Strengthening India's Forest Sector

Recommendations to the Fifteenth Finance Commission

Summary of the Recommendations

The key recommendations are given below:

1. We strongly recommend continuation of forest-related criteria in the horizontal devolution formula.
2. Equal weight should be given to 'fiscal disability' and 'ecological benefits' in the forest-related component of the formula.
3. The recorded forest area (RFA) and protected area (PA) should be considered as indicators of fiscal disability faced by states due to restrictions imposed by national laws and judicial directions. RFA and PA should be given weights in proportion to their area in the country, i.e. 0.8 and 0.2, respectively.
4. The proportion of RFA and PA in the states' geographical area should also be considered while determining their share.
5. Forest and tree cover are appropriate indicators of ecological benefits. The weighting should be as per the canopy density classes.
6. The devolution formula should be made dynamic by revising the states' shares as per subsequent reports of Forest Survey of India during the award period (expected to be released in 2021 and 2023). This would incentivize states to conserve and develop their forest resources and reward the high-performing states.
7. Forest-dependent population of a state could be considered as an alternative criterion of fiscal disability due to higher cost of delivering amenities to this sub-group of the population.
8. A performance-based grant to tackle climate change and meet the country's international commitment of additional carbon sink should be considered.
9. Forest cover is not a reliable indicator to assess climate change mitigation through forests as different types of forests store vastly different amount of carbon. Thus, distribution of the grant among states should be based on the carbon stock added by the states. This can be assessed through the periodic assessments carried out by Forest Survey of India.
10. Sole focus on carbon could be detrimental to other ecosystem services provided by forests and biodiversity. Thus, appropriate social and environmental safeguards should be incorporated in the grant conditions.

Introduction

This paper discusses pathways to strengthen India's forest sector through inter-governmental fiscal transfers. Specifically, it:

1. discusses key learning from previous forest-related Finance Commission (FC) awards and selected international case studies of ecological fiscal transfers (EFTs);
2. proposes inclusion of certain forest criteria in the horizontal devolution formula; and
3. explores the need for a performance-based grant for the forest sector.

This discussion paper is the outcome of collaboration between a group of professionals with expertise and experience in the fields of forestry, environment, public policy, and economics. The group members, affiliated with different reputable organizations, worked together for more than a year to develop the paper's recommendations based on a number of stakeholder consultations and analytical studies (see inside back cover for the list of contributors).

The remainder of this paper is divided into eight sections. In the second section, we discuss the environmental, economic and social significance of forests and the need for inter-governmental fiscal transfers. The approach and methodology are presented in the third section. In the fourth section, we summarise experience from the three FC allocations to the forest sector and international case studies. The rationale for retaining forest-related criteria in the devolution formula, ways for strengthening forest-related criteria, and the recommended formula are discussed in the fifth, sixth and seventh sections, respectively. We present the rationale for a performance-based grant for the forest sector in the eighth section. The key recommendations are summarised in the concluding section.

India's Forest Sector

Environmental, Economic and Social Significance of Forests

India is the tenth-most forested country in the world, as well as one of the 17 megadiverse countries (FAO 2010; FSI 2017). The country is home to nearly 8% of globally known flora and fauna, with forests playing an important role in biodiversity conservation (MoEFCC 2019a). The entire country benefits from these biodiverse areas. For example, a recent study conducted by the Indian Institute of Forest Management showed that while the direct benefits from a sample of tiger reserves in India were between INR 9 crore and INR 102 crore, the indirect benefits ranged between INR 4,221 crore and INR 13,317 crore (Verma et al. 2019). Forests are key to combating climate change, with an estimated carbon stock of 7 billion tonnes in India (FSI 2017). The Intergovernmental Panel on Climate Change recognized that, "reducing deforestation and forest degradation rates represents one of the most effective and robust options for climate change mitigation" (IPCC 2019).

