density classes indicating better conservation and plantation measures.
- A total of 4614 Sq. km of VDF got converted into MDF and 613 Sq. km of VDF got converted into OF. Significantly, a total of 19285 Sq. km MDF got converted to OF indicating degradation/deforestation in these areas. The reasons could include diversion of forest land for non-forestry purposes, encroachments and other biotic and natural disturbances in the forests.

Change in forest cover by density class across states shows the following:

- The maximum increase in the total forest cover and tree cover has been seen in Andhra Pradesh followed by West Bengal, Kerala, Tamil Nadu and Odisha. In the North Eastern States, Assam has shown the largest increase followed by Manipur and Sikkim. All other North-Eastern States have shown a decrease in the total forest and tree cover.
    - Andhra Pradesh has observed the maximum increase in the Total forest Cover and Tree cover in the country since 2007. Very dense forest, Moderately Dense Forest and open forest – all the categories have observed an increase in the forest cover. The net increase in forest cover may be attributed mainly to plantation and conservation activities both within and outside the Recorded Forest areas as well as improvement.
    - In West Bengal, the total Forest Cover and Tree cover has increased since 2007. Very Dense Forest, and Open Forest have shown an increase and the Moderately Dense Forest has decreased. The increase in the forest cover may be attributed to the plantation activities mostly outside recorded forest areas as well as due to the conservation of mangroves (ISFR, 2017).
    - In Kerala, MDF saw a decrease in FC and TC 2015 but an increase in 2017. The main reason for the increase in the forest cover in the State can be attributed to commercial plantations outside Forest areas and also improvement in the interpretation due to better radiometric resolution of the recent satellite data from Resourcesat-2 (ISFR, 2017).

- The maximum loss of the total forest and tree cover has been observed in Telangana[26] (2064 Sq. km), followed by Nagaland and Mizoram. The decrease in forest cover observed in Nagaland can be attributed to shifting cultivation and development activities (ISFR, 2017). Similarly, the decrease in Forest cover in Mizoram can be attributed to shifting cultivation, rotational felling and developmental activities (ISFR, 2017).
- The maximum increase in VDF was observed in Chhattisgarh (2902 Sq. km) followed by Karnataka (2725 Sq. km) and Andhra Pradesh (1621 Sq. km). The maximum decrease in VDF was observed in Jammu and Kashmir (-223 Sq. km) followed by Arunachal Pradesh (-137 Sq. km) and Himachal Pradesh (-114Sq. km).
- The top three States with an increase in MDF from 2007 to 2017 are: Andhra Pradesh (2468 Sq. km) followed by Manipur (1036 sq. km) and Tamil Nadu (763 Sq. km). Telangana has observed the maximum decrease in MDF (-4436 Sq. km) followed by Chhattisgarh (-2823 Sq. km) and Assam (-1366 Sq. km).
- West Bengal has shown the maximum increase in the open forest (4343 sq. km) followed by Kerala (2780 sq. km) and Odisha (2620 Sq. km). The maximum loss in OF has been observed in Karnataka (-1628 Sq. km) followed by Tripura (-1368 sq. km) and Manipur (-1177 Sq. km).

Protected areas

Protected Areas (PA) are those in which human occupation or at least the exploitation of resources is limited. As per the Wildlife Protection Act, 1972 protected areas are categorised into four types, (i) national park, (ii) wildlife sanctuary, (iii) conservation reserve, or (iv) community reserve. The legal framework for these protected areas is discussed in Chapter 3.

The International Union for Conservation of Nature (IUCN) has defined Protected Area as a 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 value. This definition of IUCN has been widely accepted across regional and global frameworks in its categorization guidelines for protected areas. 771 areas have been declared as Protected Areas under the four categories recognised under WPA, 1972. These correspond to four of IUCN categories Ib (wilderness area), II (National Park), IV (Habitat / Species Management Area), and VI (Protected area with sustainable use of natural resources). (UNEP-WCMC (2018)

Table 12: Protected Areas of India (as on July, 2018)

	No.	Total Area (km^2)	Coverage % of Country
National Parks (NPs)	104	40501.03	1.23
Wildlife Sanctuaries (WLSs)	544	118931.80	3.62

[26] For Years 2007, 2011 and 2013, the tree cover data is not available separately for Telangana and Andhra Pradesh. The tree cover value has been proportionately distributed with reference to 2015 and 2017 tree cover figures. Strictly speaking, inter-temporal comparison Andhra Pradesh and Telangana is not appropriate given that two states were bifurcated only in 2017.

	No.	Total Area (km^2)	Coverage % of Country
Conservation Reserves (CRs)	77	2594.03	0.08
Community Reserves	46	72.61	0.002
Protected Areas (PAs)	771	162099.47	4.93

Source: National Wildlife Database Cell, Wildlife Institute of India Website: http://www.wii.gov.in

The network of 771 Protected Areas extends over 1,62,099.47 sq. km. (4.93% of total geographic area), comprising 104 National Parks, 544 Wildlife Sanctuaries, 77 Conservation Reserves and 46 Community Reserves, as shown in **Table 12**. Table **13** shows the increase in protected areas from 2000 to 2018. Overall, wildlife sanctuaries cover 73% of the total protected area, followed by national parks (25%) and conservation reserves (2%).

Table 13: Protected Areas of India from 2000 to 2018

Year	No. of National Parks	Area Under National Parks (km²)	No. of Wild Life Sanctuaries	Area Under Wild Life Sanctuaries (km²)	No. of Community Reserves	Area Under Community Reserves (km²)	No. of Conservation Reserves	Area Under Conservation Reserves (km²)	No. of Protected Areas	Total Area under Protected Areas (km²)
2000	89	37803.10	485	108862.50	-	-	-	-	574	146665.60
2006	96	38392.12	503	111229.48	1	0.31	4	42.87	604	149664.78
2007	98	38428.88	507	111529.04	5	21.00	7	94.82	617	150073.74
2008	99	39441.74	510	113123.35	5	21.00	45	1259.84	659	153845.93
2009	99	39441.74	512	113395.36	5	21.00	45	1259.84	661	154117.94
2010	102	40283.62	516	113842.87	5	21.00	47	1382.28	670	155529.77
2011	102	40283.62	518	113998.75	5	21.00	52	1801.29	677	156104.66
2012	103	40500.13	526	114933.44	5	21.00	59	2012.93	693	157467.50
2013	102	40500.13	532	117123.63	19	30.94	64	2232.61	717	159887.31
2014	103	40500.13	535	118290.66	43	58.22	64	2232.61	745	161081.62
2015	103	40500.13	541	118866.44	44	59.51	71	2548.82	759	161974.90
2016	103	40500.13	543	118917.71	45	59.66	72	2566.20	763	162043.70
2017	103	40500.13	544	118931.80	46	72.61	76	2587.95	769	162092.49
2018	104	40501.13	544	118931.80	46	72.61	77	2594.03	771	162099.47

Source: National Wildlife Database Cell, Wildlife Institute of India Website: http://www.wii.gov.in

The State/Union Territory wise details of PAs in the country are given in **Table 14.** Compared with Table 13, the sum of PA across States is more than the national figure, indicating the possibility of some overlap across State boundaries.

As per the Table, Gujarat has the largest network of protected areas, followed by Maharashtra, Jammu & Kashmir and Andhra Pradesh.

Table 14 : State/Union Territory wise details of PAs in the country

State/ Union Territory	Geographical Area (Sq.km.)	Protected Area (Sq.km.)
Andhra Pradesh	162968	13006.62
Arunachal Pradesh	83743	9778.57
Assam	78438	3962
Bihar	94163	3237.33
Chhattisgarh	135192	6659.45
Delhi	1483	27.82
Goa	3702	754.91
Gujarat	196244	17325.54
Haryana	44212	330.18
Himachal Pradesh	55673	10016.86
Jammu & Kashmir	222236	14997.86
Jharkhand	79716	2182.15
Karnataka	191791	9749.11
Kerala	38852	2488.057
Madhya Pradesh	308252	10814.76
Maharashtra	307713	15429.78
Manipur	22327	224.4
Meghalaya	22429	301.68
Mizoram	21081	1240.75
Nagaland	16579	222.36
Odisha	155707	7959.85

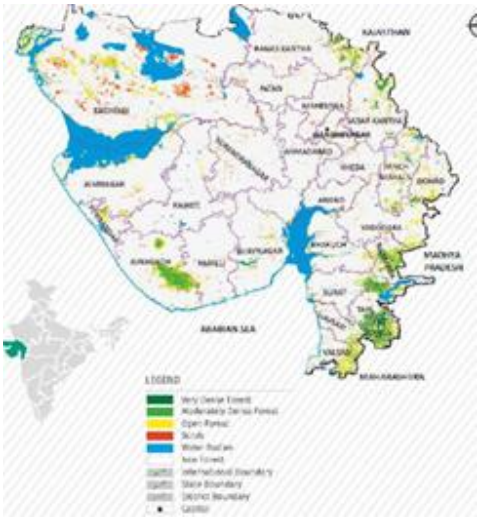
State/ Union Territory	Geographical Area (Sq.km.)	Protected Area (Sq.km.)
Punjab	50362	344.72
Rajasthan	342239	9696.55
Sikkim	7096	2183.1
Tamil Nadu	130060	4945.98
Telangana	112077	7097.34
Tripura	10486	603.72
Uttar Pradesh	240928	5711.88
Uttaranchal	53483	7705.65
West Bengal	88752	3423.77
Andaman & Nicobar	8249	1549.93
Chandigarh	114	26.01
Dadra & Nagar Haveli	491	92.16
Daman & Diu	111	2.18
Lakshadweep	30	0.01
Pondicherry	490	3.9
Total	3287469	**174096.937**

Source: National Wildlife Database Cell, Wildlife Institute of India Website: http://www.wii.gov.in

It is also evident that some protected areas lie outside forest cover. For instance, the Gulf of Mannar Marine National Park is a protected area consisting of 21 small islands (islets) and adjacent coral reefs in the Gulf of Mannar in the Indian Ocean. It is the core area of the Gulf of Mannar Biosphere Reserve which includes a 10 km buffer zone around the park, including the populated coastal area (Nanditha et al 2009). Many of the protected areas fall outside the dense forests. For example, part of Gir National park & Wildlife sanctuary in Gujarat falls under open forests and partly under moderately dense forest as per the forest cover map of Gujarat (See Box 5). In fact, it is worth noting that in Gujarat, the area under PA exceeds the FC of the State.

Box 5 : Gir – Protected area falling under open forest: a case study

Gir National Park and Wildlife Sanctuary, also known as Sasan Gir, is a forest and wildlife sanctuary near Talala Gir in Gujarat, India. It has a total area of 1,412 km2, of which 258 km2 is fully protected as national park and 1,153 km2 as wildlife sanctuary. Part of the Gir National Park falls under open forests and partly under moderately dense forest as per the forest cover map of Gujarat as shown in the Figure (ISFR 2017). It is the only area in Asia where the Asiatic lions are found and is considered as one of the most important protected areas in Asia due to its ecological conditions.



Source: ISFR 2017

Forest cover in tribal districts

Nearly sixty per cent of total forest cover, i.e., 421170 sq. km of total 708273 sq. km, is found in tribal districts of the country. This 421170 sq. km is spread across 215 districts in 27 States and Union Territories. Forest cover as a share of geographical area in tribal districts (at 37.43%) is higher than national average of forest cover.

Table 15 gives a State/UT wise break up of forest cover in tribal districts for 2007 and 2017 assessments. Tribal districts in North Eastern States have upto 80 per cent of their geographical area under forest cover (e.g., Mizoram – 86%, Arunachal – 80%) Overall, forests in tribal districts have increased by 2%. As seen in Table 15, forest cover in tribal districts has increased by 8644 sq. km between 2007 and 2017. States reported a mix of increase and decrease in forest cover in tribal districts. However, Jharkhand, West Bengal, Kerala, Madhya Pradesh increased forest cover in tribal districts by more than 10%.

Table 15 : Change in forest cover in tribal districts

State /UTs	Total forest cover in tribal districts (sq. km)	Total forest cover in tribal districts (sq. km)	Change (sq. km)
	2007 assessment	2017 assessment	
Andhra Pradesh, incl Telengana	25567	24457	-1110
Arunachal Pradesh	67353	66964	-389
Assam	12008	11832	-176
Chhattisgarh	40210	39950	-260
Gujarat	6767	6966	199

State /UTs	Total forest cover in tribal districts (sq. km)	Total forest cover in tribal districts (sq. km)	Change (sq. km)
	2007 assessment	2017 assessment	
Himachal Pradesh	3231	3259	28
Jharkhand	13889	17419	3530
Karnataka	13039	13279	240
Kerala	13109	14820	1711
Madhya Pradesh	42312	47414	5102
Maharashtra	29509	30537	1028
Manipur	17280	17346	66
Meghalaya	17321	17146	-175
Mizoram	19240	18186	-1054
Nagaland	13464	12489	-975
Odisha	33299	34206	907
Rajasthan	6348	5274	-1074
Sikkim	3357	3344	-13
Tamil Nadu	6727	5700	-1027
Tripura	8073	7726	-347
Uttar Pradesh	1320	1274	-46
West Bengal	12200	14595	2395
A&N Islands	6662	6742	80
Dadra & Nagar Haveli	211	207	-4
Daman & Diu	4	11	7
Lakshadweep	26	27	1
Grand Total	**412526**	**421170**	**8644**

Source: ISFR, 2007; ISFR 2017

Carbon stock in India's forests

India's Nationally Determined Contribution (NDC) aims to improve forest and tree cover at a large scale in order to sequester an additional 2.5 to 3 billion tons CO_2 equivalent by 2030. The total carbon stock of the country is 7082 million tonnes (ISFR, 2017) and its State wise distribution of carbon stock is shown in Table 16.

Table 16 : State wise distribution of carbon stock

State/ Union Territory	Total carbon stock (In Million tonnes)	Total Carbon stock (tonnes/ ha)	tCO_2e (in Million tonnes)
Andhra Pradesh	262.69	93.33	964.07
Arunachal Pradesh	994.54	148.52	3649.96
Assam	176.85	62.93	649.05
Bihar	55.4	75.9	203.31
Chhattisgarh	560.98	100.99	2058.80
Delhi	0.95	49.38	3.48
Goa	19.02	85.31	69.79
Gujarat	110.7	75.01	406.26
Haryana	12.41	78.15	45.55
Himachal Pradesh	175.78	116.41	645.12
Jammu & Kashmir	275.93	118.72	1012.65
Jharkhand	222.88	94.63	817.98
Karnataka	475.09	126.52	1743.56
Kerala	255.88	125.92	939.08
Madhya Pradesh	695.66	89.86	2553.09
Maharashtra	493.02	97.28	1809.39
Manipur	143.09	82.49	525.14
Meghalaya	155.84	90.89	571.93
Mizoram	95.04	52.26	348.80
Nagaland	125.06	100.14	458.97
Odisha	452.9	88.21	1662.15

State/ Union Territory	Total carbon stock (In Million tonnes)	Total Carbon stock (tonnes/ ha)	tCO_2e (in Million tonnes)
Punjab	16.04	87.31	58.86
Rajasthan	89.66	54.1	329.05
Sikkim	48.53	145.14	178.12
Tamil Nadu	229.34	87.26	841.67
Telangana	184.98	90.59	678.86
Tripura	63.41	82.07	232.71
Uttar Pradesh	125.13	85.25	459.24
Uttaranchal	284.66	117.17	1044.72
West Bengal	163.2	96.87	598.95
Andaman & Nicobar	115.07	170.68	422.32
Chandigarh	0.2	92.73	0.75
Dadra& Nagar Haveli	1.43	68.84	5.23
Daman & Diu	0.09	45.5	0.33
Lakshadweep	0.16	59.63	0.59
Pondicherry	0.45	83.52	1.66
Total	**7082.06**	**3319.51**	**25991.17**

Source: (ISFR 2017)

The analysis of the carbon stock data from ISFR 2017 suggests that in terms of total carbon stock and its Co2 equivalent, the relative share of States closely follows the relative size of the FC and TC in States, with Arunachal contributing to about 14% of the carbon stock, followed by MP (10%) and Chhattisgarh (8%). Figure 9 shows the linear relationship between area under forest cover on the one hand and carbon stock on the other.

In per hectare terms, the following inferences can be drawn from the data:

- Per hectare carbon stock increases with density class across forest stratum
- Per hectare carbon stock varies by the stratum of forest type. With Himalayan dry temperate forests having the largest per hectare carbon stock (about 243 tonnes/ha in VDF), followed by Tropical semi-evergreen forests (204 tonnes/ha in VDF) and Sub-alpine forests (203 tonnes/ha in VDF) to Tropical thorn forests at the lowest end (48 tonnes/ha in VDF)

- The above implies that per hectare carbon stock varies across States/UTs from a high of 171 tonnes/ha in Andaman and Nicobar Islands to about 100-150/tonnes per hectare in the Himalayan States. Notable are Karnataka and Kerala with a per hectare stock of about 125 tonnes/ha. At the lower end are States like Mizoram, Assam, Rajasthan, Gujarat, and Haryana with per hectare carbon stock of about 50-75 tonnes/ha.

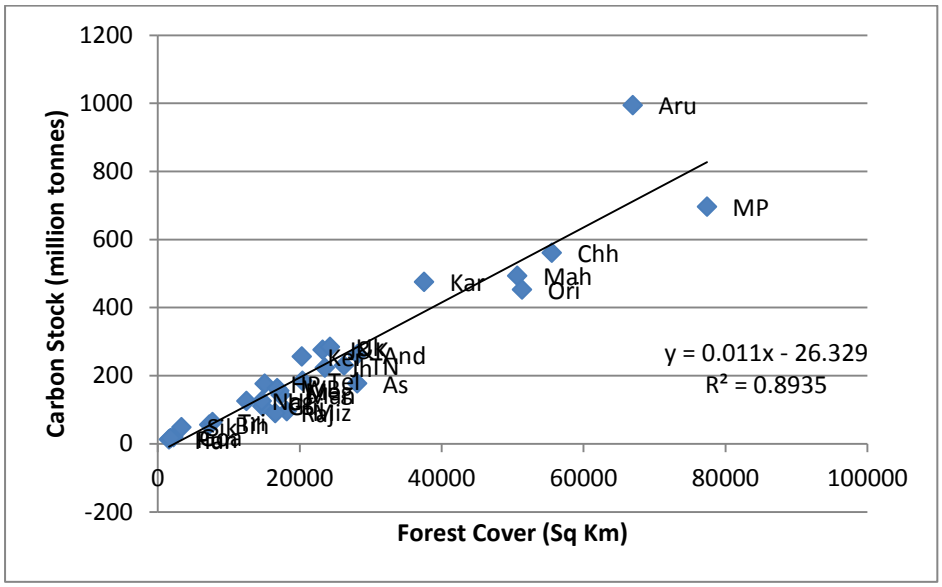


Figure 9 : Scatter plot between area under Forest Cover and Carbon Stock in States
Source: ISFR, 2017

While forests serve as important sinks for carbon, these can also be a net source of carbon on account of consumption of timber and fuelwood. In fact, forestry sector in India is a net source of GHGs as shown in the Table 17. The annual average productivity of forests and tree outside forests has been considered for the estimation of carbon sequestration while the consumption of fuel wood, paper & pulp and forests fire have been considered for the estimation of emissions. Timber has been considered as locked carbon for long period. More than 90% contribution towards emissions is due to use of fuel wood for commercial and cooking purposes.

Table 17 : Inventory of GHGs in Forestry Sector in India (BAU)

Estimated Emissions/Removals	2015	2020	2025	2030
Total emissions	482.84	539.16	587.71	626.95
Total removals	398.87	408.11	415.03	422.36
Net Emissions	83.97	131.05	172.68	204.59

Source: (TERI Analysis)

As discussed in Chapter 1, the projected addition to carbon stock (based on reported data for 2015 and 2017) shows that India will achieve less than half the NDC target of additional 2.5

BT of CO_2 equivalent of carbon stock by 2030, if 2015 is considered as the initial year.[27] The achievement of the target will be possible only through a combination of forest conservation and afforestation based on a landscape approach.

The **conservation approach** will involve protection and conservation of open forests so that part of open forests can be converted into moderately dense forests, and part of moderately dense forests can be converted into dense forests through assisted natural regeneration, with a focus on forest areas which have seen degradation to lower canopy density. The conservation approach will also require that dependence on forests be reduced through an emphasis on income generating activities for the forest dependent communities, and effective transition from fuelwood to alternative such as LPG or electricity as well as to stall feeding for livestock.

The **afforestation approach** on the other hand will involve large scale plantation on a landscape approach, including agro-forestry.

This will require, in addition to financial resources and innovative financial mechanisms, institutional strengthening, capacity building, research and development and policy interventions such as policy interventions in terms of price support for agroforestry. To ensure that the target is met, it will be necessary to distribute it among the States on the basis of appropriate criteria that take into account the potential for both augmenting forest cover in existing forests as well as green cover outside forests.

Key issues in sustainability of India's forests

India seems to have successfully addressed the problem of deforestation, largely due to stringent legislation such as the Forest Conservation Act, 1980 which has played a key role in maintaining a balance between conservation and development. However, forest degradation remains a key concern for quality of forests in India. Several indicators point to the deterioration in quality of forests. One such indicator is the decline in growing stock of India's forests.[28] Between 2007 and 2017 India's Forest cover increased by 18,174 square kilometres, whereas the Growing stock in Forests (GS) reduced significantly by 563.03 million cubic meters or 11.78%.[29] Another indicator is the reduction in area under higher density forest forests and increase in open forests. During 2007-17, about 19285 sq. km. of MDF got converted to OF (FSI, 2007, 2011, 2013, 2015, 2017). Yet another indication of poor forest quality is the fact that, 94.96% of recorded forest is prone to crop injuries, 39.94 percent has inadequate regeneration, and 5.05 percent has no regeneration (FSI, 2015).

Forest degradation is broadly defined as the reduction of the capacity of a forest to provide goods and services, such as wood, food, habitat, water, carbon storage and other protective socio-economic and cultural values. The estimated projections of GHG emissions and removals from forestry sector (from 2015-2030) discussed above suggest that Indian forests are a net source of emissions.

[27] Annual increase of carbon stock between 2015 and 2017 is 71.5 MT of CO_2 eq. (ISFR, 2017).

[28] Growing stock of forest cover was reported to be 4218.38 million cubic meter and growing stock of TOF 1603.99 million cubic meters in the latest State of Forest Report (ISFR, 2017).

[29] GS of Forests reduced by 282.68. Million cubic meters between 2003 and 2011 while it increased by just 55.57 million cubic meters between 2011 and 2017 (FSI, 2017).

The causes of degradation, in general, may be divided into proximal and distal reasons. The proximal reasons are biophysical in terms of the vulnerability of soils due to topography and climatic factors such as temperature, rainfall and wind, but also due to unsustainable land management practices. Unsustainable forest management results from deforestation, degradation, overgrazing, and conversion to other land uses, forest fires, excessive fuel wood collection and unsustainable harvests of non-timber forest products (Nachtergaele et al., 2010, Meyfroidt and Lambin, 2011, GLASOD). The distal reasons which precipitate or exacerbate land degradation are far more systemic (Nkonya et al., 2011). These include weak institutions and poor governance, policy and market failures (e.g. subsidizing fertilizer use), land fragmentation and uncertain tenure, demographic and socio-economic factors as well as the impacts of globalization. The major driver for forest degradation in India is the unsustainable harvest of fuel wood and minor forest produce. This is discussed in more detail below.

Forest dependence and unsustainable harvest

Over 853 million people in India use fuel wood, 199.6 million of those collect fuel wood directly from forests, 38.49% of total livestock in India is directly dependent on forests for grazing, around 350 million people living in and around forests derive their full or partial sustenance needs from forests (FSI, 2011).

As per the NFHS report for the year 2015-2016, at all India level, wood as a cooking fuel is used by 55.7% of rural households, followed by LPG, which was used by 23% households. LPG is used by 78.3% of the urban households at all-India level, followed by wood, used by 12 % households. The dependence of rural population on fuelwood is shown in Figure 10 below.

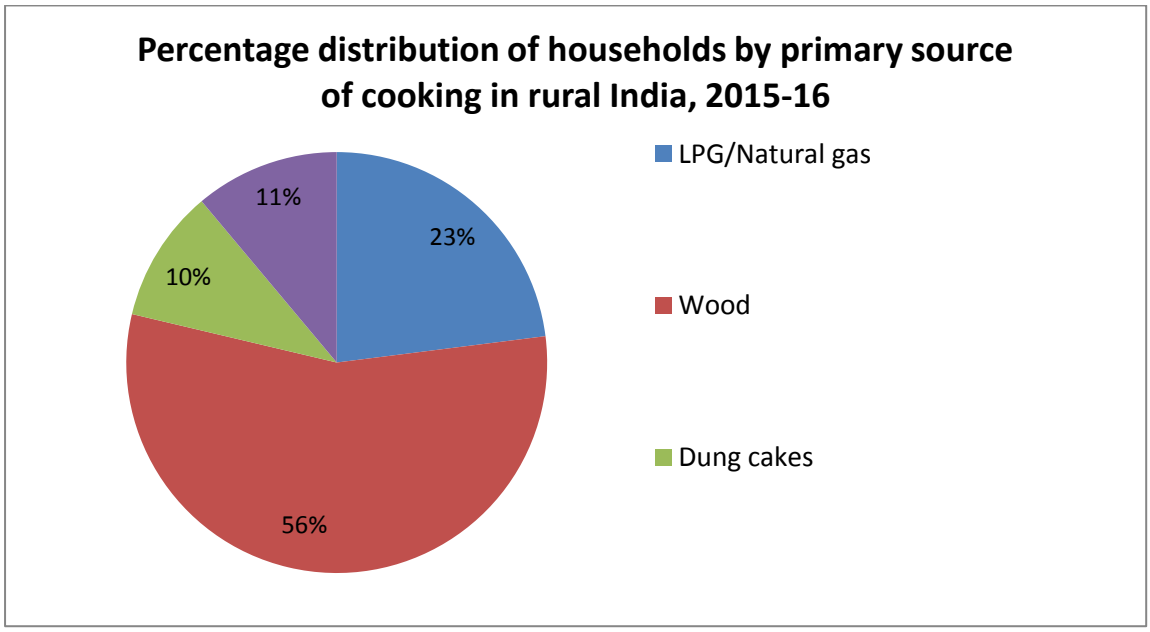


Figure 10 : Percentage distribution of households by primary source of cooking in rural India, 2015-16 (NFHS 2015-2016)

Source : NFHS 2015-2016

Globally, India accounts for highest annual wood removal of 434,766 thousand cubic meters, 88.6% of which is fuel wood (FAO, 2015). Annually, 216.47 million tonnes of fuel wood is

consumed in India, of which 27.13% comes directly from natural forests. This rate of consumption is well beyond sustainable limits (FSI, 2011) as 61.17% crops in forest area are prone to girdling and illicit felling for fuel wood and timber collection (FSI, 2015). Unsustainable harvest of forest produce and NTFPs degrade the ground and middle flora of the forests. Grazing affects 81 percent of country's forest area. Heavy and excessive grazing and lopping for fodder affect vegetation. Around six percent of forest area is prone to injuries from lopping for fodder (FSI, 2015).

Efforts have been made for fulfilling the increasing demand of fuel wood and timber from tree outside forests or farm forestry. The demand for timber required by various industries (construction, real state, production of agricultural equipment, pulp-wood) is primarily fulfilled from farm forestry in India. With about 5 crore connections across several States, several of which are forest-rich, the 2016 Ujjwala scheme has reached a large underserved population, but the refilling of cylinders by the households still remains a challenge. As per a survey done by CRISIL in 2015, 86% of the people who received LPG cylinders as a part of Ujjwala scheme said they had not shifted from biomass to LPG because the price of refilling the cylinder was too high (CRISIL 2015). While official figures state that 80% of PMUY beneficiaries opt for at least one refill[30], field based media reports suggest that number of refills is far from sufficient to meet the cooking needs of the households.[31] According to a June 2017 study[32] undertaken by Centre for Science and Environment (CSE) in Uttar Pradesh, many of the families have not opted for the LPG connection despite being eligible, since refilling was not affordable. While it is argued that PMUY is an access centric scheme and not refill centric[33], the effectiveness of the Scheme is dependent on whether people refill their cylinders or revert to previous fuels, including fuelwood wood chips.

Forest fires, invasive species, pest and diseases

Another important reasons for degradation are forest fires and attack by invasive species, pests and diseases. It has been reported that the 64% percent of the forests in India are prone to fire and over 90% of forest fire are human induced (FSI 2015). Forest fire, though a natural phenomenon, if not controlled or managed properly can cause significant damage to the

[30] Lok Sabha. (2018, March 12). Unstarred question no. 2657: Target of PMUY. Retrieved August 6, 2018, from Lok Sabha Secretariat: http://164.100.47.190/loksabhaquestions/annex/14/AU2657.pdf

[31] Pandey, K., Jitendra, Sadhu, P., & Thakur, P. (2017, August 31). Ujjwala scheme: Are cleaner cooking fuels affordable and accessible? Retrieved August 4, 2018, from Down To Earth: http://www.downtoearth.org.in/coverage/india-steps-on-the-gas-58502; Malhotra, S. (2017, December 14). Prime Minister Modi's LPG scheme for poor running out of gas. Retrieved August 4, 2018, from Hindustan Times: https://www.hindustantimes.com/indianews/lpg-scheme-for-poor-running-out-of-gas/story-t4SSXDV9tkDWCYoyKURtKP.html; Kishore, R. (2017, June 28). India's poor are not using LPG cylinders they got under Ujjwala scheme. Retrieved August 4, 2018, from Mint: https://www.livemint.com/Politics/oqLQDFKNuMdbmLEVL88krN/Indias-poor-are-not-usingLPG-cylinders-they-got-under-Ujjw.html; Jha, D. (2017, June 11). Modi's pet Ujjawala scheme wobbles as many beneficiaries drop out after their first LPG cylinder. Retrieved April 4, 2018, from Scroll: https://scroll.in/article/839961/modispet-ujjawala-scheme-wobbles-as-many-beneficiaries-drop-out-after-their-first-lpg-cylinder

[32] Ujjwala scheme: Are cleaner cooking fuels affordable and accessible? Kundan Pandey, Jitendra, Priyaranjan Sahu, Purushottam Thakur, February, 2018

[33] Abhishek Kar, 'Rethinking Ujjwala through the lens of behavioral science', Energy Resources Development Laboratory, University of British Columbia, 4 April 2018. Available on url http://erdelab.forestry.ubc.ca/2018/04/rethinking-ujjwala-through-the-lens-of-behavioral-science/

biodiversity of forest. Forest Survey of India has developed advanced forest fire detection and monitoring systems to control this hazard. Though detection has become easier, instances of fire have become more pronounced because of intentional fires caused by communities and unintentional fires caused from cigarettes/ bidi butts (ISFR 2017). Invasive species are another cause of forest degradation in India as these species often come up in degraded forest patches and spread extremely fast. The rapid growth and regeneration of these species suppress the growth of indigenous species and affect local biodiversity. For example the excessive growth of *Lantana camara,* an invasive plant species has affected the biodiversity of Corbett Tiger Reserve (Babu 2009).

Inadequate human resource and capacity

Adequate forest staff, particularly frontline staff, on field is necessary for successful protection and management of forests. While there is a well-established organizational hierarchy for the management of forests in the country, forest departments are severely constrained for field level staff. Most State forest departments are seeing an inverted pyramid of human resources, as several field-level posts have been lying vacant. It emerged from our interview with forest officials in a Forest Division in Chhattisgarh that no direct recruitment of Range Officers took place between 1995 and 2017. Without trained Range Officers, it was difficult to manage forests effectively and also develop sound working plans with proper beat and range level information.

As per available estimates, the estimated gap between sanctioned strength and in-field staff is about 18% with the gap being more pronounced (20%) for forest guards who are the frontline staff responsible for field operations (ICFRE 2010)- see Table 18

Table 18 : Category-wise sanctioned strength, filled in positions and vacancy as in March 2010

Category	Sanctioned Strength	In Position in 2010	Vacancy in 2010
Indian Forest Services	3,034	2,650	284
State Forest services	3,337	2,734	603
Field Executive Staff	134,309	109,685	24,624
Forest Rangers	9,881	7,731	2,150
Deputy Rangers	7,118	6,052	1,066
Foresters	32,459	28,206	4,253
Forest Guards	84,451	67,696	17,155

Source: ICFRE, 2010

Though more recent data are not available, our visits to select States indicate that the issue of inadequate front line staff persists. For example, in Khellong Division of Arunachal Pradesh, for instance, against the sanctioned strength of 132, the existing strength was only 59.

Capacity building of staff as well as the community also remains an important issue when it comes to improving the quality of forests. An example of limited capacity is provided by the

inadequate implementation of the National Working Plan Code 2014, which was designed for documenting and evaluating the status of forests and biodiversity resources, assessing the impact of past management practices, and designing suitable management interventions for future. Many of the State forest departments need to update their working plans as per the latest National Working Plan Code 2014 (see Box 6 for a discussion on working plans). As suggested by the 2014 Code, Working Plans need to make use of digital maps and satellite imagery etc. Field staff members involved in Working Plan process perceives this as onerous and time intensive. Interaction with field level staff indicated that there was lack of expertise, interest and confidence in using these tools and techniques or using GPS devices. Since only a few organisations are designated to deal with satellite imagery, access to them and getting the maps matched and approved by them is challenging. For example, for all of Working Plans and Working Schemes being prepared in every Division in each of the seven NE States, NESAT has to be approached for maps. As an example, in Arunachal, over half of the forest divisions had working plans that had expired. In these divisions, planned harvesting operations had come to a halt. In one forest division, the resulting loss was equivalent to 50% of the potential revenue in 2016/17.

Community rights and participation

Forest Right Act, 2006 provides for recognition of individual and community rights of those forest dwellers 'who are integral to the very survival and sustainability of the forest ecosystem.' It also aimed at empowered Gram Sabha for the forest governance but devolution of empowerment is still awaited except in few pockets. The Rules were notified in 2008 and implementation began in States thereafter. In ten years of FRA implementation, the Government has received 42,19,741 claims and 18,89,835 of these claims have been distributed, spread over 58530 sq. km of forestland.[34] Thus, only 44 per cent of claims have been settled or titles distributed accordingly. Some States have awarded titles for over 60% of claims (Odisha, Kerala, Tripura), while several States have settled less than 10% of claims received (Bihar, Goa, Karnataka, Uttarakhand).

India has mandated for peoples' involvement in the forest conservation and protection with benefit sharing mechanism on the principle of care and share. There are more than 100,000 JFMCs that are managing more than 22 million forests in the country (TERI, 2016) with the involvement of more than ten million people. The communities may lack the capacity particularly in the context of scientific knowledge for management, protection and conservation of forest resources (TERI, 2017). Capacity building of community is a key factor for community based forest governance (MoEF&CC, 2014).

Conclusion

This chapter gives an overview of the state of forests in India and analyses the trends that emerge with respect to quantity, quality and carbon stock of forests across States of India.

India has a total forest cover of 7,08,273 Sq.km. Madhya Pradesh, Arunachal Pradesh and Chhattisgarh are the top three States in terms of total forest cover. These are also the top three States in terms of area under dense forests. The share of forests in total geographical area of the country is 21.54%, which is significantly short of the target of 33%. This share is

[34] Ministry of Tribal Affairs, Government of India, Status of implementation of FRA. Dated 15 September 2018. Available at url https://tribal.nic.in/FRA/data/MPRSep2018.pdf

distributed unevenly amongst States, with North Eastern States and Hill States having a higher per centage of their total GA under forests. These States' share in the national forest cover may not be too high but the share of forests in their own GA can be significant - more than 80% in the case of Mizoram.

There has been an increase of 6600 Sq. km in total forest cover of the country between 2007 and 2017. The maximum increase in the total forest cover and tree cover has been seen in Andhra Pradesh followed by West Bengal, Kerala, Tamil Nadu and Odisha. However, the maximum loss of the total forest and tree cover has been observed in Telangana, followed by Nagaland and Mizoram.

India's Nationally Determined Contribution (NDC) aims to sequester an additional 2.5 to 3 billion tons CO_2 equivalent through additional forest and tree cover by 2030. The total carbon stock of the country is 7082 million tonnes (ISFR 2017), with Arunachal contributing to about 14% of the carbon stock, followed by MP (10%) and Chhattisgarh (8%). Current projections suggest that India will be able to achieve less than half the NDC target in the BAU scenario. This target can be attained only through a combination of forest conservation and afforestation based on a landscape approach. This makes tree cover an important indicator for going forward. At present, only about 2.85% of the total GA is under tree cover, but there is immense potential to increase this.

Some of the key issues around management of forests are discussed in detail in the chapter. Even though India does not face deforestation as an issue, degradation remains a concern. The main reasons of forest degradation in India are excessive fuel wood collection, unsustainable harvest of forest produce, and overgrazing. The impact of Government initiatives on providing alternatives to fuelwood, in particular LPG, will depend on how these can be scaled up and incentivize users beyond one-time connections.

Most State forest departments grapple with the issue of inadequate human resources and capacity, especially at the field level. This has implications for field level implementation as well as planning of forest governance since the development and implementation of Working Plans depend on good beat and range level information and expertise. Some States have gone without direct recruitment for posts like Range Officers for decades resulting in an inverted pyramid of human resources for forests.

With nearly sixty per cent of total forest cover in tribal districts, tribal and forest dwelling communities are an important stakeholder in forest management. Experience of forest rights settlement has been varied across States ranging from 60% to less than 10% of claims being settled. Reports suggest that nearly 200 million people depend on forests for their fuel requirements, as 55% of rural households use wood as cooking fuel. Around 300 million people derive their full or partial sustenance from forests. Joint forest management which was intended to ensure people's involvement in forest management and share benefits has had a limited impact and is marked by inadequate capacity of communities. Issues of capacity, both at the level of the forest departments and the communities are critical in strengthening forest governance in India.

Box 6 : Working Plans for Forest Management

The National Forest Policy of 1988 prescribed that 'no forest should be permitted to be worked without the Government having approved the management plan'. In December 1996, Supreme Court of India, in ***T.N. Godavarman Thirumulkpad vs Union Of India***, clarified that all forests were to be worked only as per Working Plans and those Working Plans were to be approved by the Centre. As per the judgment, any tree felling in forests was suspended unless in accordance with approved Working Plans. It further clarified that in States like Arunachal, where permit systems exist and Working Plans may not exist, felling under the permits had to be done by State Forest Department or the State Forest Corporation.

Working Plans have been in existence since colonial times. However, there have been several periods in between when forests have been worked either without or in disregard to the Working Plans. Post-independence, working plans were being developed as per codes existing in different States and regions. After the 1996 judgment of SC, Working Plans received renewed thrust. It was viewed as getting a legal sanctity vide this order. In 2004, MoEF adopted a National Working Plan Code for management of forests. The Code was revised in 2014 and the current Working Plans for various forest divisions are prepared in accordance with the **National Working Plan Code of 2014**. Working Plans received further thrust with the Thirteenth Finance Commission, which recommended forest grants for third, fourth and fifth years on the basis of approved Working Plans.

The task of preparing Working Plans is to be budgeted in State Plan/ Non-plan, or borne out of CAMPA funds or forest related grants under Finance Commission.

It must be noted that normally, Working Plans are prepared for Divisions and Working Schemes are prepared for smaller areas. Schemes are generally for a specific purpose or for forest areas under the control of institutions like village, municipal, cantonment, autonomous district council etc. Similar to Working Plans, Working schemes need approval from the Centre.

According to the 2014 Code, a Working Plan Unit comprising Assistant Conservator of Forests, Range Forest Officers, Foresters, subject matter experts for GIS, biodiversity assessment, socio-economic analysis, taxonomy, ecology, soil science etc. is to be headed by a Working Plan Officer of the rank of Conservator of Forests. It is to be supervised by APCCF/ CCF (Working Plan). The Code lays emphasis on adequate workforce for preparation of Working Plans. It recommends engaging consultant experts in case of inadequate staff. However, it clarifies that the responsibility of preparing a Working Plan is not to be transferred to territorial DFO/CF of the forest division.

The Code also prescribes use of digital maps of the division based on up to date and good quality satellite imagery provided by the GIS Cell of the Forest Department or any designated agency in the state or region, such as North Eastern Space Applications Centre (NESAC). In this regard, the working plan unit is envisaged to be equipped with requisite tools and technologies - geo-spatial software, hardware devices like computers, GPS, internet access and other accessories.

Working of forests is contingent on a valid approved Working Plan. However, several circles and divisions across States are without a current Working Plan. Most of these have either expired or under preparation or are pending approval from the Centre. While the incentives of XIII Finance Commission may have improved the tally and status of Working Plans, many forest divisions across the country are without approved working plans. For example, in Arunachal Pradesh, as many as 9 working plans in nine forest divisions out of 18 had either expired or waiting for approvals.[1] The revival of economic activity in the form of reopening the saw-mills and veneer mills is contingent on the approval of the expired working plans, as felling of trees can only take place after the regeneration has been completed in accordance with the Working Plans.

3. Legal and policy framework for forests

This chapter lays the context and scenario for federalism in India with respect to forests and fiscal devolution. The first section describes the Constitutional scheme of federalism as relevant to the interface of environment and forests with fiscal devolution and transfers. The second and third sections provide a detailed overview of various laws and policies governing forests in India. The discussion includes policies and programmes that are not necessarily forest-oriented but may have an impact on forests. The following section discusses international commitments with respect to forests in terms of NDCs and their legal tenability. The final section concludes by raising some issues that have been at the centre of discussion in forest policy and centre-State relations.

Federalism and fiscal devolution in India

With the commencement of the Constitution of India, ownership of all the property and assets vested in the Crown was transferred to the Union and State Governments along with all the existing rights, liabilities and obligations. The rights transferred to the Indian Union and States included the power of the Executive in holding and disposal of the property. A combined reading of Articles 294-297 of the Constitution of India suggests that States own all the subsoil resources located within their territory in cases where they have proprietary rights over land. This ownership is subject to the legislation governing regulation and control of mining enacted by the Parliament.

The constitution of India assigns functions, legislative competence, and fiscal powers for different subject to both the Centre and the States. Schedule VII, read with Article 246, assigns powers through three Lists: List I, the Union List, covers subjects that serve at a national level; List II, the State List, sets out those areas which are a State's exclusive jurisdiction, subject to other clauses; List III, the Concurrent List, identifies areas where both the Parliament and a State legislature can make laws, subject to central laws prevailing in case of a conflict where there is no scope for a harmonious reading of the provisions. Only Parliament has the residuary power to make laws on matters not included in the three lists. The relevant entries with respect to forests and environment in general, and how they are distributed amongst Centre and States are listed in. (Table 19 and Table 20)

With the 73rd and 74th amendment decentralized governance was extended to local and rural level. However, local Government and village administration is a State subject thereby implying that States are responsible for setting up of these village institutions and endowing them with the powers requisite for becoming institutions of self-governance. This dependence on States gets a further thrust from the constitutional provisions itself where the states *may* devolve the 'necessary' powers to municipalities and 'panchayats at appropriate level' (Act.243G). Thus, even though envisaged as institutions of self-Government, local and rural units are in fact subject to State's control as they derive their 'powers, functions and jurisdiction from their State Governments and not from the Constitution itself.'[35]

Table 19 : List of subjects distributed across different levels of governance u/ Constitution of India

35 Nilima Chandiramani, Environmental Federalism: An Indian View-Point

Jurisdiction	Items
Union	International Conferences and decisions
	Residuary powers
	Atomic energy, mineral resources necessary for its production
	Inter-State rivers and river valleys
State	Inter-state trade and commerce
	Land
	Water
	Agriculture
	Fisheries
Concurrent	Forests
	Protection of wild animals and birds
	Electricity
	Economic and social planning

Source: Schedule VII of the Constitution of India, read with Article 246

Table 20 : List of subjects for devolution to Municipalities and Panchayats

Jurisdiction	Items
Municipal	Regulation of land use
	Urban forestry, protection of the environment and promotion of ecological aspects
	Economic and social development planning
	Public health, sanitation conservancy and solid waste management
Panchayat	Social and farm forestry
	Minor forest produce
	Land improvement, implementation of land reforms, land consolidation, soil conservation
	Minor irrigation, water management, watershed development
	Fuel and fodder

Source: Schedule XI and XII of the Constitution of India, read with Art 243G and Art 243W

Under the constitutional scheme, several subject matters are governed by States. As much as legislative competence, administration of these matters requires financial resources. There are some needs that are identified and prioritised by States, and some needs that are prioritised by policies of the Centre. States may not always have adequate resources to address these needs.

Broadly, States have two types of resources – (i) Self-generated (tax and non-tax levies) and (ii) Intergovernmental transfers. These manifest within the Indian federal structure at two

levels. *First*, distribution of taxation subjects and fees[36], and *second*, distribution of revenues and sharing of (financial) powers between the Union and states[37]. The latter could be in the form of tax devolution or grants in aid to States[38].

Constitutional basis for different sources of revenue and transfers for States

The different sources of revenue for the States can be categorised into four types –own tax revenue, own non-tax revenue, State's share of union taxes and duties, and grants-in-aid from the Centre. The first two are States' own revenue and the latter two are in the nature of intergovernmental transfers.

The Seventh Schedule which demarcates the domains of legislation between the Union and the States deals with powers of taxation separately since a power to tax cannot be deduced from a general legislative entry. The general executive powers flow from the legislative powers of the units of Government but fiscal powers are not general powers and hence have been dealt with separately in the Constitution and listed as tax related entries in the State List of the Seventh Schedule. With the legislation of the Constitution (One Hundred and First Amendment) Act, 2016 introducing the GST regime, several taxes earlier levied by States have been subsumed. The main tax revenue sources for States now include State GST, taxation on consumption of electricity, and stamp duty.

States' powers to tax are mutually exclusive of the taxing powers of the union, so as to ensure an independent source of revenue for the States (Seervai, 1991). However, this may not always be the case as there are instances of States' fiscal powers being subject to Central legislation either directly or indirectly.

The scheme for distribution of revenues between the Union and the States is detailed in Articles 268 to Article 279, 286 - 289 of the Constitution. All the taxes, duties, and cess that the Central Government is empowered to collect under the Seventh Schedule of the Constitution of India are to be distributed between the Centre and the States as prescribed by the President of India after considering the recommendations of the Finance Commission.[39] These do not include duties levied by the Union but collected and appropriated by the States, taxes levied and collected by the Union but assigned to the States, and GST on supplies in the course of inter-State trade or commerce.

Irrespective of the legislative competence of Union or States, the Union or State can make any grants for any public purpose.[40] This Article enables Central Government to intervene and make grants in the form of centrally sponsored schemes and the central sector schemes. Grants-in-aid from the Central to State Governments take different routes and are for different purposes, channelled through the Finance Commission and Central Government ministries and departments. Through these channels, central funds are devolved to States in the form of resources for state budget or state plan schemes, central sector schemes, centrally sponsored schemes, special plan schemes, and some non-plan and ad hoc grants.

[36] Articles 246, 248 and 265, read with the Legislative Lists I and II
[37] Articles 268 to Article 279, 286 - 289 of the Constitution
[38] Article 275
[39] Article 270
[40] Article 282

Since there is often a mismatch between the costs that a State may incur on account of several factors and its ability to generate own revenue, States rely heavily on transfers and grants from the Centre. The Finance Commission of India deals with the transfers to States from the Centre and plays an important role in addressing this imbalance. The role and specific functions of Finance Commission in transfers to States is discussed in detail in the following section.

Finance Commission

Under Act.280, Finance Commission (FC) is constituted every five years. It makes recommendations on the distribution of tax proceeds between the Union and the States and the allocation between States. It also recommends principles that should govern the grants in aid of the revenues of the States, and measures needed to augment State fund to supplement resources of municipalities and panchayats; and any other matter referred to it by the President of India.[41] Thus, the scope of FC extends to share of States in Central taxes, grants in aid to States, and resources of Panchayats and Municipalities.

The current Finance Commission, that is, the Fifteenth Finance Commission of India has been mandated to make recommendations for (i) transfers to States, including distribution of taxes and principles for grants-in-aid (ii) a fiscal consolidation roadmap (iii) measurable performance-based incentives for States based on their efforts and achievements in the areas of, inter alia, GST, population control, ease of business, digital economy, control of expenditure on populist measures, sustainable development goals, sanitation and solid waste management; (iv) financing disaster management initiatives.[42]

Tax devolution and grants are dealt with separately under the Constitution. Distribution of net proceeds of taxes between the Union and the States and the allocation between the States under Article 270 are determined by the Finance Commission under Article 280 (2) (a). Grants are dealt with in Article 275 and 282.

Article 275, in dealing with 'grants –in-aid of the revenue of States', clarifies in its proviso that any Grant shall be made only after considering the recommendations of the Finance Commission. Thus, the FC plays an important and indispensable role in determining the grants received by States.

FC Grants are seen predominantly as 'general purpose grants' (Economic Survey of India). However, over the Commissions, the scope of FC grants has become broader. The First FC itself noted as following,

> *"We are of the view that scope of Article 275 or Article 280 (3) (b) should not be limited solely to grants - in - aid which are completely unconditional grants directed to broad but well defined purpose could reasonably be considered as falling within their scope."*[43]

Subsequent to the seventy-third and seventy-fourth amendments to the Constitution, the scope of FC grants has increased further as a result of recommendations for Panchayats and Municipalities. [44]

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[41] Art 280 (2)

[42] Terms of Reference of the Fifteenth Finance Commission

[43] Chapter VII, Report of First Finance Commission of India, 1952, at 91p.

[44] Subclause bb and c inserted vide Constitution (Seventy-third Amendment) Act, 1992 and Constitution (Seventy-fourth Amendment) Act, 1992

Grants can be 'conditional', i.e., that place restrictions on use by the recipient, or be 'unconditional', i.e., lump sum transfers where recipient is free to use in whichever way (Oates: An Essay on Fiscal Federalism). The transfers recommended by FC can be both conditional and unconditional. The tax devolution is not conditional or tied to specific objectives. Under Article 270, all taxes levied and collected by the Government of India *shall* be distributed between the Union and the States, and among States as per FC recommendations on the distribution between the Union and the States and the allocation between the States. Under Article 280, the FC is entrusted with the task of determining the share, and not empowered with the power to impose any conditionality thereupon. However, FC also makes recommendations on principles that should govern the grants in aid. These principles can be broad or specific and can determine the basis, means of disbursement, as well as intended utilisation of grants in aid.

Legal framework for forest in India

Constitution

Environmental concerns were not recognized by the Constituent Assembly at the time of framing the Constitution. While 'environment' was absent in the Constitution and its Schedules in 1950, forest was indeed present as an entry in State list for legislative competence. This was, however, a continuation of the colonial policies on treatment of forests as a resource and a subject in the domain of Provinces. Under the Government of India Act of 1935, which served as a model for the Lists in Schedule I, forests came clearly under the domain of provinces. This was followed in the Constitution of India in 1950, which placed forests in the State List of Schedule VII.

The National Commission on Agriculture (1970 -1976), inter alia, pointed out the States `inability to implement forest laws in the country' and the need for 'uniformity in forests law'.[45] In light of the recommendations and observations of the report, and rapid deforestation, the Centre made room for legislative intervention by the Parliament in 1976.[46]

The forty-second amendment to the Constitution of India in 1976 made three important changes with respect to environment and forests. *First*, it moved the subject of forests to the 'concurrent' list from the 'State' list, thereby opening up the doors for Central legislation in the domain of forests in independent India;[47] *Second*, it added a new Directive Principle to State Policy on protection and improvement of environment, forests and wildlife; *Third*, it enjoined citizens with a duty to protect and improve the environment.

The Directive Principles of State Policy states that '*The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country*'.[48] The Fundamental Duties of the citizens include protection and improvement of '*natural*

[45] Ministry of Agriculture and Irrigation, Report of the National Commission on Agriculture, 1976 (Part IX: Forestry) at 365p.
[46] 'Forests' moved to Concurrent List vide Constitution (Forty-second amendment) Act, 1976
[47] entry 17A inserted in Concurrent List by the Constitution (Forty–second Amendment) Act, 1976, s. 57 (w.e.f. 3-1-1977).
[48] Article 48A

environment including forests, lakes, rivers and wild life, and to have compassion for living creatures'.[49]

Forests are owned by State Governments; hence the revenue generated from Government forests accrues to State Governments. However, 'forests' as a subject is concurrent and regulated by both Centre and States. Powers and responsibilities over forests are distributed between Centre and States, with State Governments being responsible for management of forests in accordance with the Central laws (Indian Forest Act, Forest Conservation Act, etc.) and State level forest Acts and Rules.

Indian Forests Act, 1927

One of the most important and oldest forest laws in existence in India is the Indian Forests Act (IFA), 1927. The IFA, 1927 was preceded by several forest charters and laws before independence. The 1855 Charter of Indian Forestry, furthering the annexationist position of the Government, declared all forests not privately owned as state property. [50] The Indian Forest Act of 1878 created four classes of forests: reserved, demarcated protected, non-demarcated protected and village (Davidson-Hunt I.J., 1995). The Act was further amended and resulted in the Indian Forest Act of 1927, the forest legislation that governs forest related matters till date.

On the basis of ownership and control, forests can be private or Government owned. Government forestland is classified as follows:

Reserved Forests: Forestland declared as Reserved Forests under chapter II of IFA. Most activities by public (*For example*, rights to NTFP collection, grazing, water course) are prohibited in a reserved forest, unless recognised during the course of settlement.

Protected Forests: Any forestland or wasteland declared as Protected Forest by the State Government under chapter IV of IFA. Unless expressly prohibited, most activities such as grazing, NTFP collection, passage etc. are allowed in protected forests, usually as per the procedure laid down by State rules and Settlement records.

Village Forests: Any Government forest where rights of the Government are assigned to the village or community by State Government under Chapter III of IFA.

The IFA and declaration of forests as reserved or protected forests strengthened Government control over forests and its resources. The legal classification of forests determined the extent to which rights could be exercised over timber and NTFP in a forest. Exploitation of forest resources were largely prohibited and restricted for public in reserved and protected forests respectively. Monopoly of the Government in using forests as a source of timber and associated revenue is rooted in the colonial scheme of IFA.

Besides classification of forests into reserved forests, protected forests and village forests, the 1927 Act lays down provisions for exploitation of forest produce and mechanisms to deal with forest offences. The Indian Forests Act, drawing from the earlier Forest Acts that it consolidates, aims at strengthening state control over forests as a source of revenue. The Act has a very clear focus on exploitation and appropriation of the forest resources. (Hazra A.K., 2002). Conservation is not one of the objectives of the Act; neither is expressly provided for

[49] Article 51A (g)

[50] 3 August 1855, a Memorandum of the Government of India, the 'Charter of Indian Forestry'

in the provisions of the Act. However, the Act has been an important piece of legislation for governance of forests.

In some States (e.g., Himachal Pradesh, Madhya Pradesh) the Act is applied as it is, whereas other States (e.g. Andhra Pradesh, Karnataka, Odisha) have their own State Forest Acts, modelled on the Central Act emulating the same principles and provisions. The Indian Forest Act, and corresponding State Acts, also form the basis for various State level laws and Rules on different aspects of forests such as trade in forest produce, transit of forest produce, forest fires, participatory forestry etc. Chhattisgarh Transit (Forest Produce) Rules, 2001, Maharashtra Forest (Protection of Forest from Fire) Rules, 1982 are examples of Rules promulgated under IFA. Odisha Timber and Other Forest Produce Transit Rules, 1980, Odisha Village Forests Rules, 1985, Odisha Forest (Grazing of Cattle) Rules, 1980, Andhra Pradesh Sandalwood Transit Rules, 1969, Andhra Pradesh Forest Produce Transit Rules, 1970, Andhra Pradesh Forest Produce (Storage and Depot) Rules, 1989 have been made under State Forest Acts applicable.

Wildlife (Protection) Act, 1972

The Wildlife (Protection) Act, 1972 lays down the framework for different sanctuaries, national parks and other protected areas. The main categories of protected areas in India are the following:

- Sanctuaries
- National Parks
- Conservation Reserves
- Community Reserves

Sanctuaries: The State Government can declare an area outside a reserve forest as a sanctuary in view of its ecological, faunal, floral, geomorphological, natural or zoological significance, for the purpose of protecting, propagating or developing wild life or its environment.[51] Before an area is declared as a sanctuary, any claim over the land or resources in question is examined and settled. In some cases, some of these rights are allowed even after an area is declared as a sanctuary. However, several other restrictions are imposed in a sanctuary to minimise human interference in the wild habitat. Some of these include, restriction on entry, ban on destruction, exploitation or removal of any wild life including forest produce without the permission of the Chief Wildlife Warden for the collectors' personal bonafide needs, ban on construction of commercial tourist lodges, hotels, zoos and safari parks except with prior approval from the National Board of Wildlife. Once a State declares an area as a sanctuary, it cannot alter its boundaries except on recommendation of the National Board of Wildlife.

National Parks: National Parks are similar to Sanctuaries in terms of their purpose and procedure. However, restrictions in a national park are greater than those in a sanctuary. For instance, no livestock grazing is allowed in a national park. No continuation of a local right (as may come up at the time of settlement of claims) is allowed in a national park. National Parks can be declared by both Central as well as State Governments. Boundaries of a National Park cannot be altered except on recommendation of the National Board of Wildlife.

[51] Section 18 WLPA

The 2003 amendment to the Wildlife Act introduced two new categories of protected areas – Conservation and Community Reserves, which have a bigger role for local communities. The State Government can declare any area owned by the Government, particularly the areas adjacent to National Parks and sanctuaries, as a ***Conservation Reserve***. Rights of inhabitants are not affected in Conservation Reserves. Where a community or an individual has volunteered to conserve wild life and its habitat, the State Government may declare any private or community land as a ***Community Reserve*** for protecting fauna, flora and traditional or cultural conservation values and practices.

Currently, 4.93% of the country's total geographical area, that is 1620099.47 Sq. Km is spread over 771 different kinds of Protected Areas.[52]

In addition to the abovementioned categories of protected areas recognized under the law, there are other areas, which are of crucial importance. These are species reserves, such as Tiger reserves and elephant reserves.

Conservation programmes

Tiger reserves have been in place since 1974, when the Project Tiger was launched. However, it was given a statutory status in 2006. In 2006, an amendment was made in the Wildlife Protection Act to include provisions for declaration of Tiger Reserves and constitution of a Tiger Conservation Authority. Once declared a tiger reserve, its boundaries cannot be altered except on a recommendation from Tiger Conservation Authority and approval from National Board of Wildlife. There are at present 50 Tiger Reserves in the country spanning a total area of **71027.10** square kilometres in 17 States. Out of these 71000 sq. Km area under Tiger Reserves, 66590 sq. km are under Protected Areas.[53]

Project Elephant began as a Centrally Sponsored Scheme in 1992 to protect elephants, their habitat and corridors, and to address the issue of human elephant conflict. It is implemented across 16 States all over India. There are currently 30 Elephant Reserves in India, with the latest one being declared as Singphan Elephant Reserve in Nagaland.[54]

Forest (Conservation) Act, 1980

In 1980, the Forest (Conservation) Act was enacted to put restrictions on de-reservation of forests or use of forest land for non-forest purpose.[55] The Act explicitly provides for conservation of forests by making it mandatory to seek Central Government approval for de-reservation of a reserved forest, using any forest land for non-forest purpose, and clearing of forestlands for re-afforestation.[56] Thus, the Act does not put a blanket ban on non-forest activities but introduces checks and balances, in the nature of approvals and

[52] Data as in July 2018, Source: http://www.wiienvis.nic.in/Database/Protected_Area_854.aspx; Last accessed on 3rd October 2018

[53] ENVIS Centre on Wildlife & Protected Areas. Available at http://wiienvis.nic.in/Database/trd_8222.aspx#Protected_Areas_within_Tiger_Reserves_(area-wise) ; Last accessed on 30 September 2018

[54] http://envfor.nic.in/sites/default/files/press-releases/%20india's30.PDF

[55] Section 2 of the Forest (Conservation) Act, 1980 (69 of 1980) defines "non-forest purpose" as breaking up or clearing of any forest land or portion thereof for- (a) the cultivation of tea, coffee, spices, rubber, palms, oil-bearing plants, horticultural crops or medicinal plants;(b) any purpose other than reafforestation;

[56] Section 2, Forest Conservation Act

compensatory afforestation. The Act and the Rules made thereunder lay down a two stage clearance procedure for diversion of forests for non-forest use.

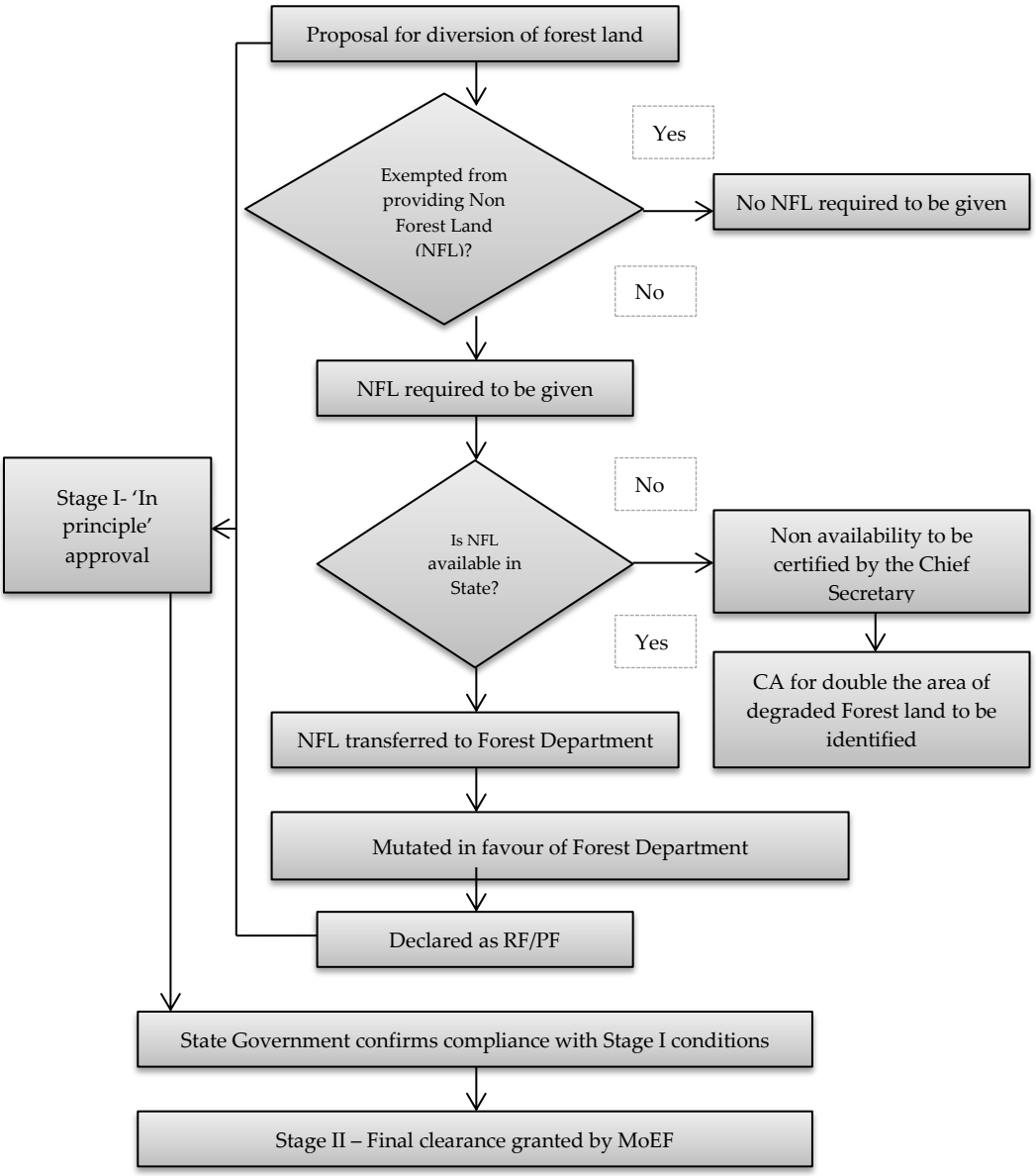

Figure 11 : Procedure for diversion of Forest Land
Source: Comptroller and Auditor General of India, 2013

The Act has been credited with being instrumental in controlling rampant deforestation and diversion of forest land that took place in early years of independence.[57] Diversion of forest land for non-forest activities reduced substantially after the implementation of FCA Act as the rate of diversion of forest land came down from 1.43 lakh ha. per annum to 15000 ha. per annum.[58]

[57] https://www.downtoearth.org.in/news/streamlining-forest-protection-law-30183
[58] http://www.moef.nic.in/division/introduction

Box 7 : Judicial intervention and restriction on tree felling

Role of Supreme Court in governance of forests is best exemplified by the judicial intervention over decades in *T N Godavarman Thirumulpad Vs. Union of India and Others*. (Writ Petition (Civil) No. 202/1995) The case filed originally to address illegal timber felling in Nilgiri forests in Tamil Nadu soon expanded its scope and became one of the biggest judicial intervention for forests in the entire country. Through one of the most important orders dated 12 December 1996 it was clarified that the word 'forest' must be understood according to its dictionary meaning and any area recorded as forest in the Government record irrespective of the ownership for the purposes of FCA. Thus it brought under the ambit of FCA all forestland, including deemed forests. The second important aspect of the order was the ban on green felling.

SC suspended all on-going activity within any forest in any State throughout the country, without the prior approval of the Central Government. It suspended any felling of trees unless in accordance with a Working Plan approved by the Central Government. In Himachal Pradesh, hill regions of the states of Uttar Pradesh and West Bengal, Tamil Nadu, felling of trees was banned in any forest, public or private. State Governments through forest corporations could remove fallen trees or fell and remove diseased or dry standing timber.

A complete ban on felling of any kind of trees in the tropical wet evergreen forests of Tirap and Changlang in the State of Arunachal Pradesh was also imposed. All saw mills, veneer mills and plywood mills in Tirap and Changlang in Arunachal Pradesh and within 100 Kms. from its border, in Assam, were directed to close down. In a subsequent order, all licenses to all wood-based industries in NE States were suspended and were asked to relocate to specified industrial zones for better monitoring. There was also a complete ban on the movement of cut trees and timber from North-Eastern States to any other State.

The order had a devastating impact on the wood based industry, especially in the North Eastern States. While the ban was hailed as the only option for checking deforestation and illicit timber trade, it adversely affected sawmill owners, its employees and people involved in timber-based activities. The restrictions also had an impact on the revenue of States which were home to these industries. For example, Arunachal Pradesh alone has seen a drop in revenue from forestry sector from an average of Rupees 36 crores (before 1997) to Rupees 13.80 crores since the imposition of SC restrictions. (Arunachal Pradesh Memorandum to XV FC) In terms of volume, average annual timber operation has declined from 269122.6 cum to 25008 cum as a result of the order on tree felling restrictions and ban. (ibid) This shows that some States have incurred heavy cost in terms of loss of revenue for preservation of forests for the country. The inability to augment States' own revenue through sustainable forestry makes them dependent on transfers from the Centre.

Compensatory Afforestation, one of the key features of the scheme of FCA, has been a contentious issue from both ecological as well as fiscal perspective. It has also been a source of conflict between Centre and States. For every forestland which is used for non-forest activity, afforestation in another piece of land has to be carried out to compensate for the loss. Under the Forest Conservation Act, 1980 and the 2003 Rules made thereunder, in order to obtain approval for use of any forestland for any non-forest activity, every project proponent has to give details of the project, extent of deforestation, impact on adjoining and a cost - benefit analysis. The proponent has to give an undertaking to bear the cost of raising and maintenance of compensatory afforestation and/or penal compensatory afforestation.[59] The forest officials have to give a corresponding declaration regarding details of non-forest

[59] Form A, part I, Forest Conservation Rules, 2003

area/degraded forest area identified for compensatory afforestation, detailed compensatory afforestation scheme including species to be planted, implementing agency, time schedule, financial outlay and suitability of area identified for compensatory afforestation. One of the criteria on which applications for approval are assessed include whether the State Government or the other authority undertakes to 'provide at its cost for the acquisition of land of an equivalent area and afforestation thereof.'[60] The cost of compensatory afforestation is, therefore, recovered by the user agencies and ascertained by the State Forest departments in light of characteristics of the land and species.

Supreme Court intervention on CA

In 2001, the SC observed that a user agency had carried out only 10 per cent of the compensatory afforestation required as per their approval, and asked for details of conditions fulfilled and the role of MoEF in monitoring and ensuring compliance. [61] It was noted that out of the large sums of money collected by Governments from agencies, only 63 per cent was utilized for compensatory afforestation.[62] MoEF was asked to prepare a scheme under which user agency is responsible for compensatory afforestation and is liable to pay for the same. The Centrally Empowered Committee (CEC) reviewed the scheme submitted by MoEF and the compensatory afforestation guidelines and observed that the focus was only on regeneration through plantations, and it did not adequately compensate the loss of natural forests (Yadav, 2005).[63] CEC inter alia recommended that in addition to compensatory afforestation, net present value shall be paid by the user agency. It also recommended that any unspent or balance money should also be deposited in Compensatory Afforestation Fund.[64]

MoEF was directed to frame rules regarding setting up and managing a body to administer this fund. Compensatory Afforestation Fund Management and Planning Authority was set up on 23rd April 2004. The notification and the authority created thereunder was criticised on various grounds and SC issued an order for an ad hoc arrangement based on recommendations from CEC.

Subsequently, in 2006, SC ordered setting up of an adhoc CAMPA and all the moneys collected from 30th October 2002 by the State Governments to be transferred to this adhoc CAMPA. [65]

Annual release of funds from ad hoc CAMPA

In 2009, MoEF issued State CAMPA Guidelines laying down roles and functions of the State CAMPA and the National CAMPA Advisory Council. The Scheme proposed by MOEF was accepted by Supreme Court in its order dated 10 July 2009. SC ordered release of funds contributed by States back to the States in proportion to 10 per cent of the principal amount annually, subject to a cap of Rupees 1000 crore. The maximum limit was justified as it was

[60] Rule 7, Forest Conservation Rules, 2003
[61] T.N. Godavarman Thirumulpad vs Union Of India (UoI) And Ors. Order on 3 April, 2000 in I.A. Nos. 419 and 420, (2002) 10 SCC 641
[62] T.N. Godavarman Thirumulpad vs Union Of India (UoI) And Ors. SC order dated 23rd November, 2001
[63] Dutta and Yadav 2005, 298
[64] CEC Report dated 9 August 2002
[65] order dated 05.05.06 I.A. No. 1337

felt that 'substantial amount of funds have been received by the Ad-hoc CAMPA and sudden release and utilization of this large sum all at one time may not be appropriate and may lead to its improper use without any effective control on expenditure'.[66] The Funds were to be released in accordance to an Annual Plan of Operation submitted by States and approved by Steering Committee. This arrangement was meant to be a temporary disbursal mechanism. However, all the monies being collected on account of CA and NPV are being deposited with the Ad hoc CAMPA till date. As on 31st March 2018, a balance of Rs. 51880.52 Crore was lying with the authority.[67]

Compensatory Afforestation Fund Act, 2016

The Compensatory Afforestation Fund Act, 2016 provides for setting up of National and State level Compensatory Afforestation Fund Management and Planning Authorities, and establishment of National and State Compensatory Afforestation Funds. The Act also lays down the procedure for disbursement and utilization of funds to be released to States.

The most important impact of the Act is going to be unlocking of thousands of crores of Rupees lying unutilised with the Ad hoc CAMPA for years. The Act had received Presidential assent but Rules under the Act were pending since 2016. Hence, the Act and release of money under it were not implemented. The current regime is as in place since 2009. The draft Rules were finally published in February, 2018 inviting comments from the public. The final draft, after incorporating comments, has now been approved by the Ministry of Law and Justice. [68] The Act has come into force on 30th September 2018.[69]

Release of funds and expenditure

The Act provides that 90% of unspent balance of all monies collected by a State, currently under the (Central) ad hoc CAMPA are to be released back to States. Currently, the fund being administered by the ad hoc CAMPA has a balance of Rs. 51880.52 Crore.[70] (See Table 21 showing the status of funds in CA Fund managed by ad hoc CAMPA and Table 22 for total amount received and released as on 31 March 2018) If all this money is released to the States, States will have substantial resources to use in the forestry sector. Some forest rich States, such as Odisha can receive as much as 5984 crores once the CAF Act is implemented. Monies are continuing to be deposited with ad hoc CAMPA, therefore the amount that States will eventually be entitled to may be higher.

[66] Order dated 10 July 2009 in I.A.No. 2143 in W.P.(C)NO.202/1995
[67] Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018
[68] Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018
[69] MoEF Notification S.O. 3967(E) dated 13th August 2018
[70] Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018

Table 21 : Status of funds in Compensatory Afforestation Fund managed by ad hoc CAMPA*

State	Amount (Principal and interest) (in crores)	Amount released to State/UT (In crores)
Andhra Pradesh	3,668.40	946.70
Arunachal Pradesh	2,452.24	358.37
Assam	757.65	150.89
Bihar	712.38	148.35
Chhattisgarh	7,288.17	1293.24
Goa	400.79	45.47
Gujarat	2,011.54	364.83
Haryana	1,632.17	274.96
Himachal Pradesh	2,710.98	671.10
Jammu & Kashmir	1,554.61	277.78
Jharkhand	5,193.59	1153.12
Karnataka	1,982.15	527.78
Kerala	112.91	15.66
Madhya Pradesh	6,353.67	861.53
Maharashtra	5,029.50	1120.69
Manipur	418.86	88.24
Meghalaya	193.51	23.73
Mizoram	120.74	37.68
Odisha	9,725.19	3076.02
Punjab	1,371.58	342.47
Rajasthan	2,635.80	620.54
Sikkim	445.94	79.23
Tamil Nadu	148.08	30.08
Telangana	2,155.19	356.22
Tripura	257.64	43.61
Uttar Pradesh	2,557.18	589.84
Uttarakhand	3,801.17	853.39
West Bengal	277.33	37.42

*Does not include UTs. Data as on 31 March 2018.

Source: Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018

Table 22 : Monies to be released to States after implementation of CAF Act *

State	Rupees in crores
Odisha	5,984.25
Chhattisgarh	5,395.43
Madhya Pradesh	4,942.92
Jharkhand	3,636.42
Maharashtra	3,517.93
Uttarakhand	2,653.01
Andhra Pradesh	2,449.53
Arunachal Pradesh	1,884.48
Himachal Pradesh	1,835.89
Rajasthan	1,813.73
Uttar Pradesh	1,770.60
Telangana	1,619.08
Gujarat	1,482.04
Karnataka	1,308.93
Haryana	1,221.49
Jammu & Kashmir	1,149.15
Punjab	926.20
Assam	546.09
Bihar	507.62
Sikkim	330.03
Goa	319.79
Manipur	297.57
West Bengal	215.92
Tripura	192.63
Meghalaya	152.81
Tamil Nadu	106.20
Kerala	87.53
Mizoram	74.76

* Calculated on the basis of 90 Per cent of balance as on 31.03. 2018; Does not include Union Territories.

Source: Ministry of Environment, Forest & Climate Change, Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018

It is important to note that all these funds will not go into the Consolidated fund of the State but into a dedicated State Compensatory Afforestation Fund. Under the Act, States can use

the money transferred to the Fund as well any new payment realized from user agencies that they may receive as follows -

a. CA money - as per site-specific schemes submitted by the State along with the approved proposals for diversion of forest land under the Forest (Conservation) Act, 1980;

b. NPV - for artificial regeneration (plantation), assisted natural regeneration, forest management, forest protection, forest and wildlife related infrastructure development, wildlife protection and management, supply of wood and other forest produce saving devices and other allied activities

c. Interest accrued on funds - for conservation and development of forest and wildlife in the manner as may be prescribed;

d. All monies realised from the user agencies - for undertaking protection and conservation activities in protected areas of the State including facilitating voluntary relocation

e. Ten per cent of amount realised from the user agencies to be transferred to the National Fund.

Money from State CA Fund will be transferred to implementing agencies in pre-determined instalments as per the annual plan of operation finalised by steering committee of State CA Authority and executive committee of the National Authority. Thus, while the money will be released to State CA Fund now, its utilisation will be subject to a similar procedure, that is, of preparing and getting approved an APO.

CA funds are not a measure of a State's forest cover or potential. Neither are they commensurate with percentage geographical area under forest cover. It reflects the compensation collected on account of diversion of forest land. However, it is worthwhile to compare States' share in CAMPA funds with their contribution to overall forest cover in the country. It is seen that barring a few States like Chhattisgarh, Odisha and Uttarakhand, most States that have more than one third of total area under forests are likely have a very small share in the Rs.5000 crores of CAMPA funds. Similarly, States such as Jharkhand and Rajasthan, which have a small share in total forest cover have a relatively larger share in CAMPA. On the other hand, Arunachal Pradesh, which accounts for nearly 10 per cent of the total forest cover of India has less than 4 per cent share in total CAMPA funds (see Figure 12). Thus, CAMPA funds, being a compensation for forests lost have limited scope for rewarding or incentivising States to maintain their forest cover but can aid afforestation programmes.

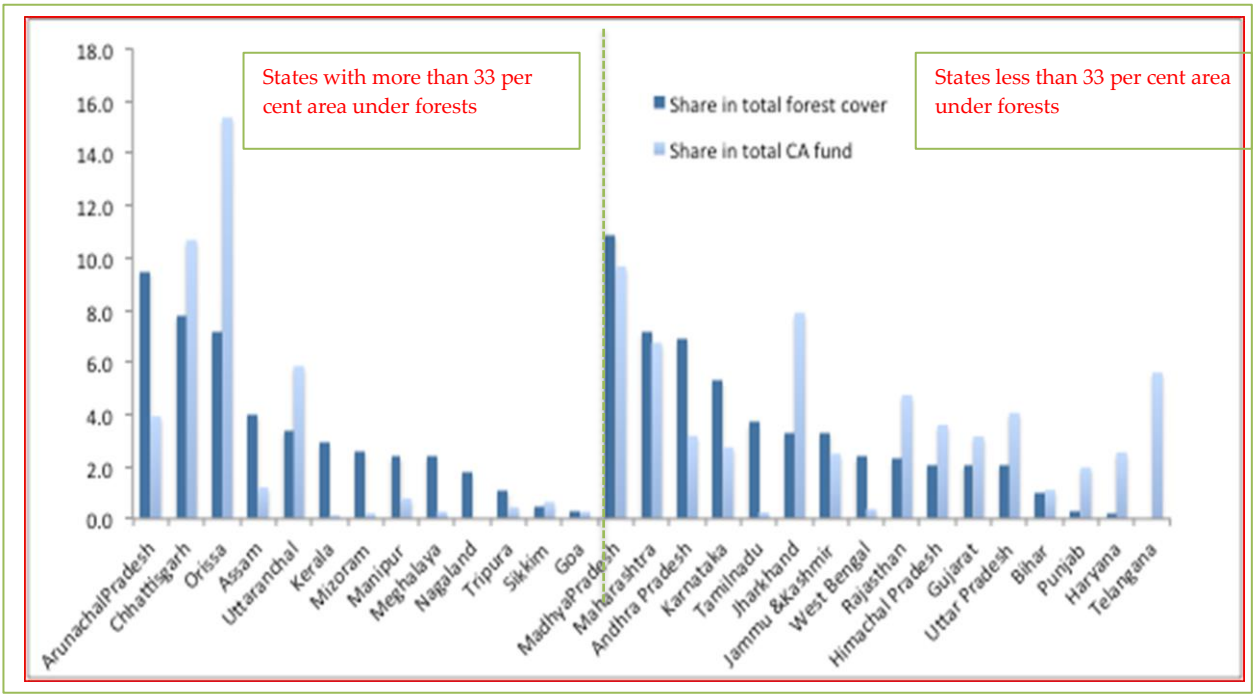

Figure 12 : Share of States in Total forest cover of country and total CA Funds
Source: Data compiled from ISFR, 2018 & MoEF, 2018

While release of funds lying with ad hoc CAMPA will augment the financial resources of State forest departments to improve forest cover, its role in meeting the NDC objective may be limited. Funds deposited with the ad hoc CAMPA are essentially monies received to 'compensate' for loss of forest. Whether the funds are for CA or NPV, it is to compensate for forests already lost. Thus, the issue is whether use of CAMPA monies for compensatory afforestation and regeneration can count as 'additional' forest cover for the purposes of NDC objectives. Since NDC in its target of 2.5 – 3 billion tonne carbon sink does not give a baseline date, it is possible to meet a part of this target from compensatory afforestation and regeneration on account of forests lost before the date of NDC, i.e. 2 October 2016. Any CA for diversion of forest land after that date cannot be seen as 'additional' forest cover.

Biological Diversity Act, 2002

Biological Diversity Act of 2002 was legislated in response to the country's international obligations under the Convention on Biological Diversity. The Act aims at conservation and sustainable use of biological resources within an access and benefit sharing framework. It regulates access and fair and equitable sharing of the benefits arising out of the use of biological resources as well as traditional knowledge associated with such resources. The Act also provides a three tier institutional framework comprising National Biodiversity Authority, State Biodiversity Boards and Biodiversity Management Committees.

Under the Act, no person can obtain any biological resource or knowledge associated with it for research or for commercial utilisation or for bio-survey and bio-utilisation without prior approval. While the Act's application is not specific to forests, it is an important legislation for governance of forests. This is primarily because forests, especially reserved and protected, are reservoirs of rich bio-resources and the Act governs access and utilisation of these resources.

Decentralisation in scheduled areas

The 73rd and 74th amendments to the Constitution in 1992 paved the way for greater decentralization by listing down areas in which states could devolve powers to Panchayats and municipalities. However, the states are under no strict obligation to completely devolve functions relating to environmental and natural resource management.

The decentralized governance framework as envisaged by the Constitution is not uniform and varies in states, scheduled areas and special category states/regions. While most states are governed by the provisions of *nagarpalikas* and *panchayats*, certain areas are exempt from it or have a modified version of the same. In this regard, it is important to examine three articles of the Constitution – Article 244(1) r/w Schedule V, Article 244(2) r/w Schedule VI and Article 371.

Administration of scheduled areas and scheduled tribes in the states of Assam, Meghalaya, Tripura, and Mizoram is carried out in conformity with the Sixth Schedule. V Schedule deals with administration and control of Scheduled Areas and Scheduled tribes in any state other than Assam, Meghalaya, Tripura and Mizoram. V Schedule described, as 'a Constitution within the Constitution' is the most comprehensive provision for the protection of the tribal people living in Scheduled Areas against the State and other exotic forces.[71] As per Para 2 and 3 of the Schedule and Art. 60 and 159, it is the duty of the President and the concerned governors to preserve, protect and defend the Constitution including this special feature concerning the Schedule Areas and the law including customs and usage of tribal people.

Fifth schedule areas are present in States like Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Telangana. Most of these States are rich in forests and have a sizeable population of forest dependent communities.

At the time of 73rd amendment, provisions of panchayats were not extended to Scheduled Areas, and it is only in 1996 that the provisions were extended to resource rich V scheduled areas. The Act Panchayat Extension to Scheduled Areas Act (PESA) 1996 leaves it to the respective States to ensure that the Panchayat at appropriate level has the ownership of minor forest produce, has the power to prevent alienation of land in the Scheduled Areas and to take appropriate action to restore any unlawfully alienated land of a Scheduled Tribe and control local plans and resources. The much ambitious and hopeful piece of legislation paving way for decentralized governance too was diluted in the corresponding State enactments. This is primarily because the powers that panchayats derive come from their home State Governments and not from the Constitution, which only offers recognition and direction in this regard. Overall, the states are under no strict obligation to completely devolve functions relating to environment and natural resources.