A unique facet of Indian forests is the crucial role they play in supporting livelihoods of more than 250 million people, including millions of scheduled tribe persons (MoEF 2014). The non-timber forest produce (NTFP) sector is one of the largest unorganized sectors in rural India and supports the livelihoods of millions of people (Sahu 2018). Forests have a significant impact on two critical issues facing India – water conservation and air pollution. India's forests contain nearly 17,156 sq. km of water bodies (FSI 2017). Forests regulate hydrological cycles by increasing precipitation, recharging aquifers and maintaining the flow of water in rivers (Bonan 2008). There is evidence that trees play a key role in reducing air pollution by intercepting and absorbing particulate matter and gaseous pollutants (Nowak et al. 2014). India's National Clean Air Programme recognizes trees as one of the efficient and effective options for mitigating air pollution (MoEFCC 2019b).

Forests and trees contribute to many of the United Nations' Sustainable Development Goals (SDGs). The contribution of forests to *climate action* and *life on land* is well-established. There is increasing focus on their contribution to *clean water and sanitation* and *good health and well-being* by sustaining water supply and improving air quality. Forests are also linked to several other SDGs including *no poverty*, *zero hunger*, *gender equality*, *decent work and economic growth*, and *reduced inequalities* (Seymour and Busch 2017) (see Annex 1).

Need for Inter-governmental Fiscal Transfers in Forest Sector

India's forests face several challenges. While the percentage of land under forest and tree cover has shown an increasing trend in recent years, 28% of natural forests have been lost over the past eight decades (Reddy et al. 2016). Further, very dense forests account for only 3% of India's total forest cover (FSI 2017).

Although state governments provide budgetary support for forest sector activities, a large proportion of this is used for meeting non-plan expenditure such as wages and salaries. While states do get significant financial resources under the Compensatory Afforestation Fund (CAF), it supports them only for compensating for the loss due to diversion of forest lands for non-forest purposes. The fund allocation to the states is in

proportion to the forest land diverted by them. Therefore, there is likely to be little or no net gain in terms of forest and tree cover.

EFTs can play a critical role in meeting the country's national goals and international commitments. The 14th FC took a major step in this direction, which made India a global leader in EFTs.[1] The terms of reference of the 15th FC mention that the Commission should *inter alia* consider climate change and SDGs when making its recommendations. As discussed in the previous section, the forest sector plays a significant role in addressing both these issues.

Appropriately designed EFTs could incentivize state level action critical for meeting the country's national goals and international commitments. These include the national target to bring 33% area under forest and tree cover, the Sub-Mission on Agroforestry under the National Mission for Sustainable Agriculture, the aim of doubling farmers' income by 2022, the National Biodiversity Action Plan, and the National Clean Air Programme. International commitments include the Nationally Determined Contribution (NDC) for an additional carbon sink of 2.5 to 3 billion tons of CO_2eq through additional forest and tree cover by 2030, the Bonn Challenge to restore 21 million hectares of degraded and deforested lands by 2030, targets under the Convention on Biological Diversity, the Land Degradation Neutrality target[2], and the SDGs.

Approach and Methodology

A mixed methods approach to research underpins this discussion paper. The approach involved (i) desk review and analysis of secondary data, (ii) spatial data analysis, (iii) stakeholder consultations, (iv) key-informant interviews, and (v) state-level case studies. The process was carried out at four levels:

International level: We undertook a desk-review of nine major initiatives related to inter-governmental transfers for environmental and social objectives. Of these, three (from Brazil, Portugal and Costa Rica) were found to be most relevant for FC devolution in India.

National level: Our focus was on analysis for the entire country such as carbon potential, past forest-related FC awards, and performance-based schemes across sectors. We convened a national roundtable with experts in forest, development and finance sectors. Additionally, we interviewed 10 officials and experts to explore possible pathways to strengthen the forest sector through financial allocations under the FC.

Regional level: The emphasis was on understanding the perspective of key stakeholders regarding the previous FC awards and obtaining their suggestions for the future award. We organized three regional consultations - at Dehradun, Hyderabad and New Delhi. More than 150 experts, including representatives from central and state governments, non-governmental organizations, development agencies, and academic institutions, attended these consultations (see Annex 2).

State level: Interviews were held with 52 key stakeholders from 16 states, *viz*. Andhra Pradesh, Assam, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal. This included 13 officials from state finance departments, and 39 officials from state forest departments.

Five state-level case studies were prepared – Assam, Himachal Pradesh, Madhya Pradesh, Maharashtra and Tamil Nadu – based on analysis of outcomes of previous three FC awards. We conducted state-level roundtables in Assam, Maharashtra and Tamil Nadu to discuss (i) findings, (ii) potential design of forest criteria in the tax devolution formula, and (iii) the need for a performance-based grant.

Experience with Forest Sector Awards

The key insights from the past three FC awards are presented in this section. The previous three FCs deployed three different approaches to support the forest sector (see Table 1).

Table 1: Forest sector awards in previous three Finance Commissions

	12th FC (2005-10)	13th FC (2010-15)	14th FC (2015-20)
Approach	Tied grant	Partially-tied grant	Untied
Purpose	Maintenance of forests	Preparation of working plans; preservation of forest wealth (25%) and development (75%)	Not defined; included 7.5% weighting to dense forest cover in the horizontal devolution formula
Quantum	INR 1,000 crore	INR 5,000 crore	Estimated amount: INR 2,96,000 crore to be disbursed to states as part of tax devolution

Source: Twelfth Finance Commission 2004; Thirteenth Finance Commission 2009; Fourteenth Finance Commission 2014

Grants and Innovations

Even though the size of grants under the 12th and 13th FCs was modest, they enabled states to carry out many critical activities that were not part of routine works. These included strengthening local institutions, research, and field infrastructure, particularly at the Forest Range level[3]. These grants were also used to bridge critical resource gaps in forestry operations[4]. In some states, the grants supported innovations, such as Mangrove Cell in Maharashtra (see Box 1).

BOX 1: MANGROVE CELL OF MAHARASHTRA

Around INR 7.16 crore from the 13th FC grant was used to set up a Mangrove Cell in Maharashtra to protect and restore mangroves and enhance livelihood opportunities for local communities. The Cell facilitated establishment of 77 mangrove co-management committees with 14,362 members, who were involved in mud crab farming, oyster culture, ecotourism and so on. Between 2013 and 2017, mangrove cover in Maharashtra increased by 63% (from 18,600 ha. to 30,400 ha.) (Mangrove Cell 2018).

Although there is anecdotal evidence for the positive impact of the 12th and 13th FC grants, it is difficult to discern their overall impact at the state and national level due to the limited size of these grants. Forest and tree cover in the country increased by 17,374 sq. km between 2006 and 2015 (FSI 2009; FSI 2017) – the time frame coinciding with 12th and 13th FCs' award period – but there is no correlation between the FC grants received by a state and the change in its forest and tree cover.