According to Ministry of Panchayati Raj, Andhra Pradesh, Gujarat, Himachal, Maharashtra, Odisha, Rajasthan, Telangana are compliant with the requirement of delegating ownership of minor forest produce to PRI and Gram Sabha (PESA). Madhya Pradesh, Chhattisgarh, Jharkhand are not yet compliant with PESA with respect to minor forest produce. (PESA).

Not all the States have notified state level specific PESA Rules either. Some such States have, however, included aspects of PESA in the existing laws and rules of the State. For example,

71 Sharma, B.D., 'Tribal Affairs in India'

under the Odisha Gram Panchayat Minor Forest Produce Administration Rules, 2002, Panchayats are regulate collection and trading of 68 items of MFP (Patnaik P.P., 2015).

Forest Rights Act, 2006

The regime created by the Indian Forests Acts, Forest Conservation Act and Wildlife Protection Act restricted the rights of communities dependent on forests for habitat and livelihood. Over the years, rights became concessions, seen to be granted as largesse by the Government. With many rights not recorded in forest settlement reports, a large section of forest dependent communities were seen as encroachers. The divide between communities and forests was detrimental to not only the needs of the people but overall governance of forests too as the traditional symbiotic relationship between forest dwelling communities and the ecology was disturbed.

With this background, and to redress the 'historical injustice' faced by forest dwelling Scheduled Tribes and other traditional forest dwellers 'who are integral to the very survival and sustainability of the forest ecosystem', Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, [Hereinafter Forest Rights Act (FRA)] was enacted in 2006. The Act recognises the tenurial and access rights of communities, and places the responsibility for sustainable use of forest resources while ensuring livelihood and food security of the forest dwelling and dependent communities. The Act is implemented through a four tier institutional mechanisms, comprising Gram Sabha, Sub-Divisional Level Committee, District Level Committee and State Level Monitoring Committee.

The main categories of rights recognised under the FRA are individual (right to hold, live, including self-cultivation), community (nistars, settlement, rights over NTFP, grazing, fisheries, water etc.) and development rights (e.g., health education, basic amenities, fair price shops).(section 4) The Act also introduces rights to Community Forest Resources (CFRs), which include right to protect, regenerate or conserve and manage CFRs, which they have been traditionally conserving and protecting for sustainable use. (Section 3(1)(i) r/w Section 2 (a)) Such CFRs exist even if they fall under the PAs or Recorded forests notified under WLPA or FCA. The Gram Sabha and village level institutions are empowered to protect forests, wildlife and biodiversity, adjoining catchment area, water sources and other ecological sensitive areas; and regulate access to CFR and stop any activity that adversely affects wild animals, forest and biodiversity. (section 5)

It must be noted that the FRA recognises and vests only 'existing' rights, which have not been recognised by the Government for various reasons. The pre-existence of rights is an important feature as the Act does not open up the forests for mass exploitation, but recognises and vests the traditional dwellers with their rights, which they have been deprived of.

The Rules were notified in 2008 and implementation began in States thereafter. In ten years of FRA implementation, the Government has received 42,19,741 claims and 18,89,835 of these claims have been distributed, spread over 58530 sq. km of forestland.[72] Thus, only 44 per cent of claims have been settled or titles distributed accordingly. Some States have

[72] Ministry of Tribal Affairs, Government of India, Status of implementation of FRA. Dated 15 September 2018. Available at url https://tribal.nic.in/FRA/data/MPRSep2018.pdf

awarded titles for over 60% of claims (Odisha, Kerala, Tripura), while several States have settled less than 10% of claims received (Bihar, Goa, Karnataka, Uttarakhand). State wise distribution of claims received and titles distributed is given in figure 13. Further, reports from Government as well as civil society have highlighted that most of the titles are given for individual rights and the rate of settlement of community rights is dismal.[73] While some of these low percentages are a result of inaction by State Governments or lack of will, other factors may also be responsible, such as conflicting or overlapping claims.

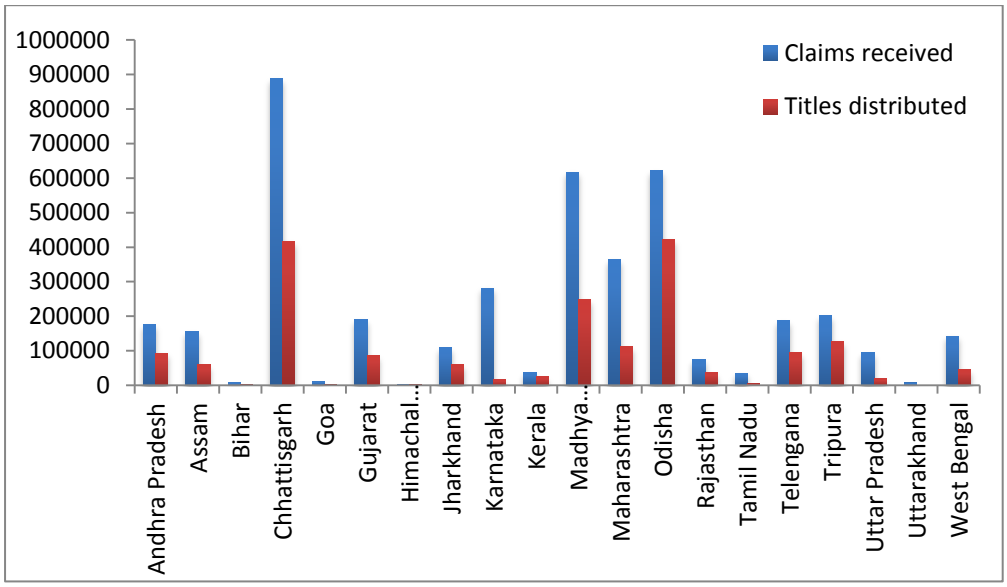

Figure 13 : Status of claims received and titles distributed under FRANo. of titles as on 30 April 2018.

Source: Ministry of Tribal Affairs

Consultations with the forest departments hinted towards increased pressure on forests due to distribution of forest rights. However, no direct causal link can be seen between the two based on data. Sixty eight per cent of the total forestland in the country over which FR titles have been distributed is in Maharashtra, Madhya Pradesh and Chhattisgarh. (See figure 14) Maharashtra, which accounts for 35% of the total forests over which titles have been distributed under FRA since 2008, has shown a marginal increase of total forest cover between 2007 and 2017. In fact, of the seven States that comprise over 90% of forest land where titles have been distributed, only two (MP and Chhattisgarh) have reported decline in forest cover between 2007 and 2017. It must also be noted that forest cover in tribal districts of Madhya Pradesh witnessed an increase of 12% from 42312 sq. km in 2007 to 47414 sq. km in 2017. (ISFR 2009 and 2017). **Table 23** shows extent of forest for which titles have been distributed.

[73] Government of India, Report of National Committee on FRA, under chairmanship of N C Saxena, December 2010; Richard Mahapatra, Kumar Sambhav Shrivastava, Sumana Narayanan, Aparna Pallavi ,'How Government is subverting Forest Rights Act, *Down To Earth*, 21 March 2018

Table 23 : Extent of forest for which titles under FRA have been distributed

	State	Forest land in Sq. km
1	Maharashtra	20287
2	Chhattisgarh	10819
3	Madhya Pradesh	8598
4	Gujarat	5224
5	Odisha	3880
6	Telengana	3053
7	Andhra Pradesh	2730
8	Tripura	1862
9	Jharkhand	820
10	Uttar Pradesh	565
11	Rajasthan	232
12	Karnataka	198
13	Kerala	134
14	West Bengal	87
15	Tamil Nadu	22
16	Himachal Pradesh	19
	Total	58531

Note : Status as on 30 September 2018;
Source: Ministry of Tribal Affairs

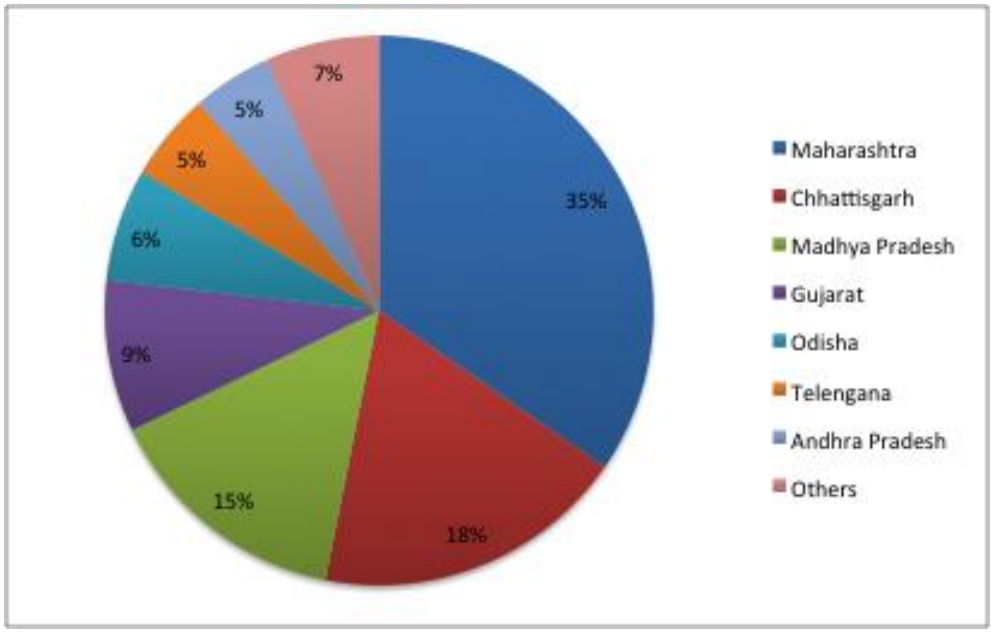

Figure 14 : State wise distribution of Forest land on which FR titles have been given
Source: Ministry of Tribal Affairs, September 2018

On-going policies and programmes for forests

National Forest Policy, 1988

Administratively, forests were dealt with under the Ministry of Agriculture at the time of Independence. The Centre did not have the jurisdiction to legislate on forests. It could only

introduce a policy. The first National Forest Policy of independent India was formulated in 1952, and drew heavily from the colonial forest policy of 1894 with a focus on sustained supply of timber and other forest produce74. The National Forest Policy of 1988 made landmark changes in the policy discourse on forests by shifting the focus from commercialisation to conservation. Its principal aim was to 'ensure environmental stability and maintenance of ecological balance'.

One of its objectives is to increase substantially the forest/tree cover through 'massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands'. Its other objectives include, preserving natural forests; increasing the productivity of forests; and meeting the requirements of fuelwood, fodder, minor forest produce and small timber of the rural and tribal populations.

To achieve the stated objectives, the Policy adopts a two pronged strategy – (i) prescribing one third land under forest cover, (ii) need based and time bound programme for afforestation, social forestry and farm forestry.

The policy is credited with bringing about a fundamental shift in focus from revenue generation to conservation, while securing subsistence needs of the local communities, in the overall approach towards forest governance.[75]

National Afforestation Programme, 2000

National Afforestation Programme aims at increasing forest and tree cover in degraded forests in the country. The programme seeks to rehabilitate degraded forests and other areas through decentralized institutions such as Forest Development Agencies (FDAs) and Joint Forest Management Committees (JFMCs) and improved livelihoods.

The Programme, which was introduced in 2000, was preceded by Schemes on Integrated Afforestation and Eco-Development Projects Scheme (IAEPS), Area Oriented Fuel wood and Fodder Projects Scheme (AOFFPS), Conservation and Development of Non-Timber Forest Produce including Medicinal Plants Scheme (NTFP) and Association of Scheduled Tribes and Rural Poor in Regeneration of Degraded Forests (ASTRP).

Until 2016 – 2017, over 21 Lakh hectare of land has been approved for afforestation with an investment of Rs. 3698.63 crores.[76] In 2018, the National Afforestation Programme has been merged with the Green India Mission.[77]

Green India Mission

The National Mission for Green India (GIM) is one of the eight Missions under the National Action Plan on Climate Change (NAPCC). Unlike other Missions under NAPCC, GIM was not an existing programme being brought under the ambit of NAPCC, but a new programme that was prepared after formulation of NAPCC.

The Mission has the following objectives:

[74] Para 3 (v),National Forest Policy 1952
[75] Sinha and Srivastava, 2015
[76] Lok Sabha Starred Question No: 272; Answered on: 05.01.2018
[77] MoEF&CC order no. MoEF&CC(NAEB):1-2/2017-B-I; Dated 30 January 2018

- Increased forest/tree cover on 5 m ha of forest/non-forest lands and improved quality of forest cover on another 5 m ha (a total of 10 m ha).
- Improved ecosystem services including biodiversity, hydrological services and carbon sequestration as a result of treatment of 10 m ha.
- Increased forest-based livelihood income of about 3 million households living in and around the forests.
- Enhanced annual CO2 sequestration by 50 to 60 million tonnes in the year 2020.

These objectives are to be achieved through clear targets for different forest types and ecosystems. The Mission is implemented through the following sub missions

- **Sub-Mission 1 :** Enhancing quality of forest cover and improving ecosystem services (4.9 mha)
- **Sub-Mission 2 :** Ecosystem restoration and increase in forest cover (1.8 mha)
- **Sub-Mission 3 :** Enhancing tree cover in Urban & Peri-urban areas (including institutional lands) (0.2 mha)
- **Sub-Mission 4:** Agro-Forestry and Social Forestry (increasing biomass & creating carbon sink) (3.0 mha)
- **Sub-Mission 5:** Restoration of Wetlands (0.1 mha)

The Green India Mission is currently being implemented in 13 states including Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Manipur, Mizoram, Odisha, Punjab and Uttarakhand.[78]

One of the important features of the Mission is its approach to 'greening', which emphasises on landscape approach. It goes beyond plantations and includes restoration of degraded ecosystems such as grasslands, wetlands and other critical ecosystems. Landscape approach allows for intervention in areas that may comprise both forest as well as non-forest area. This provides an opportunity to achieve the target of additional carbon sink by (a) bringing non-forest area under forests and (b) improving quality of forests in moderate and open forests.

Table 24 shows current target under Green India Mission

Table 24 : Current Target under Green India Mission

Year	Physical target (in ha)
2017-18	4180.80
2018-19	4599.60
2019-20	5059.20

Source: Lok Sabha Starred Question No: 272; Answered on: 05.01.2018

[78] Rajya Sabha Unstarred Question No. 2771; answered on 27.03.2017

Recognising the importance of other programmes in achievement of its objectives, Green India Mission is being merged and converged with other relevant programmes. As first steps, GIM has been merged with NAP and converged with MNREGS.

National REDD+ Policy and Strategy, 2018

Government of India has recently published the National REDD+ Policy and Strategy to facilitate implementation of REDD+ in India and to give effect to relevant decisions of Cancun Agreements, Warsaw Framework for REDD+, and the Paris Agreement. The REDD + Strategy aims at addressing deforestation, enhancement of forest carbon stocks and achieving sustainable management of forests in the country. A two tier structure comprising National Governing Council for REDD+ (NGC-REDD+) and State Governing Council for REDD+ (SGC-REDD+) is proposed to implement the Strategy.

The Strategy recommends ascertaining of afforestation and reforestation targets for each State to achieve the targets of GIM and India's NDC. These targets will incorporate tree plantation activities of various Ministries and Departments such as MoRD, MoA, MoPR.

The 2018 Strategy states that finances will be mobilised through allocation via GIM, CAMPA, Namami Gange, Green Highways, etc., and the deficit will be sought from external sources through GCF and UNFCCC.

On-going policies and programmes with relevance for forests

National Forest Policy, National Afforestation Programme and Green India Mission have clear goals of maintaining and increasing forest and tree cover in the country. These have been designed primarily, if not exclusively, for forests and its governance. However, intervention to reduce pressures on forests may not always be based in forests. These interventions are of two broad kinds – *first,* where tree cover outside forest is targeted by non-forestry schemes and programmes, *second,* where dependence on forest resources is reduced by providing alternatives. Some of these are discussed below.

National Mission for Clean Ganga and Ganga Vriksharopan Abhiyan, 2018

National Ganga River Basin Authority (NGRBA), constituted under the provisions of the Environment (Protection) Act (EPA),1986 was implemented by a society registered in August 2011, called National Mission for Clean Ganga(NMCG). The NGRBA was dissolved in 2016 and replaced by National Council for Rejuvenation, Protection and Management of River Ganga (referred as National Ganga Council).[79]

Namami Gange Programme involves undertaking a slew of activities such as creating sewerage treatment infrastructure, river surface cleaning, afforestation, industrial effluent monitoring, making villages on the banks of Ganga (Ganga gram villages) open defecation free and riverfront development, among others.

Although bulk of projects under Namami Gange relate to sewage treatment, biodiversity conservation has been identified as a major objective. The rich fauna of the Ganges needs to be protected from continuous exposure to pollutants and ensure their longevity. Out of Namami Gange's allocated budget of Rs 20,000 crore for a period of 5 years (2015-2020),

[79] S.O. 3187(E) dt. 7th October 2016 under EPA 1986

Rs.2,000 crore has been set aside for afforestation purposes. Nearly 4 crore trees are planned to be planted across Ganga basin states by 2019, to ensure that the river regains some of its lost glory as afforestation will help in controlling some of the waste that flows directly into the river. Apart from afforestation, Namami Gange has also identified the need to protect marine life in the river. Wildlife Institute of India has established three rescue and rehabilitation centres at Narora, Bulandshahr and Varanasi to research extensively on the status of marine life.

The National Mission for Clean Ganga (NMCG) launched the "***Ganga Vriksharopan Abhiyan***" campaign in five main stem Ganga basin states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal in July 2018. The State Forest Departments of the five states were made responsible for the smooth and effective execution of the tree plantation initiative observed as 'Shubharambh Saptah'. The campaign which has been initiated as part of the Forest Interventions in Ganga (FIG), component of Namami Gange programme aims to bring greater awareness among people and other stakeholders regarding the importance of afforestation for the task of Ganga rejuvenation.

In order to implement the afforestation project in a scientific manner, Forest Research Institute (FRI), Dehradun was assigned the project to prepare a Detailed Project Report (DPR) on the basis of which the State Forest Departments would carry out their plantation activities. In the DPR a river scape covering an area of 83,946 km2 (1,13,751 hectare) has been delineated along the five main stem Ganga basin states for afforestation over a period of 5 years at a cost of Rs. 2293.73 crore.[80]

National Agroforestry Policy, 2014

National Agroforestry Policy was launched in 2014 with a view of improving productivity, income and livelihood opportunities of rural households, especially of the smallholder farmers through agroforestry. Its other policy goals were to meet demand for timber, food, fuel, fodder, fertilizer, fibre, and other agroforestry products; conserving the natural resources and forest; and increasing the forest / tree cover.

The Policy recognises, in its preamble, the role of agroforestry in environmental services and its potential to mitigate the climate change effects through 'microclimate moderation and natural resources conservation in the short run and through carbon sequestration in the long run'. The Policy identifies 'an enabling environment for quantifying carbon sequestration and other environmental services for the economic benefit of farmers' as a means for achieving the policy objectives.

Some of the basic objectives of the **National Agroforestry Policy** in the context of forestry are to:

- Encourage and expand tree plantation in complementarity and integrated manner with crops and livestock to improve productivity, employment, income and livelihoods of rural households, especially the small holder farmers.
- Supplement the availability of agroforestry products (AFPs), such as the fuel-wood, fodder, non-timber forest produce and small timber of the rural and tribal populations, thereby reducing the pressure on existing forests.

[80] http://pib.nic.in/newsite/PrintRelease.aspx?relid=180726 dated 19th July, 2018

- Complement achieving the target of increasing forest/tree cover to promote ecological stability, especially in the vulnerable regions.
- Develop capacity and strengthen research in agroforestry and create a massive people's movement for achieving these objectives and to minimize pressure on existing forests.

INR 75 crores has been budgeted for agroforestry by the Central Government for 2018-19. The revised revenue for 2017-18 stood at 40 crores INR.[81]

Green Highways Policy, 2015

The Ministry of Road Transport and Highways (MoRTH), Government of India has promulgated Green Highways (Plantations, Transplantations, Beautification and Maintenance) Policy – 2015 on 29th September 2015 to develop green corridors along National Highways for sustainable environment and inclusive growth. The policy envisions `development of eco-friendly National Highways (NH) with participation of the communities, farmers, NGOs, private sector, institutions, Government agencies and the Forest Departments for economic growth and development in a sustainable manner'. National Green Highway Mission (NGHM) is responsible for overall planning, implementation and monitoring of Green Highways Projects.

Under the aegis of the Policy, development of green corridors is proposed along developed and upcoming National Highways in the width available in existing Right of Way (ROW) in the form of median and avenue plantations. A dedicated "Green Highways Fund" with up to 1% of the Project Cost of all NH projects.

Large amount of land available with NHAI in the form of Roadside Plantation (Median & Avenue Plantation) and Vacant land parcels near flyovers & road alignments for commercial plantations **(Table 25).** NGHM has awarded plantations work along 2500 km stretch of NHs with an investment of 375 crore.

The Green Highways Projects phase-I spans across 10 States and covers 25 NHs. Projects for 1590 km were awarded on 1st July, 2016

Table 25 : Plantation Target for National Highways

Year	Length (km)
2016-17	6,000
2017-18	6,600
2018-19	7,200
2019-20	8,000
2020-21	8,800
Total	36, 600

Source: Presentation on Green Highways for Sustainable Environment, Dr A K Bhattacharya, MD, NGHM, NHAI-2016.

[81] Source https://www.indiabudget.gov.in/ub2018-19/eb/sbe1.pdf

Table 26 : Plantation Progress against target

Year	Type of Agency	Length of Project (in km)	Estimated Project (In Crores)	Plantation Progress	
				Target No. of plants	Physical Achievement
2016-17	Government Agency	933.00	149.10	8,56,840	2,72,657
	Private Agency	611.00	121.58	8,00,648	3,51,328
2016-17 Subtotal		1,544.00	270.68	16,57,488	6,23,985
2017-18	Government Agency	1,155.00	151.88	9,72,473	925
	Private Agency	40.00	3.00	20,000	7,800
2017-18 Subtotal		1,195.00	154.88	9,92,473	8,725
2018-19	Government Agency	538.00	52.46	3,57,017	-
	Private Agency	1.60	0.10	-	-
2018-19 Subtotal		540.00	52.56	3,57,017	-
Grand Total		3,278.00	478.12	30,06,978	6,32,710

Source: Green Highways Division, National Highways Authority of India*82*

As seen above in **Table 26**, the actual progress on plantation as against the target has been low. Between 2016 and 2018, only 21 per cent of the plantation target had been physically achieved. Moreover, mere plantations may not ensure increase in tree cover, which is dependent on plants reaching a certain maturity. Data on survival rate of plantations under the National Green Highways Policy was requested, but not received.

Mahatma Gandhi National Rural Employment Guarantee Scheme

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) under the Mahatma Gandhi National Rural Employment Guarantee Act, 2005, is a scheme administered by Ministry of Rural Development which aims at efficient use of resources through inter-sectoral approach for bringing, inter alia, improvement of livelihoods through horticulture, sericulture, plantation and farm forestry.

MNREGS emphasises on afforestation, tree plantation and horticulture in common and forest lands, road margins, canal bunds, tank foreshores and coastal belts, improvement of livelihoods through horticulture, sericulture, plantation and farm forestry, development of fallow or wastelands of households and water conservation through water harvesting structures, watershed management, de-silting of water bodies and irrigation works.

The Scheme has been converged with the Green India Mission to bring co-ordination in developing forest and its fringe areas and community / privately owned forests and to bring economic security of vulnerable sections in the rural sector in a holistic manner. The Convergence is also meant to utilise resources efficiently and avoid lack of coordination between different schemes.

The shared vision is to increase the forest/tree cover to the extent of 5 million hectare (mha) and improving quality of forest/tree cover of another 5 mha of forest/non-forest lands, and increasing forest based livelihood income of about 3 million households. All lands including

[82] http://nationalgreenhighway.org/ongoing-national-highway-development-project

village common lands, community lands, revenue wastelands, shifting cultivation areas, wetlands and private agricultural lands will be eligible for afforestation under this convergence.

Under MNREGS, Central Government pays for 100% of the wage expenditure and 75% of the material expenditure. The budget estimate for 2018-2019 for MNREGS as provided by the Ministry of Rural Development is 55000 INR.

National Mission for Sustainable Agriculture (NMSA)

One of the Missions under NAPCC, National Mission for Sustainable Agriculture (NMSA) aims at improving agricultural productivity especially in rainfed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation. NMSA is implemented through Sub Missions, including the Sub Mission on Agro Forestry (SMAF). SMAF's objectives include

- Expansion of tree plantation in complementary and integrated manner
- Availability of good quality seeds seedlings and other planting materials
- Promotion of agro forestry models suited for different ecological regions and land use conditions
- Information and data support for agroforestry
- Capacity building for agroforestry

SMAF is implemented by NRM Division of Department of Agriculture, Cooperation & Farmers Welfare under Ministry of Agriculture. SMAF will be operational under the umbrella of NMSA on a funding pattern of 60:40 as GoI: State Governments for all states excepting for 8 states of NE Region, the hilly states of Himachal Pradesh, Uttarakhand and Jammu & Kashmir where it would be 90:10 fund sharing. For UTs, the assistance will be 100% from GoI. Farmers would be supported with financial assistance to the extent of 50% of the actual cost of the interventions as per cost norms and provisions specified in the Mission guidelines. Liberal transit rules are a precondition for availing the benefits of the programme and states will be included as they undertake the necessary reforms. About Rs. 79 crores have been released to States and UTs during 2016/17-2018/19 (including about 0.6 crores to central agencies - Central Agroforestry Research Institute, Jhansi, Cane and Bamboo Technology Centre, Assam, and the Indian Society of Agroforestry), under the Mission.[83]

The State level implementing agencies have to ensure that at least 50% of the allocation is utilised for small, marginal farmers (30 % of this has to be for women beneficiaries) and 16% for SC/ST population.

Agroforestry provides a range of ecological benefits apart from addressing the challenges of food, nutrition, energy, and employment security, contributing to carbon sequestration and enhancing climate resilience of agriculture through diversification of farming.[84] The practice of agroforestry is not new in India and has been emphasized earlier in multiple policies

[83] Calculated from the allocation and release statements of the NMAF
[84] National Agroforestry Policy, 2014- The "National Forest Policy" (1988), aims to bring a minimum of one-third of the total land area of the country under forest and tree cover, which would require the plantation of another 28.58 million hectares of forests.

including the National Forest Policy 1952,1988 National Agriculture Policy 2000, National Bamboo Mission 2002, National Policy on Farmers 2007 and Green India Mission 2010. The National Agriculture Policy (2000), for instance, states that, "*farmers will be encouraged to take up farm/agroforestry for higher income generation by evolving technology, extension and credit support packages and removing constraints to development of* agroforestry".

Pradhan Mantri Ujjwala Yojana

Fuelwood is one of the major reasons for forest dependence of communities living in and around forests. Villagers collect fuelwood from forests for their basic needs such as cooking, heating etc. A cheap and efficient alternative to fuelwood can reduce dependence of local population on forests and help in conservation.

The Central Government launched "Pradhan Mantri Ujjwala Yojana" (PMUY) in May, 2016 to provide deposit-free LPG connections to 5 crore families below poverty line (BPL) families over a period of 3 years from 2016-17. The scheme has been upgraded to provide 8 crore LPG connections by 2020 to BPL households according to the Union Budget 2017-18.

Till date 5 crore connections (48660000) in 715 districts have been released across all states and union territories.[85] The top ten states who received the connections under the scheme are

- Uttar Pradesh
- West Bengal
- Bihar
- Madhya Pradesh
- Rajasthan
- Odisha
- Maharashtra
- Chhattisgarh
- Tamil Nadu
- Assam

Several of these States are forest rich States and the LPG connections have the potential to reduce fuel wood collection and consumption in these States. However, the real impact can be felt only if the switch to LPG is sustained. Refill of cylinders can be an indicator of this but the experience so far suggests that refill of cylinders has in fact been a deterrent to successful uptake of the Scheme.

BPL families do not get additional support from the Government after they have received the connection under the Ujjwala scheme. Refilling costs vary between 450-800 INR from location to location and the subsidy which is roughly one fourth of the cost of cylinder also varies from state to state.

High upfront refill cost and long waiting period for refill have been highlighted as major hindrance by several reviews and reports on the Ujjwala Scheme. While official figures state that 80% of PMUY beneficiaries opt for at least one refill[86], field based media reports suggest

[85] as on 25th June, 2018

[86] Lok Sabha. (2018, March 12). Unstarred question no. 2657: Target of PMUY. Retrieved August 6, 2018,

that number of refills is far from sufficient to meet the cooking needs of the households.[87] According to a June 2017 study (Pandey K., 2018) undertaken by Down to Earth (DTE) in Uttar Pradesh, many of the families have not opted for the LPG connection despite being eligible for it since refilling was not financially viable.

While it is argued that PMUY is an access centric scheme and not refill centric (Kar A., 2018), the effectiveness of the Scheme is dependent on whether people refill their cylinders or revert to previous fuels, including fuelwood wood chips. .

International commitment

India is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC).[88] Being a non-annex I country, India has no binding commitments under the UNFCCC – a point that India has reiterated from time to time. However, Indian position has become more flexible in the recent years and has moved towards accommodating actions towards climate change mitigation, albeit voluntarily.

The Paris Agreement requires Parties to prepare, communicate and maintain successive 'nationally determined contributions' (NDCs).[89] These NDCs outline the targets and actions for post 2020. One of the issues that were subject to much discussion and speculation during Paris negotiations was the legal character of NDCs and whether it would be binding or not.[90] Article 4.2 of the Paris Agreement states that

> *"Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions."*

First sentence makes it clear that parties have an obligation to /prepare, communicate and maintain' NDCs. Thus, the procedural requirement of NDCs is clearly binding. The binding nature of NDCs itself is not as straightforward. The second part that deals with substantive aspect of NDCs expects Parties to only 'pursue' domestic measures towards achieving objectives stated in NDCs. Thus, while there is a procedural obligation, implementation or

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from Lok Sabha Secretariat: http://164.100.47.190/loksabhaquestions/annex/14/AU2657.pdf

[87] Pandey, K., Jitendra, Sahu, P., & Thakur, P. (2017, August 31). Ujjwala scheme: Are cleaner cooking fuels affordable and accessible? Retrieved August 4, 2018, from Down To Earth: http://www.downtoearth.org.in/coverage/india-steps-on-the-gas-58502; Malhotra, S. (2017, December 14). Prime Minister Modi's LPG scheme for poor running out of gas. Retrieved August 4, 2018, from Hindustan Times: https://www.hindustantimes.com/indianews/lpg-scheme-for-poor-running-out-of-gas/story-t4SSXDV9tkDWCYoyKURtKP.html; Kishore, R. (2017, June 28). India's poor are not using LPG cylinders they got under Ujjwala scheme. Retrieved August 4, 2018, from Mint: https://www.livemint.com/Politics/oqLQDFKNuMdbmLEVL88krN/Indias-poor-are-not-usingLPG-cylinders-they-got-under-Ujjw.html; Jha, D. (2017, June 11). Modi's pet Ujjawala scheme wobbles as many beneficiaries drop out after their first LPG cylinder. Retrieved April 4, 2018, from Scroll: https://scroll.in/article/839961/modispet-ujjawala-scheme-wobbles-as-many-beneficiaries-drop-out-after-their-first-lpg-cylinder

[88] United Nations Framework Convention on Climate Change, 29 May 1992, *International Legal Materials* , 31 (1992), 849

[89] Article 4.2, Paris Agreement UNFCCC, 'Decision 1/CP.21 Adoption of the Paris Agreement' (29 January 2016) FCCC/ CP/2015/10/Add.1, Annex (Paris Agreement)

[90] Daniel Bodansky, 'The Legal Character of the Paris Agreement', *Review of European Community & International Environmental Law*, RECIEL 25 (2) 2016, 143.

achievement of NDC is not binding. However, Governments are expected to take measures towards achieving NDC objectives.[91]

India ratified the Paris Agreement on 2 October 2016, and communicated its Intended Nationally Determined Contribution (INDC)[92] to the UNFCCC for the period 2021 to 2030.[93] The eight objectives communicated by the country were listed in Chapter 1. Of these, the aim of creating 'an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through *additional* forest and tree cover by 2030' is directly relevant to forests. (emphasis added).

It is pertinent to note that the NDC aims at creating the additional sink of 3 billion tonnes of CO2 equivalent through 'additional' forest and tree cover. This essentially limits the potential of existing forest cover in in creating an additional carbon sink, by improving the quality of existing forests. The intended target of 2.5 – 3 billion tonne will, thus, have to be met by additional or new forest and tree cover.

NDCs, NAPCC and States

The Central Government is competent to make laws *for implementing any treaty, agreement or convention or any decision made at any international conference.*[94] Government has used this provision in the past to legislate upon matters related to environment in the form of Environment Protection Act and Air (Prevention and Control of Pollution) Act. This has not been the case with respect to climate change. There is no single comprehensive Climate Change law or policy that has been formulated in India. However, several Acts and Policies contain provisions that hold relevance for addressing climate change.

The main document governing Indian domestic policies on climate change is the National Action Plan on Climate Change (NAPCC). The Action Plan adopts a co-benefits approach towards climate change, whereby it seeks to promote '*development objectives while also yielding co-benefits for addressing climate change effectively.*' While India's position has changed since the NAPCC was formulated, it continues to be the primary Government document on climate change action in India. The legal and regulatory landscape is still being populated by provisions across various laws, none of which has been legislated with a clear objective of addressing climate change concerns. These span sectors such as energy, infrastructure, and forestry.

Since most of the sectors identified as important in the NAPCC fall within the legislative and administrative domains of sub national Governments, there is a clear need for greater ownership and action from State Governments.

Further to the NAPCC, State Action Plans for Climate Change (SAPCC) were mandated from all the States. Although each State was responsible for preparing its SAPCC, the

[91] Bodansky, 2016 @146, https://www.c2es.org/site/assets/uploads/2017/06/paris-climate-agreement-qa.pdf; http://ambitiontoaction.net/wp-content/uploads/2018/08/NDC-Update-Report-May-2018_web.pdf

[92] The INDC is treated as first NDC.

[93] Government of India, India's Intended Nationally Determined Contribution, India's submission to UNFCCC (2015), 29

[94] Article 253, Constitution of India

process was essentially top down and driven by the Central Government.[95] Moreover, States were not actively involved in the formulation of National Plan, to which the SAPCCs had to be consistent with. [96] So far, thirty-two State Action Plans have been approved and endorsed by National Steering Committee on Climate Change.[97]

Besides NAPCC, NDCs are also going to be realized at the level of States. The fact that NDCs are made by the Union Government at international level are to be implemented ultimately at State level makes it imperative for increased support in the form of grants or allocations.

Conclusion

Unlike `environment' or `climate change', `forests' is a clear subject in the federal legislative scheme of the Constitution of India. Constitution of India originally placed forests as a State subject but subsequently changed it to a concurrent subject. This opened up the space for Centre to intervene on matters that related directly to forests. One of the most obvious examples of utilisation of this newly opened space was the Forest Conservation Act of 1980, which is also one of the most far-reaching legislation over forests.

A number of laws exist that are key to governance of forests in India. These laws range from pre independence era to 2016. The various laws deal with different aspects of management of forests and benefit sharing from forests. The overall balance of various Acts tilts in favour of the Centre as most functions and powers of States over forests are subject to approval from Centre. These activities include diversion of forestland, formulation of working plans for management of forests, or utilisation of compensatory afforestation money.

Besides legislation, there are also several policies and programmes that govern forests, both directly and indirectly. While National Forest Policy, National Afforestation Policy, Green India Mission etc. have clear objectives and targets for increasing forest cover and improving its management, there are several non-forestry policies, schemes and programmes that have goals and provisions that support forest governance, such as Ganga Vriksharopan Abhiyan, National Agroforestry Policy, Green Highways Policy etc. These are especially important in increasing the tree cover outside forests, which are going to be instrumental in achieving the stated NDC objective of creating 'an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030'.

[95] Elizabeth Gogoi, India's State Action Plans on Climate Change: towards meaningful action, OXFORD POLICY MANAGEMENT NOTE (2015), Srivastava, 2015, CSE, 2018, http://cdn.cseindia.org/attachments/0.40897700_1519110602_coping-climate-change-volII.pdf

[96] The Energy and Resources Institute, *Strengthening Green Federalism in India* (New Delhi, TERI, 2012). Srivastava, 2015

[97] http://www.moef.nic.in/ccd-sapcc

4. Forest finances and fiscal Policy

This chapter analyses the fiscal landscape of the forestry sector in India. It examines major trends in revenues and expenditures at the State level with respect to forestry, including funding under various centrally sponsored schemes and forest-related transfers as recommended by recent Finance Commissions. The Chapter concludes with the major findings of analysis with a focus on issues that will be of relevance to the XV Finance Commission.

The analysis is based on data from State Finances compiled by the Reserve Bank of India, annually and other official sources, including answers to questions raised in the Parliament. Under this study, we sought information from the States on forestry revenue, revenue sources, expenditure and expenditure heads since the year 2000 (to be able to analyse trends from before the XII FC period). Only some States responded and in most cases, the information provided was not complete. Analysis of the limited information received is also presented in this Chapter.

State revenue and expenditure related to forestry

This section discusses revenue from and expenditure on forestry in State budgets. The analysis is largely based on State finances compiled by the Reserve Bank of India annually.

Revenue

States' revenue from forestry is classified in the State revenue budget as non-tax revenue from 'forestry and wildlife' and 'plantations'. This revenue broadly includes the following minor heads:[98]

- Timber and other forests produce removed by Government agency
- Timber and other forest produce removed by others
- Drift and waif wood, and confiscated forest produce
- Revenue from forests not managed by the Government
- Miscellaneous

Other forest produce can include any non-timber product, such as firewood, charcoal, resin, grazing and fodder grass. The Indian Forest Act gives a very broad definition for forest produce and includes charcoal, caoutchouc, catechu, wood-oil, resin, natural varnish, bark, lac, mahua flowers, mahua seeds, kuth and myrabolams from any forest or non-forest area. It also includes trees and leaves, flowers and fruits, found in or brought from forests.[99]

Revenue from miscellaneous sources includes fines, refunds and fees from other sources such as fees on account of transit, export or registration of property mark.

Table 27 provides the revenue receipts on account of "forestry and wildlife" and "plantations" in the States in aggregate terms and as percentage of total non-tax revenue of States. As can be seen, revenue from forests constituted less than 3% of the States' own non-tax revenue for all States combined in 2017/18. **Table 28** shows that in most States, including

[98] http://budget.up.nic.in/Fin_H_Book/volume7/92.html
[99] Section 2 (4), Indian Forest Act, 1927

most forest-rich NE States, the shares of forestry to total non-tax revenue hovers about the national average, although the share is noticeably higher in select States, particularly Meghalaya (22%), Uttarakhand (20%), Manipur (14%), MP (12%), Andhra Pradesh (9%) and Chhattisgarh (7%).

On a per hectare basis, this revenue translates into revenue of Rs 700/ha for all State combined. Compared to this, the average per ha GVA from agriculture was much higher - about Rs. 1,60,000 - for all States combined in 2015/16.

Table 27 : Revenue Receipts of States

(Rs. Crore)

	2016-17 (Accounts)	2017-18 (Revised Estimates)	2018-19 (Budget Estimates)
TOTAL REVENUE (I+II)	2046401	2457718	2812994
I. TAX REVENUE (A+B)	1520773	1743769	2013453
A. State's Own Tax Revenue	912912	1050350	1198796
B. Share in Central Taxes	607861	693419	814657
II. NON-TAX REVENUE (C+D)	525628	713949	799540
C. State's Own Non-Tax Revenue	169536	194591	224904
- Forestry and Wildlife (F&W)	3963	5333	6079
- Plantations (P)	5	6	7
- F&W and P as % of State's Own Non-Tax Revenue	2.34	2.74	2.71
D. Grants from the Centre (1 to 5)	356091	519358	574636
1. State Plan Schemes	164120	62675	58756
2. Central Plan Schemes	5957	12587	5990
3. Centrally Sponsored Schemes	50234	283075	309807
4. NEC/ Special Plan Scheme	3534	1187	626
5. Non-Plan Grants	132247	159834	199458

Source: Compiled from RBI State Finances, 2018

Table 28 : Revenue of States on account of "Forestry & Wildlife" & "Plantations" 2017/18

(Rs crore)

	States	Receipts		F&W as % of SONTR
		Forestry & Wildlife	Plantations	
1	Andhra Pradesh	350.00	-	8.77
2	Arunachal Pradesh	21.32	-	3.05
3	Assam	239.59	-	3.74
4	Bihar	15.95	-	0.56
5	Chhattisgarh	600.00	-	7.78
6	Goa	4.58	-	0.16
7	Gujarat	46.00	-	0.27
8	Haryana	60.00	-	0.55

	States	Receipts		F&W as % of SONTR
		Forestry & Wildlife	Plantations	
9	Himachal Pradesh	44.39	0.02	2.07
10	Jammu & Kashmir	92.28	-	1.71
11	Jharkhand	8.00	-	0.07
12	Karnataka	262.78	0.02	3.85
13	Kerala	341.32	–	2.91
14	Madhya Pradesh	1134.00	–	11.91
15	Maharashtra	412.14	–	1.90
16	Manipur	35.00	–	14.26
17	Meghalaya	112.55	–	21.95
18	Mizoram	2.31	-	0.73
19	Nagaland	7.76	–	2.64
20	Odisha	46.80	–	0.52
21	Punjab	22.61	–	0.44
22	Rajasthan	173.82	–	1.04
23	Sikkim	13.50	6.0	4.16
24	Tamil Nadu	105.76	-	0.98
25	Telangana	89.53	–	1.36
26	Tripura	6.00	–	1.37
27	Uttarakhand	500.00	–	20.18
28	Uttar Pradesh	450.00	–	2.57
29	West Bengal	135.33	0.02	4.27
32	All States	5333.32	6.06	2.74

Source: Compiled from RBI State Finances, 2018

Expenditure

Expenditure on forestry includes expenditure on general works (pay of officers, pay of establishment, allowances and honoraria) and conservancy works (all charges, whether direct or incidental, connected with extraction and removal of timber and other forest produce; infrastructure; forest organisation and improvement expenses such as demarcation, settlement of rights, survey, working plans, plantation, prevention of forest fires, ex gratia etc.).