Devolution and Forest Budgets

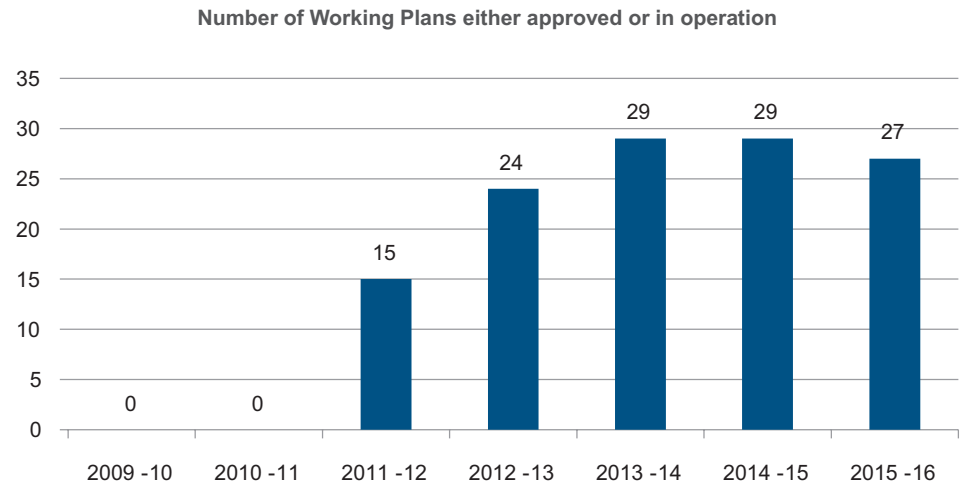
The quantum of resources allocated to states through the forest component of horizontal devolution formula under the 14th FC was significantly higher than the previous two FCs. However, during the stakeholder consultations, several Forest Department officials shared that this did not result in a corresponding increase in budgetary allocations for forestry by most state governments. This is corroborated by a study that compared 25 state budgets for the first three years of the 14th FC award with three years prior to that. The study found that although the state forest budgets increased in most states by an average of 19% (with a maximum increase of 65% in Maharashtra), this increase was considerably less than the overall increase of 42% in state budgets during the same period (Busch, Kapur & Mukherjee 2019).

It is too early to comment on the impact of this devolution on forest and tree cover as Forest Survey of India's latest available report – *India State of Forest Report 2017* – is based on remotely-sensed data collected in 2015, the first year of the 14th FC award period. However, there is anecdotal evidence that the 14th FC funds facilitated convergence in some states, especially for forest-related developmental activities.

Catalytic Role

There is evidence that the 13th FC award played a catalytic role in improving forest management across the country. The working plan pre-condition incentivised states like Himachal Pradesh to undertake a large-scale exercise to prepare and update working plans (see Box 2).

BOX 2: STATUS OF APPROVED WORKING PLANS IN HIMACHAL PRADESH



Source: Annual Administrative Reports and Statistics Office, Himachal Pradesh Forest Department, Government of Himachal Pradesh

However, some states, such as Assam, could not adequately meet the pre-condition due to various constraints, and consequently received only 44% of the grant allocated to them. Overall, the percentage of forest sector grant released to the states dropped to 88.6% compared with 95.3% under the 12th FC, which imposed no conditions (Ministry of Finance 2019).

A review of similar conditional transfers in other sectors revealed that while conditions are helpful in focusing the states' attention and energy on critical issues, too many or onerous conditions may result in reduced uptake of the grant. For example, in the case of performance-based grants for local bodies allocated by the 13th FC, Tamil Nadu could access only 17.5% of its share due to the large number of conditions attached to the grant (Tamil Nadu Fifth State Finance Commission 2016). Although this may seem acceptable from an efficiency perspective, it could impact equity as it effectively reduces the size of grant, often for those states that need this support the most.

Sustained Approach

Interviews and consultations with key stakeholders indicated that a consistent policy signal is needed to encourage states to prepare long-term plans for better management of existing forests and enhancing forest cover. In one interview, a senior official from a state finance department said, "the provision (for dense forest cover in the devolution formula) has been included only once. We don't know whether it will be continued or not. Having it only once will not make the state focus on forestry".

Global experience also indicates that a sustained approach over a relatively longer period can result in significant positive impacts for forests as well as for local people. For example, the Payment for Ecosystem Services policy introduced in Costa Rica in 1996 resulted in an increase in forest cover from 42% in 1997 to 52% in 2010 (Banco Central de Costa Rica 2016).

Rationale for Retaining Forests in the Devolution Formula

The 14th FC gave two main arguments for including forest cover in the horizontal devolution formula – opportunity cost and ecological benefits – as is evident from the following extract from the Commission's report:

> We believe that a large forest cover provides huge ecological benefits, but there is also an opportunity cost in terms of area not available for other economic activities and this also serves as an important indicator of fiscal disability. We have assigned 7.5 per cent weight to the forest cover (Fourteenth Finance Commission 2014).

Further, the Commission noted:

> [T]here is a need to address the concerns of people living in forest areas and ensure a desirable level of services for them (Fourteenth Finance Commission 2014).

These arguments *continue to remain valid* from the perspective of promoting equity among the states. A further argument is policy continuity, especially considering the long time period required for forestry projects and programmes to deliver results. These aspects are discussed below.

Opportunity Cost

The opportunity cost of forests in terms of area unavailable for other economic activities has been raised by various states (CAG 2013) and acknowledged by several previous FCs. Reports of the previous three FCs highlighted the "restrictions on the exploitation of forest wealth, which has a consequential impact on states' revenues", the need for "compensation to states for the opportunity loss", and the necessity "to compensate the decline in the revenues due to existing policy prescriptions" (Twelfth Finance Commission 2004; Thirteenth Finance Commission 2009; Fourteenth Finance Commission 2014). The scale of this opportunity cost is substantial; for instance the Indian Institute of Forest Management estimated the opportunity cost of forest land that could be converted to other land uses such as horticulture and cultivation of cereal crops at INR 2,44,000 crore annually in terms of GDP contribution (Verma et al. 2014).

Ecological Benefits

Forests provide a range of ecological benefits such as regulation of the hydrological cycle, ground water recharge, soil conservation, carbon sequestration, and conservation of biodiversity. While there are local benefits provided by forests, most forest ecosystem services "by their very nature, accrue beyond the boundaries of the state in which the forest lies" (Thirteenth Finance Commission 2009). These positive externalities are generally not accounted for, resulting in inadequate allocation of funds for preserving and maintaining forests (CAG 2013). The 14th FC recognized these ecological benefits and the need to "support states in shouldering the responsibility of managing the environment" (Fourteenth Finance Commission 2014).

Policy Continuity

Forest sector outcomes such as climate change mitigation, improved air quality, increased availability of water and biodiversity conservation are long term and require sustained investment. International experience suggests that a sustained focus on specific policies yields positive results. For instance, Brazil's ICMS Ecologicó is an EFT scheme that redistributes a portion of the value-added tax revenue from state governments to municipalities based on quantitative ecological indicators, such as total area under protection. The scheme was first implemented in Paraná in 1992 and other states joined later. Between 1992 and 2000, protected areas (PAs) in participating municipalities of Paraná increased by 165 percent (Cassola 2010; May et al. 2002).

Strengthening the Forest Criteria in the Devolution Formula

As discussed in the previous section, the two main arguments used by the 14th FC for including forests in the horizontal devolution formula were opportunity cost/fiscal disability and ecological benefits. However, the Commission used only one criterion (dense forest cover) to cover both these aspects. In this section, we discuss ways to strengthen the forest-related criteria in the horizontal devolution formula.

Forest Cover and Fiscal Disability

The fiscal disability imposed by forests on a state is largely on account of restrictions imposed on use of these resources by national laws such as the Forest (Conservation) Act, 1980 and related judicial directions. As these restrictions extend to the entire recorded forest area (RFA), it is a better indicator than forest cover for reflecting the state's fiscal disability. Forest cover only captures the 'greenness' of a state. As per the definition used by Forest Survey of India, forest cover includes "all lands more than one hectare in area with a tree canopy density of more than 10% irrespective of land use, ownership and legal status. It may include even orchards, bamboo, palm, etc. and is assessed through remote sensing" (FSI 2017). Therefore, a part of forest cover includes commercial tree plantations outside RFA and horticulture plantations such as mango, coconut, rubber, and areca nut. This portion of forest cover does not have any fiscal disability associated with it and represents a significant proportion of total forest cover. As per the assessment made by Forest Survey of India for 16 states for which the digitized forest boundaries are available, around one-third of the forest cover in these states is outside RFA (FSI 2017).