Table 29 gives details of the share of forests and wildlife in total expenditure of States.

Table 29 : Expenditure on Forestry and Wildlife in States (Rs crore)

	2016-17 (Accounts)	2017-18 (Revised Estimates)	2018-19 (Budget Estimates)
Revenue Expenditure			
Forestry and Wildlife (F&W)	14,510	16,745	18,442
Plantations (P)	14	18	20
Total Revenue Expenditure	20,86,892	25,18,797	27,83,775
F&W and P as % of Total Revenue expenditure	0.7%	0.7%	0.7%
Capital Outlay			
Forestry and Wildlife	3338	2598	3415
Plantations	0	0	0
Total Capital Outlay	392188	470713	537795
F&W and P as % of Total Capital Outlay	0.9%	0.6%	0.6%
Total Expenditure (rev and Cap) on F& W and P	17,862	19,361	21,876
F&W and P as % of Total Expenditure	0.7%	0.6%	0.7%

Source: Compiled from State Finances, 2018, Reserve Bank of India

A review of expenditure incurred by States on account of forests and wildlife shows that it was about 0.7% of the total revenue and capital expenditure for all States combined in 2017/18 (**Table 30**). This ratio was about 1.1% in 2000/01 and has progressively fallen since (Figure 15). Close to 90% of total expenditure is on the revenue head. Our interactions with State forest departments and divisional officers suggest that, in general, over 90% of this is on account of salaries.

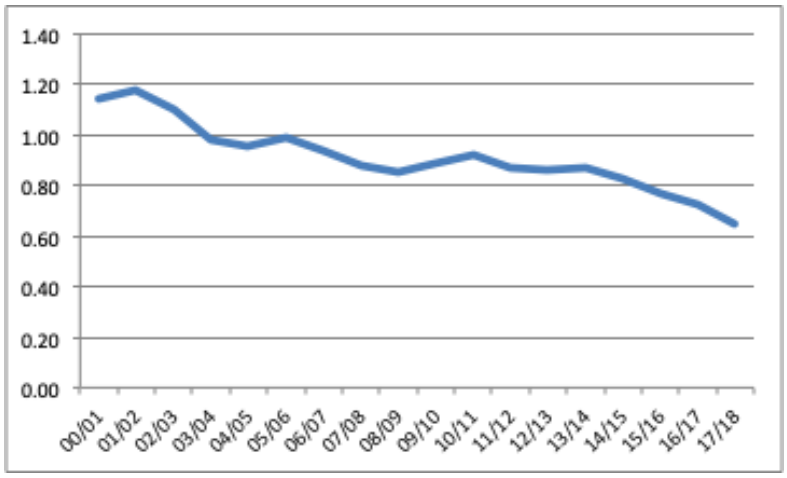

Figure 15: Expenditure on Forests and Wildlife and Plantations (Revenue and Capital) as per cent of total expenditure: all States

Source: Data from RBI State Finances, various issues

In absolute terms, however, expenditure on Forestry and Wildlife and Plantations has increased over the years, except for a brief decline during 2014/15 and 2015/16 (Figure XX).

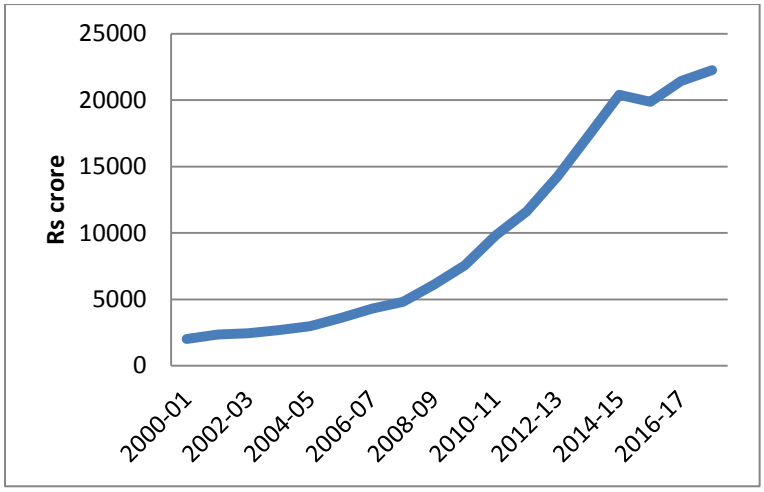

Figure 16: Expenditure on Forests and Wildlife and Plantations (Revenue and Capital) in constant 2011/12 prices: all States
Source: Data from RBI State Finances, various issues

State-level disaggregation shows that the percentage of forestry in total expenditure was below 2% in all States in 2017/18, ranging from about 0.2% in several States and going up to a maximum of 1.8% in Chhattisgarh.

Table 30 : Revenue and Capital Expenditure of States on account of "Forestry and Wildlife" and "Plantations" 2017/18

	State	Revenue Expenditure (Rs in crore)		Capital Expenditure (Rs crore)	As Percentage of Total Public Expenditure (%)
		Forestry and Wildlife 2017-18 (RE)	Plantations 2017-18 (RE)	Forestry and Wildlife 2017-18 (RE)	F&W and P
1	Andhra Pradesh	341.99		1.46	0.23
2	Arunachal Pradesh	232.89			1.42
3	Assam	1041.01		56.16	1.17
4	Bihar	310.99		2	0.19
5	Chhattisgarh	1398.41		40.45	1.84
6	Goa	54.8		5.1	0.42
7	Gujarat	518.54		647.62	0.76
8	Haryana	343.73			0.37
9	Himachal Pradesh	494.84	1.5	10.28	1.46
10	Jammu And Kashmir	615.82		103.31	1.10
11	Jharkhand	646.84			0.91
12	Karnataka	1242.63		10	0.71
13	Kerala	533.13		94.35	0.57
14	Madhya Pradesh	1785.06		372.26	1.33
15	Maharashtra	2261.62		529.97	0.92
16	Manipur	154.67	0.08		1.20
17	Meghalaya	147.38		0.35	1.19
18	Mizoram	131.87			1.36

	State	Revenue Expenditure (Rs in crore)		Capital Expenditure (Rs crore)	As Percentage of Total Public Expenditure (%)
		Forestry and Wildlife 2017-18 (RE)	Plantations 2017-18 (RE)	Forestry and Wildlife 2017-18 (RE)	F&W and P
19	Nagaland	117.14		4.8	1.00
20	Odisha	651.04		3.06	0.64
21	Punjab	166.28			0.22
22	Rajasthan	804.51		176.29	0.55
23	Sikkim	101.55	8.81	2	1.65
24	Tamil Nadu	365.54	0.01	156.52	0.26
25	Telangana	295.25		50	0.26
26	Tripura	116.13		9.34	0.90
27	Uttarakhand	543.32	0.6	49.95	1.68
28	Uttar Pradesh	701.73	6.88	254.09	0.28
29	West Bengal	626.34		19.05	0.39
30	All States	16745.05	17.88	2598.41	0.65

Source: Data compiled from State Finance, 2018, Reserve Bank of India

Figure 17 shows the per unit area expenditure in the forestry sector, which suggests that, with some exceptions, non-forest-rich States spend more on a per unit area basis than forest-rich States.

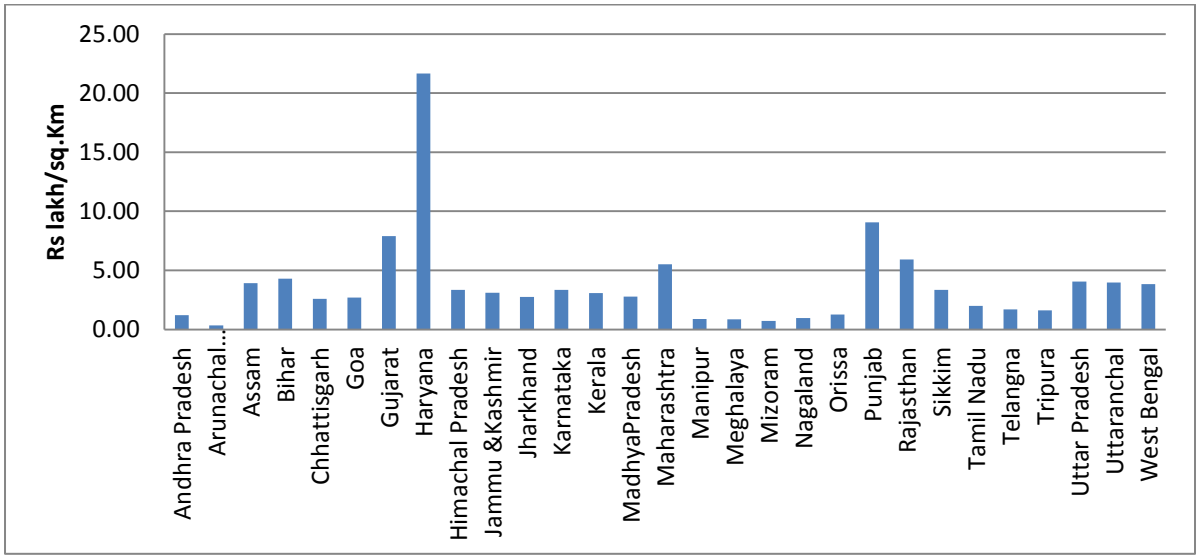

Figure 17: Expenditure on Forests and Wildlife and Plantations (Revenue and Capital) in 2017/18: Rs/sq. Km of forest cover

Source: Data from RBI State Finances and ISFR, 2017

Time series analysis of expenditure on forests and wildlife and plantations at the State level, mirrors the national trend in most States. Figure 18 shows the trend for the seven forest rich States which make up for about 55% of the national forest cover. It is seen that in general, while expenditure (in 2011/12 prices) has been increasing there has been some decline in

recent years. Maharashtra is a notable exception, which has seen a consistent increase in expenditure in the sector.

A comparison of forest-related revenue and expenditure for 2017/18 indicates that expenditure on forestry was higher than receipts from the sector in all States (except Andhra Pradesh, where the two were nearly equal). The difference is over 10 times in several States, including Mizoram, HP, Nagaland, Odisha, Goa and Gujarat.

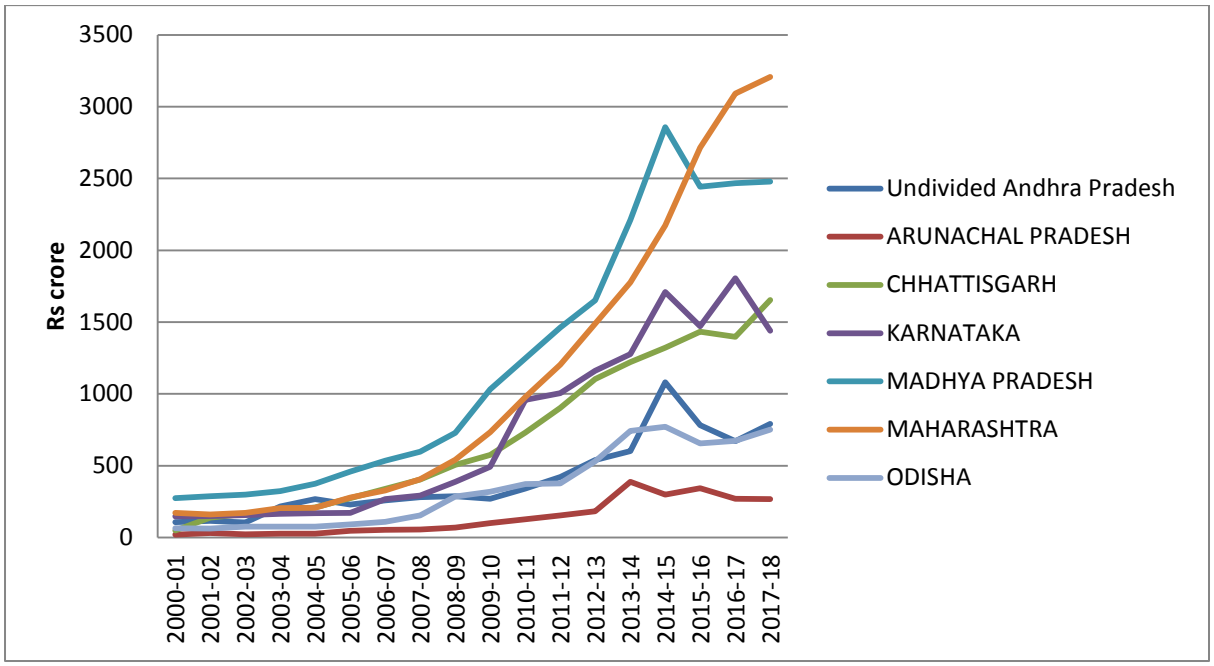

Figure 18: Expenditure on Forests and Wildlife and Plantations (Revenue and Capital) in constant 2011/12 prices: select States

Source: Data from RBI State Finances, various issues

Table 31 : Budgetary sources for forestry activities from outside the State Budget

		Actual 2015-2016			Actual 2016-2017			Revised 2017-2018			Budget 2018-2019		
		R	C	T	R	C	T	R	C	T	R	C	T
1	National Mission for a Green India (Funded From NCEF)												
	Green India Mission-National Afforestation Programme	164.97	...	164.97	101.10	...	101.10	127.30	...	127.30	159.00	...	159.00
	Green India Mission-National Afforestation Programme (EAP Component)				...	...	...	0.50	...	0.50	1.00	...	1.00
	Forest Fire Prevention and Management*	44.50	...	44.50	44.55	...	44.55	45.25	...	45.25	50.00	...	50.00
	Total	209.47	...	209.47	145.65	...	145.65	173.05	...	173.05	210.00	...	210.00
2	Integrated Development of Wildlife Habitats (Funded from NCEF)												
	Project Tiger	154.85	...	154.85	342.25	...	342.25	345.00	...	345.00	350.00	...	350.00
	Project Elephant	12.08	...	12.08	21.20	...	21.20	27.50	...	27.50	30.00	...	30.00
	Integrated Development of Wildlife Habitats	61.01	...	61.01	89.51	...	89.51	150.00	...	150.00	165.00	...	165.00
	Development of Wildlife Habitats (EAP Component)				...	...	...	10.00	...	10.00	10.00	...	10.00
	Total	227.94	...	227.94	452.96	...	452.96	532.50	...	532.50	555.00	...	555.00

	Actual 2015-2016			Actual 2016-2017			Revised 2017-2018			Budget 2018-2019		
	R	C	T	R	C	T	R	C	T	R	C	T
3 Conservation of Natural Resources and Ecosystems (Funded from NCEF)												
Conservation of Corals and Mangroves	5.17	...	5.17	16.37	...	16.37	15.00	...	15.00	...	...	...
Biodiversity Conservation	17.85	...	17.85	20.90	...	20.90	11.00	...	11.00	14.50	...	14.50
Biodiversity Conservation (EAP Component)				...	...	...	14.00	...	14.00	...	...	...
Conservation of Aquatic Ecosystems	39.23	...	39.23	59.99	...	59.99	56.00	...	56.00	66.00	...	66.00
Total	62.25	...	62.25	97.26	...	97.26	96.00	...	96.00	80.50	...	80.50
4 National River Conservation Programme												
Funded from NCEF	61.73	...	61.73	77.99	...	77.99	140.50	...	140.50	123.50	...	123.50
EAP Component	4.99	...	4.99	21.00	...	21.00	33.00	...	33.00	50.00	...	50.00
Total	66.72	...	66.72	98.99	...	98.99	173.50	...	173.50	173.50	...	173.50
Total- CSS	566.38	...	566.38	794.86	...	794.86	975.05	...	975.05	1019.00	...	1019.00

**The scheme was called "Intensification of Forest Management" up till the Union Budget 2018/19

Source: compiled form Union Budget 2017/18 and Union Budget 2018/19

Funds received under centrally sponsored schemes

States receive funds from the Centre for forestry activities, through allocations under Central Sector and Centrally Sponsored Schemes, both directly for forest-sector projects and as components of other projects.

Funding under major forest-related CSS

Major on-going forest-related CSS (centrally sponsored schemes) include the Green India Mission - National Afforestation Programme, Biodiversity Conservation, Conservation of Aquatic Ecosystems, Conservation of Corals and Mangroves, Forest Fire Prevention and Management Scheme, Integrated Development of Wildlife Habitats, Project Elephant, Project Tiger, and National River Conservation Programme. **Table 31** shows the amount spent/budgeted for these schemes since 2015.

It is worth noting that in 2016, the Cabinet approved the rationalisation of CSS in order to ensure optimum utilization of resources with better outcomes through area specific interventions. CSS were divided in the following:

i. Core schemes: Focus of CSSs should be on schemes that comprise the National Development Agenda where the Centre and States will work together in the spirit of Team India.
ii. Core of the Core Schemes: Those schemes which are for social protection and social inclusion should form the core of core and be the first charge on available funds for the National Development Agenda.
iii. Optional Schemes: The Schemes where States would be free to choose the ones they wish to implement. Funds for these schemes would be allocated to States by the Ministry of Finance as a lump sum.

All the major schemes of MoEFCC listed in Table 31 above (National Mission for a Green India, Integrated Development of Wildlife Habitats, Conservation of Natural Resources and Ecosystems, and National River Conservation Programme) were designated as Core Schemes.[100] For such schemes, expenditure sharing between the centre and State is as follows:

a) For 8 North Eastern States and 3 Himalayan States: Centre: State: 90:10
b) For other States: Centre: State: 60:40
c) For Union Territories (without Legislature): Centre 100% and for UTs with legislature existing funding pattern would continue.

Scheme wise release of funds under CSS is shown in **Table 32**. The total funds released to States under these Schemes in 2017-2018 amounted to Rupees 942 crores. As can be seen from Figure 19, two States, MP and Maharashtra accounted for nearly 30% of all allocations. These two States, along with Gujarat, Uttarakhand and Punjab received nearly 50% of all funds. Scheme wise analysis shows that nearly 37% of all CSS was allocated towards Project Tiger, followed by National River Conservation Programme (18%). It is difficult to draw any conclusions from this data since it is only for a single year, but it is likely that political considerations play a role in the prioritization of schemes and states.

[100] http://pib.nic.in/newsite/PrintRelease.aspx?relid=148299

Table 32 : Actual releases made under Centrally Sponsored Schemes of MoEFCC 2017 – 2018

S No	State / UT Name	Green India Mission-National Afforestation Programme	Forest Fire Prevention & Management Scheme	Pro-ject Tiger	Project Elephant	Integrated Development Of Wildlife Habitats	Conservation Of Corals & Mangroves	Biodiversity Conservation	Conservation. of Aquatic Ecosystems	National River Conservation Programme	Total
1	Andhra Pradesh	3.81	0.00	2.32	0.17	4.81	0.00	0.00	0.00	0.00	11.12
2	Arunachal Pradesh	0.86	1.02	6.71	1.19	2.70	0.00	0.64	0.00	0.00	13.12
3	Assam	0.00	0.00	23.10	0.00	2.76	0.00	0.71	0.08	0.00	26.65
4	Bihar	4.23	0.75	5.52	1.54	3.23	0.00	0.00	3.61	0.00	18.88
5	Chhattisgarh	21.81	1.68	13.15	0.48	4.35	0.00	0.98	0.00	0.00	42.46
6	Delhi	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
7	Goa	0.00	0.00	0.11	0.00	0.86	0.00	0.00	0.00	3.00	3.97
8	Gujarat	0.00	0.75	0.00	0.00	5.59	8.01	0.65	0.00	62.00	76.99
9	Haryana	2.71	0.75	0.00	0.18	1.81	0.00	0.00	0.13	0.00	5.58
10	Himachal Pradesh	1.73	2.77	0.00	0.00	2.37	0.00	0.00	0.99	0.00	7.86
11	Jammu And Kashmir	7.20	0.75	0.00	0.00	5.78	0.00	0.00	23.82	0.00	37.55
12	Jharkhand	0.00	1.05	3.39	1.06	0.96	0.00	0.00	0.00	0.00	6.45
13	Karnataka	4.09	1.05	23.09	3.56	4.28	0.52	0.00	0.00	0.00	36.59
14	Kerala	0.00	2.35	6.36	4.83	9.01	1.57	2.36	2.07	0.00	28.54
15	Madhya Pradesh	8.74	1.68	114.55	0.00	13.79	0.00	2.50	3.47	0.00	144.74
16	Maharashtra	6.73	3.22	65.24	0.27	10.50	0.00	2.06	8.74	31.75	128.50

S No	State / UT Name	Green India Mission-National Afforestation Programme	Forest Fire Prevention & Management Scheme	Pro-ject Tiger	Project Elephant	Integrated Development Of Wildlife Habitats	Conservation Of Corals & Mangroves	Biodiversity Conservation	Conservation. of Aquatic Ecosystems	National River Conservation Programme	Total
17	Manipur	9.61	2.20	0.03	0.11	4.26	0.00	0.00	0.93	0.00	17.13
18	Meghalaya	1.65	1.05	0.00	1.63	1.99	0.00	0.00	0.00	0.00	6.31
19	Mizoram	25.80	0.91	2.15	0.00	4.87	0.00	0.00	0.98	0.00	34.71
20	Nagaland	5.85	0.93	0.01	0.25	5.66	0.00	0.00	0.00	5.00	17.70
21	Odisha	4.90	1.68	16.46	1.25	3.43	0.89	1.30	6.23	1.99	38.13
22	Puducherry	0.00	0.30	0.00	0.00	0.07	0.00	0.00	0.30	0.00	0.67
23	Punjab	6.22	0.75	0.00	0.00	0.00	0.00	0.00	0.00	50.00	56.97
24	Rajasthan	1.40	1.05	7.73	0.14	6.22	0.00	0.00	1.54	0.00	18.09
25	Sikkim	0.00	1.49	0.00	0.00	2.02	0.00	0.00	1.84	18.01	23.36
26	Tamil Nadu	0.00	1.05	25.51	2.92	3.95	0.90	4.94	1.06	0.00	40.32
27	Telangana	0.00	1.05	3.50	0.00	1.57	0.00	0.00	0.00	0.00	6.12
28	Tripura	4.94	0.66	0.00	0.10	0.00	0.00	0.00	0.00	0.00	5.70
29	Uttar Pradesh	0.67	0.75	8.20	0.31	3.87	0.00	0.00	0.00	0.00	13.80
30	Uttarakhand	3.36	1.68	11.87	3.42	32.00	0.00	4.75	0.00	0.00	57.08
31	West Bengal	0.00	0.75	5.98	0.80	6.58	1.26	1.30	0.00	0.00	16.66
	Total	126.29	34.39	345.00	24.19	149.29	13.15	22.19	55.80	171.75	942.06

Source: MoEFCC 2018
http://www.moef.nic.in/public-information/receipts-disbursements

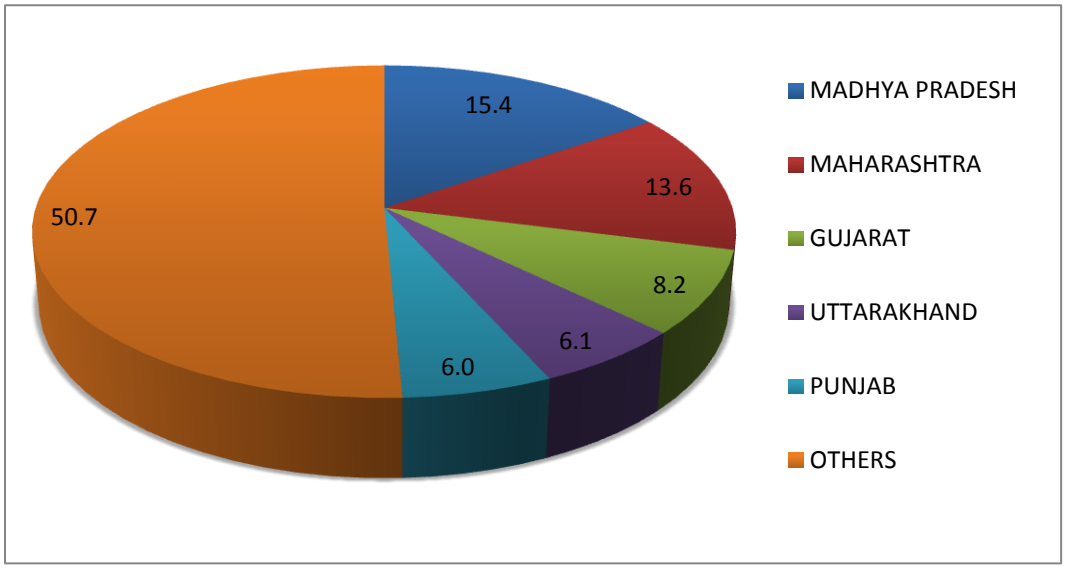

Figure 19 : Share of States in total releases for Centrally Sponsored Schemes (MOEF) 2017 – 2018
Source : Data source – MOEFCC, 2018

It is worthwhile discussing in some detail funding under the Green India Mission, which is one of the eight Missions under the National Action Plan on Climate Change. The Mission aimed at increasing and improving forest and tree cover in the country and contributing to improved ecosystem services, forest-based livelihood and enhanced CO2 sequestration. [101] The Mission was to be implemented over 10 years, coinciding with the 12th and 13th five year plan periods. The total mission cost was estimated to be Rs 46,000 crores, which was meant to be mobilized from across a number of sources, including other CSS such as MGNREGS and funds such as the National Clean Energy Fund, CAMPA, and the XIII FC grants. In 2014, the Cabinet Committee on Economic Affairs approved a proposal of Rs. 13,000 for the GIM in the 12^{the} Plan.[102] Of this, the plan outlay was to be Rs.2000 crore. Against this target, only about Rs 112 crores were allocated to the scheme between 2014 and 2017. Consolidated physical achievements under the scheme are not publicly available.

The Mission has been merged with the National Afforestation Programme, and their institutional as well as funding mechanisms will be merged too.[103] The National Afforestation Programme was launched in 2000. Until FY 2016 – 2017, Rupees. 3698.63 crores had been approved for investment in afforestation across the country.[104]

An illustrative State-wise distribution of NAP and Green India Mission fund allocation for the period 2014-2017 is given in Figure 20. It appears that only some States have benefitted from allocations under GIM.

[101] http://www.moef.gov.in/sites/default/files/GIM_Mission%20Document-1.pdf
[102] http://pib.nic.in/newsite/PrintRelease.aspx?relid=103978
The expenditure of 13,000 crores was to be met from the Plan outlay, and convergence with MGNREGA activities, CAMPA and the NAP. The sharing pattern for the plan outlay would be 90 Centre and 10 State for the North Eastern States and 75 Centre and 25 State for the rest of the States. The 13th Finance Commission grant funds may be counted towards the States' share, to the extent that this is in conformity with the Commission's award. http://pib.nic.in/newsite/PrintRelease.aspx?relid=103978
[103] MoEF&CC order no. MoEF&CC(NAEB):1-2/2017-B-I; Dated 30 January 2018
[104] Lok Sabha Starred Question No: 272; Answered on: 05.01.2018

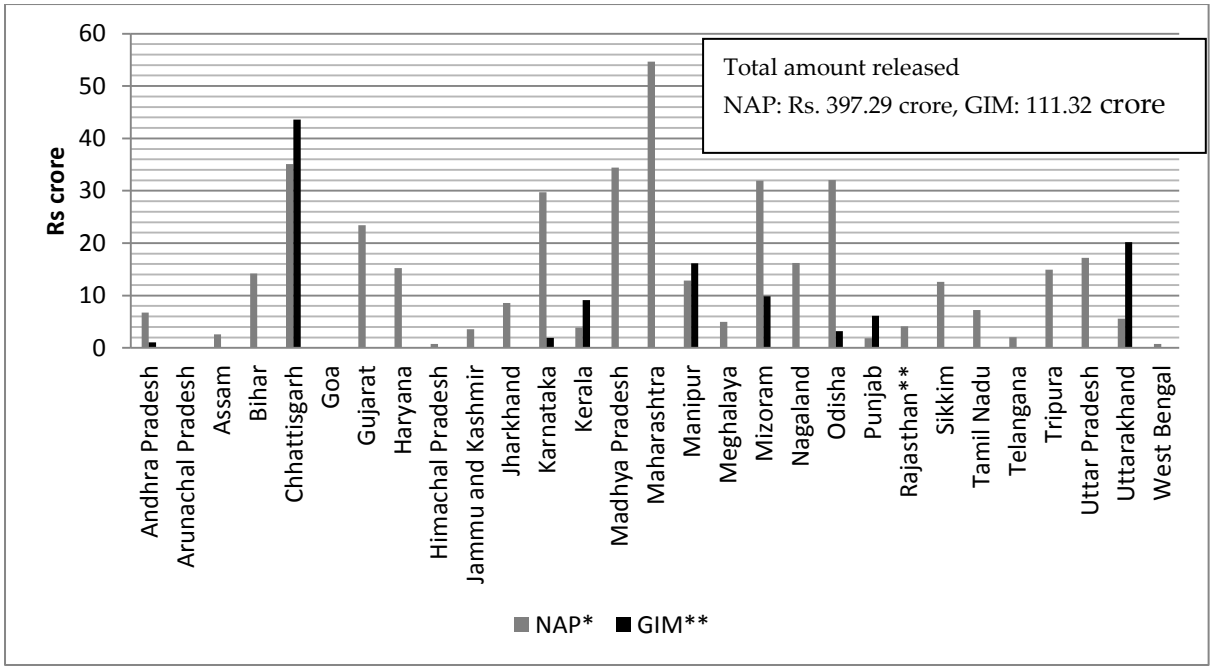

Figure 20 : Funds Released under National Afforestation Programme and National Mission for Green India (2014-2015 to 2016-2017

Note : * : Programmes not implemented in UTs; ** An amount of Rs. 2.75 Crores has been released to Rajasthan for Preparatory Activities under GIM during 2011/12.

Source : India Stats; Lok Sabha Unstarred Question No. 250, dated on 18.07.2017.

Funding under other relevant schemes and programmes

States also receive funds for afforestation and plantation activities from schemes other than those housed in MoEF&CC. For example, around Rs 2000 crore under the ***Namami Gange scheme*** have been assigned for plantation activities. These activities will be carried out by State Forest Departments as per the ***Ganga Vriksharopan Abhiyan***, 2018 in 83,946 sq. km area along the five main Ganga basin States (Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal) over the next five years.[105]

Similarly, under the ***Sub Mission on Agroforestry (Table 33)***, 79 crores have been released since 2016.

Table 33 : Allocations and Releases to Sub Mission on Agroforestry: 2016-2019 (Rs crore)

State	Allocation	Release
Andaman And Nicobar Islands	0.00	0.00
Andhra Pradesh	6.30	3.15
Arunachal Pradesh	0.00	0.00
Assam	0.00	0.00
Bihar	6.00	3.00
Chandigarh	0.00	0.00
Chhattisgarh	5.00	4.00
Dadra And Nagar Haveli	0.00	0.00

[105] http://pib.nic.in/newsite/PrintRelease.aspx?relid=180726 dated 19th July, 2018

State	Allocation	Release
Daman And Diu	0.00	0.00
Delhi	0.00	0.00
Goa	0.00	0.00
Gujarat	9.00	9.70
Haryana	3.50	1.75
Himachal Pradesh	2.30	2.64
Jammu And Kashmir	0.00	2.11
Jharkhand	8.00	5.00
Karnataka	15.50	10.25
Kerala	5.00	0.00
Lakshadweep	0.00	0.00
Madhya Pradesh	8.40	4.20
Maharashtra	8.00	6.00
Manipur	0.00	0.00
Meghalaya	2.00	1.00
Mizoram	0.00	1.25
Nagaland	0.00	0.75
Odisha	8.00	6.00
Puducherry	0.00	0.00
Punjab	4.00	3.28
Rajasthan	12.00	6.00
Sikkim	0.00	0.00
Tamil Nadu	5.00	2.50
Telangana	0.00	0.00
Tripura	0.00	0.00
Uttar Pradesh	0.00	6.00
Uttarakhand	0.00	0.00
West Bengal	0.00	0.00
CAFRI- Jhansi(Central Agroforestry Research Institute)	0.00	0.01
CBTC- Assam(Cane and Bamboo Technology Centre)	0.00	0.40
ISAF(Indian Society of Agroforestry)	0.00	0.02
NSC- Delhi(National Seed Corporation Limited)	0.00	0.19
Head Quarter Expenses	8.00	0.00
Total	116.00	79.19

Source: https://nmsa.dac.gov.in/RptAllocationReleaseProgress.aspx?ARA=SMAF
National Mission on Sustainable Agriculture, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare,

However, it is estimated that about Rs. 4000 crore are spent annually on the tree-plantation components for agroforestry under various on-going CSS including (i) Mahatma Gandhi National Rural Employment Guarantee Scheme (ii) Integrated Watershed Development

Programme (iii) National Rural Livelihoods Mission (iv) National Horticulture Mission (v) Mahila Kisan Sashaktikaran Pariyojana (vi) Green India Mission, (vii) Rashtriya Krishi Vikas Yojana etc. (National Advisory Council, Agroforestry).[106] It is reported that MGNREGA alone spends about 8-10% of its resources on tree planting. MGNREGA received an allocation of Rs 55,000 crore in the union Budget 2018/19. The National Advisory Council, Government of India which made the case for the National Agroforestry Policy in 2013, envisaged that the amount allocated under MNAF would serve as a means to leverage and coordinate, converge and synergize between various elements of agroforestry scattered in various existing, missions, programmes and schemes -- agriculture, environment, forestry, and rural development.

Receipts under CAF Act

Every project proponent undertaking any non-forest activity in a forest has to make payment to States towards compensatory afforestation and net present value. These payments were being deposited with the ad hoc CAMPA and a maximum of ten per cent was released to States annually. With the implementation of the Compensatory Afforestation Fund Act, 2016, 90% of unspent balance of all monies collected by a State, currently under the (Central) ad hoc CAMPA will be released back to States. Since a balance of Rs. 51880.52 Crore is lying with the ad hoc CAMPA, (as on 31 March 2018)[107], the States' share will amount to a total of 46692 crores. Some forest rich States, such as Odisha can receive as much as 5984 crores once the CAF Act is implemented. (***See* Table 34)** Monies are continuing to be deposited with ad hoc CAMPA, therefore the amount that States are eventually entitled to may be higher.

While release of funds lying with ad hoc CAMPA will augment the financial ability of State forest departments to improve forest cover, this money is a way of compensation for forest area diverted in the past to other economic activities and should be seen from that perspective.

Table 34 : Monies to be released to States under CAF Act*

State	Rupees in crores
Odisha	5,984.25
Chhattisgarh	5,395.43
Madhya Pradesh	4,942.92
Jharkhand	3,636.42
Maharashtra	3,517.93
Uttarakhand	2,653.01
Andhra Pradesh	2,449.53
Arunachal Pradesh	1,884.48
Himachal Pradesh	1,835.89
Rajasthan	1,813.73
Uttar Pradesh	1,770.60
Telangana	1,619.08
Gujarat	1,482.04

[106] http://www.indiaenvironmentportal.org.in/files/file/recommendations_agroforestry_0.pdf
[107] Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018

State	Rupees in crores
Karnataka	1,308.93
Haryana	1,221.49
Jammu & Kashmir	1,149.15
Punjab	926.20
Assam	546.09
Bihar	507.62
Sikkim	330.03
Goa	319.79
Manipur	297.57
West Bengal	215.92
Tripura	192.63
Meghalaya	152.81
Tamil Nadu	106.20
Kerala	87.53
Mizoram	74.76

* Calculated on the basis of 90 Per cent of balance as on 31.03. 2018; Does not include Union Territories.
Source: Ministry of Environment, Forest & Climate Change, Response to Lok Sabha Unstarred Question No 3938; answered on 10.08.2018

Finance Commission transfers

Finance Commission transfers are an important source of revenue for States. Total transfers from FC, including tax devolution and grants in aid have increased from 755751 crores under the XII FC recommendations to 4485540 crores under the XIV recommendations. Since the XII Finance Commission, successive Finance Commissions have proactively promoted environmental stewardship in States, with a focus on forest conservation. Each Finance Commission has used a different approach to this end, in terms of both the criteria for inter-se distribution to transfers to States and the conditionality of use.

The **Twelfth Finance Commission (2005-2010**) report highlighted the financial constraints that States had pointed out in the maintenance of the forest area as per working plans. The Commission recognized that forests were a national wealth and the country as a whole had a responsibility in preserving it. Accordingly, the Commission recommended a grant of Rs.1000 crore spread over the award period 2005-2010 for the maintenance of forests. This amount was meant to be over and above the budget of the State Forest Departments. It recommended that the grant be distributed among States based on their forest area, and be spent for preservation of forest wealth only.[108]

The Terms of Reference of the **Thirteenth Finance Commission (2010-2015)** had environment as an integral consideration with the inclusion of "the need to manage ecology, environment and climate change consistent with sustainable development".[109] It set aside Rs.

[108] Finance Commission of India (2004). Report of the Twelfth Finance Commission: 2005-2010. http://fincom{India}.nic.in/writereaddata/html_en_files/oldcommission_html/fcreport/Report_of_12th_Finance_Commission/12fcreng.pdf
[109] Finance Commission of India (2009). Report of the Thirteenth Finance Commission: 2010-2015.http://fincomindia.nic.in/ShowContentOne.aspx?id=28&Section=1

15000 crore to be distributed, inter-se, based on states' relative performance in managing forests and water resources and promoting renewable energy.

The XII FC recognized the need to carry forward the forest grant recommended by the XII FC. It was reasoned that the combination of benefit externalities and internalised costs called for federal compensation. Accordingly, the forest grant was calibrated to the share of the national forested area falling in a state as well as to economic disability on the basis of the percentage of forested area in each State, with a weight reflecting the quality of forests (Finance Commission of India, 2009).[110] Further, the grant was so configured that subject to a mandated floor, the funds were not tied to any further expenditure on forests. A large portion of the forest grant, which was given in recognition of the economic disabilities imposed by forests, was freed for use as a development resource of the States. The only conditionality imposed was that States develop working plans for all forest divisions. This conditionality was intended as an enabler of governance capacity in States.

The following conditions and institutional arrangement was recommended for the administration of the grant.

Conditions for release of the grant:

i. The grant would be released in five annual instalments in the first quarter and not later than July of each year.

ii. The grants would be released without any conditions and be untied for the first two years, 2010-11 and 2011-12. However, priority would be given to preparation of working plans for all forest divisions of the State.

iii. States would have to develop working plans within a stipulated period of two years. This was stipulated as an enabler of governance capacity within the State, so that subsequent use of the grant, coming on-stream two years into the projection horizon, could be based on a detailed plan. These working plans would provide a benchmark data base to assess changes in forest cover overtime. Each working plan would have the customary horizon of ten years.

iv. All subsequent instalments i.e. in the last three years 2012-13, 2013-14 and 2014-15 would be released on the basis of approved working plans as under:

    a. The grants would be linked to progress on approval of working plans. The entire amount would be released after approval of more than 80% of the

[110] The inter se allocation of forest grants within all states was given by the following formula:

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

Where;

G_i = Share for state i

A_i = Geographical area of state i

F_i = Total forest area of state i

M_i = Moderately dense forest area of state i

H_i = Highly dense forest area of state i

$R_i = \max\left[0, \left\{\frac{F_i}{A_i} - \frac{\sum F_i}{\sum A_i}\right\}/100\right]$

All data on forested area and on density are as defined and quantified in SFR-2009 (data pertaining to 2007)

working plans of the State. Till this was achieved, releases shall be in the ratio of number of working plan approved to 80% of the number of working plans for the State.

v. 75% of the total release could be for used development purposes. The remaining 25% of the grant was to be used for preservation of forest wealth and was meant to be additionality to the States' budget for development of forestry and wildlife in the last three years.

vi. Grant released in a particular year would be utilised in that year.

vii. State Government would submit Utilisation Certificate every year by first week of June indicating for preceding year grant received from Government of India, budget provision, items of expenditure on plan and non-plan side, unutilised amount etc. Utilisation Certificate should be countersigned by the State Finance Secretary.

Monitoring agency at State level

Every State would constitute a High Level Monitoring Committee (HLMC) to ensure proper utilisation of the grant. This HLMC would be headed by the Chief Secretary to the State Government and would include Finance Secretary and Secretaries of Departments concerned as members. HLC shall be responsible for monitoring both physical and financial targets, ensuring adherence to the specific conditionality in respect of the grant, approving of working plan etc.

The HLMC would meet on a quarterly basis during the award period to review the utilisation of grants and to issue directions for mid-course correction, if considered necessary. Minutes of HLMC meetings shall be provided to the Department of Expenditure (Finance Commission Division), Ministry of Finance and Ministry of Environment & Forest, Government of India.

Monitoring agency at the Union Government level

A Review Committee would be constituted in the Government of India, headed by Secretary, Environment & Forest to review utilisation of grants. The Committee would include representatives from the Ministry of Finance (Department of Expenditure), etc. The Committee shall meet at least twice in a year.

Audit by the Comptroller and Auditor General

The Comptroller and Auditor General of India would be expected to audit the release and use of the grants-in-aid within the time and for the purposes mentioned by the FC-XIII. GOI may take appropriate decision about withholding grants to a State, if the CAG reports that the State allowed the grants to be used for purposes other than the ones for which these were provided.