Although there are several restrictions imposed on RFA, various states are able to obtain economic benefit by harvesting timber and NTFPs in accordance with the prescriptions of approved forest working plans. However, the opportunity cost is relatively higher in PAs because the national Wildlife (Protection) Act, 1972 and relevant state laws and judicial directions impose stringent legal restrictions on economic exploitation of these lands. Therefore, in addition to RFA, PA also indicates the fiscal disability of a state. The area under protection is also used as the EFT criterion in countries such as Brazil and Portugal (see Box 3).

BOX 3: BENEFITS OF FOCUSING ON PROTECTED AREAS

The experience of Brazil's ICMS-Ecologicó (ICMS-E) and Portugal's Local Finances Law suggests a focus on protected areas internationally. Both these initiatives reward local governments through EFTs for the proportion of area under the local government's jurisdiction that is formally declared as a PA. Incentives for PAs led to an increase in their extent. For instance, in Brazil, by 2000, more than two million hectares of PAs were created in the two states (Paraná and Minas Gerais) as a result of EFTs (Ring 2008).

The weights given to RFA and PA should be in proportion to their actual area in the country i.e. 0.8 and 0.2, respectively[5]. Considering that most of the area under PAs is also included in RFA, this effectively implies giving additional weight to that area of RFA, which is also part of a PA. This can be justified on account of considerably higher legal restrictions in PAs as compared to RFAs.

Another important aspect to consider is the share of RFA and PA in the state as a proportion of its geographical area. The states that have a higher proportion have a higher fiscal disability and should be compensated accordingly. This argument was also used by the 13th FC to enhance the entitlement of those states where the share of forested area in the total area of the state was greater than the national average. A similar criterion has been used in Portugal for devolving funds to the municipalities with double weight assigned to those municipalities where more than 70% of the land is protected (see Box 4).

BOX 4: WEIGHTS ASSIGNED TO MUNICIPALITIES IN PORTUGAL BASED ON AREA UNDER PROTECTION

In Portugal, EFT from central government to municipalities is based on designated conservation areas. Since 2007, 5% weighting is allocated to the proportion of designated protected land in municipalities with less than 70% territory protected, and 10% weighting to municipalities with more than 70% territory protected. In 2008, EUR 53 million was devolved as EFTs – reflecting the unit value of ecological component as EUR 50 per hectare of PA for municipalities with more than 70% of their territory under conservation status and EUR 25 per hectare for remainder of the municipalities (Santos et al. 2012).

Forest Cover and Ecological Benefits

The 14th FC had only considered dense forest cover (consisting of very dense and moderately dense cover) in its award. However, open forests also provide a range of ecological benefits, for example in the arid and semi-arid parts of the country (such as Gir National Park and Sanctuary). Although it is recognized that many open forests are in a degraded condition, it is equally true that several such forests are naturally open. Further, tree cover – small patches of trees outside RFA that are less than one hectare in extent – also provides multiple ecological benefits at different scales, such as carbon sequestration, improvement of air quality, enhanced recharge of ground water, and reduction in urban heat islands. Thus, to adequately reflect the ecological benefits of forests, open forests and tree cover should also be considered in addition to dense forest cover. To acknowledge the fact that dense forests provide higher ecological benefits in many cases, the weighting should be as per the canopy density classes.

Making the Formula Dynamic

The forest-related award of the 14th FC was based on dense forest cover reported in the Forest Survey of India's *India State of Forest Report 2013*. Due to this static approach, a state's share remains constant irrespective of its performance during the award period. As can be seen from Table 2, there is a considerable difference in the performance of

different states with respect to forest cover in recent years.

If the forest and tree cover component of the formula is made dynamic by linking it to the subsequent FSI reports during the award period (expected to be released in 2021 and 2023), it would further incentivize states to conserve and develop their forest resources and reward the high performing states.