An important change introduced by the **Fourteenth Finance Commission (2015-2020)** was the incorporation of 'Forest Cover' as a criterion in the horizontal tax devolution formula itself with a weightage of 7.5% **(Table 35)**.[111] The Commission recognized that States had the responsibility of environment management and climate change while creating suitable

[111] Finance Commission of India (2015). Report of the Fourteenth Finance Commission: 2015-2020. http://finmin.nic.in/14fincomm/14thFinanceCommission.htm.

conditions for sustainable economic growth and development; and went on to say that 'Of these complex and multidimensional issues, we have addressed a key aspect, namely, forest cover, in the devolution formula'. The rationale behind selecting forest cover was that a large forest cover provides huge ecological benefits, but also gives rise to an opportunity cost in terms of area not available for other economic activities and therefore, serves as an important indicator of fiscal disability (Finance Commission of India, 2015).[112] The devolution formula, thus, captures both revenue and cost disability and also enables the States to consider forests as a national treasure that needs to be protected (XIV FC).

Table 35 : Criteria and Weights for Tax Devolution: XII, XIII & XIV Finance Commissions

	XII FC		XIII FC		XIV FC
Criteria	**Weight (%)**	**Criteria**	**Weight (%)**	**Criteria**	**Weight (%)**
Population (1971)	25.0	Population (1971)	25.0	Population (1971)	17.5
Income Distance[113]	50.0	Area	10.0	Demographic Change[114]	10.0
Area	10.0	Fiscal Capacity Distance[115]	47.5	Income Distance[116]	50.0
Tax Effort[117]	7.5	Fiscal Discipline	17.5	Area	15.0
Fiscal Discipline[118]	7.5			Forest Cover	7.5

Source: XII, XIII, XIV Finance Commission Reports

While the amount transferred to States by the XIV FC (estimated at Rs 2,96,000 crore by the Commission) on account of forests was significantly higher than previous Commissions, it was part of the general tax devolution to the States as compared to forestry grants provided by the XII and XIII Finance Commissions.

Table 36 shows the forestry grants provided by the XII and XIII FCs, as well as the estimated tax devolution on account of the 7.5% weight for forests during the XIV FC period. As can be seen, six States (Madhya Pradesh, Arunachal Pradesh, Chhattisgarh, Odisha, Maharashtra

[112] XIV FC estimated the share of each State in total moderate and very dense forests of all states (in % terms) as the forest indicator, using data from the Forest Survey of India, 2013.
[113] For determining the state-wise **Income Distance** index, the Commission considered average per capita comparable Gross State Domestic Product (GSDP) of each of the 28 states for the last three years (1999-2000, 2000-2001 and 2001-2002), Following 10th& 11th FC, average of the top three states with highest per capita income was taken to compute the income distance of each state.
[114]The ToR of the 14th FC recognized **Demographic Change** and provided space for these changes across States to be taken into consideration while deciding devolution shares. Migration was seen as an important factor affecting population of a State. It posed several challenges including resource utilization leading to additional administrative and other costs. The 14th Finance Commission concluded that a weight to the 2011 population would capture the demographic changes since 1971, both in terms of migration and age structure.
[115]**Fiscal Capacity Distance** is the distance between states in tax capacity. The Commission estimated state-wise per capita tax revenue using the three year average per capita GSDP for 2004-05 to 2006-07 and obtained the average tax to comparable GSDP ratio as the weighted mean separately for general and special category states. These group specific averages were applied to the constituent states in each group to obtain per capita tax revenue. Finally, fiscal distance was obtained for each state as the distance between its estimated per capita revenue and the estimated per capita revenue of the second highest state in per capita income ranking.
[116] The 14th FC reverted back to the method of representing fiscal capacity in terms of **income distance**. It adopted the 12th FC methodology for estimating income distance.
[117] **Tax Effort** criterion was worked out by taking the three year average (1999/00- 2001/02) of the ratios of own tax revenue to comparable GSDP weighted by the square root of the inverse of the per capita GSDP.
[118] **Fiscal Discipline** was proposed by 11th FC view to provide for an incentive for better fiscal management. It was computed as a ratio of the state's revenue receipts to revenue expenditure for base year and reference period. E.g. the 12th FC computed the index using the base period from 1993-94 to 1995-96 and the reference period from 2000-01 to 2002-03.

and undivided Andhra Pradesh) received between 50-55% of all forest related transfers in each of the three FC periods on account of the share of their forest cover in the national total.

Table 36 : Recommended Forest grants by XII and XII FCs and tax devolution based on forest criteria by XIV FC

(Rs crore)

	12 FC	13 FC	14 FC	Share in forest grant/ transfer		
	2005-10	2010-15	2015-20	XII FC	XIIIFC	XIV FC
Madhya Pradesh	115	490	31084	11.5%	9.8%	10.5%
Arunachal Pradesh	100	728	39080	10.0%	14.6%	13.2%
Chhattisgarh	85	411	29188	8.5%	8.2%	9.9%
Odisha	75	331	21200	7.5%	6.6%	7.2%
Maharashtra	70	310	22060	7.0%	6.2%	7.4%
Andhra Pradesh	65	269	20144	6.5%	5.4%	6.8%
Karnataka	55	221	16424	5.5%	4.4%	5.5%
Assam	40	185	9567	4.0%	3.7%	3.2%
Uttaranchal	35	205	14135	3.5%	4.1%	4.8%
Jammu & Kashmir	30	133	9650	3.0%	2.7%	3.3%
Jharkhand	30	151	9167	3.0%	3.0%	3.1%
Manipur	30	150	5103	3.0%	3.0%	1.7%
Meghalaya	30	168	7584	3.0%	3.4%	2.6%
Tamil Nadu	30	142	9835	3.0%	2.8%	3.3%
Kerala	25	136	8176	2.5%	2.7%	2.8%
Mizoram	25	171	4517	2.5%	3.4%	1.5%
Nagaland	25	139	4514	2.5%	2.8%	1.5%
Rajasthan	25	88	3363	2.5%	1.8%	1.1%
Gujarat	20	82	4186	2.0%	1.6%	1.4%
Himachal Pradesh	20	101	7185	2.0%	2.0%	2.4%
Uttar Pradesh	20	80	4618	2.0%	1.6%	1.6%
Tripura	15	96	3553	1.5%	1.9%	1.2%
West Bengal	15	79	5324	1.5%	1.6%	1.8%
Sikkim	8	41	1991	0.8%	0.8%	0.7%
Bihar	5	38	2713	0.5%	0.8%	0.9%
Goa	3	37	844	0.3%	0.7%	0.3%
Haryana	2	9	359	0.2%	0.2%	0.1%
Punjab	2	9	551	0.2%	0.2%	0.2%

	12 FC	13 FC	14 FC	Share in forest grant/ transfer		
	2005-10	2010-15	2015-20	XII FC	XIIIFC	XIV FC
Total States	**1000**	**5000**	**296114**	**100%**	**100%**	**100%**

Source: Reports of XII, XII and XIV FC

We examined the actual releases of the forest grants recommended by the XII and XIII FC based on data provided by the Ministry of Finance. For the XII FC period (**Figure 16**), it is seen that about Rs 953 crores out of Rs 1000 was released to States. The largest difference between the amount sanctioned and the amount released is seen for Maharashtra (recommended: Rs 70 crore; released 42 crores). The reason for this shortfall is not clear since the grant was not contingent on any performance-based measures. For the XIII FC period **(Figure 17)**, about Rs 4432 crores out of Rs. 5000 crores were released. The States which saw the largest shortfall between amounts recommended and released were Arunachal Pradesh (recommended: Rs727.8 crore; released: Rs. 591.37 crore); Assam (Rs 184.6 crore; Rs 80.78 crore), Meghalaya (Rs 168.1 crore; Rs.105.05 crore) , J& K (Rs 133 crore; Rs 77.16 crore) and Andhra Pradesh (Rs 268.6 crore; Rs 225.31 crore). This shortfall may be on account of States not having atleast 80% of their Working Plans approved, which was the requirement for full release of the grant. Our discussion with the Forest Department of Arunachal Pradesh suggests that some of these shortfalls were made good subsequently.

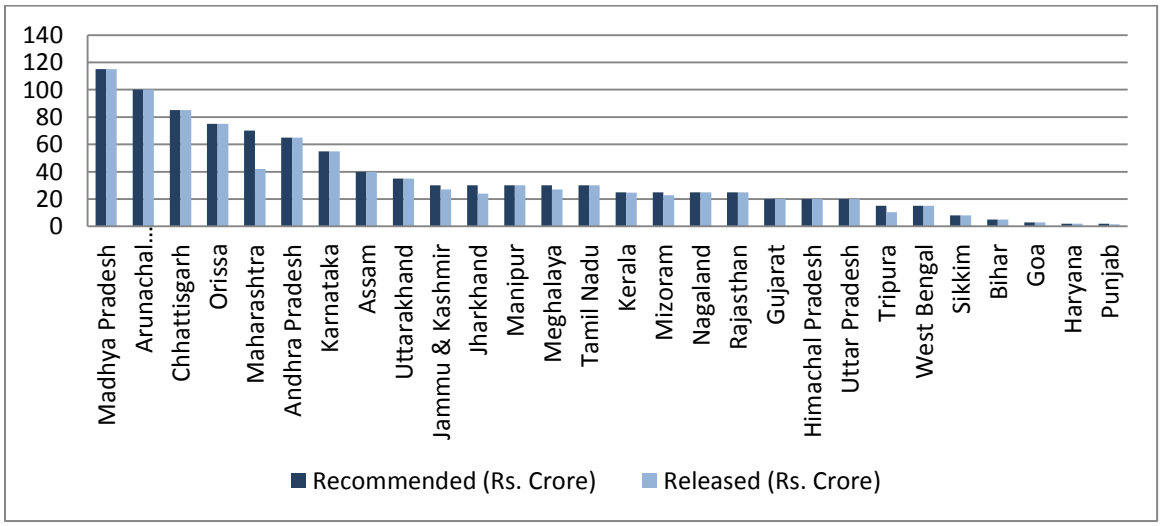

Figure 21 : XII FC Forest Grant: Recommended vs Released (Rs crore)
Source: Ministry of Finance

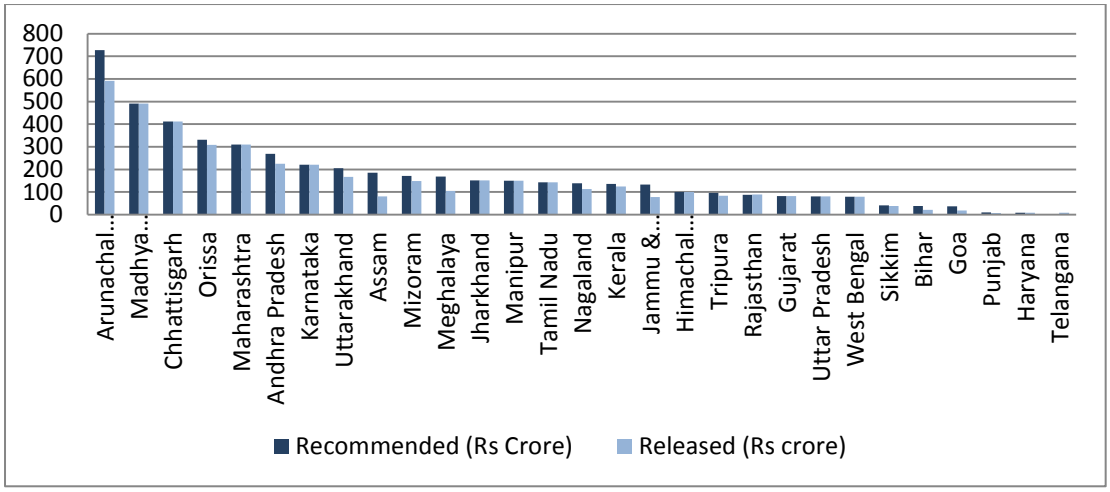

Figure 22 : XIII FC Forest Grant: Recommended vs Released (Rs crore)
Source : Ministry of Finance

In terms of size, even though the XIII FC grant amount was only Rs 5000 crore, the amount for individual States were large when compared to what they received under forest-related CSS. For a State like Arunachal Pradesh, which was the highest recipient of the XIII FC grant, the amount was significant in the overall expenditure on forestry and wildlife. The XII FC grant was about 23% of the expendtiture on forestry and wildlife in Arunachal Pradesh, while the XIII FC grant were about 68% of the total expenditure on the sector.

As a rough comparison with forest-related CSS, Rs 922 crores was released to States under various CSS in the year 2018/19, compared to an average annual forestry grant of Rs 1000 crores in the period of the XIII FC. State and year wise data was not readily available for all allocations under all CSS but as can be seen from **Figure 23,** XIII FC grant was significantly higher than funds released under the three main Programmes for wildlife habitat and species (Project Tiger, Project Elephant and Integrated Development of Wildlife Habitat Scheme) across States. Rupees 1290.60 crores were released to States under these three flagship CSS during the XIII FC period (2010 – 2015). For Kerala, Madhya Pradesh, Maharashtra, Karnataka, Uttar Pradesh, Gujarat, funds received under these programmes were nearly half of what they received through FC grants. Rajasthan was the only State that received comparable funds under the FC grant and these schemes.

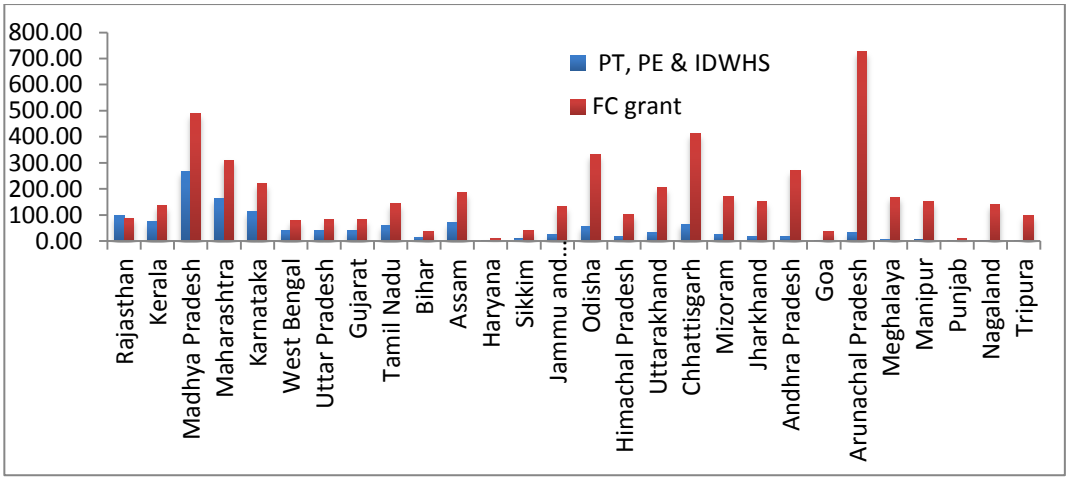

Figure 23 : Released funds under Project Tiger, Project Elephant & IDWHS during XIII FC period
Source: Data compiled from MoEF, India Stats; Answers to LS questions

The XIII FC had recommended that a CAG audit be undertaken of the utilization of the forestry grant. Only one State level CAG audit of the XII and XIII FC forest grant could be traced- for the State of Nagaland. The audit suggests several discrepancies.[119] It is noted that the FD did not prioritize preparation of WPs in the first two years of the XIII FC grant period, because of which subsequent grant instalments were likely affected. It also notes that in addition to delays in release of funds from MoEFCC to the State Government (on account of delays in submission of utilization certificates for previous releases); there were delays of 1-6 months in the release of the grant amount from the State Government to the forest department. The audit raises several questions about proper planning of activities for effective utilization of funds and adequate monitoring of expenditures, leading to wasted/idle expenditure (e.g. a Biodiversity Data Centre was constructed but not staffed and eventually used, low survival of avenue plantations etc.) and lack of clear impact of expenditures undertaken (e.g. creation of nurseries, distribution of seedlings, construction of village drinking water sources etc.). The audit also raises concerns about the veracity of some of the reported expenditures that were undertaken (e.g. free LPG connections).

In the absence of such evaluation for other States, it is difficult to comment on the effectiveness of the FC grants in terms of outcomes. The SFDs we interacted with suggested that the XIII FC grant were important for supporting preparation and updating of Working Plans. Forest officials at the divisional level felt that their budgets had been adversely affected because this assured line of funding had stopped in the period of the XIV FC. It was also pointed out by some forest officials that State allocation to the forest department was reduced on account of the XII and XIII FC grant, in contradiction of the "additional" clause that both Commissions had provided for. Overall analysis of RBI State Finances does not seem to support this claim, though there was a temporary dip in expenditure on forestry immediately after the XIII FC period. It may be mentioned here that Finance Departments in some States questioned the absorptive capacity of Forest Department to effectively utilize higher budgetary allocations.

Additional data was sought from States to analyse sources of revenue and expenditure patterns in States over XII, XIII and XIV FC periods. Based on the limited data that the study team received from States, it appears that some SFDs were able to sustain funding on account of State funded schemes during the XIV FC period. The examples of Maharashtra, Arunachal and Himachal Pradesh, all forest rich States, show that expenditure of SFD under the head State Schemes has increased since 2010 (in current prices), including during the term of XIV FC. However, this inference is based on data from only 3 States and cannot be generalized.

Table 37: Expenditure of SFD under the head State Schemes **(In crores)**

State	2010 - 2011	2011- 2012	2012 - 2013	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018
Maharashtra	223.6	366.35	469.35	563.36	637.84	1300.43	1538.46	1674.46
Arunachal Pradesh	11.93	12.53	7.05	6.37	11.52	20.18	21.63	23.67
Himachal Pradesh	256.52	273.92	328.89	360.8	476.82	404.3	457.1	517.82

Source: Data received from States

[119] https://cag.gov.in/sites/default/files/audit_report_files/Nagaland_Report_2_2014.pdf

On expenditure patterns, data available from State Forest Departments on the use of the XIII FC grants suggests that the only a small portion of the funds received were spent on preparation of scientific working plans, which was the priority for XIII FC. From available data, it appears that SFDs spent a large amount on construction of offices, residences and associated infrastructure. *For instance*, Nagaland FD spent only 2% of the funds on preparation of working plans and associated activities while over 20% of funds received during the XIII FC were spent on infrastructure activities such as construction and maintenance of residential quarters, offices and roads. Forest Department of Gujarat also spent approximately 2% of XIII FC funds on inputs for working plans and 26% on infrastructure activities and procurement of vehicles. However, it spent the maximum, accounting for 72%, on establishment of high tech nurseries, plantation of NTFP and capacity building of JFMCs and forest dwellers.

Conclusions

A few issues emerge from the above analysis of revenues and expenditures. One, the share of forestry in States' own non tax revenue is small, being mostly under 4%, except in a few States like Meghalaya, Uttarakhand, Manipur, MP, Andhra Pradesh, and Chhattisgarh. In per hectare terms, this revenue is significantly less than alternative land-use such as agriculture. For States that have a large area under forests, such as Arunachal Pradesh, this can impose a significant fiscal liability. In general, expenditure on forestry activities is higher than revenue, the difference being three times for all States combined but much higher for some States.

Second, in terms of the role of the FC in addressing the overall fiscal liability of forest-rich States, it may be said that the XIV FC has most significantly done so. This has been welcomed by the forest-rich States, particularly by the Finance Departments. However, from the perspective of the Forest Departments, the grants provided by the XII and XIII FC have been more effective in augmenting the budgets for forestry activities in States, even when compared to various CSS. In the States that the study team visited, the XIII FC grant was seen as an important line of funding for forest departments. This perception was even stronger at the divisional level. It was felt that the absence of such dedicated funding in the XIV FC period had adversely affected funding of the forest departments. It is hard to corroborate this claim due to the inadequate data provided by States. An analysis of State finances compiled by RBI shows that while the share of forestry is total State expenditure has been declining since 2000, there is decline in real terms in the term of the XIV FC, except for a temporary dip between 2014/15 and 2015/16.

Third, as can be seen from the example of the GIM (and to a smaller extent the SMAF), there can be significant deficits between what is budgeted for States under CSS and what is eventually released. This has a bearing on achievements of targets under these schemes.

Fourth, some State Finance Departments have raised the issue of inadequate absorptive capacity of the Forest Departments in effectively utilizing higher budgetary resources.

Finally, fifty thousand crores lying unutilised with ad hoc CAMPA are seen as a major source of funding for increasing and improving quantity and quality of forests. This money is not uniformly available to all States and inherently compensatory in nature, being a payment on account of forests being lost to non-forest activities. The FC grant should serve as an additional motivation that this money, where available, is used effectively for

conservation and afforestation activities. As the XIII FC had stated "It is hoped that States will thereby see the advantages of retaining land under forest cover and will efficiently and effectively direct CAMPA funding towards afforestation, so as to reap the advantages of future provisions of the kind started by the present Commission"

5. International experience

The experience of other countries in implementing fiscal transfers to promote sustainable forest management can provide useful insights into the design and operationalization of India's fiscal transfers to promote forest conservation.

The first section of the chapter provides an overview of key international agreements and conventions, which include targets related to forestry, some of which impose obligations on signatories. The next section examines intra-Governmental fiscal transfer mechanisms related to forests and their role in forest conservation in three countries that have implemented ecological fiscal transfers, namely Brazil, France and Portugal. The final section outlines implications of these international policies and practices to promote forest conservation through fiscal transfers for the Indian context.

Global frameworks and strategies

Globally, several multilateral agreements and conventions discuss frameworks and strategies which countries can adopt for the sustainable management of forest resources. Some countries frame their national agendas and forest conservation strategies based on these recommended actions.

Major international initiatives, conventions or agreements which have implications for the forestry sector are discussed below. These include the Convention on Biological Diversity (CBD) which came into force in 1993; the United Nations Convention to Combat Desertification (UNCCD), hy6the REDD + (Reducing Emissions From Deforestation and Forest Degradation in Developing Countries) initiative (2013) and Paris Agreement (2015) under the United Nations Framework Convention on Climate Change (UNFCCC) as well as Bonn Challenge and the Sustainable Development Goals (SDGs) (2015).

The CBD, with 192 parties, including India, is one of the three Rio Conventions (along with the UNCCD and the UNFCCC) that derive from the 1992 Earth Summit. The CBD and the Aichi Biodiversity Targets adopted under the CBD include targets related to sustainable forest management, specifically Target 5, which seeks to halve, and where possible bring close to zero, the rate of loss of natural habitats, including forests, and significantly reduce degradation and fragmentation by 2020 and Target 7, which seeks to ensure the conservation of biodiversity through the sustainable management of areas under forestry, agriculture, and aquaculture.[120]

The UNCCD, with 197 Parties, including India, was first established in 1994, and is a legally binding international agreement, which seeks to link the environment and development to sustainable land management, with a focus on semi-arid, arid, and dry sub-humid areas, or drylands.[121] It includes the reduction or loss of forest land in these areas within its definition of land degradation and recommends that parties to the Convention take into account forestry activities in their national action programmes.[122]

[120] Convention on Biological Diversity, https://www.cbd.int/sp/targets/
[121] United Nations Convention to Combat Desertification, https://www.unccd.int/convention/about-convention
[122] United Nations Convention to Combat Desertification, https://www.unccd.int/sites/default/files/relevant-links/2017-01/UNCCD_Convention_ENG_0.pdf

Launched in 2011, and later extended as a part of the New York Declaration on Forests, 2014 at the United Nations Climate Summit, 2014, the Bonn Challenge seeks to restore 150 mha of degraded forest land by 2020, and 350 mha by 2030 using a forest landscape approach.[123] Till date approximately 168 million hectares of land have been pledged for reforestation, with a potential to sequester 15.67 GtCO2 and generate economic benefits worth $ 48.42 million.[124] 48 countries have launched initiatives under the Challenge, including India which has committed to restoring 21 million hectares of degraded forest land by 2030.[125]

As mentioned above, REDD+ programme is another approach developed by parties to the UNFCCC that seeks to provide financial incentives, through international funds, to reduce deforestation and forest degradation, and also improve forest carbon stocks while promoting the sustainable management of forests in developing countries.[126] 64 countries have submitted targets as a part of the REDD+ programme, including India, specifying the reference level against which performance on REDD+ will be measured.[127]

The Sustainable Development Goals were adopted by the 193 members of the United Nations in 2015, and the 17 goals represented the agenda for global development up to 2030. Specific, measurable targets are assigned to each of the 17 goals, and indicators are assigned to each target to measure progress on the target. Within the framework of the Sustainable Development Goals, Goal 15, 'life on land' includes targets to achieve sustainable forest management including: (i) the conservation, restoration and sustainable use of ecosystems such as forests by 2020, and (ii) the sustainable management of all types of forests, halting degradation, restoring degraded forests globally and increase afforestation and reforestation globally by 2020.[128]

However, as mentioned in Chapter 1, which includes more details on the inter-linkages between SDGs and forest conservation, forest conservation efforts can contribute towards several other SDGs including those relating to ending poverty (SDG 1), eliminating hunger (SDG 2), achieving good health and well-being (SDG 3), clean water and sanitation (SDG 6), industry, innovation, and infrastructure (SDG 9), and climate action (SDG 13). Further, forest conservation efforts can be supported through the achievement of certain SDGs, especially on affordable and clean energy (SDG 7) and sustainable consumption and production (SDG 12).

Article 5 of the 2015 Paris Agreement states that the 197 countries which are Parties to the UNFCCC: (i) should take measures to conserve and enhance greenhouse gas sinks, including forests, and (ii) are encouraged to implement and support existing frameworks in related guidance and decisions already agreed under the UNFCCC (such as REDD+) for:[129] (a) policy approaches and incentives towards reducing emissions from deforestation and forest degradation and the sustainable management of forests and enhancement of forest carbon stocks in developing countries, and (b) alternative policy approaches (such as joint mitigation and adaptation) for the sustainable management of forests.

[123] Bonn Challenge, http://www.bonnchallenge.org/content/challenge
[124] Bonn Challenge, http://www.bonnchallenge.org/
[125] Bonn Challenge, http://www.bonnchallenge.org/content/india
[126] World Resources Institute, https://www.wri.org/blog/2016/01/forests-are-paris-agreement-now-what
[127] United Nations Framework Convention on Climate Change, https://redd.unfccc.int/submissions.html
[128] United Nations Development Programme, http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-15-life-on-land.html
[129] United Nations (2015) Paris Agreement of the United Nations Framework Convention on Climate Change, https://unfccc.int/sites/default/files/english_paris_agreement.pdf

Article 5 makes a reference to Article 4.1(d) which states that taking into account common but differentiated responsibilities and specific national development priorities, all Parties should promote the sustainable management of, and enhance sinks and reservoirs of greenhouse gas not covered under the Montreal Protocol including forests.[130]

As a part of the Paris Agreement, signatories have submitted their Nationally Determined Contributions (NDCs), which are actions which signatories have committed to taking to meet the objectives of the UNFCCC. Several countries, including India, have committed to increasing forest and tree cover as a part of their NDCs, to create additional carbon sinks.[131] Box 8 outlines certain forest related NDCs of countries from across regions.

Box 8 : Forests in Nationally Determined Contributions

Other than India, several countries including Canada, Brazil, Colombia, Mexico, Chile, Bolivia, Peru, Somalia, Ethiopia, Ghana, Nigeria, Niger, Central African Republic, Zambia, Namibia, Malawai, Laos, Cambodia, Vietnam, Mongolia, Uzbekistan, and Indonesia, among others, have include targets related to the forestry sector in their Nationally Determined Contributions (NDCs) as a part of the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC).[132] The following map depicts countries with NDCs which link to SDG 15, life on land, which includes sustainable forest management, addressing desertification, reducing the degradation of natural habitats, and the conservation of wetland and mountain ecosystems.

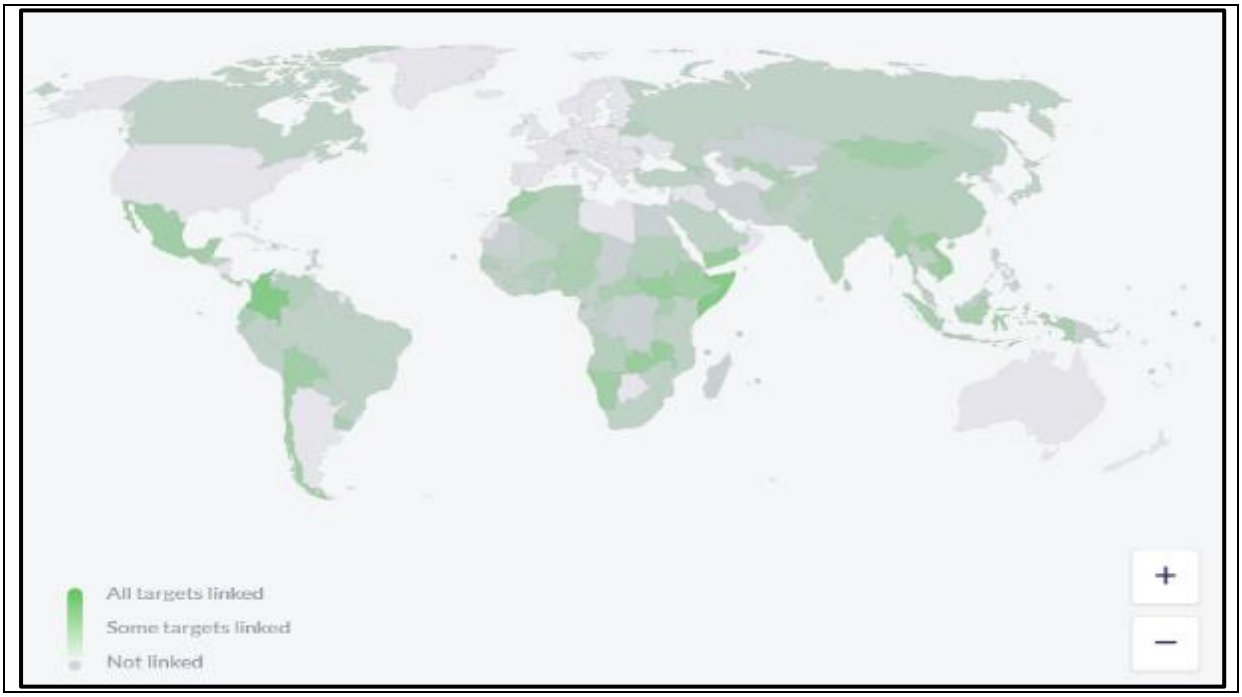

Figure 24: SDG15-NDC linkages
Source: https://www.climatewatchdata.org/ndcs-sdg?goal=15

[130] United Nations (2015) Paris Agreement of the United Nations Framework Convention on Climate Change, https://unfccc.int/sites/default/files/english_paris_agreement.pdf
[131] United Nations Framework Convention on Climate Change, http://www4.unfccc.int/ndcregistry/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf
[132] Climate Watch, https://www.climatewatchdata.org/ndcs-sdg?goal=15

NDCs pertaining to forests include measures to increase forest cover, halt deforestation, strengthen the regulatory framework for the forestry sector, restore forests and promote social forestry. Chile has committed to reforest 100,000 hectares of land by 2030 to enable the sequestration of 900,000 – 1,200,000 tonnes of CO2 equivalent annually.[133] Mexico has committed to reach a deforestation rate of 0% by 2030.[134] Laos commits to increasing forest cover to 70% by 2020, as also outlined in its National Forestry Strategy, 2020.[135] Ethiopia does not provide a specific number but commits to "Protecting and re-establishing forests for their economic and ecosystem services, while sequestering significant amounts of carbon dioxide and increase the carbon stocks in landscapes."[136] Venezuela seeks to bring an additional 2,184 hectares of land under agro-forestry systems between 2016 and 2019.[137] Nigeria commits to strengthening community-based forest resources management and develop a forest inventory system.[138] Namibia commits to reducing the deforestation rate by 75% by 2030, reforest 20,000 hectares of land per year, and reduce removal of wood by 50%.[139]

Thus a range of strategies have been committed to by countries, as a part of their NDCs ranging from afforestation to reduction in deforestation to institutional measures such as improved monitoring of forests and strengthening community-based forest resources management.

Thus, several international initiatives / conventions / agreements outline a global agenda for forest conservation and countries often frame national policies for the sustainable management of forests, in line with some of the targets set under these initiatives / conventions / agreements, especially if they are legally binding. While environmental fiscal transfers (EFTs) are not specifically mentioned in the agreements mentioned above, they represent a fiscal policy mechanism to meet obligations of countries pertaining to sustainable forestry.

EFTs and their role in forest conservation

EFTs are fiscal transfers from one level of Government to another which integrate ecological criteria, such as the extent of forest cover, protected areas (PAs), national parks, and watersheds into the fiscal allocation formula used to determine transfers.[140]

Most countries have more than one level of Government, except for small city states. In federal countries, the jurisdiction of sub-national Governments is typically outlined in the constitution, or legally defined. However, even in countries which are classified as unitary such as Peru or Chile, sub-national Governments do exist, but may derive their authority

[133] United Nations Framework Convention on Climate Change, https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Chile/1/INDC%20Chile%20english%20version.pdf
[134] Government of Mexico (2014) Intended Nationally Determined Contribution, https://www.gob.mx/cms/uploads/attachment/file/162973/2015_indc_ing.pdf
[135] United Nations Framework Convention on Climate Change, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Lao%20People%27s%20Democratic%20Republic%20First/Lao%20PDR%20First%20NDC.pdf
[136] United Nations Framework Convention on Climate Change, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Ethiopia%20First/INDC-Ethiopia-100615.pdf
[137] United Nations Framework Convention on Climate Change, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Venezuela%20First/Primera%20%20NDC%20Venezuela.pdf
[138] Nations Framework Convention on Climate Change, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nigeria%20First/Approved%20Nigeria's%20INDC_271115.pdf
[139] United Nations Framework Convention on Climate Change, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Namibia%20First/INDC%20of%20Namibia%20Final%20pdf.pdf
[140] United Nations Development Programme, http://www.undp.org/content/sdfinance/en/home/solutions/ecological-fiscal-transfer.html

more directly from the national Government. Inter-Governmental transfers are an important source of finance for subnational expenditures in many countries, financing approximately 60% of sub-national expenditures in developing countries, and approximately 30% in OECD countries.[141] While the types of transfers vary across countries, there are some common factors which determine the choice of allocation formulae used by countries. These include the extent of revenue and expenditure decentralization, equalizing financial abilities across sub-national Governments, and the extent to which national Governments influence decisions of sub-national Governments (Broadway and Shah, 2007).

These transfers are used to fulfil several objectives, including, firstly, to ensure that sub-national Governments are able to meet their expenditure needs to deliver public services, secondly, to create a system of incentives to meet national and sub-national developmental objectives, and thirdly, to compensate for any costs (for example, due to land use restrictions or conservations efforts) incurred in undertaking activities which generate spill over benefits to areas which are beyond the jurisdictional boundaries of the sub-national Government (Broadway and Shah, 2007, Loft et al., 2016). So far, EFTs have typically been used to meet the third objective. However, EFTs can also be used to incentivize development objectives as well, especially to meet international commitments such as the NDCs under the UNFCCC or national forest targets, some of which are outlined in **Box 9** below.

Box 9 : Forest cover targets

Globally, several countries, including India, have set targets to improve the area under forests. These include China, Indonesia, Malaysia, Papua New Guinea, Rwanda, and Vietnam, but this list is not exhaustive. Targets are either in the form of increasing land area under forests, or number of trees planted. Malaysia planted 53 million trees between 2005 and 2013, and Indonesia has committed to planting 4.2 billion trees by 2020.[142] China has set a target of bringing 23% of its area under forest cover by 2020, Rwanda seeks to achieve a forest cover of 30% by 2020, while Myanmar seeks to bring 30% of its land area under reserved forests and protected public forests.[143] Brazil aims to increase the area under forest cover by 3 Mha by 2025 as well as restore and reforest 12 Mha by 2030.[144] Vietnam had set a target of achieving 43% forest cover by 2010 through an additional 5 million hectares under forest cover. While the country fell short of meeting its target by 2010, it was able to do so subsequently, and currently its forest cover is at 48%.[145]

Plantation forests play a role in the strategies of several countries that seek to increase area under forest cover. For example, as the table below shows, the increase in forest area in Rwanda has been through plantation forests.

[141] United Nations Development Programme, http://www.undp.org/content/sdfinance/en/home/solutions/ecological-fiscal-transfer.html
[142] Asia Pacific Economic Cooperation (2015) Assessment of Progress Towards the APEC 2020 Forest Cover Goal, http://mddb.apec.org/Documents/2015/MM/AMM/15_amm_002.pdf
[143] Republic of Rwanda (2012) Rwanda Vision 2020 http://www.minecofin.gov.rw/fileadmin/templates/documents/NDPR/Vision_2020_.pdf, Republic of Rwanda, Rwanda National Forest Policy, 2017, http://extwprlegs1.fao.org/docs/pdf/rwa174363.pdf, Japan International Cooperation Agency, https://www2.jica.go.jp/en/evaluation/pdf/2012_CXXII-P137_4.pdf, Climate Data, https://www.climatewatchdata.org/ndcs/country/MMR/full?document=indc-EN&query=15&searchBy=goal
[144] World Bank (2017) Brazil's INDC Restoration and Reforestation Target Analysis of INDC Land-use Targets https://openknowledge.worldbank.org/bitstream/handle/10986/28588/AUS19554-WP-P159184-PUBLIC-Brazils-INDC-Restoration-and-Reforestation-Target.pdf?sequence=1&isAllowed=y
[145] World Bank (2018) Project Performance Assessment Report, VIETNAM Forest Sector Development Project, https://ieg.worldbankgroup.org/sites/default/files/Data/reports/ppar_vietnamforest.pdf

Forest cover in Rwanda (2010 – 2015)

Year	Plantations (ha)	Percentage of area under land	Natural forest (ha)	Percentage of area under land	Total forest area (ha)	Percentage of area under land
2010	334,465	14.0	283,128	11.9	617,593	25.9
2011	353,961	14.9	283,128	11.9	637,089	26.7
2012	379,165	15.9	283,128	11.9	662,293	27.8
2013	390,507	16.4	283,128	11.9	673,635	28.3
2014	404,047	17.0	283,128	11.9	687,175	28.9
2015	413,274	17.4	283,128	11.9	696,402	29.2

Source: Rwanda National Forest Policy, 2017

Similarly, in Vietnam the increase in forest cover between 1990 and 2015 is largely because of the drive towards increasing cover under plantation forests, and also the policy of the Government to grant large tracts of State-owned forests to communities and individuals on fifty year leases.[146]

In Brazil as well, while forest cover of natural forests has declined, leading to a decline in forest cover as a whole, the area under plantation forests has increased, as show in below:

Area under natural and planted forests in Brazil (1990 – 2015)

Natural forests/ biomes	1990	2015
Natural forests	541,720,759	485,801,973
Planted forests	4,984,141	7,735,772
Total (natural + planted forests)	546,704,900	493,537,745

Source: Food and Agriculture Organization (2015), http://www.fao.org/3/a-az172e.pdf (accessed on August 19, 2018)

In this section, the experience of the three countries, other than India, which have instituted EFTs is discussed. Brazil was the first to establish EFTs in 1997, followed by France and Portugal in 2006 and 2007, respectively.

Brazil

Brazil is largest country in Latin America in terms of land area, and the fifth largest in the world. With a population of 209 million, it has the fifth highest population, globally.[147] Approximately 59% of Brazil's land area was covered by forests (natural and planted) in 2015.[148] **Table 39** provides details of forest cover in 1990 and 2015.

Table 38 : Area under forest cover (ha)

Natural forests/ biomes	1990	2015
Amazon	369,820,791	342,027,340
Caatinga	46,490,458	40,582,671
Cerrado (Savanna)	89,175,265	69,235,988
Atlantic forest	22,579,479	21,770,466
Pampa	3,663,163	3,210,486

[146] World Bank, https://ieg.worldbankgroup.org/sites/default/files/Data/reports/ppar_vietnamforest.pdf
[147] World Bank, https://data.worldbank.org/indicator/SP.POP.TOTL?locations=BR
[148] World Bank,,https://data.worldbank.org/indicator/AG.LND.FRST.ZS

Natural forests/ biomes	1990	2015
Pantanal	9,991,603	8,975,022
Total (natural forests)	541,720,759	485,801,973
Planted forests	4,984,141	7,735,772
Total (planted forests)	4,984,141	7,735,772
Total (natural + planted forests)	546,704,900	493,537,745

Source: Food and Agriculture Organization (2015), http://www.fao.org/3/a-az172e.pdf (accessed on August 19, 2018)

As can be seen in Table 39, there has been a decline in total forest cover by 6% from 1990. However, there has been an increase in the area under planted forests in the same period. The largest area under natural forests is in the Amazon.

EFTs in Brazil

The Constitution of the Federative Republic of Brazil, 1988 gives common powers to the Union, the States, the Federal District and the municipalities to protect the environment and to mitigate pollution; and to preserve the forests, fauna and flora. Legislative powers on forests, fishing, fauna, and preservation of nature, protection of the environment and control of pollution are listed as concurrent powers between the federal and State Governments. Therefore, while municipalities have power to take action to protect environment, the legislative space is reserved for the federal and State Governments (TERI, 2014).

Brazil introduced the Imposto Sobre Circulação de Mercadorias e Serviços-Ecológico (ICMS-E) in 1992, as one of the first EFTs in the world. 25% of a State value added tax on goods and services termed the Imposto Sobre Circulação de Mercadorias e Serviços (ICMS) is to be transferred to municipalities, according to Article 158 of the 1988 Constitution.[149] While 3/4th of this amount must be transferred on the basis of the proportion of value added by goods and services, 1/4th of this amount can be transferred on a basis determined by the State Government. Figure 20 depicts this mechanism.

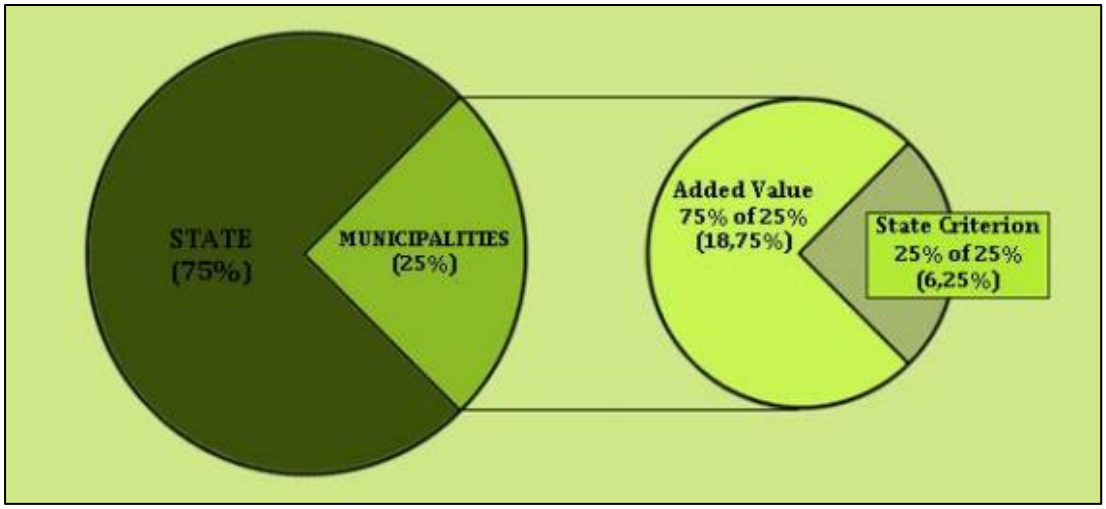

Figure 25: Transfer mechanism for the ICMS
Source: May et al. 2012

[149] Food and Agriculture Organization of the United Nations, http://extwprlegs1.fao.org/docs/pdf/bra116951E.pdf

In the early 1990s, Paraná, a state in Brazil, began to transfer 5% of the 1/4th of the ICMS on the basis of ecological considerations (initially on the basis of PAs and later on the basis of watershed areas). Currently 16 other States use this mechanism, termed ICMS – Ecológico (ICMS-E) (Droste et al, 2015).

Criteria used to determine transfers include land use restrictions, such as PAs and in some cases, environmental public services such as degree of sanitation and waste management in the municipality. However, PA coverage is the most commonly used criteria (Cassola, 2010). The following table provides an overview of the tax transferred on ecological criteria and the criteria used.

Table 39 : Ecological indicators used by various Brazilian States

State	Year of enactment	% of ICMS for conservation	Ecological indicators used
Acre	2010	5%	PAs (recognized at the national or State level)
Amapá	1998	1.4%	Pas
Ceará	2008	2%	Solid waste management
Goiás	2012	5%	Sustainable development plans (PA, waste management, environmental education, reduced deforestation, reduced forest fires, watershed protection etc.)
Mato Grosso	2002	5%	PAs and indigenous lands
Mato Grosso do Sul	2002	5%	PAs, indigenous lands, waste management plans
Minas Gerais	1997	0.45%	PAs, conservation factor, conservation quality factors
Pará	2014	8%	PAs, avoided deforestation, registered rural lands, etc.
Paraíba[150]	2011	10%	PAs and solid waste management
Paraná	1992	2.5% (PAs), 2.5% (watershed area)	PAs, PA category, conservation quality, area under water resource management
Pernambuco	2001	1%	PA share per municipal area, category, and degree of conservation
Piauí	2009	5%	Waste management, watershed protection, reduction in deforestation, pollution control, PAs
Rio de Janeiro	2009	2.5%	PAs, water quality, waste management, designation of municipal Pas
Rio Grande do Sul	1998	7%	PAs, indigenous lands, inundated lands
Rondônia	2003	5%	PAs (% of municipal area, number, total area)

[150] Government of Pariba, https://www.receita.pb.gov.br/ser/legislacao/64-leis/icms/614-lei-n-9-600-de-21-de-dezembro-de-2011

State	Year of enactment	% of ICMS for conservation	Ecological indicators used
São Paulo	1994	0.5%	PAs
Tocantins	2007	13%	PAs, solid waste disposal and sanitation systems, water protection, slash and burn control, local environmental policy, soil protection

Sources: The Nature Conservancy (2014); Droste et al. (2015); Ring et al. (2008) Website of Government of Paraiba (https://www.receita.pb.gov.br/ser/legislacao/64-leis/icms/614-lei-n-9-600-de-21-de-dezembro-de-2011)

Ring et al. (2008) point out that while details of transfers vary across States, a basic procedure which is followed in the transfer of funds through the ICMS-E may be outlined.

The ecological index of municipality 'i' (EI_i) is calculated by dividing the municipal conservation factor of the municipality 'i' (MCF_i) by the State conservation factor (SCF).

$EI_i = MCF^i/SCF$

The SCF is the sum of all MCFs in the state.

The MCF of municipality 'i' is calculated by dividing the total area of conservation units in the municipality (Area CU_i) with the total area of the municipality (Area M_i).

MCF_i = Area CU_i/Area M_i

The total area of conservation units is calculated by assigning different weights to different categories of management. The different categories of management in the state of Paraná are provided below.

Table 40: Weights assigned to various management categories

Management category	Conservation weight
Ecological research station	1
Biological reserve	1
Park	0.9
Private natural heritage reserve	0.8
National, state or municipal forest	0.7
Indigenous area	0.5
Environmental protection area	0.1
Area of relevant ecological interest	0.1
Special, local areas of tourist interest	0.1
Buffer zones	0.1

Source: Ring et al. (2008)

Therefore, if 'n' is a category of management, the total area covered under conservation units is:

Area CUi = $\sum_n PA_n \times CW_n$

Here, CW_n is the conservation weight assigned for category 'n'. Conservation weight is determined by the nature of land use restrictions on a PA.

Two states, Paraná and Minas Gerais, have also introduced a quality to further measure the quality of the conservation units (Grieg-Gran, 2000, Ring et al., 2008). The quality of the conservation units is included while calculating the ecological index. Paraná's experience with EFTs is discussed below.

A case study of Paraná State

In 1992 Paraná became the first Brazilian State to enact a law to mandate the transfer of 5% of the ICMS on the basis of biodiversity conservation areas. This was done to compensate municipalities that had a large area that was protected leading to land-use restrictions (Ring et al., 2008). Currently, 2.5% is transferred on the basis of biodiversity conservation areas and 2.5% on the basis of watershed areas.

For PAs, the indices consider the size of the PA, the municipality, and the category of PA. A 'quality index' has also been added to this calculation, which is assessed by the State environmental agency, the Paraná Environmental Institute. The quality index is developed on the basis of: (i) physical quality (ii) biological quality (quality of flora and fauna), (iii) quality of water resources, (iv) physical representativeness including support to producers and local communities, and (v) quality of planning, implementation and maintenance (Ring et al., 2008). This quality index was added to incentivise improvements in conservation indicators rather than restricting the ICMS-E to a compensatory transfer.

The watershed protection index is based on the proportion of the municipal area designated for water resource conservation and management (Cassola, 2010).

Several studies have examined the impact of the introduction of the ICMS-E in Paraná. Loureiro (2000) found that the number of municipalities that had benefitted from the transfers based on PAs increased by 179% from 1992 to 2000, partly due to the designation of new areas as PAs. He also found that the introduction of the quality index in Paraná has led to an improvement in the quality of PAs in addition to an increase in the number of PAs. Cassola (2010) argues that the introduction of a quality criterion allows the fiscal transfer to act as an incentive and not remain a compensatory mechanism with no direct impact on environmental protection.

May et al. 2002, found that the extent of conservation increased by 165% in this period, with an increase of over one million hectares of PAs. They point out that the introduction of the quality index allows each municipality to influence outcomes according to their conservation related decisions and actions.

Cassola (2010) argues that the building of consensus on the need and type of EFT as well as the institutionalization of the EFT through the identification of the Paraná Environmental Institute were two factors which contributed towards the successful implementation of the ICMS-E in Paraná.

A more recent study of Paraná by Sauquet et al (2014), found that while there has been an increase in PAs over the 20 year period of the implementation of ICMS-E in the State, there are certain potentially negative spatial interactions which policy makers ought to be cognizant of while designing EFTs. Key among these is the possibility that the creation of PAs by a municipality may decrease the incentive of neighbouring municipalities to create PAs and lead to forest fragmentation. The authors argue that this ought to be addressed in the design of the ICMS-E.

In general analyses of ICMS-E in Brazil, studies have found a 'saturation effect' which implies that the majority of the increased protection occurred in the first 10 years of implementing the program, possibly because of decrease availability of appropriate areas to designate as PAs (Loureiro 2002; Ring et al. 2011). May et al. (2002, 2012) point out that issue with the current design of the EFTs which use a fixed coefficient is that the amount allocated for PAs in a municipality may actually decrease if the total number of PAs in the state increases at a greater rate than in the municipality and the total ICMS collected in the State does not increase correspondingly.

France

France has a land area of 547,557 square kilometres. Forest cover in the country increased from 26% of its total land area in 1990 to 31% of its total land area in 2015.[151]

EFTs in France

Fiscal transfers from the national Government to municipalities were first started in 1979. The transfer consists of a lump sum allocation and an equalization allocation. The lump sum allocation is based on five criteria: (i) population, (ii) size and type of land area, (iii) compensation for reduction in any other income sources, (iv) a stabilization amount, and (v) an "ecological allocation", introduced in 2006 for municipalities with national parks or marine parks. The equalization allocation seeks to compensate for differences between rural and urban areas and for differences in fiscal capacities of various municipalities (Schröter-Schlaack et al., 2014, Borie et al., 2014).

The formula used for calculation is:

Ecological allocation = [(area of a core national part in the municipality * coefficient) / municipality's total area]* point value

Point value = sum of the money to be distributed / ∑ [(total surface area of municipalities in core area*coefficient) / total surface area of eligible municipalities]

The value of coefficient:

= 1 if, overall core area of the national park < 5000 km^2

= 2 if, overall core area of the national park > 5000 km^2

Due to the restricted nature of the definition of national parks and marine parks, only 0.05 per cent of municipalities are eligible for funding under the ecological allocation, representing 0.02% of available public finance (Borie et al., 2014). Thus, in 2011, of a total of € 13.6 Billion which was devolved to municipalities only 0.02% was transferred to municipalities on the basis of the ecological allocation (Schröter-Schlaack et al., 2014).

Borie et al. (2014) also point out that in this system there is no obligation to use the transfers for environmental purposes, and municipalities can use the lump sum amount which is transferred (including on ecological allocations) for any purpose. In addition, there appears to be limited incentive to promote biodiversity conservation, as there is only a tenuous link between the transfer and a specific conservation goal. There is a possibility that new areas may be designated as PAs without much impact on conservation. They recommend that a

[151] World Bank, https://data.worldbank.org/indicator/AG.LND.FRST.ZS

quality index (similar to the one instituted under ICMS-E in Paraná, Brazil) also be instituted under this mechanism to also consider the quality of PAs.

Schröter-Schlaack et al., 2014 point out that EFTs have had varied effects on municipalities, as while EFTs do not constitute a significant share of transfers for average sized municipalities, they may be constitute a significant part of the budget for small sized municipalities.

One of the benefits of using this mechanism is that it may be more efficient to introduce an ecological parameter under an existing fiscal transfer rather than creating a new law or new institutions to integrate environmental parameters into policy. Finally, EFTs could also increase the social acceptability of PAs by increasing funding on the basis of PAs (Borie et al., 2014).

Portugal

Portugal has a land area of 91,605 square kilometres. Approximately 35% of this land area comprised forest area in 2015. There has been a slight decrease in forest area from 1990, when it was close to 38% of the total land area.[152]

EFTs in Portugal

The EFT mechanism was initiated in 2007, to compensate those municipalities which had certain land use constraints after designating areas as PAs for an opportunity cost in terms of economic development (Santos, 2012, Rodrigues, 2016).

The Local Finances Law (Lei das Finanças Locais) was revised in 2007 to mandate EFTs to municipal areas. The law transfers finances from the Central Government to municipalities using three sources of funds: (i) the Financial Equilibrium Fund (Fundo de Equilíbrio Financeiro), (ii) the Municipal Social Fund (Fundo Social Municipal), and (iii) a fund comprising 5% of an amount obtained from personal income tax. The Financial Equilibrium Fund is divided into two equal parts, the General Municipal Fund (Fundo Geral Municipal), and the Municipal Cohesion Fund (Fundo de Coesão Municipal). The EFT is a part of the transfers made through the General Municipal Fund.

The General Municipal Fund is transferred on the following criteria (Santos et al. 2012):

- **5%** is divided equally amongst all the municipalities.
- **65%** is allocated according to population size of the municipalities, and of the average number of stays in hotels and campsites. Interestingly, unlike the Indian context, this allocation is meant to benefit municipalities with a lower population density.
- **30%** is transferred in proportion to the area, weighted by elevation levels, and in proportion to the area classified as Natura 2000 or PAs.
    - 25% is transferred in proportion to the area, weighted by elevation levels, and 5% is allocated in proportion to the area classified as Natura 2000 or PA in municipalities with less than 70% of their area under Natura 2000 or PA.

[152] World Bank, https://data.worldbank.org/indicator/AG.LND.FRST.ZS

- 20% is transferred in proportion to the area, weighted by elevation levels, and 10% is allocated in proportion to the area classified as Natura 2000 or PA in municipalities with more than 70% of their area under Natura 2000 or PA.

The revenues received through the EFT are not earmarked and can be used by municipalities for any purposes. The quality of the conservation is not considered while transferring funds. Funds are not typically earmarked when inter-Governmental transfers are made to the local level (Santos et al., 2012 Droste et al., 2017)

Droste et al. (2017) find that there has been an increase in the number of municipal and national PA designations since the introduction of EFTs in Portugal. However, Rodrigues (2016) identifies certain issues with the current functioning of EFTs in Portugal including low awareness about the intervention among local Government authorities and technocrats and low involvement of civil society organizations in the design of the intervention. He points out that some local authorities have stated that no transfer has been initiated on the basis of this intervention, or that they are not aware of such a transfer. It has also been recommended that perceptions of local stakeholders towards the EFT should be improved, and that it should be extended to other areas in addition to PAs.

EFT proposals and related instruments: experience from other countries

In addition to these countries, EFTs have been proposed in Germany, Indonesia, Poland and Switzerland. Queensland in Australia uses a multi-criteria analysis for the allocation of environmental funds. In Germany, proposals to establish EFTs consider indicators such as the size of PAs or the proportion of PAs relative to the total area of a municipality (Ring, 2008), PA coverage per capita (Droste et al. 2017), and combinations of species and landscape protection (Schroter-Schlaack, 2013). In Poland, EFTs have been proposed on the basis of Natura 2000 PAs (Schroter-Schlaack, 2014). An EFT mechanism on the basis of biodiversity benchmarking that measures impacts on species diversity has been proposed in Switzerland (Kollner, 2002 in Kettunen, 2017). In the Indonesian case, three alternatives are suggested: (i) the incorporation of an ecological indicator into general purpose transfers, (ii) distributing shared revenue from taxes on the basis of an ecological indicator or earmarking these revenues for environmental purposes, and (iii) extending specific purpose transfers for environmental purposes (Mumbunan 2011).

In addition to these EFTs, forest conservation has also been sought to be achieved through inter-country development aid transfers. Norway developed a new mechanism to counter deforestation and climate change, through linking action on these issues to development aid to other countries (Seymour et al. 2015). Two such agreements between Norway and Guyana and Norway and Indonesia, are discussed below in Box 10.

Box 10 : Forest conservation through development aid

I. Guyana-Norway Memorandum of Understanding, 2009

In 2009, the Governments of Guyana and Norway signed a Memorandum of Understanding, to enable performance-based payments from Norway to Guyana as a part of collaboration on REDD+.[153]

[153] Memorandum of Understanding between the Government of the Cooperative Republic of Guyana and the Government of the Kingdom of Norway regarding Cooperation on Issues related to the Fight against Climate Change, the Protection of Biodiversity and the Enhancement of Sustainable Development

Financial support was made contingent on limiting GHG emissions from deforestation and forest degradation as well as through the implementation of a REDD+ governance development plan, that is, through the creation of certain institutions and policies to limit deforestation. A UNFCCC compliance grade national system for monitoring, reporting and verifying (MRV) was established to monitor results in accordance with the policies of the UNFCCC. Till UNFCCC policies were in place, finance support was to be contingent on attaining initial REDD standards. A Multi-stakeholder Steering Committee was constituted under Guyana's Low Carbon Development Strategy (LCDS) to enable the participation of all affected and interested stakeholders

In his analysis of the impact of this agreement on deforestation in Guyana, Laing (2018) finds that the agreement has not had a significant effect on deforestation, in the short term. However, he points out that Guyana was able to keep its deforestation levels below the rate of 0.275%, which was one of the performance criteria outlined in the agreement.

II. Indonesia-Norway Letter of Intent, 2010

In 2010, the Governments of Indonesia and Norway signed a Letter of Intent to strengthen cooperation on reducing GHG emissions from deforestation and forest degradation.[1] Unlike the Norway-Guyana Memorandum of Understanding, the Letter of Intent signed between Norway and Indonesia outlined a phased implementation of the contribution towards Indonesia's national emissions. In the preparatory phase, phase I, key activities to be carried out by Indonesia included: (i) completing a REDD+ strategy, (ii) establishing an agency to coordinate the implementation of the REDD+ strategy, (iii) establishing the initial framework for the establishment of an independent institution to monitor, report, and verify GHG emissions from the forestry sector, (iv) setting up an appropriate funding instrument for transfers from Norway to Indonesia, and (v) undertaking a province level pilot study.

The next transition phase, phase II was to consist of: (i) a national wide monitoring, reporting, and verification system conforming to IPCC standards, (ii) increasing the number of the province wide

pilots, and (iii) developing national policies and enforcement capabilities relating to: (a) a two-year suspension of new conversion of peat or natural forests, (b) establishing a degraded land base to

enable the carrying out of economic activity on this land rather than peat or natural forest land, (c) enforcing existing laws against illegal logging and trade in timber, and related forest crimes, and (d) taking appropriate action to address land tenure conflicts and compensation claims

It was only in the final phase, phase III that the transfers based on verified emissions reduction would begin. Indonesia would receive financial contributions from Norway through the financial instrument established in phase 1 for independently verified emissions reductions relative to a UNFCCC reference level.

In their study of the performance of the letter of intent, Seymore et al. (2015) find that it has been uneven and slow across the three phases. Norway has not released performance based funds as satellite imagery in 2013-14 showed that deforestation rates had actually been increasingly in the period after signing the letter of intent and not decreasing. According to the authors, the non-payment of performance-based funds makes forest-based international transfer more credible and will also allow future Governments to take greater ownership of forest conservation policies. Secondly, they argue that even though there has been limited progress on achieving the objectives of the letter of intent, the process of signing it brought visibility to those within and outside the Government pushing for forest conservation and granting rights to indigenous communities.

[1] https://theredddesk.org/sites/default/files/resources/pdf/2011/mou_between_the_govt_of_guyana_and_the_govt_of_norway.pdf

Conclusions

While it is difficult to draw conclusions for India on the basis of EFT mechanisms used in other countries, given differing country contexts and mechanisms, there are a few issues which have been highlighted in the functioning of previously operational EFTs in Brazil, France and Portugal which can possibly serve as lessons for policy makers and practitioners working to operationalize the recently instituted EFT mechanism in India.

A key issue which has been highlighted is the need to outline the purpose of the EFT clearly, as when EFTs are seen as compensatory, they may not be perceived as being for the purposes of forest conservation and therefore not be used to promote conservation. For example, as Borie et al. 2014 point out in the context of France, there is no obligation to use the transfers for environmental purposes, and municipalities can use the lump sum amount that is transferred (including on ecological allocations) for any purpose. Thus, there appears to be limited incentive to promote biodiversity conservation, as there is only a weak link between the transfer and a specific conservation goal.

Further, as May et al. 2012 point out in the Brazilian case, not earmarking funds for conservation actions can impede the effectiveness of the ICMS-E as, as paradoxically, municipalities may choose to spend on infrastructure and industry development, threatening those PAs which made the EFT available to them in the first place. They point out, that while the ICMS-E has had positive results for conservation; this is dependent on the level of commitment of local Governments and the presence of procedures to ensure the equitable distribution of rewards.

In the Portuguese case, Santos et al. 2012 point out that while earmarking may increase the effectiveness of the EFT, authorities are constitutionally bound to transfer funds from the General Municipal Fund in the form of lump-sum transfers. They argue that even without earmarking, lump sum transfers on the basis of protect area networks may act as an incentive for conservation.

An important intervention which has been tried in a few States in Brazil to incentivize forest conservation is the introduction of an index which also measures changes in the quality of PAs. Loureiro (2002) and Grieg-Gran (2000) found that the introduction of the quality index in Paraná has led to an improvement in the quality of PAs in addition to an increase in the number of PAs. Studies suggest that the introduction of the quality index: (i) allows each municipality to influence outcomes according to their conservation related decisions and actions, and (ii) allows the fiscal transfer to act as an incentive and not remain a compensatory mechanism with no direct impact on environmental protection (May et al. 2012, Cassola, 2010). A similar quality index has been recommended in both France and Portugal as well as for other States in Brazil, which have not introduced this mechanism (Borie et al., 2014 Rodrigues, 2016, Droste et al., 2017 and Ring, 2008).

Other potential issues which have been identified in the implementation of EFTs in other country contexts include the ability of local Governments to absorb potentially large increases in transfers, the lack of indicators on measuring environmental quality improvements, and low awareness about complicated transfer formulae among authorities, as EFTs require strong information sharing and transparency regarding the indicators which are selected and the transfers which are made on the basis of these indicators. For example, Rodrigues (2016) points out that, in Portugal, local authorities either stated that no transfer

had been initiated on the basis of this intervention, or that they were not aware of such a transfer. Finally, when only PA is used as an indicator, monitoring costs are fairly low but if additional indicators are added monitoring costs may rise as regular field verification may be required.

The experience of other countries with EFTs may hold some lessons for India. As Busch and Mukherjee (2017) point out, EFTs have been introduced too recently in India to be able to conclusively establish any impact on forest cover. Further, they argue that it may take time for State Governments to become aware of the fiscal benefits under the newly introduced EFTs. Even if they become aware of the positive gains which may be expected when forest cover increases, it may take time for State Governments to formulate and begin to implement appropriate policies. Finally, even if policies are implemented, it would take time for newly planted trees to be mature enough to be detected by satellites, and therefore included under the forest cover. However, they also point out that possible challenges, which ought to be addressed in the policy design, include transferring an appropriate amount of financial incentives which is significant enough to cause policy shifts, and clarity on the role of the State Governments in forest conservation.

6. Recommendations

This chapter discusses our recommendations to the XV Finance Commission on the approach towards the critical issue of maintaining and enhancing forests and trees in designing fiscal transfers to States. The recommendations are an outcome of analysis (covered in previous chapters) as well as perspectives that have emerged during consultations with stakeholders, including State Government and experts working on different aspects of forest management in India.

This chapter is structured as follows. The next section discusses some of the key issues that were raised in our discussions with stakeholders and presents the official views of select states whose submissions to the XV FC are already available. This is followed by a discussion on guiding principles that have informed the design of recommendations to the XV FC in the present study. The following section details the recommendations along with their indicative implications for inter-se share of States in the transfers. The final section concludes with a summary of the recommendations.

Perspectives from States and other stakeholders

Forest rich States have time and again represented to the Government of India and successive Finance Commissions that their ability to raise tax revenue and provide a standard of living that is comparable with other States is compromised to the extent that they maintain a large percentage of their geographical area under forests. The presence of forests also increases the cost of providing services to people both on account of difficult physiographic conditions as well as higher transaction costs associated with obtaining environmental clearances for developmental projects. At the same time, these States have to incur significant expenditures for maintenance and conservation of forests.

The Second Commission on Centre-State Relations, the Punchhi Commission (Ministry of Home Affairs, 2010) recognized *the universal demand to compensate States which have conserved and maintained the forest cover to benefit the eco-system, and for the opportunity lost because of not exploiting them.*[154] It argued for a compensatory mechanism to cater to:

- payments made towards contributing to maintain the flow of eco-system services;
- compensation towards non-exploitation of forest resources either directly (i.e. by not resorting to sale of forest wealth especially timber) or indirectly (i.e. by not resorting to clear felling and converting of forest land for agricultural purposes);
- providing for investment in alternate sustainable developmental models to provide a standard of living and employment at par with the rest of the country;
- appropriate rehabilitation packages for those displaced from their places of residence, for the greater good of maintenance of the ecology and biodiversity.

The Commission recommended a National Policy on Compensation, which should include the criteria for eligibility of recipient States as well as possible contributions, in addition to the

[154] Ministry of Home Affairs (2010). Commission on Centre-State Relations, Volume VI: Environment, natural resources and infrastructure. http://interstatecouncil.nic.in/Sarkaria_Commission.html.

Central contribution, from States that benefit from the eco system services provided by other States.

Acknowledging such concerns, past Finance Commissions have provided fiscal compensation to states in recognition of ecological services provided by forests and the need to preserve them as our national wealth.

As part of this study, we made an attempt to analyse the views and experience of States with respect to fiscal transfers by past FCs in order to understand how these may be made more effective. This was done through visits to States (Arunachal Pradesh, Chhattisgarh, Assam) and three larger consultations. The first consultation was organized with ICFRE, Dehradun and was attended by representatives of key central agencies (e.g. MoEFCC, FSI, and NRSC), State forest departments (Rajasthan, Punjab, Haryana, Gujarat, Nagaland, Meghalaya, H P, Uttarakhand, Odisha, and MP), as well as experts from various think tanks and research organizations. The second consultations was organized with the Forest Department of Telangana and attended by State forest departments (Telangana, Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal, and Maharashtra), State finance departments (Karnataka), central agencies (e.g. NRSC) and sector experts.[155] The third consultation was organized around the specific issue of trees outside forests and their role in meeting India's NDC commitments. It was organized in Delhi and attended by representatives of relevant central Government agencies (e.g. MoEFCC, Ministry of Agriculture & Farmers Welfare, Ministry of Road Transport and Highways, Ministry of Rural Development, Forest Research Institute, and ICAR-CAFRI-Jhansi), Forest Departments and Forest Development Corporation of States that are doing notable work on agroforestry (e.g. Punjab, Karnataka, Uttar Pradesh, Haryana), the private sector (e.g. Pragati Biotechnologies, Haryana Plywood Manufacturers Association, Sarvabhauma Forestry & Environmental Consultancy Services, CII-CESD), as well as international and national organization (e.g. FAO, World Agroforestry Centre, IFFDC), and other experts.

The key points that were put forward by stakeholders are as follows:

- The inclusion of forests as a criterion in tax devolution by the XIV FC is a positive step in recognizing and compensating States for fiscal disabilities due to forests. This view was mostly shared by the Finance Departments of the forest-rich States.
- State Forest Departments have not benefitted from inclusion of forests in the tax devolution formula (XIV FC) in terms of additionality of funds when compared to earmarked grants by XII and XIII FCs. Forests continue to receive low priority in most States budgets, as a result of which even in forest-rich States that benefitted from the tax devolution formula of XIV FC, there was no commensurate increase in funding for forest departments from State budgets. Most forest departments face budgetary constraints which adversely affect technical capacity and human resources, especially at the field level, in turn leading to a vicious cycle of delays in preparation and implementation of working plans and resulting loss of revenue.
- Earmarking of FC transfers is necessary to augment State resources for management of forests. Earmarked grants of the XII and XIII FC though meagre, resulted in a more focussed approach for the sector as a whole, especially the XIII FC grants that were performance-oriented and linked with Working Plans. Such grants become even more

[155] The list of participants and proceedings of these events are available in Annexures I, II and III, respectively.

necessary in view of India's forest-related NDC targets. The "additionality" of FC funds for the forest sector needs to be ensured so that funding from other sources to the forest department is not reduced. Timely release of funds to forest departments also needs attention.

- The XIV FC used "dense forests" as the criterion for determining the inter-se share of States. However, the exclusive focus on dense forests does not adequately capture the complexity of forest systems and their governance in different States. Specifically, it is discriminating for States where physiographical conditions can only support open forests, which also provide important ecological services and support biodiversity. It neither takes into account the extent of community engagement in forest conservation nor the livelihood support provided by forest. Some factors that were highlighted as being important for a performance metric include protected areas, biodiversity hotspots, ecosystem services, dependence of people on forests for livelihood, usufruct sharing by State Governments and people's participation in forest management, community conserved areas and trees outside forests.
- States like Rajasthan and Gujarat felt that forest area may be considered in lieu of forest cover in the distributive criteria. This is important for regions where natural conditions are unfavourable for dense forests but where land is locked up as forest area, nevertheless. However, other States, particularly those from the North East, were more inclined towards retaining forest cover as determining criteria for inter-se allocation of funds.
- Compensation to states for historical forest area or cover is not sufficient to promote environmental conservation. It is also important, in the interest of progressive environmental protection and sustainable development, to recognise and reward the performance of states that have improved quality and quantity of forest cover. Part of the FC transfers should be linked to outcome or performance-based indicators.
- Earmarking grants and linking them to specific outcomes of additional carbon sequestration is also critical in view of the need to ensure achievement of India's forest-related NDC targets (2021-30) under the Paris Agreement. There is an urgent need to enhance capability of State governments and the forest administration to meet such targets through earmarked grants.
- It may not be possible to meet the national goal of enhanced carbon sequestration through efforts only in forest areas. The strategy for enhanced carbon sink should place equal reliance on forests as well as trees outside forests. Increasing ToF is necessary to meet the national target of increasing forests to 33% of the country's geographical area. Trees outside forests, including agroforestry are also essential for meeting the timber needs of the country and can play an important role in enhancing ecological, employment and food security.
- Farmers will take up agroforestry only if it is an economically viable option. A number of issues were discussed that need to be addressed in order to make agroforestry sustainable for farmers. These include availability of certified quality planting material, design of appropriate extension services, market linkages, financing mechanisms, price (including pricing carbon) and institutional support to farmers, rationalization of the

regulatory regime for production, trade and processing of agroforestry produce, and coordination among concerned agencies of the Central and State Governments.

Forest-related demands in States' memoranda submitted to XV FC

Some States have raised specific forest-related issues in their memoranda submitted to the XV FC. These are summarized below:

Arunachal Pradesh

On account of maintenance cost, restoration cost and opportunity cost of forests, the State has asked for at least 10 % or higher weightage to forests in allocation of central taxes. The State views this as compensation as well as reward for contribution towards meeting climate change goals.

Arunachal Pradesh has requested for forest specific grants amounting to Rs 7458.75 crore over the Fifteenth Finance Commission period. The breakup of this amount is as follows

i. Rs 405 crores for compensation on account of loss of forest revenue
ii. Rs 213.75 crores for reclamation of degraded forests
iii. Rs 5000 crores for Incentive for containing CO_2 emission
iv. Rs 540 crores for control of shifting cultivation
v. Rs1000 crores for forest maintenance
vi. Rs 300 crores for wildlife conservation

Uttarakhand

Uttarakhand in its Memorandum estimates that the value of ecosystem services from the State is Rs 137.568 billion per year. Highlighting the opportunity cost and developmental disadvantage due to forests, the State has sought enough economic incentives and compensation for ecosystem services in monetary terms. The State has requested for **Rupees 1753.29 crore** from the Fifteenth Finance Commission.

Kerala

Kerala has requested that forest cover as a criterion must be retained and 10 percentage weightage must be given for Forest Cover in horizontal sharing of taxes between the States. In addition to the weight for forest cover in sharing of taxes, Kerala has demanded specific grants to compensate for expenditure gap in preserving forests. The State has requested an amount of **Rupees 1000 crores** as grants to fill this gap between revenue and expenditure, and for a) controlling forest fires, b) restricting encroachments and c) regulated use of forests for getting optimum forest produce and d) utilizing forest for eco-tourism purposes.

Jharkhand

Jharkhand is yet to submit its official memorandum to the FC. However, the demand note of the forest department for the State has made the following demands –

i. With respect to 7.5 % weight to forests in tax devolution, the State requests FC to give clear directions about allocation to forestry sector out of the share of Taxes devolved to States.

ii. A grant of Rs. 4011 crores over the FC period (or Rs 802 crores per year) for meeting its responsibility towards India's carbon sequestration targets in its NDC.

iii. Additional allocation of Rs. 246 crores for rejuvenation of drying up river streams in forest areas over 1500 kms.

iv. Rs 1500 crores for silviculture operations in three lakh ha of Open Forests

v. Rs 1800 crores for improving livelihoods of rural population through NTFPs. This will include funds required to transfer to JFMCs and support activities such as business development, monitoring evaluation etc.

vi. Rs 330 crores for housing infrastructure for frontline forest staff.

vii. Rs 60 crores for capacity development of villagers as a part of participatory forest management and of forest officials on modern technologies and techniques.

Maharashtra

Maharashtra has requested for Rupees 973 crores as forest specific grants to support execution of Working Plans (protection works, maintain fire lines and regeneration activities); for greening Maharashtra through block plantations and roadside plantations; infrastructure for accommodation of front line staff; and capacity building. In addition, Rs 153 crores has been requested for wildlife management and development of mangroves. Specifically, Maharashtra has requested the following on account of forest related activities over the XV FC period:

i. Rs 37.5 crores for fire protection measures

ii. Rs 50 crores for natural regeneration works in forest

iii. Rs 365 crores for block plantations in forest areas (8000 Ha)

iv. Rs 439 crores for roadside plantations over 8000 KM

v. Rs 56 crores for construction of residential unit for front line staff in remote areas

vi. Rs 75 crores for capacity building related to climate change, eco-tourism, natural resource management, wildlife management etc.

Available State submissions suggest that the forest-rich States are in favour of retaining or even increasing the weight on forests in the tax devolution formula. Most States have also put forward demands for grants to meet specific expenditures in the forestry sector.

Suggested principles to guide forest-related fiscal transfers

In this section we discuss the principles and priorities that have guided our approach to designing fiscal transfers related to forests. These principles have emerged from our analysis of data and issues as well as interactions with state and central agencies and other stakeholders. It needs to be said upfront that forest conservation is a complex and multi-dimensional issue, involving ecological, social, economic and political considerations. **We have mainly approached the issue from a fiscal perspective given the mandate of this study.**

The three key principles (not necessarily in order of priority) that we recommend should guide the design of forest-related fiscal transfers to States are as follows:

1. Forests provide critical ecological services and States need to be compensated for the opportunity cost of conserving forests,
2. Adequate resources need to be provided to relevant State agencies to support conservation and maintenance of forests and prevent degradation,
3. An appropriately designed and large enough performance-based grant is necessary to incentivize States to contribute to the national NDC target through ecological restoration of degraded forests (along with conservation and where possible, increase in forest area) and an increase in the area under trees outside forests.

Compensation to States for the opportunity cost of conserving forests

Forests provide a range of provisioning, regulating, cultural and support services (discussed in Chapter 2), most of which traverse State boundaries and some even national boundaries. The value of many of these services is, however, not adequately internalized in land-use or resource-use decisions. This happens because, one, many of these services are intangible and non-monetized, and two, while the benefits of these services spill over to neighbouring jurisdictions, the costs of forest conservation – both direct maintenance costs and indirect opportunity costs- must be borne by the jurisdictions where the forests stand.

The combination of public good characteristics, trans-boundary externalities and absent markets has led overtime to a strong regulatory framework to safeguard forests (see Chapter 3). The shift from commercialization to conservation in the forest policy framework has been strengthened by various judicial directives, particularly the Supreme Court order of 1996 that restricted irregular felling of forests and mandated management of forests according to scientifically prepared working plans approved by the Government of India with additional restrictions on felling in high altitude regions.

These restrictions have reduced, in some cases significantly, the revenues that States derive from forest land. For example, the share of forest revenue in total state revenue of Arunachal Pradesh decreased from an average of 60% during 1991-96 to below 2% in the years following the 1996 SC order.[156] In general, there appears to be a negative relationship between the share of a State's area under forests and the percentage of its expenditure met from its own revenues (Figure 26). Ironically, when States divert forest area to non-forest uses, they receive, as compensation, the full monetary value of services, including un-priced services, provided by forests (in the form of the net present value of ecosystem services lost).

[156] This was accompanied by a gradual decline in the share of forests in the state plan outlay, which fell from around 4% in 1990/91 to below 0.5% in 2016/17.

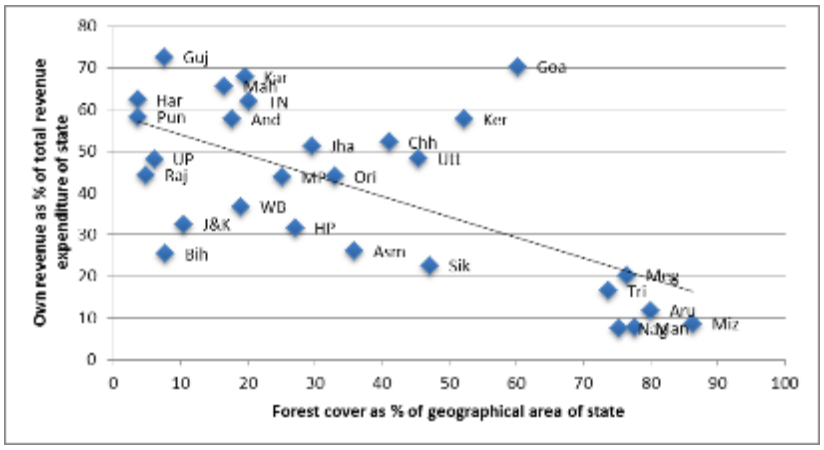

Figure 26: Relation between forest cover and own revenue dependence in States
Sources: FSI, 2017, RBI State Finances (2016/17)

One way of estimating the fiscal opportunity cost of land under forests is in terms of the monetary value of output from that land if it were under agriculture instead. For India, this amount roughly works out to Rs. 10,25,000 crore.[157] For individual States, opportunity cost thus calculated, can be comparable or even higher than the entire GSDP, especially for NE States like Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland, and over 25% of the GSDP of other forest-rich States like HP, Uttarakhand, Sikkim, Tripura, and J&K.

It is also important to recognize that compensation for forests cannot be limited to dense forests. Canopy density, forest productivity and the intensity of regeneration in an area are often dependent on bioclimatic conditions. Further, open forests and even grasslands, some of which are part of Protected Areas, can be of high ecological importance in their own right, and impose as much of a fiscal disability as dense forests. Figure 24 compares the forest cover map with the map of Protected Areas. It shows that in several parts of the country, and particularly in parts of Rajasthan, Gujarat, and Uttar Pradesh, there is an overlap between PAs and non-dense forest regions. This makes it imperative to look at PAs as a distinct ecosystem of importance and not merely as a part of forests. Thus, it is necessary to use canopy cover as a proxy for the health and quality of forests in the appropriate context.

[157] This was estimated by multiplying the per hectare value added of agriculture in each State by its forest cover.

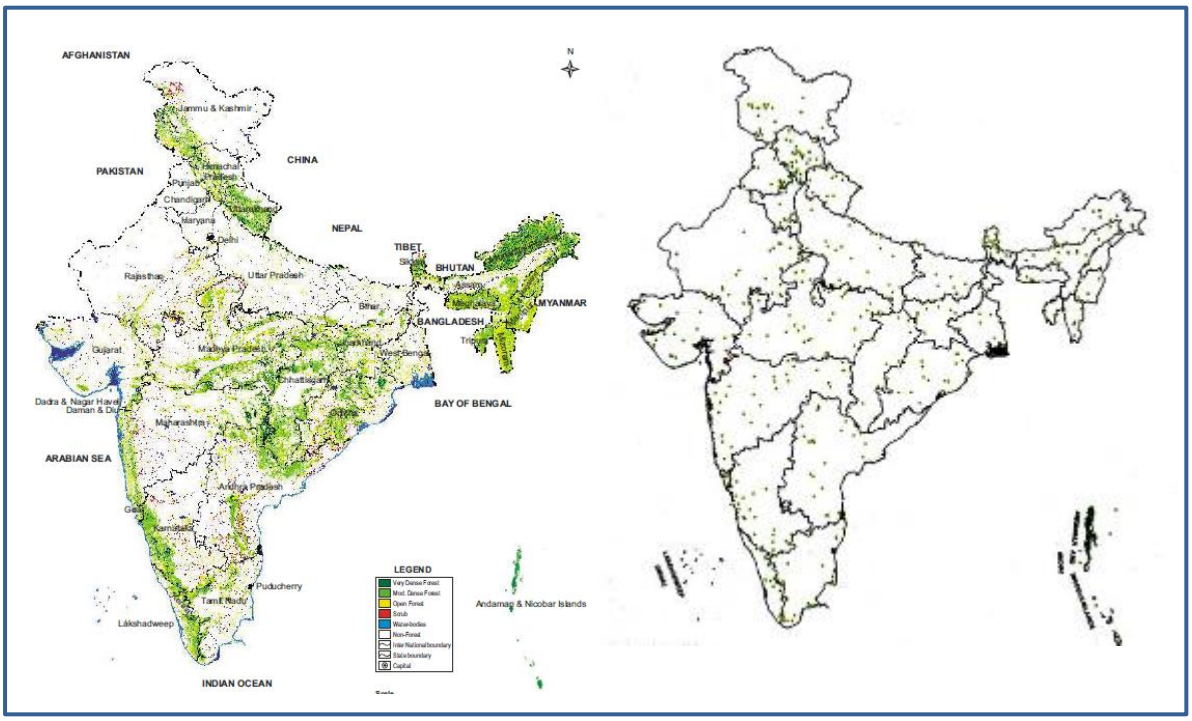

Figure 27: Maps of forest cover and Protected Areas in India

Source: http://wiienvis.nic.in/Database/HtmlPages/forest_cover_map.htm; http://www.wiienvis.nic.in/Database/HtmlPages/palocations_existing.htm

In line with the views of the Commission on Centre-State Relations, 2010, as well as previous Finance Commissions, there is a strong case for compensating 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 the critical ecological services they provide. While giving due weight to the quality of forests, the compensation mechanism must recognize the situation of States where natural physiographical conditions can support mostly low canopy density forests, which are important ecosystems in their own right and may even be part of national Protected Areas.