Table 2: Change in total forest cover between 2006 and 2015

States with maximum increase in forest cover in sq. km and %		States with maximum loss of forest cover in sq. km and %	
West Bengal[6]	3,853 (29.65%)	Mizoram	-1,054 (-5.48%)
Andhra Pradesh & Telangana[7]	3,464 (7.68%)	Nagaland	-975 (-7.24%)
Kerala	2,997 (17.3%)	Arunachal Pradesh	-389 (-0.58%)
Tamil Nadu	2,943 (12.61%)	Tripura	-347 (-4.3%)
Odisha	2,490 (5.1%)	Chhattisgarh	-323 (-0.58%)

Source: FSI 2009; FSI 2017

Recommended Devolution Formula

Based on the arguments presented in the previous section, the formula used by the 14th FC can be strengthened in several ways. First, it is proposed to give equal weight to the two arguments of 'fiscal disability' and 'ecological benefits'. Second, the criteria for fiscal disability should be area under RFA and PA, weighted by their proportion in the country's geographical area. Third, the criterion for ecological benefits should be adjusted forest cover, which can be calculated by giving different weights to the canopy density classes and tree cover.

With this line of reasoning, the share of states can be calculated as:

$$Share\ A1_i = \left[\left\{0.5 \times \left\{\left(0.8 \times \frac{RFA_i}{\sum RFA_i}\right) + \left(0.2 \times \frac{PA_i}{\sum PA_i}\right)\right\}\right\} + \left\{0.5 \times \frac{AdjFC_i}{\sum AdjFC_i}\right\}\right] \times 100$$

where,

Share A1$_i$ is the share of state

RFA_i is recorded forest area in the state

$\sum RFA_i$ is total recorded forest area[8]

PA_i is protected area in the state

$\sum PA_i$ is total protected area[8]

$AdjFC_i$ is adjusted forest cover in the state

$$AdjFC_i = (2 * VDF_i) + (1 * MDF_i) + (0.5 * OF_i) + (0.5 * TC_i)$$

where,

VDF_i is very dense forest cover in the state

MDF_i is moderately dense forest cover in the state

OF_i is open forest cover in the state

TC_i is tree cover in the state

$\sum AdjFC_i$ is total adjusted forest cover[8]

However, the above formula does not account for the inter-state differences in the proportion of RFA and PA in relation to the states' geographical area. To elaborate, it is possible that two states may have equal proportion of RFA and PA in the country's total RFA and PA; but their proportion in respective state's geographical area might differ substantially. To account for this inter-state difference, we recommend the 15th FC to calculate states' share (Share A2$_i$) as:

$$Share\ A2_i = \left[\left\{0.5 \times \left\{\left(0.8 \times \frac{AdjRFA_i}{\sum AdjRFA_i}\right) + \left(0.2 \times \frac{AdjPA_i}{\sum AdjPA_i}\right)\right\}\right\} + \left\{0.5 \times \frac{AdjFC_i}{\sum AdjFC_i}\right\}\right] \times 100$$

where,

$$AdjRFA_i = RFA_i \times \frac{RFA_i / GA_i}{\sum RFA_i / \sum GA_i}$$

$$AdjPA_i = PA_i \times \frac{PA_i / GA_i}{\sum PA_i / \sum GA_i}$$

GA_i is geographical area of the state

$AdjFC_i$ is calculated as earlier.