Supporting States with adequate resources for sustainable management of forests

A review of expenditure incurred by States shows that their combined expenditure on account of forests and wildlife is less than one per cent of total expenditure, both on the revenue and capital accounts (see Chapter 4). State-level disaggregation shows that the percentage of forestry in total expenditure is below 2% in all States, ranging from about 0.2% in many States and going up to a maximum of 1.8% in Chhattisgarh. This proportion has seen a consistent decline since 2000 for several States taken individually as well as for all States combined. In absolute terms, forest expenditure (in constant 2011/12 prices) has increased for all States combined during the period 2000/01 and 2017/18, but there was a brief decrease between 2014/15 and 2015/16.

In addition to the amount available from State budgets (approximately Rs 20,000 crore) for forestry activities, another Rs. 1000 crore is allocated under various Centrally Sponsored

Schemes. In 2017-2018, an amount of Rs 942 crores was released to States under the National Mission for Green India, Integrated Development of Wildlife Habitats, Conservation of Natural Resources and Ecosystems, and National River Conservation Programme.

Many State Forest Departments pointed out that funds were a limiting factor in the scientific management of forests and in addressing the pressures on forests. Considering only the cost of restoration of degraded forests, a quick calculation suggests that this is anywhere between Rs 46,000-150,000 crore. This estimate is based on per hectare restoration norms (Rs 15,000 –Rs 50,000) of Green India Mission and considering about 40% of the total Recorded Forest Area is considered to be degraded or barren (MoEFCC, 2018).[158] In order to make a realistic assessment of the funding gap in the forest sector, the availability of funds should be compared with the requirement of States for preparing and implementing their Working Plans/Schemes and other expenses. Unfortunately, this information was not available from States.

In a scenario of reported budgetary constraints, earmarked FC grants have been an important source of revenue for forest departments, atleast in some States (see Chapter 4). In comparison, it was reported by SFDs that the forestry sector did not receive additional funding during the XIV FC period despite the inclusion of forests as a criterion in tax devolution to States. This is reflected in some of the demands made by States. Jharkhand in its demand note has requested the XV FC for directions about allocation to forestry sector out of the share of taxes devolved to States. The need for earmarking of FC transfers to augment State resources for the maintenance of forests was one of the main issues raised by States at the Stakeholder Consultations organised by TERI in Dehradun and Hyderabad.

An earmarked grant for forests is necessary since forests continue to receive low priority in most State budgets, which is reported to have adversely affected their scientific management by the Forest Departments. It is important that each State maintains updated estimates of its funding needs for preparing and executing Working Plans/Schemes. MoEFCC should compile these estimates for a realistic assessment of funds required for the scientific management of forests in the country.

Creating a performance-based incentive for achieving NDCs through forests and trees outside forests

The existing stock of carbon in India's forests is about 7 bn tonnes.[159] As discussed in Chapter 1, with the annual increase of carbon stock at the rate of 19.50 million tonnes or 71.5 million tonnes of CO_2 equivalent (between 2015 and 2017), this target may not be achievable unless imaginative and new policies are in place. Specifically, going by the rate of increase in carbon stock between 2015 and 2017, India will achieve less than half the NDC target of additional 2.5 BT of CO2 equivalent of carbon sink by 2030, considering 2015 as the base year.

Analysis of data and discussions with experts suggest that the achievement of the NDC target will require a two-pronged approach- one, the restoration of degraded forests (along with conservation of existing forests and where possible, increase in forest area) and two, increasing the area under trees outside forests, particularly agroforestry. Both of these interventions will have significant co-benefits in terms of other ecological services. Agroforestry will also

[158] Report of the Expert Committee on "Strategy for Increasing Green Cover Outside Recorded Forest Areas", MoEFCC, GoI, 2018; http://envfor.nic.in/sites/default/files/EXPERT%20COMMITTEE%20REPORT%20ON%20TOF%2018112018_0.pdf
[159] India State of Forest Report 2017

contribute to the nation's food, timber and livelihood security. Each of these two issues is discussed below from the perspective of FC's potential role.

Over the years, the area under forest cover in the country has stabilized and even increased modestly. However, as discussed in Chapter 2, forest degradation remains a key concern. It is estimated that about 40% of Recorded Forest Area is degraded or barren (MoEFCC, 2018).[160] Several indicators point to deterioration in quality of forests. For example, growing stock of India's forests decreased by 11.78% during 2007-17 even as the national forest cover increased by 18,174 square kilometres during the period. Another indicator is the conversion of about 613sq. km of VDF and 19285 sq.km of MDF to OF; and about 4614 sq. km of VDF to MDF during 2007-17 (see Chapter 2).

It is important to create the right incentive for States to prevent the loss and degradation of forests. An analysis of change in forest cover during 2007-17 (roughly the XII, XIII and XIV FC periods) in the top 5 recipients, which accounted for roughly 45% of past forest-related FC grants/tax-devolution shows that MP, Arunachal and Chhattisgarh saw a decline in total forest cover, all five (i.e. including Odisha and Maharashtra) witnessed a decrease in MDF and all, with the exception of Chhattisgarh, a decrease in VDF. At the other end, some States that have seen large increases in total forest cover and dense forest (VDF+MDF) cover, for example Tamil Nadu, Punjab, Kerala, Bihar, and WB, were not among the top 10 beneficiaries of these transfers (the top 10 together claimed about 75% of transfers in each of the FC awards- see Table 41). It is important to note that the 14 States where percentage geographical area under forests is less than the national average together account for 77.5% of India's total geographical area, indicating the larger potential for enhancing area under forest and trees as compared to forest-rich States.

In including dense forests as a criterion in the tax devolution formula, the XIV FC intended this to serve both as a means of compensation for existing forests as well as an incentive for improving and augmenting area under forests. The report of the XIV FC says "In our view, forests, a global public good, should not be seen as a handicap but as a national resource to be preserved and expanded to full potential, including afforestation in degraded forests or forests with low density cover. Maintaining a green cover, and adding to it, would also enable the nation to meet its international obligations on environment related measures. We recognise that the States have to be enabled to contribute to this national endeavour and, therefore, we are designing our approach to transfers accordingly."

As the foregoing analysis shows, it is difficult to say whether the XIV FC formula created an effective incentive for States to increase or improve their forests. This is also partly because afforestation efforts can take 5-10 years before they show up in satellite data. Nevertheless, it may be argued that status-based measures do not create adequate incentive for change. Any change in forest cover may not be significant enough to impact a State's grant share when these shares are based only on existing forest status. For example, States like Andhra Pradesh, Manipur, Punjab, Tamil Nadu, and UP have seen a significant increase in their dense forest cover between 2013 (the forest assessment year which the XIV FC used) and 2017 (latest), yet they will not benefit or benefit only marginally in terms of tax share if the XV FC were to use the same indicator as the XIV FC- see Table 42. It is, thus, necessary to introduce change in

[160] Report of the Expert Committee on "Strategy for Increasing Green Cover Outside Recorded Forest Areas", MoEFCC, GoI, 2018; http://envfor.nic.in/sites/default/files/EXPERT%20COMMITTEE%20REPORT%20ON%20TOF%2018112018_0.pdf

forest area, or equivalent carbon to create an explicit linkage with the NDCs, in the fiscal transfer formula to create an effective performance-based incentive for States.

International experience also shows that countries like Brazil, which started with status-based indicators for designing ecological fiscal transfers, have in more recent years included quality and change-based indicators in their transfer formula.

Table 41: Share in FC grants and change in forest area

State	Share in forest grant/transfer		% change in forest cover (2007-17)				
	XII FC	XIIIFC	XIV FC	Very Dense forests	Moderately Dense forests	Open Forests	Total Forests
Madhya Pradesh	11.5%	9.8%	10.5%	-1.3%	-1.2%	0.6%	-0.4%
Arunachal Pradesh	10.0%	14.6%	13.2%	-0.7%	-1.9%	2.3%	-0.6%
Chhattisgarh	8.5%	8.2%	9.9%	69.7%	-8.1%	-2.4%	-0.6%
Odisha	7.5%	6.6%	7.2%	-1.5%	-0.1%	12.9%	5.1%
Maharashtra	7.0%	6.2%	7.4%	0.0%	-0.9%	1.0%	0.1%
Andhra Pradesh	6.5%	5.4%	6.8%	333.3%	-7.9%	13.8%	7.7%
Karnataka	5.5%	4.4%	5.5%	153.3%	1.3%	-11.4%	3.8%
Assam	4.0%	3.7%	3.2%	91.4%	-11.8%	3.0%	1.5%
Uttaranchal	3.5%	4.1%	4.8%	4.3%	-9.0%	15.7%	-0.8%
Jammu & Kashmir	3.0%	2.7%	3.3%	-5.2%	-4.4%	12.5%	2.4%
Jharkhand	3.0%	3.0%	3.1%	0.3%	-2.2%	8.3%	2.9%
Manipur	3.0%	3.0%	1.7%	29.5%	18.9%	-10.6%	0.4%
Meghalaya	3.0%	3.4%	2.6%	10.5%	-1.2%	-1.4%	-1.0%
Tamil Nadu	3.0%	2.8%	3.3%	25.5%	7.5%	14.1%	12.6%
Kerala	2.5%	2.7%	2.8%	15.2%	0.0%	43.0%	17.3%
Mizoram	2.5%	3.4%	1.5%	-2.2%	-6.2%	-5.1%	-5.5%
Nagaland	2.5%	2.8%	1.5%	0.4%	-6.3%	-9.2%	-7.2%
Rajasthan	2.5%	1.8%	1.1%	8.3%	-2.5%	5.6%	3.3%
Gujarat	2.0%	1.6%	1.4%	0.5%	-0.9%	2.0%	0.9%
Himachal Pradesh	2.0%	2.0%	2.4%	-3.5%	5.0%	4.4%	2.9%
Uttar Pradesh	2.0%	1.6%	1.6%	60.9%	-10.8%	-2.0%	2.4%
Tripura	1.5%	1.9%	1.2%	491.0%	10.0%	-42.9%	-4.3%
West Bengal	1.5%	1.6%	1.8%	0.2%	-10.7%	81.0%	29.7%
Sikkim	0.8%	0.8%	0.7%	116.2%	-27.1%	-1.1%	-0.4%
Bihar	0.5%	0.8%	0.9%	43.7%	0.4%	11.5%	7.3%
Goa	0.3%	0.7%	0.3%	5.3%	-7.7%	9.7%	3.6%
Haryana	0.2%	0.2%	0.1%	3.7%	-2.4%	0.4%	-0.4%
Punjab	0.2%	0.2%	0.2%	7900.0%	10.0%	9.9%	10.4%

Source: Author calculations based on data from Finance Commission and FSI reports

Table 42: States ranked by area under dense forests: 2013, 2017

State	Share of DF-2013	Share of DF-2017	% change in dense forests 2013-17	State	Share of DF-2013	Share of DF-2017	% change in dense forests 2013-17
Andhra Pradesh	3.42	4.00	18.32	Maharashtra	7.45	7.35	-0.35
Arunachal Pradesh	13.20	12.92	-1.08	Manipur	1.72	1.85	8.74
Assam	3.23	3.25	1.56	Meghalaya	2.56	2.46	-2.95
Bihar	0.92	0.90	-0.96	Mizoram	1.53	1.50	-0.76
Chhattisgarh	9.86	9.82	0.67	Nagaland	1.52	1.47	-2.78
Goa	0.28	0.28	-1.24	Odisha	7.16	7.09	-0.01
Gujarat	1.41	1.39	-0.32	Punjab	0.19	0.20	10.60
Haryana	0.12	0.12	0.00	Rajasthan	1.14	1.10	-1.73
Himachal Pradesh	2.43	2.45	2.19	Sikkim	0.67	0.66	-0.19
Jammu & Kashmir	3.26	3.16	-1.91	Tamil Nadu	3.32	3.66	11.44
Jharkhand	3.10	3.07	0.24	Telangana	3.39	2.58	-22.88
Karnataka	5.55	6.24	13.62	Tripura	1.20	1.48	24.25
Kerala	2.76	2.77	1.28	Uttar Pradesh	1.56	1.67	8.31
Madhya Pradesh	10.50	10.29	-1.01	Uttarakhand	4.77	4.46	-5.52
				West Bengal	1.80	1.79	0.34

Source: Data from ISFR, various years.

It is also evident that India's NDC target (as well as the target spelt out in the National Forest Policy 1988 of increasing forest and tree cover to 33%) cannot be achieved by increasing forest cover. While forest quality can be improved, it is understood that the maximum limit of Recorded Forest Area is to the tune of about 24% of the country's total geographic area. [161] Trees outside forests, in particular agroforestry, are recognized as perhaps the only alternative to meeting the NDC as well as the national target.[162]

For the sake of argument, even if all of India's degraded forests are taken up for restoration, only about 0.8 billion tonnes of CO2e worth additional carbon sink can be created.[163] The balance, translating into roughly 2/3 of the NDC commitment will need to come from trees

[161] Report of the Expert Committee on "Strategy for Increasing Green Cover Outside Recorded Forest Areas", MoEFCC, GoI, 2018; http://envfor.nic.in/sites/default/files/EXPERT%20COMMITTEE%20REPORT%20ON%20TOF%2018112018_0.pdf

[162] National Agroforestry Policy, 2014

[163] TERI studies suggest that 25-30 tonnes of additional carbon sequestration are possible per hectare of forest restored. (Source: Assessment for Designing REDD Plus Projects in India, TERI final report, January, 2014). Applying this norm to 40% of total Recorded Forest Area of 76.74 m ha which is considered to be degraded or barren (MoEFCC, 2018), gives an estimate of what may be considered an upper-bound of additional carbon sequestration potential from forests. It is to be noted that some restoration may be possible even in the MDF category and also that not all open forests are degraded and need/should to be taken up for restoration to a higher canopy density.

outside forests, particularly agroforestry. This objective will require serious policy, institutional and financial commitment.

There is no official estimate of area under agroforestry presently. Estimates suggest it to be about 20-25 million ha.[164] There are also no official estimates of the potential for agroforestry in India or the area to be brought under agroforestry to meet the NDC goal. According to one estimate, the NDC goal will require, in addition to protecting and improving existing forest cover, plantation of 25 million to 30 million hectares in mixed land use, including agriculture.[165] Recent estimates of the World Resources Institute suggest that mosaic restoration (integration of trees in a patchwork of different land uses including rainfed cultivated areas, with tree cover density of less than 40 percent and population density of less than 400 persons per sq.km.) is possible in about 87 million ha, constituting 26 percent of India's geographical area. It is estimated that this will lead to 0.96 - 2.1 billion of above-ground carbon sequestration. In comparison, protection of forest with density of more than 40 percent and wide-scale restoration in areas where existing forest and tree cover is less than 40 percent (and population density is less than 200 persons per square km) can yield 0.39 and 1.74 billion tonnes of carbon sequestration respectively. [166]

The National Agroforestry Policy, 2014 and the Sub-Mission on Agroforestry (SMAF), launched in 2016 under the National Mission on Sustainable Agriculture are important initiatives in promoting agroforestry in the country. Their success, however, will depend on the actions that States take to address existing constraints on agroforestry. Agroforestry is a farmer-driven initiative and its uptake by farmers will depend on whether State Governments can create a conducive policy and institutional environment. Specifically, State Governments will need to address issues related to, inter alia, easing of regulations in harvesting and transportation of trees planted on farmlands, extension, marketing, pricing and institutional support for farmers, institutional coordination across departments and programmes, development and supply of certified quality planting material, and research on agroforestry models suitable for specific ecosystems. The examples of States like Punjab, Haryana, Andhra Pradesh and Uttar Pradesh demonstrate how a favourable policy and regulatory regime can significantly improve adoption of agroforestry by farmers. Haryana and Punjab, with negligible forest area, have been transformed from "wood deficit" to "wood surplus" States.

The Expert Committee constituted by MoEFCC to develop a "Strategy for Increasing Green Cover outside Recorded Forest Areas"[167], identified the following areas where Government intervention is necessary to promote agroforestry:

- Research & development on agroforestry species and quality planting material;
- High quality planting material production and supply; and nursery accreditation;

[164] Report of the Expert Committee on "Strategy for Increasing Green Cover Outside Recorded Forest Areas", MoEFCC, GoI, 2018; http://envfor.nic.in/sites/default/files/EXPERT%20COMMITTEE%20REPORT%20ON%20TOF%2018112018_0.pdf
[165] https://portals.iucn.org/library/sites/library/files/documents/Rep-2017-010.pdf
[166] WRI INDIA - RESTORATION OPPORTUNITIES ATLAS: STATE REPORTS; Available at url https://s3.amazonaws.com/wri-doc/State+Report.pdf
[167] Report of the Expert Committee on "Strategy for Increasing Green Cover Outside Recorded Forest Areas", MoEFCC, GoI, 2018; http://envfor.nic.in/sites/default/files/EXPERT%20COMMITTEE%20REPORT%20ON%20TOF%2018112018_0.pdf

- Skill enhancement in nurseries, value addition, wood-based commerce, bioenergy;
- Price stabilization funds, minimum support price and insurance;
- Soil and moisture conservation on public wasteland;
- Transport and marketing infrastructure in remote tree production areas.

Price support will be an important determinant of the success of agroforestry in India. States should develop market-linked schemes to reward individuals, farmers or communities for creating green cover (trees outside forests) in private or leased land, based on their carbon potential. Green credits can be introduced where-under each individual or community is paid for the value of carbon stock generated by planting trees in their private or leased lands. The price could be fixed upfront but payments could be back- loaded in an assumed life cycle on the basis of 3rd party verification. These payments may be made directly to growers. Payments can be routed through JFMCs, authorized forest corporations etc. in the forest areas. Funds for such a scheme may come either from Government schemes such as Green India Mission or CAMPA.

A performance-based and adequately large grant is required to incentivize States to contribute to the achievement of India's NDC target (additional carbon sink of 2.5-3.0 billion tons CO_2 equivalent by 2030), which calls for a two-pronged approach, focusing on forests and trees outside forests, particularly agroforestry.

Recommendations for fiscal transfers

The proposed design of transfers takes into account India's national goals and international commitments, while keeping in mind the underlying principles discussed above. The following three main recommendations are being made:

1. In designing transfers, a distinction must be made between the two objectives of:
    i. Compensating States for the opportunity cost of maintaining forests, which are an important source of local, national and global ecological services; and
    ii. Supporting States in conserving and enhancing area under forest and tree cover for meeting India's NDC commitments.
2. For objective (i), forests should be retained as a criterion in horizontal tax devolution. The specific formula must take into account a State's fiscal disability on account of forests as well as the ecological services provided by forests of that State.
3. For objective (ii), an earmarked performance-based or outcome-based grant linked to the additional carbon sinks created in States should be provided. The grant will serve as an incentive to States to conserve and increase area under forests, improve the quality of forests, and increase green cover under trees outside forests.

We believe that the continuation of forest-related transfers is essential to provide sustained policy signalling to States on the importance of forest ecosystems.

Forest as a criterion in tax devolution

As discussed at length above, there is a strong case for compensating states for the opportunity cost and resulting deficiency in fiscal capacity that emerges on account of maintaining forests.

This compensation is necessary in recognition of the ecological services that forests provide, some of which, such as carbon sequestration, being global in nature.

The share of a given State in the compensatory transfer must factor in both its fiscal disability on account of forests and the ecological services contributed by its forests.

The following formula is proposed for the inter-se distribution of forest-based devolution among States:

The share of State (i) is given by S_i where

$$S_i = \underbrace{0.5\frac{\left(\frac{RFA}{GA}\right)_i}{\sum_i\left(\frac{RFA}{GA}\right)_i}}_{\text{(b) Fiscal disability}} + \underbrace{0.5\frac{(2DF+OF)_i}{\sum_i(2DF+OF)_i}}_{\text{(b) Ecological services}}$$

Where, subscript `i' denotes the i^{th} State; RFA: Recorded Forest Area; GA: Geographical Area; and DF: Area under Dense Forest Cover, including Very Dense Forest and Moderately Dense Forest.

The formula has two components

- Component (a) measures the fiscal disability faced by a State on account of keeping land under forests. It is measured by Recorded Forest Area in a State relative to its geographical area.

  RFA measures the area recorded as forests in Government records. It comprises forests which have been notified so under the provisions of the Indian Forest Act, 1927 or its counterpart State Acts. It may also include all such areas which have been recorded as forests in the revenue records or have been constituted as so under any State Act or local laws. RFA includes blank areas with tree density less than 10% such as degraded lands, wetlands, rivers, riverbeds, creeks in mangroves, glaciers and snow covered areas, cold deserts, alpine pastures, grasslands etc.

  RFA is a more accurate measure of the opportunity cost of forests than Forest Cover for two reasons. One, any land-use change within RFA invokes the provision of the Forest (Conservation) Act, 1980. Diversion of any forest for non-forest activities is prohibited unless approved by the Central Government and compensated for. These forests can be Reserved Forests, Protected forests, community/ village forests or unclassed forest. Different levels of activities, such as grazing, collection of forest produce, passage is allowed within RFA as per their classification under the Indian Forest Act. Protected Areas, especially National Parks, are areas notified under the Wildlife Protection Act are even more restrictive in terms of access and activities allowed. Two, RFA would also cover important ecosystems and Protected Areas such as grasslands and mangroves with canopy density less than 10% which may not show up in satellite-based Forest Cover estimates, but which are both important ecologically and entail a fiscal opportunity cost for States.

- Component (b) measures the share of the State in national Forest Cover and is a proxy of the contribution of the State to ecological services provides by the country's forests.

The proposed formula includes both dense and open forests in recognition of the fact that OF also provide important ecological services especially in regions where natural physiographic conditions can support only low-canopy density forests. However, for any given forest stratum and region, ecological services provided by dense forests are generally higher than open forests. This is corroborated by the NPV values of ecological services of different forest density classes underlying payments for compensatory afforestation under CAMPA. Annexure IV shows that, on an average, the annual per hectare economic value of ecological services of VDF and MDF combined are about twice that of OF in any forest type. Similarly, carbon stock estimates of FSI show that per hectare carbon stock increases with density class across forest stratum, and on an average the value for VDF and MDF combined is about twice that for OF. Thus, the proposed formula assigns twice the weight to DF as compared to OF.

- Relative weights of component (a) and (b). In order to avoid complexities in determining relative weights for the two components, it is proposed that equal weights be assigned to each.

The inter-se shares of States based on the above formula (using data from the India State of Forest Report, 2017) are indicated the in Table 43. Figure 28 compares these shares with those of the XII, XIII and XIV Finance Commissions.

Table 43: Estimated inter-se shares of States based on proposed devolution formula

	State	Share
1	Andhra Pradesh	3.21
2	Arunachal Pradesh	8.61
3	Assam	3.66
4	Bihar	0.88
5	Chhattisgarh	6.63
6	Goa	1.89
7	Gujarat	1.50
8	Haryana	0.28
9	Himachal Pradesh	4.63
10	Jammu &Kashmir	2.11
11	Jharkhand	3.18
12	Karnataka	3.89
13	Kerala	2.95
14	Madhya Pradesh	7.00
15	Maharashtra	4.69
16	Manipur	5.22
17	Meghalaya	3.45
18	Mizoram	2.50
19	Nagaland	3.57
20	Orissa	5.68
21	Punjab	0.44

	State	Share
22	Rajasthan	1.46
23	Sikkim	4.60
24	Tamil Nadu	2.78
25	Telangana	2.66
26	Tripura	3.77
27	Uttar Pradesh	1.33
28	Uttaranchal	5.65
29	West Bengal	1.79

Source: Study estimates

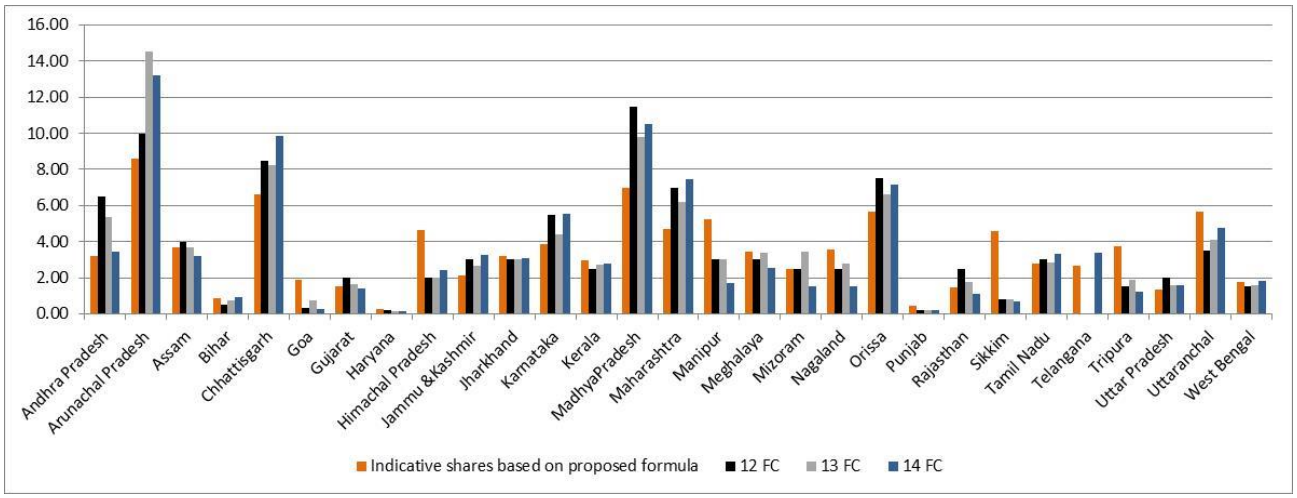

Figure 28: Comparison of estimated shares of States based on proposed formula with their shares under previous forest-related FC transfers.

The proposed formula, we believe, takes into account most of the concerns raised by States during our consultations with them. The inclusion of RFA (as a measure of fiscal disability) and OF (while measuring ecological services) in the formula addresses concerns of States like Gujarat and Rajasthan that are home to low density forests and grasslands. At the same time, the use of Forest Cover and a higher weight to dense forests takes on board concerns of States in the North East as well as States like Kerala, where area under notified forests is less than satellite-based forest cover.

Management models, livelihood dependence on forests, and social safeguards are other issues that were highlighted by stakeholders as being important considerations in the design of transfers. With nearly sixty per cent of total forest cover lying in tribal districts, tribal and forest dwelling communities are undoubtedly important stakeholders in forest management. Community participation is one of the central principles of policy and legislative framework governing forests in India, and must be strengthened in general. However, lack of consensus and comprehensive data on relevant indicators are restrictive factors when it comes incorporating these aspects within the transfer formula itself. It is expected that participatory and community based management should reflect in the overall health of forests and thus indirectly improve the relative standing of better performing States with respect of FC transfers.

Earmarked grant towards meeting India's NDC target

An earmarked grant is recommended to incentivize States to contribute to the national NDC target by conserving and improving existing forest and increasing area under trees outside forests.

Recognizing that the maintenance of existing forest carbon sinks are as important for the NDCs as creation of additional sinks, the proposed grant should reward States for existing carbon stock of their forests as well as create an outcome/performance-based incentive for States to create additional carbon stock.

The following formula is proposed for the inter-se distribution of the grant among States:

The share of State (i) is given by S_i where

$$S_i = 0.3\,\frac{CS_i}{\sum_i CS_i} + 0.7\,\frac{Max\left(0, \left(\frac{\Delta CS_i}{CS_i^{T=0}}\right)\right)}{\sum_i \left(Max\left(0, \left(\frac{\Delta CS_i}{CS_i^{T=0}}\right)\right)_i\right)}$$

(a) Reward for existing carbon stock of forests and trees outside forests

(b) Incentive for creating additional carbon sink through forests and trees outside forests

Where, subscript `i' denotes the i^{th} State; CS: Carbon Stock; **Δ** is the change in the parameter within brackets between the initial (T=0) and final years (T=T).

The formula has two components:

- Component (a): Grant for maintenance of carbon stock of existing forest and trees outside forests. This component serves to address the concerns of forest departments regarding shortfall of funds adversely affecting conservation efforts.
- Component (b) is an outcome/performance-based incentive linked to increase in carbon stock which a States can realize through different ways available to it- increase in area under forest and tree cover and restoration of degraded forests.

By focusing on the outcome (carbon stock) rather than area under forests/trees, the formula is able to make a clear link with the NDC target while also circumventing the challenge posed by the fact that the carbon sequestration potential of trees is a function of various factors, including their species and age.

Weights - As the objective of the earmarked grant is enhancement in forests or carbon sequestered, a higher weight to the second component is justified. Accordingly, weights in 30:70 ratio can be considered. The final decision on weights may be taken based on sensitivity runs using different weights once the 2019 ISFR report is available.

Estimation of parameters in the formula- Data on various forest parameters are published by FSI in India State of Forest Report (ISFR) biennially. ISFR, 2017 reported (for the first time) the

carbon stock under different carbon pools (above ground, below ground, dead wood, litter and soil organic carbon) of forests in each State.

It is expected that ISFR 2019 will be published before the XV FC period (2020-25). During the term of XV FC, two more reports with updated data on forests are expected– in 2021 and 2023, respectively. FSI must be advised to provide carbon stock within RFA and Trees outside Forests separately in the forthcoming reports. This will in any case be important to monitor and report India's progress with respect to the NDC target. Our discussion with FSI suggests that not only is this doable but also under consideration for the 2019 report.

It is proposed that in the first year of the grant (2020), component (a) may be estimated for 2019, the year of the latest ISFR before the XV FC period. In the interest of verifiability, stability, and predictability of data, it would be prudent to adopt a 4 year moving or dynamic cycle of measurement for component (b), synchronised with ISFR reports. The first calibration can take place in 2022 based on data for 2017-2021 and the second in 2024 based on moving data of 2019-2023.

Grant value: Cost norms from Green India Mission (GIM) were used to arrive at a rough approximation of the grant amount. The original budget of GIM was about Rs 45,000 core for the 10-year period starting 2011/12. This amount was to be used for restoration of MDF, OF and grasslands (4.9 m ha), ecosystem restoration and increase in forest area (1.8 m ha), enhancing tree cover in urban and peri urban areas (0.2 m ha), agroforestry and social forestry (3m ha) and restoration of wetlands (0.10 m ha).[168] These interventions were expected to result in incremental annual carbon sequestration of 55 MT by 2020, or 550 Mt in 10 years.

A simple extrapolation shows that 1.07 BT of CO2 equivalent of carbon pool will be created between 2015 and 2030, leaving a gap of 1.43BT with respect to the NDC commitment (see Chapter 1). As per the above GIM cost norms, creating this additional carbon pool will require an investment of Rs 135000 crore over the next 10 years (accounting for inflation), or roughly Rs 67500 crores over the five year period of the XV FC.

Assuming that current programmes and schemes of the Central and State Governments will ensure that the BAU trend is maintained, additional investment will be necessary to meet the gap in the NDC goal. The total cost of additional investments can be shared by the centre and the state governments through earmarked grants available from the Finance Commission as well as specific programmes to meet the objective. The Finance Commission can recommend Rupees 50,000 crores to be provided to States as earmarked grants spread over five years. Besides the earmarking of FC grants, on-going National Green Mission and CAMPA may need to be re-oriented to meet this objective. Imaginative programmes for disbursements linked to carbon measurements, especially for communities and individuals should be implemented to ensure that the objective of the earmarked FC grants is met simultaneously, effectively and adequately.

Conditionality of use:

It is recommended that atleast 40% of the grant should be used for forestry and related activities while the remaining should be used for agroforestry and other interventions that further the achievement of the NDC target, e.g. social forestry, provision of alternative fuel or fodder to forest fringe villages etc. Accordingly, atleast 40% of the funds should flow to the

[168] In addition, Rs 1000 crore was allocated for promoting alternative fuel energy in 3 million households)

forest department in each State and 60% can be allocated to relevant agencies in the State that are responsible for specific interventions, such as agroforestry, that contribute to eh NDC target. However, to be eligible for the grant, the State should be required to fulfil the following two conditions:

1. All Forest Working Plans/Schemes must be current and approved, those prepared post 2014 must be as comply with the 2014 code;
2. Each State must prepare a strategy and action plan for promoting agroforestry and social forestry that addresses the bottlenecks discussed earlier, including R&D, development and provision of quality planting material and nursery accreditation, price support instruments and mechanisms, transport and marketing infrastructure in remote areas, monitoring, certification and review processes, etc. Each State must provide a detailed proposal along with the budget for implementing the action plan.

The year 2004 is the only previous year for which State-level data on carbon stock in forests is available for India (see Annexure V); hence the indicative shares of States in the proposed grant have not been estimated here.

Conclusions

A two part fiscal transfer is recommended – (i) Forests as a criterion in tax devolution, and (ii) An earmarked carbon-linked performance based grant to incentivize State to contribute to India's NDC of creating an additional carbon sink of 2.5-3.0 billion tonnes of CO2 equivalent. .

The inter se distribution of forest based devolution to States is recommended to be based on (a) fiscal disability faced by a State on account of keeping part of its geographical area under forests, and (b) the contribution of a State in ecological services provided by national forests.

An earmarked grant is recommended to enable India meet its global NDC goals as well as support SFDs in their conservation efforts. The earmarked grant is linked to existing and additional carbon in forests and trees outside forests. It is designed to provide support to forest departments for maintenance of forest and tree cover, hence maintaining the carbon stock of forests; and serve as a reward and incentivize States for creating additional carbon sink by increasing area under forest and tree cover and improving forest quality.

The disbursement of the grant is proposed to be contingent on the preparation of action plans by States for both forest areas (through updated working plans/schemes) and outside-forest areas (strategy and action plan for agro and social forestry) lands. It is recommended that atleast 40% of the grant should be used for forestry and related activities while the balance should be used by States for other purposes such as agroforestry to support the achievement of India's NDC.

The grant also provides an opportunity to accelerate the momentum to move towards the goal of 33% of forest and tree cover in India's geographical area. We believe that the continuation of forest-based transfers is essential for sustained policy signalling to States on the importance of forest ecosystems.

Annexures

Annexure - I

A. Proceedings of Stakeholder Consultation organized by TERI-ICFRE

The consultation brought together policy makers, practitioners, and researchers working on the issue of forest conservation, to discuss the basis of Finance Commission transfers and how these may be structured to incentivize forest conservation.

Some key points raised during the discussion are outlined below:

- There are four key considerations while discussing forest conservation through finance commission transfers, in the context of the 14th Finance Commission's addition of 7.5% weightage to forest cover while determining tax devolution to States:

  (i) How much weightage should be provided for forest cover? What was the basis for 7.5? Is it justified? If a higher amount is requested it should be justified,

  (ii) How is this 7.5% to be utilized? There are two viewpoints regarding this. On the one hand, if the 7.5% is to compensate States for the fiscal disabilities which they face as a result of forest cover, then this amount can be used for any activity. On the other hand, if the purpose is to promote forest conservation, then it is important that at least at part of this amount be allocated for the forest sector.

  (iii) How can we measure implementation of grants? Should further releases be linked to performance? What indicators can be used to measure performance?

  (iv) What impact would a possible change in the formula have on States? Any recommendations should be backed by robust reasoning.

- The Finance Commission (FC) is currently in the consultation phase with all stakeholders. Several studies have been commissioned. With all these inputs the FC hope to make the recommendations by next year and release the report by October 2019.

- Some of the issues the FC would like greater clarity on include:

  (i) The 12th and 13th FCs provided grants for the forest sector, while the 14th FC moved to forest cover as one of the criterion for tax devolution (untied). Which method has worked better?

  (ii) Should it be a devolution route or a grant route, and if devolution route is used, what formula should be used?

  (iii) Other than the devolution route, should there be a specific purpose forest grant? Can there be a performance linked grant? If so, what kind of performance indicator can be selected for the forest sector?

Inputs from State Forest Departments:

Uttarakhand

- There should not be a single criterion to decide allotment share. While forest cover is important, we should evolve multiple criteria or parameters to decide transfers. Weightage given to each of the parameters can be discussed. Protected areas, people's participation, water conservation, pollution abatement and solid waste management can also be included as possible criteria.

Odisha

- As compared to the 12th and 13th Finance Commission, in the 14th FC period, the Forest Department has not received any allocation from the FC specifically for the forest sector as no amount has been earmarked. At the same time, funds for some centrally sponsored schemes have also reduced. This has affected the ability of the department to ensure the protection of dense and very dense forests. As we need to conserve and augment our forest stock to meet the NDCs, for those States with less per capita income, forest cover should be given a weightage of at least 20%. The amount must be earmarked for the forestry sector by the FC.

Madhya Pradesh

- Forest area can be considered as a criterion while determining allocations, instead of forest cover. In addition, the dependence of people on forests, share of protected areas, usufruct sharing by State Governments, especially with affected communities, and livelihood support should also be considered as possible criteria while devolving funds. The Forest Department has not received any FC funds in the 14th FC period. At least 20% weightage should be given to forest area. The FC should determine sectoral allocation guidelines. Performance incentives can be granted based on criteria such as the performance on the tiger census.

Gujarat

- The Forest Department receives a substantial amount of money from the State Government each year. The State has improved forest cover, mangrove area, trees outside forest. The State is also increasing tree cover outside forests. However, because the forest cover is only about 11.61% and forest area is also low the State has not received a large amount of funds after the 7.5% weightage to forest cover was introduced. In Gujarat, the forest department conserves a large amount of grasslands, and marine areas. Large tracts of protected areas have been created for Asiatic lions. Thus, these criteria should also be considered while determining the formula for tax devolution. In addition, assistance for forest dependent communities through livelihood generation should be incentivized through the formula which is finally used.

Himachal Pradesh

- While the Forest Department received funds when forest related grants were operational under the 12th and 13th FC, in the 14th FC period, the department has not received any funds. Forest area should be a consideration while determining the tax devolution formula and not forest cover. The fact that there is a ban on green felling

in the State, and that the Forest Department loses significant revenue as a result of this ban should be taken into consideration and State Governments should be compensated for this. (In response to a question: This revenue can be calculated on the basis of the annual yield figures mentioned in the working plan). Eco-tourism should be allowed in open forest areas. Protected areas can also be considered while determining the tax devolution formula. Whatever the method, some amount should be earmarked for the forest sector by the FC.

Meghalaya

- While the Forest Department received funds through 12th and 13th FC grants, it has not received anything in the 14th FC period. This is because the State Government has the discretion to determine how to further allocate the transfers made by the Central Government. Therefore, for the remaining period (2018-2020), some instruction may be issued to release these funds to forest departments. Sectoral allocation may be considered, instead of leaving it to the discretion of State Governments. Using forest area as a criterion (instead of forest cover) may put certain northeastern States at a disadvantage. Therefore, in case forest area is used as a criterion northeastern States should be exempted from this. Finally, there appears to be a link between declining budgetary allocation to forest sector and decline in forest cover in the last few years.

Nagaland

- India is a diverse country and there are several State specific regulations. For example, in Nagaland there is no provision for CAMPA. In addition, 88% of land is privately owned under Article 371A. These State specific factors should be considered while determining any devolution formula. Further, the State also has the responsibility to maintain biodiversity hot spot areas, and this should also be considered. The efforts to promote community conserved areas should also be recognized in some manner. The State forest department has not received any funds after the 14th FC recommendations.

Rajasthan

- In a State such as Rajasthan, even though large areas are under forest, the geographical conditions do not permit dense forests. Therefore, forest area and not forest cover should be considered while determining the formula. Open scrub lands and grasslands may also be considered. The State has done a significant amount of work on preventing desertification and this should also be recognized. Soil and moisture conservation efforts by States should also be considered in both forest and non-forest areas.

Punjab

- In the State, forest cover is 3.6% of the total geographical area. Therefore, if only forest cover is used as a criterion then the State would be at a disadvantage. However, there is significant area under agro-forestry. If instead of forest cover, tree cover is considered then this area would also be included. Sectoral allocation should be made when transfers are given. The FC should give guidelines or set criteria. Additionally, most forest land is privately owned. There is currently no mechanism

to compensate people who own forest land, on which felling of trees is restricted. This should be a consideration while determining transfers.

Haryana

- There is very low forest cover in the State, but the forest area is higher, this should be considered while determining transfers. The State also undertakes agro-forestry and supplies timber to other States, which should also be considered. The FC should decide guidelines on sectoral allocation to the forest sector and not leave it to the discretion of State Governments. Our actions should be guided by the Sustainable Development Goals. The SDGs on zero hunger, climate change, and life on land in particular can be linked to forest conservation. Water conservation may also be considered as a criterion while determining transfers.

There was a view from the NE States that forest area (rather than forest cover) would disadvantage them.

Inputs from experts

- Ecosystem services should be covered in addition to forest cover or forest area.
- Forest area should be considered instead of forest cover, as degraded area must be improved to meet our NDC targets under the Paris Agreement. Any transfers should be considered as additional funding while not reducing budgetary support to the forest sector from States. The 15th FC should also ensure that forest sector receives at least a part of the funds which are transferred. Transfers could be made contingent on the percentage which is spent on forestry sector. We should examine why 7.5% weightage has been given to forest cover, and if it should be more.
- While it may be difficult to alter the weightage of 7.5% to forest cover, it may be possible to strengthen the manner in which funds are transferred and their utilization to ensure that funds are allocated to the forest sector by State Governments. In order to fulfill our NDC commitments under the Paris Agreement, we can justify investing more in the forest sector and having dedicated funds to increase tree cover in open forest areas.
- The presumption that all States have the same developmental model must be re-examined. On the manner in which transfers can be made to States, the amount which is transferred on the basis of forest cover should be used for any activities which are aligned to environmental objectives. This need not be restricted to the forest sector but can comprise any other related activities.
- We should differentiate between the two objectives of: (i) compensating States for the opportunity of cost of maintaining forests and the fiscal disability that this imposes, and (ii) meeting NDC commitments and SDG objectives through forest conservation. The formula should be developed in a way that separates these two objectives. Even to justify why 7.5 weightage should be given to forest cover, more reasoning is required. A combination of forest area, with some weightage given to protected areas could be a good indicator. So far grants have been miniscule; the amount given through grants should be increased substantially.

- A new approach is required. We can meet our NDC commitments of 2.5 to 3 Billon Tonnes of CO2 equivalent through our current growing stock. However, the issue of environmental sustainability is larger than the NDCs. NRSC has made a spatial map of biomass which can be developed further to measure forest stock better. Funds should be allocated for restoring degraded areas, in addition to maintaining existing cover. Working plans can also be improved significantly.
- Between 2020-25, one third of the 30 million hectares of open forests in the country i.e., 10 million hectares may be taken up for improvement. This amounts to treating of 2 million ha of open forests per year. This would require a budgetary allocation of Rs. 60,000 Crore (@ Rs. 60,000/ha) for 5 years or Rs 12,000 Crore per year. This would lead to enhanced productivity, employment generation and improved ecosystem services. Therefore, approximately 1% of the 7.5% weight may be earmarked for the forest sector including State Forest Departments.
- Two possible issues with using forest area instead of forest cover could be: (i) States that have less forest area will contest this, and (ii) there will be no incentive to increase forest cover. Instead, we should bring in change in forest cover as a factor to determine allocation. Further, the weightage of 7.5% should be increased to 10%. The transfers should also come with a rider that part of the funds transferred should be invested in forest and watershed activities.
- Forest area can be considered as a sub-category within the category of geographical area. Change in forest cover should be considered along with status. A continued weightage for forest cover can be justified only if it is linked to meeting NDC and SDG targets. In addition, it should be shown if there is any negative impact of reduced funding for forest departments after the 13th FC transfers.

Concluding comments

- Meeting the commitment to increase carbon sinks by 2.5 BT to 3 BT CO2 equivalent will be difficult without additional funding for the forest sector. Here, we should also examine the potential role of the Ministry of Environment, Forest, and Climate Change. Both finance and improved forest governance are important. A simple, workable formula which is acceptable to most States is required.
- This discussion on the weightage to the forest cover in FC transfers is only important if the forest sector gains from it. One reason why a sectoral allocation to the forest sector should be made through these transfers is to meet our NDC and SDG targets. It will be difficult to meet international commitments without the required budgetary support.
- Currently, with a forest and tree cover of 24%, we fall short of our target of bringing 33% of our land area under forest cover. A second concern is the low quality of forests, which limit their ability to provide ecosystem services and meet SDG and NDC targets. Currently, State forest departments are under-funded and short-staffed to be able to meet these objectives. In addition, since funding could not be provided to State forest departments through grants, it is all the more important to allocate a part of the amount for forest departments.

- Therefore, the FC should intervene to ensure that at least part of the funds which are transferred on the basis of forest cover are used for forests. Part of the funds could be tied to forestry activities. Some criteria which can be used to make these transfers could include forest area, protected area, and dependence of local communities on forest areas, among others. Improvement over past forest cover could also be criteria. Perhaps, 3 sub-categories within the 7.5% weightage could be evolved.
- The objective of this transfer should be to improve productivity of forests as well as increase tree cover outside forests. For example, a State with less forest area should be incentivised to increase of tree cover outside forest area. Preparing a working plan is not enough, the implementation of these plans is just as important.
- The basic premise of compensation should be re-examined and forest regeneration should be incentivized through the next transfer mechanism which is developed.
- Financial support for achieving 2.5-3 billion tonnes of Co2e, implementing prescriptions of working plans for sustainable development of forests and maintaining ecological security of the nation is needed. States assign low priority to the forestry sector financial allocations. It is recommended to allocate financial resource to the States considering weightage ranging from 7.5-10%, based on forest cover, net sown area (agro-forestry), grasslands and protected areas out of which 0.5-1% must be allocated as grant to the State forestry sector .

B. Agenda

Welcome 10:00 AM – 10:10 AM	:	**Dr. J V Sharma**, *Director, The Energy and Resources Institute, New Delhi*
Opening Remarks 10:10 AM – 10:20 AM	:	**Dr. Suresh Gairola,** *Director General, Indian Council of Forestry Research and Education*
Context Setting 10:20 AM – 10:30 AM	:	**Shri M.S. Negi,** *Additional Director General of Forests, Ministry of Environment, Forest and Climate Change*
Presentation 10:30 AM – 10:50 AM	:	**Dr. Divya Datt,** *Senior Fellow & Director, The Energy and Resources Institute, New Delhi*
10:50 AM – 1:00 PM		**Round table discussion**
Concluding Remarks 1:00 PM – 1:15 PM	:	**Dr. Suresh Gairola,** *Director General, Indian Council of Forestry Research and Education*
Vote of Thanks 1:15 PM – 1:20 PM	:	**Dr. Divya Datt,** *Senior Fellow & Director, The Energy and Resources Institute, New Delhi*
1:30 PM - 2:30 PM		**Lunch**

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Annexure II

A. Proceedings of Stakeholder Consultation organised by TERI & Telangana Forest Department

The multi-stakeholder consultation brought together policy makers, experts, and practitioners in the field of forest conservation, ecological economics, and governance to discuss the manner in which transfers made by the Finance Commission (FC) to States can be optimized to incentivize forest conservation, as well as assist in meeting Nationally Determined Contributions (NDCs) as a part of the Paris Agreement of 2015.

This consultation was the second such consultation organized by The Energy and Resources Institute (TERI), as a part of a research study being conducted for the 15th Finance Commission on forest conservation through fiscal federalism. While the previous consultation was organized in collaboration with the Indian Council of Forestry Research and Education in Dehradun, this consultation was organized in collaboration with the Telangana Forest Department in Hyderabad.

While setting the context for the discussion, it was pointed out that in the past several forest rich States have argued that they lose economic opportunities as a result of maintaining forest cover, and that they should be compensated adequately for this. Starting from the 12th Finance Commission, a certain amount was allocated as a grant to State Governments to be used specifically for the forestry sector. The 12th FC allocated approximately Rs 1000 Crore, while the 13th FC allocated approximately Rs 5000 Crore. However, the 14th FC moved towards incorporating forest cover as a criterion while determining the funds to be devolved to States as untied funds, and gave a weightage of 7.5% to the forest cover of a State.

In practice, it has been seen that forest departments have not received additional funds after the introduction of the 7.5% weightage given to forest cover. Given that the NDC targets set by the Central Government have to be achieved through the action of State Governments, it is important to allocate an appropriate amount of funds to State Governments, and specifically forest departments for this purpose. Approximately Rs 50,000 Crore to Rs 60,000 Crore is required to meet our NDC commitments of achieving 2.5 to 3 billion tonnes of CO2e (carbon dioxide equivalent). This can be met through creating a separate grant specifically for the forest sector while also retaining the forest cover as a criterion for untied tax devolution. Unless it is specified by the Central Government, funds are unlikely to be allocated specifically to the forestry sector.

After a presentation on the key findings and recommendations of TERI's study, State forest departments presented their perspectives.

Perspectives of State Government Departments

Telangana Forest Department

- In addition to basing transfers on dense forest cover, other types of forest cover should also be included. The performance of State Governments which have managed to improve forest quality and quantity should be rewarded. A certain amount of the funds transferred from the FC should be earmarked to the forest sector based on performance. It should be specified that this should be treated as an

additionally so that other sources of funds to the state forest departments are not reduced. The performance of state forest departments should be measured along predefined indicators and state Governments which perform adequately should quality to get funds. In addition to the quantity of funds, their timeliness is also important.

Karnataka Forest Department

- It is important that all State Government departments contribute if we are to meet our NDCs of 2.5 – 3 billion tonnes of CO2e. However, it is important to specifically provide funds to the forest sector. The amount which is needed to meet our various NDC commitments and other objectives may be more than Rs 50,000 Crore. Transfers to forest departments should be based on performance indicators, for example, efforts towards wildlife conservation. Performance on improving MDF and VDF areas should be incentivized as carbon sequestration is more effective in these areas. Trees outside forest (for example, through agro-forestry) should be considered and incentivized as well.

Karnataka Finance Department

- Transferring funds to only forest department is not really required for an increase in forest cover, as the experience of Karnataka shows. If you compare the experience of the 13th and 14th FC periods, forest cover in Karnataka actually increased despite no transfers to the forest department in the 14th FC period. Of course, we should focus on increasing the weightage for forest cover and incentivizing the improvement of forest quality. However, several other factors can contribute towards increasing forest cover, in addition to efforts by the forest departments. Steps that Governments have taken to stabilize population should also be considered. Linking funds transfers with improvements in agriculture is also important.

West Bengal Forest Department

- The FC should evolve a mechanism to transfer funds directly to forest departments. WB forest department has not received any funds in the 14th FC period, so far. While the previous FCs have used population as a criterion for determining tax devolution, either the 1971 or the 2011 census data, the 15th FC should also consider population density to a greater extent.

Andhra Pradesh Forest Department

- The well-being of all Indian citizens is dependent on the forestry sector. Other than traditional forest areas, several State forest departments are also making efforts towards urban afforestation. This should be captured in any assessment of the performance of State forest departments. Capacity building is the need of the hour, and it is essential to increase awareness about climate change and improve preparedness to tackle events caused by climate change.

Tamil Nadu Forest Department

- Agro-forestry can play an important role in our efforts towards afforestation. However, we should be mindful that in rapidly urbanizing States such as Tamil Nadu, as we witness a rapid conversion of land to non-agricultural land, it is

important to incentivize the retention to tree cover on agricultural land, and the non-conversion of agricultural land into land for other uses. There is limited scope to further enhance quality of MDF and VDF areas. Thus, when measuring change, all forest cover types should be included. Areas and trees outside forests should be considered as well.

Maharashtra Forest Department

- In Maharashtra, out of approximately 3,00,000 km2 of geographical area, forest area is approximately 60,000 km2 and forest cover is 20,000 km2. Out of the 45,000 villages in the State, about 15,000 villages depend on forest resources. Thus, a large proportion of the villages in the State are dependent on forest resources. In this context, States forest departments which have performed well should be incentivized. However, it is important to use appropriate indicators while measuring performance. Simply using MDF and VDF is not sufficient to capture the impact of the forest departments. Trees outside forest are equally important. In order to make any improvements in our forest targets we will need to include this criterion. For example, in Maharashtra, there has been an increase in trees outside forest, bamboo bearing areas, mangrove cover and an increase in water bodies within forest areas. We strongly support the earmarking of grants specifically for the forestry sector. Along with agro-forestry, trees outside forest should also be included. To reach our target of 33% area under forest we need to include trees outside forest. Human resource issues in FDs need to be addressed. The number of ground staff needs to be increased. Capacity building is also very important. Maybe some component of funds transfers can be for the rehabilitation of villages which are shifted from Protected Areas. Increasing livelihood opportunities for people on the forest fringes should also be considered as an activity towards which funding can be directed. Finally, human animal conflict is a serious issue now, we need to use some funds to address this issue. Whatever is transferred should be in addition to existing grants.

Perspectives of domain experts

- We should consider the pros and cons of using forest area instead of forest cover while determining devolution. Money should ideally be allocated where it can have the largest impact. Thus, if there is greater potential in working with open and scrub forests, instead of MDF and VDF areas, money should be allocated along similar lines. Some type of additional funding should be given to those States which face problems such as air pollution, for example, States along the Indo-Gangetic plains such as Uttar Pradesh and Bihar. Finally, we should also discuss how to address the requirements of forest deficit stages such as Haryana and Punjab.
- We should clearly define what we mean by terms such as agroforestry, or whether we recommend Minimum Support Price (MSP) for timber or non-timber forest produce. There is need to discuss the role of community rights and how community involvement can be incentivized. Agro-forestry could also include not just above ground but also soil carbon sequestration. We need to be clear about whether we are including this in our calculations of carbon sequestration potential. Different States have differing potential with respect to densification and agroforestry. It is also

important to examine the trade offs between the different SDGs relating to zero hunger and no poverty and the promotion of agroforestry.

- In the north eastern States, several communities have preserved forests and a lot of carbon has been sequestered as a result of their efforts. The efforts of these communities should be incentivized. Possibly, the funds can be transferred directly to these communities. In the 14th FC period, State forest departments have not received any funds. Biodiversity hotspots such as the north eastern region should be incentivized on relevant criteria as well.
- It is important to present a set of quantifiable and verifiable deliverables or action points to the 15th FC. The recommended formula should be simple. It should be suggested that if so much of an amount is invested then the corresponding increase in forest cover was a certain amount. Therefore, in order to increase forest cover by this the amount we have committed to, we need a certain amount of funds, which should be clearly specified. A similar methodology should be followed for agroforestry and trees outside forest, wherein these projections should be clearly specified. One option for funding support to forest departments is to meet any gaps in the funding required to implement working plans. There should be a shift in thinking from forests for carbon to forests for people and livelihoods. There should be an emphasis on increasing the productivity of forests.
- The tone of the discourse needs to change. Forests should not be talked about as a fiscal disability. The singular focus on densification is problematic. Forests have natural processes through which they grow. We should shift our focus from afforestation to restoration. There is also a need to focus on funding for communities, for the preservation of wildlife corridors, among others. The fragmentation of habitats is a growing problem and specific funds for corridors could be useful. We should also work towards improving data and access to data on this issue.
- The 12th and 13th FCs were more focused on incentivizing forest conservation. With the 14th FC the focus shifted to evolving a compensation mechanism for the perceived fiscal disability due to forest cover. Since constitutionally the mandate of the FC is to bring about equity in fiscal needs and capacities of States, it made its recommendations within this framework of fiscal capabilities and disabilities. Grants have historically been a much smaller component. The focus has historically been on criteria such as population, and geographical area because the idea is that States have to provide services and not all States are equally placed to provide these services. Therefore, the term fiscal disability does not imply undervaluing forests, but is simply the FC fulfilling its mandate. Compensation for forest cover was therefore to bring about equity. Unfortunately, there is not much data to show that forest outcomes have improved from 12th to 13th to 14th FCs. How can we say that grants have worked? Any future grant may not be very large, but it can be a trigger with matching grants. Finally, trees outside forest are not properly captured in our current data collection methods. How can we measure this adequately? If we use a criterion such as 'green cover' and include trees outside forest cover, 80% of States here, at this consultation, would find that their share has gone up.

- Initially it was thought that in the 14th FC period, there would be a large amount for forests. However, in practice we find that in the 14th FC period, money allocated to forest departments has decreased. We should compare performance under grants given under the 12th and 13th FC period vs performance under the 15th FC period where forest cover is a criterion for tax devolution to understand the change in forest cover under the two types of mechanisms. While currently the emphasis is on changes from MDF to VDF, it is more important is to maintain native forest cover. A lot of afforestation may be plantation cover and not contribute towards improving forest quality. Grants are an important mechanism to incentivize forests.
- Can we compare changes in funds based on different formulae which may be used? Do we have State-wise protected area networks? In some States where green felling is not banned, States can technically generate revenue from forests. How do we account for this in the recommendations?
- Agroforestry should certainly be considered as an intervention to improve tree cover. Community forestry and Joint Forest Management are both important and these should be incentivized directly. SDGs should be looked at not just from the environmental perspective but to achieve outcomes related to social justice.
- At times it is not possible to densify certain forest areas above a limit. WRI has launched a national restoration atlas which distinguishes between three types of forest cover – protection, wide scale, and mosaic areas. This classification and atlas can help us estimate how much regeneration potential a State has, beyond MDF to VDF. Supporting information such as funds allocated to the forest sector is also available. One point which should be covered to a greater extent is community forest rights. How can we consider their activities, responsibility, and performance and incentivize them to contribute towards forest conservation?
- Can we consider per capita forest cover or area instead of total? This way States would be incentivized to increase forest cover and reduce population. Density is problematic as other types forests also play an important role in the provision of ecosystem services and livelihoods. Can we include wetlands in addition to forest cover?
- We should also consider the role of the agriculture department while encouraging agroforestry. Capacity building should be undertaken. Any funds which are transferred on the basis of forest cover should at least partially be specifically targeted towards the forest departments.
- Data collection is a major challenge, and data from the Forest Survey of India as well as the National Remote Sensing Centre should be used appropriately. Some weightage should be given to open forests as well. Finally, weightage should be given to trees inside and outside notified forest areas.

B. Agenda

Welcome 10:00 AM – 10:10 AM	:	Dr. J V Sharma *Director, The Energy and Resources Institute, New Delhi*
Opening remarks 10:10 AM – 10:20 AM	:	**Shri PK Jha** *PCCF & HoFF, Telangana*
Presentation 10:20 AM – 10:45 AM	:	**Dr. Divya Datt** *Senior Fellow & Director, The Energy and Resources Institute, New Delhi*
10:45 AM – 1:10 PM		**Round table discussion**
Concluding remarks 1:10 PM – 1:20 PM	:	**Shri PK Jha, IFS** *PCCF & HoFF, Telangana*
Vote of thanks 1:20 PM – 1:30 PM	:	**Dr. Divya Datt** *Senior Fellow & Director, The Energy and Resources Institute, New Delhi*
1:30 – 2:30 PM		**Lunch**

C. List of participants

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Annexure III

A. Proceedings of Stakeholder Consultation: Harnessing the Potential of Trees outside Forests to Meet India's NDC Commitment

Inaugural session

- Over the course of the previous consultation organized by TERI, it emerged that trees outside forests (ToFs) have the potential to meet India's commitments as a part of its Nationally Determined Contributions (NDCs) of increasing carbon sinks by 2.5 Billion Tonnes (BT) to 3 BT CO2 equivalent. Around two-thirds of this NDC commitment can be met by trees outside forests. This is also one of India's least discussed NDCs.
- The role of trees outside forests has been recognized in several policy documents but has received limited institutional and financial support. It is therefore important to ask if Finance Commission transfers can be used as a lever to facilitate policy shifts to improve the extent of trees outside forests.
- The 12th Finance Commission first came up with the idea of a payment mechanism for ecosystem services for forest conservation and allocated Rs 1000 Crore between 2005 and 2010 for the forest sector. This continued in the 13th Finance Commission, which allocated Rs 5000 Crore between 2010 and 2015, also giving priority to working plans. The 14th Finance Commission shifted the nature of funding by including forest cover as a criterion for devolution of tax grants with a weightage of 7.5% in the devolution formula leading a total amount of Rs 2.96 Crore. The main argument made by the 14th Finance Commission was that this amount was to be transferred as compensation for fiscal disability. However, in practice nothing has been transferred to forest departments despite large amounts being allocated to State Governments on the basis of their forest cover.
- Carbon stock in India's forests was 6.67 BT in 2004 and 7.0 BT in 2013. The increase in carbon stock over the 9 year period from 2004 to 2013 has been only 381 Million Tonnes (MT). That is only a 5.7 % increase.
- Agroforestry and sporadic trees growing on farm lands have high potential to meet these targets. Forest deficit States like Punjab and Haryana have shown this. Most wood-based industries are concentrated in these States.
- Farmers faced a serious crisis between 2001 and 2005 when prices of poplar stocks crashed. This cycle has been repeated from 2015 onwards.
- Farmers will enter into the agroforestry business only if they get higher returns per unit area per year. They will not grow trees for environmental benefits. Marketing issues, creating demand, and long term profits are the three key issues. The productivity and quality of produce must also be improved. It is also important to provide timely extension services.
- The sub-mission on agroforestry (SMAF) has been operational since 2015-16. There has been a gradual shift in the Government's push for agroforestry from being

production centric to income centric. Agroforestry can supplement farm income, enable risk reduction, and contribute towards climate resilience.

- A Model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017 has been published, along with a model Contract Farming Act, The State/ UT Agricultural Produce & Livestock Contract Farming and Services (Promotion & Facilitation) Act, 2018.
- The Ministry of Environment, Forest, and Climate Change (MoEFCC) is trying to encourage plantations outside forests, through changes in policies. The achievement of NDC targets will depend more on non-forest lands than forest lands. This can help improve farm incomes as well.
- Key recommendations to increase agroforestry activities include:
    - Quality planting material should be more easily available.
    - Provisions for harvesting and transportation of agroforestry produce should be made less stringent.
    - Wood based industries based exclusively on farm grown timber should be exempted from stringent licensing requirements to promote establishment of new units and facilitate capacity expansion of existing units.
    - The Central Government should permit export of farm grown timber and actively promote export of value added wood products so that farmers can access international markets.
    - The Central Government should not permit import of such timber species that can easily be substituted with the tree species commonly grown by farmers in India.
    - Regulated timber markets should be established to ensure transparent timber trade and prevent exploitation of farmers.
    - R&D, technical extension services, communications, institutional support and monitoring and review processes should be strengthened.
    - A statutory and institutional mechanism for certification of planting stock and clonal plants should be established.
    - Coordination between concerned Ministries of the Central and State Governments, Governmental agencies like ICFRE, ICAR, State Forest Departments, Agriculture Departments, NABARD, NGOs, farmers and private sector should be strengthened. This cannot be a Government run programme. Industry should be brought in.
    - The Government and banks should facilitate easy availability of long term loans for agroforestry development.
    - Minimum support price should be provided for certain species.
    - Models for payments for ecosystem services should be developed.
    - An accreditation system should be developed for nursery planting stock.

- Working plans should be prepared for agroforestry, linkages with industry, and market infrastructure.
- A number of these issues have been raised in the report of the Expert Committee formed by the MoEFCC on a Strategy for Increasing Green Cover outside Recorded Forest Areas submitted in 2018. However, the recommendations of this committee are yet to be implemented by State Governments.

Session 1: Perspectives from States

The exact figure of trees outside forests has been difficult to estimate. While there are estimates which suggest that 80% of industrial wood met from trees outside forests, there is limited reliable authentic data on the ground.

Karnataka

- In Karnataka a scheme called the Karnataka Aranya Protsaha Yojane where Rs 100 is given over three years, Rs 30 each in the first two years and Rs 40 in the third year to plant saplings.
- Trees outside forests have benefits not just for NDCs but also for other purposes. These include: (i) firewood wood for daily use, (ii) fodder, (iii) fertilizer requirements, (iv) providing agricultural equipment and timber, (v) protecting agricultural crops, (vi) maintaining soil and fertility, and (vii) increasing income by providing livelihoods
- 42 species are exempt from felling permission by the Karnataka Forest Department
- Key types of agroforestry practices under SMAF in Karnataka include: agriculture – agroforestry, agriculture-horticulture-agroforestry, homestead, tree-grazing-livestock, agriculture-tree-fodder-livestock, horticulture-agroforestry, sericulture-agroforestry, boundary plantations, and bamboo.
- Small farmers are experimenting with sandalwood, melia dubia, red sandars, and coconut to generate income.
- The forest department has conducted a cost benefit analysis has been done for various farmers.
- Some of the key issues identified in the State include: (i) MGNREGA payments for material component is delayed, (ii) demand survey and extension activity can be improved, (iii) farmers are procuring seedlings from private agencies at high rates and there is no control over quality, (iv) PMKSY beneficiaries are given a subsidy only if agriculture or horticulture based crops are grown, (v) incentives in different schemes such as MGNREGA , SMAF, and KAPY are different, and (vi) insurance and loans for agroforestry and incentives to farmers for taking up agroforestry are not provided to the extent that they can be.

Punjab

- Punjab has adopted two strategies to promote trees outside forests – agroforestry and household forestry. While the green revolution has led to improvements in

agricultural productivity, it has also had environmental costs. Yields in the agricultural sector are also reducing.

- To enable agroforestry, Punjab has removed all felling permits and transit rules. Under the Rashtriya Krishi Vigyan Yojana (RKVY) a nursery has been established at Ludhiana to produce up to 50 lakh clonal plants which are being supplied to farmers.
- A State forest research institute has been established at Ludhiana but there is limited financial support to run this institute.
- To promote industries and develop markets: (i) agroforestry produce has been exempted from licensing regime even though it will continue to be regulated, (ii) apart from a regulatory fee, a proposal for a 'green fee' has been incorporated in the draft rules – to be used for agroforestry and farmers, (iii) A provision has been made for the establishment of wood based industrial estate/parks in the new Industrial and Business Development Policy, 2017.
- Some other steps that the State has taken to promote agroforestry include: (i) survival based, direct benefit transfer in the saving bank accounts of the farmers/beneficiaries, (ii) it is proposed to plant 30 lakh plants in 2018-19, (iii) development of App SMAF-PUNJAB to use technology to reach farmers directly.
- To promote household forestry a Ghar Ghar Hariyali scheme has been developed. Under this scheme, plants are supplied free of cost to all the house holds for planting in their households. The i-Hariyali application has been developed to reach people.
- The State Government has decided that 550 plants will be planted in each village, resulting in the plantation of 75 lakh plants in 2018-19. Funds from MGNREGS will be used for this activity.
- Some of the key issues in this sector in the State include: (i) limited implementation of schemes as it is difficult to meet the State Government's commitment of 40% in the current 60:40 funding patterns, and (ii) while agriculture is subsidized, there is no such subsidy for forestry or plantations by farmers
- In order to strengthen agroforestry practices it is recommended that: (i) more funds should be allocated to the States having more agricultural area and potential trees outside forests, (ii) funding should be given as a grant in aid (100%) rather than the current 60:40 funding pattern even if plan size is less, (iii) Research should be promoted to develop new agroforestry models, (iv) e-markets should be developed to allow for real time prices of the wood of various species.

Haryana

- Trees outside forests can help achieve much of the NDC target of meeting carbon stock, and Haryana is playing a leading role in this.
- The recorded forest area in the State is about 3.9% but forest and tree cover is 6.65%. Wood production has grown from 13 lakh cubic metres to 22 lakh cubic metres between 1985 and 2006. The number of wood based industries was over 5000 in 2006. Yamuna Nagar produces about 50% plywood of the country.
- Policy initiatives include: (i) no timber transit rules since the formation of the state; This allows farmers to bring their produce to the Yamuna Nagar timber market

which provides better rates in comparison to other markets, (ii) the wood of poplar and eucalyptus has been declared as agricultural produce to collect marketing fees on its sale, (iii) There is no restriction on the establishment of wood-based industries (WBIs) in the state.

- This has allowed the value of products manufactured from farm-grown wood to reach about Rs 3,000 Crore. This has also resulted in employment, improved livelihoods and tax revenue for the Government. Wood-based industries in Yamuna Nagar provide employment to one lakh people. The agroforestry sector generates employment worth Rs 900 Crore annually.
- The key challenges include ensuring sustainability, diversification such that different species are grown, motivating farmers to grow trees outside forests, and providing technological support, expansion and intensification and agroforestry and developing market linkages.

Uttar Pradesh

- While Uttar Pradesh is a forest deficit State, it is also a pioneer in agroforestry.
- 6.9% of area is forest area. Tree cover is 3.09%. Together forest area and tree cover amount to 9.18% of the State's geographical area. Almost 90% of farmers in the State are small and marginal farmers.
- Over 30 Crore saplings have been planted in the last 4 years, including 12 Crore by departments other than the forest department. 112 Crore saplings are to be planted in the coming 4 years. Common trees for plantation include poplar, teak, eucalyptus, Shisham, Bamboo, Kadam, etc.
- There has been a net increase in forest cover in Uttar Pradesh as compared to the previous assessment which can be attributed to plantation activities and conservation efforts.
- Key issues pertaining to agroforestry in the State include: (i) finding resources for achieving massive plantation targets, (ii) R&D for developing economically viable alternative species for agroforestry, (iii) enabling the free distribution of saplings, (iv) increasing incentives for farmers, (v) developing market linkages, and (vi) with a ban on the use of polybags it is important to develop alternate means of raising saplings.

Session 2: Role of trees outside forests (ToF) in meeting India's NDC commitment of creating an additional carbon sink of 2.5 to 3 BT of CO2 equivalent

- The target communicated to the United Nations Framework Convention on Climate Change (UNFCCC) is an additional carbon sink of 2.5 to 3 BT CO_2 equivalent. However, there has not been much action on the ground. We will need an additional 5 million hectares of land to meet this target. The scope lies with trees outside forests.
- More than 80% demand of wood products in the country is met from the agroforestry sector. Compensation for carbon sequestration is also important.
- However, farmers will not plant trees for ecological gains but economic gains. Research and development (R&D), market and institutional support is also required

to enable farmers to move towards agroforestry. Therefore, the Central and State Governments must come up with schemes as well as institutions.

- The institutional mechanism is not very strong in this sector especially regarding Minor Forest Produce (MFP), Minimum Support Price (MSP), and timber production. Without MSP it will be difficult to enable improvements in agroforestry production. The Government looking for a simple formula for MSP which can be implemented easily.
- If the National Highways Authority of India (NHAI) achieves 100% of its target to create green highways, then by 2020 it will contribute 3-4% of the NDC targets.
- National highways form a network of 1.25 lakh km, which accounts for 2% of the total road network. However, 40% of traffic operates on these highways.
- Currently this network emits 391 MT of carbon emissions and this is expected to be 966 MT by 2020. 160 metric tonnes of CO_2 are emitted to construct 1 km of a national highway. Sequestration with existing plantations is 20 metric tonnes. Thus, emissions are 8 times the sequestration. How do we bridge this gap?
- Issues such as carbon sequestration, climate change, and sustainable development are addressed through the green corridors that the Green Highways Division constructs. The focus is on the development of eco-friendly highways with participation by communities.
- However, the Division is behinds its targets so is trying to involve multiple stakeholders. While it aimed to complete 10,000 kilometres of greening each year, in the last three years it has only been able to complete approximately 7,000 kilometres.
- One of its objectives is to meet NDC target of creating an additional carbon sink of 2.5 – 3 BT of CO_2 equivalent. It also seeks to promote sustainable livelihoods and employ 1 lakh people through the greening of highways.
- A dynamic species matrix, which is one of its kind, has been developed for each agro climatic zone.
- 2.13 – 2.46 MT of CO_2 can be sequestered through green highways and contribute towards the NDC goals. The target is to achieve carbon neutral roads.
- The agroforestry policy has mainly been formed by agricultural specialists and fewer foresters. Some positives of the current policy framework are: (i) nearly 93% of demand for industrial wood is met by trees outside forests, (ii) quality planting material was in high demand but today it is more easily available.
- Companies which have a high demand for timber should be compelled to raise plantations.
- At ITC, the work on improvement of planting material resulted in 20 – 58 metric tonnes productivity per year, survival increased from 40% to 90%, in 7 years. 1, 67,000 hectares were planted. It was decided to diversify plantations when prices crashed. Employment generation was also a priority and 450 people found employment per hectare. 26.24 MT of CO_2 could be sequestered in a cycle of 4 years.

- Carbon sequestration should be audited and monitored, and emissions from agroforestry should be accounted (for example through fertilization, irrigation, running motors etc.).
- Globally 80% of 170 countries which have submitted NDCs have said they will include agriculture sector. 29 countries have mentioned that they will reach targets through mitigation by agroforestry and 23 through adaptation. India has mentioned mitigation.
- India is among a handful of countries which have initiated ecological fiscal transfers based on forest cover. There is no formulation for payment for ecosystem services in India, in the agriculture or forest sectors. Between 2015 and 2017, there has been a 0.9% increase in forest cover and 80% of this comes from trees outside forest. Instead of restricting the criterion to forest cover, the Finance Commission should use tree cover or green cover instead of forest cover when devolving taxes. There should be a mechanism which outlines how States can use these funds, for example through the mapping of agroforestry areas of the State, developing technology such as geo-mapping, and tree-based apps to allow farmers to see which trees they can plant, capacity building, and long term research and development for high quality germ plasm material, and the development of trees which are suitable for agroforestry. Policy interventions at the State level should also be made.

Session 3: Strengthening regulatory, policy, and institutional framework for supporting trees outside forests

- Forest and tree covers have been almost stagnant for the last 15 years. 25 million hectares of non-forest land (mainly farmlands) must be brought under forest & tree cover in order to meet the target of 33% forest cover. Forest and tree cover of the country is currently about 24% and NDC targets are to create an additional carbon sink of 2.5 to 3 BT of CO_2 equivalent by 2030. Currently, the area under trees outside forests is 20-25 million hectares.
- The agroforestry sector can be strengthened by: (i) certification of quality planting material in the manner that is done in the horticulture sector, (ii) training and awareness generation among farmers, (iii) incentivizing carbon capture through trees outside forests by providing a platform for carbon trading, (iv) the development of PPP models involving private sector and forest corporations and the issuance of Green Bonds, (v) controlling trade of illegal timber & products through third party forest certification, (vi) the rationalization and easing out of felling & transit permits on wood & wood products, (vii) notifying wood, wood products and NWFP grown on non-forest lands as agricultural produce, (viii) insurance and MSP for farm-grown wood, wood products and NWFP, and (ix) the creation of National/State Forest Seeds Corporations, among others.
- In addition, general actions to be taken include: (i) controlling trade of illegal timber, (ii) 20% anti-dumping duty on BCTMP pulp as well as veneer/furniture, (iii) financial incentive for carbon sequestration, (iv) promoting wood over alternatives like iron, aluminium, (v) educating the farmers about planting tree crops as per market conditions, and (vi) replacing disease prone clones and treating diseases of tree crops.

- To improve market conditions, the following actions may be taken: (i) free movement for poplar, eucalyptus, jamun, teak, semul, melia dubia, among others, (ii) currently timber is taxed at 18% GST, which should be reduced to 5%, (iii) develop more regulated timber markets, we have only 2 regulated timber markets currently to which around 4 lakh quintals arrive each day, (iv) introduction of more mandis, (v) reduction of the 4% commission to timber merchants which is included in the APMC Act, (vi) reduction in 2% mandi fees, (vi) reduce licenses, (vii) move agroforestry from an orange category industry to a green category industry, (viii) create a poplar and eucalyptus board such as the rubber and spices board, (ix) promote the export of agroforestry products through providing subsidies on the basis of the volume of timber exported.
- Recently the license on wood - based industries which consume agroforestry wood was removed. License became free and only registration was required. However, States are charging a huge amount for registration.
- Research pertaining to biological, technical and socio-economic and legal aspects should be conducted. This includes research on different agroforestry models, genotypes, diseases and their control, among others. The role of the private sector, financing models and licenses should also be researched.
- Several new tree varieties have been developed by Forest Research Institute. 13 have been developed recently, of which 10 are of melia dubia while 3 are of eucalyptus. FRI has been able to reduce harvesting time from 9-12 years to 6 years for these varieties. The productivity has increased from 12 cubic metres per hectare per annum to 35 cubic metres per hectare per annum. In some cases, productivity is more than 50 cubic metres per hectare per annum for some types of melia dubia.
- Agricultural production should not be compromised but vacant land can be used for agroforestry so as not to affect food security.
- The key issue is how to motivate farmers and build trust. They will not do it for NDCs. We can only talk in terms of monetary gains. We need to give germ plasm which will be welcomed by them. We should think of new species other than poplar eucalyptus and melia dubia. Confidence will only come if we give incentives and reassure on felling transit and prices are concerned.
- While the market is there, we are still importing material and not able to meet demand at the same time the farmer is not able to find buyers. Supply can be increased only if we are able to create a strong linkage between demand and supply.
- We have only been able to reach a handful of people and are still trying to develop new models of agroforestry. We need to standardise models and make then reach people. More coordination is required between key stakeholders.
- Tree improvement programmes should address issues such as productivity, clonal technology development (macro propagation), root trainer Technology, site specific clones, establishment of centralized modern nurseries, certification of quality planting material, and plantations yield improvement.
- Plantations are not currently very productive due to poor Survival, lack of availability of good quality seed for raising plantations, close spacing, termite

damage to young plants & outbreak of pest and diseases, hybrid breaking, primitive nursery practices, mismatch of species to site, and primitive cultural practices.

- In order to improve productivity: (i) reduce rotation age, (ii) adopt suitable spacing, (iii) develop disease resistant, wind & drought tolerant clones, (iv) develop site specific clones, (v) improve silvicultural traits (timber traits), (vi) improve package of practices (cultivation practices), and (vii) develop models & package for farm forestry
- Broader recommendations include: (i) strengthen tree improvement research through mapping genetic resources, establishing seed technology laboratories and clonal development, and (ii) institutionalize production and use of quality planting stock through establishing quality planting stock registry and its certification, and establishing modern centralized nurseries with root trainer technology.

B. Agenda

Welcome 10:00 AM – 10:05 AM	**Dr Divya Datt** *Director, Integrated Policy Analysis Programme, The Energy and Resources Institute (TERI)*
Context Setting 10:05 AM – 10:15 AM	**Dr J V Sharma** *Director, Forestry and Biodiversity Division, TERI*
Keynote Address 10:15 AM – 10:35 AM	**Mr Piare Lal** *Technical Advisor, Pragati Biotechnologies, Hoshiarpur, Punjab*
Special Remarks 10:35 AM – 10:45 AM	**Dr Alka Bhargav** *Joint Secretary (NRM & IC), Ministry of Agriculture & Farmers Welfare*
Inaugural Address 10:45 AM – 11:00 AM	**Mr M S Negi** *Additional Director General of Forests, Ministry of Environment, Forests & Climate Change*
11:00 AM – 11:15 AM	**Tea Break**
11:15 AM- 01:00 PM	**Session 1: Perspectives from States** ***Chair:*** **Dr Devendra Pandey** *Former DG, FSI & PCCF & HoFF* ***Panellists:*** **Ms Anita S Arekal** *Addl. Principal Chief Conservator of Forests (Social Forestry), Govt. of Karnataka*

	Mr Saurabh Gupta *Chief Conservator of Forest, Department of Forests & Wildlife Preservation, Government of Punjab* **Mr Vivek Saxena** *Chief General Manager, Haryana Forest Development Corporation* **Dr Kuruvilla Thomas** *Chief Conservator of Forest (Planning), Govt. of Uttar Pradesh*
1:00– 1:45 PM	**Lunch**
1:45- 3:00 PM	**Session 2: Role of trees outside forests (ToF) in meeting India's NDC commitment *** ***Chair:*** **Dr J V Sharma** *Director, Forestry and Biodiversity Division, TERI* ***Panellists:*** **Dr A K Bhattacharya** *Head, Green Highways Division, NHAI, MoRTH* **Dr H D Kulkarni** *General Manager (P), ITC Limited, Paperboards and Specialty Papers Division* **Ms Deveshree Nayak** *Scientist, World Agroforestry Center (ICRAF)*
3:00-3:15 PM	**Tea**

3:15-5:00 PM	**Session 3: Strengthening regulatory, policy, and institutional framework for supporting ToF** ***Chair:*** **Mr Piare Lal** *Technical Advisor, Pragati Biotechnologies, Hoshiarpur, Punjab* ***Panellists:*** **Mr R K Sapra** *Former PCCF, Haryana Forest Department* **Mr J K Bihani** *President, Haryana Plywood Manufacturers Association (Regd.)* **Dr P P Bhojvaid** *Former PCCF & HoFF, Haryana Forest Department* **Dr Savita** *Director, Forest Research Institute* **Dr H D Kulkarni** *General Manager (P), ITC Limited, Paperboards and Specialty Papers Division*
Presentation Summing up key issues 5.00-5.20 PM	**Dr Divya Datt** *Director, Integrated Policy Analysis Programme,* *The Energy and Resources Institute (TERI)*
5.20–6.00 PM	**Discussion**
Concluding remarks 6.00-6.20 PM	**Mr Siddhanta Das** *Director General of Forests & Special Secretary, Ministry of Environment, Forests & Climate Change*
6:20-6:30 PM	**Vote of Thanks** *Ms Joyita Ghose, Associate Fellow, TERI*

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Annexure IV

Total economic value of forests

Table 44: Total Economic Value of forests (by adjusting for double counting and simultaneous delivery of ecosystem services)

Total Economic Value Rs/ha/yr	VDF	MDF	OF	LTF (less than 15% canopy)
Tropical Wet Evergreen Forests – North East	178772	93991	81716	22988
Tropical Wet Evergreen Forests – Western Ghats	197052	138537	53832	27464
Tropical Semi Evergreen Forests - North East	102971	80975	42447	24170
Tropical Semi Evergreen Forests - Eastern Deccan	240290	195825	104140	93733
Tropical Semi Evergreen Forests - Western Ghats	159497	105316	63064	34818
Tropical Moist Deciduous Forests	147493	101457	57112	26102
Littoral & Swamp Forests	240606	161884	92650	63943
Tropical Dry Deciduous Forests	107810	77390	46804	29565
Tropical Thorn Forests	61365	54008	43238	29289
Tropical & Subtropical Dry Evergreen Forests	126952	93131	51781	21928
Subtropical Pine/Broadleaved Hill Forests	108322	83875	47420	17256
Montane & Moist Temperate Forest	165691	127735	63635	18541
Sub Alpine & Dry Temperate Forest	139036	114532	54901	13563
Alpine Scrub	120739	89210	41483	18038

Source: Verma M et al, 2014.[169]

[169] Verma M, Negandhi D, Wahal AK, Kumar R, Kinhal, G. A., and Kumar, A. Revision of rates of NPV applicable for different class/category of forests. Indian Institute of Forest Management. Bhopal, India.November 2014

Annexure V

Carbon stock of forest

Table 45 Carbon stock of forest: 2004

State/ Union Territory	Total Carbon Stock (in Million tonnes) 2004	Total Carbon stock (tonnes/ ha) 2004
Andhra Pradesh	398.03	89.7
Arunachal Pradesh	962.88	142.07
Assam	168.92	61.1
Bihar	46.99	84.23
Chhattisgarh	552.21	98.85
Goa	16.78	77.52
Gujarat	113.50	77.14
Haryana	12.68	79.91
Himachal Pradesh	161.22	112.2
Jammu & Kashmir	241.71	113.62
Jharkhand	213.94	94.7
Karnataka	439.43	124.66
Kerala	199.54	127.95
Madhya Pradesh	682.53	89.79
Maharashtra	478.54	100.8
Manipur	138.15	80.86
Meghalaya	149.10	87.77
Mizoram	97.93	52.41
Nagaland	129.88	94.67
Orissa	423.08	87.46
Punjab	13.84	88.85
Rajasthan	89.12	56.22
Sikkim	39.73	121.8
Tamil Nadu	211.48	91.77
Telangana	-	-
Tripura	58.92	72.25
Uttar Pradesh	113.61	80.42
Uttaranchal	285.69	116.88
West Bengal	119.76	96.48
Delhi	0.82	46.5
Andaman & Nicobar	100.27	151.25
Chandigarh	0.14	92.7
Dadra& Nagar Haveli	1.62	73.42
Daman & Diu	0.03	38.53
Lakshadweep	0.15	58.46
Pondicherry	0.36	86.62
Total	**13221.77**	**3149.56**

Source: Carbon Stock in India's Forests, FSI, 2011

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