Based on data reported in *India State of Forest Report* 2017, the top five states with maximum share will be Arunachal Pradesh, Madhya Pradesh, Chhattisgarh, Odisha, and Uttarakhand; while the bottom five states with least share will be Haryana, Punjab, Goa, Bihar, and Tripura. In terms of percentage change in state share with respect to the 14th FC, the top five states that gain the most will be Himachal Pradesh (149%), Sikkim (143%), Gujarat (98%), Manipur (76%), and Rajasthan (59%); while maximum loss will be for Meghalaya (-36%), Kerala (-27%), Bihar (-26%), Telangana (-24%), and Mizoram (-21%). In absolute terms[9] with respect to the 14th FC, Himachal Pradesh (INR 10,686 crore), Uttarakhand (INR 6,697 crore), Gujarat (INR 4,123 crore), Manipur (INR 3,861 crore), and Sikkim (INR 2,848 crore) will gain the most. Cumulatively, the share of the top five states will be 17.57 times that of the bottom five states, as compared to 22.09 times under the 14th FC. The distribution of all the states under this formula vis-à-vis the 14th FC is presented in Annex 3, and a detailed state-wise distribution is provided in Annex 4.

Lastly, it is strongly recommended to calculate the share of states based on the latest available data on forest cover, tree cover, RFA and PA, released biennially by the Forest Survey of India. This will likely motivate states to better manage their forests and enhance their forest and tree cover. This will also contribute towards meeting India's national and international forest sector commitments.

Forest-dependent Population

One of the issues discussed during the stakeholder consultations was fiscal disability faced by states due to the higher cost of delivering basic amenities to forest-dependent population, and the required investment in forest conservation. To promote inter-state equity, the opportunity cost imposed by forests can be scaled by the number of forest-dependent people in the state. The 15th FC may like to consider this aspect, the details of which are provided in Annex 5.

Performance-based Grant

Rationale for the Grant

While continued inclusion of forest-related criteria in the horizontal devolution formula is likely to strengthen the country's forest sector in the long run, the Commission may also consider a targeted performance-based grant to address the pressing issue of climate change. The Commission's terms of reference also mention the need to consider requirement of resources for climate change (6(ii)) as well as the need for measurable performance-based incentives (7(iii)) to achieve *inter alia* SDGs, which include *climate action*. Forests are key for addressing climate change as they are a source of carbon emissions (due to deforestation and forest degradation) as well as a sink and carbon store.

It could be argued that this issue should be addressed through regular state budgets or funds available through funding mechanisms such as CAF and Green India Mission (GIM). The state-level budgetary process, however, operates on an annual cycle that often precludes a long-term view that is needed to address issues such as climate change. As discussed earlier, the funds received by the states through CAF (under the Compensatory Afforestation Fund Management and Planning Authority or CAMPA) are for compensating the loss of forests due to diversion of forest land for non-forest purposes, and as such are unlikely to address the climate change issue. This was also noted by the 13th FC:

> In contrast to CAMPA flows to states, which are in the nature of compensation to states for diversion of forest land, the forest grant envisaged here is calibrated to the extent of standing forest in each state (Thirteenth Finance Commission 2009).

The GIM was designed under the National Action Plan on Climate Change prepared over a decade ago. However, its implementation has been impeded due to funding constraints. While the Mission's proposed budget for 10 years was INR 46,000 crore, only INR 236 crore had been allocated to 12 states until 2018-19 (MoEFCC 2019c).

The Commission is well placed to take a long-term view for addressing the key challenges facing the country. A performance-based grant by the FC will encourage action across all states. This will also help India in achieving its NDC commitment of an additional 2.5 to 3 billion tonnes of CO_2eq through additional forest and tree cover by 2030 – a target that cannot be met with a 'business as usual' approach.

Indicator

The performance indicator should be easily measurable and linked to the actual outcome required, i.e., climate change mitigation through forests. Forest cover in itself is not a reliable indicator as different types of forests store vastly different amount of carbon. For example, while one hectare of very dense Tropical Semi-Evergreen Forest stores around 748 tonnes of CO_2eq, one hectare of very dense Tropical Thorn Forest stores only 177 tonnes, i.e. less than one-quarter (FSI 2017).

The carbon stock, which is now regularly measured and reported at the state level by the Forest Survey of India, is a better indicator. The distribution of the grant among states could be based on the change in carbon stock as reported in the Forest Survey of India's *India State of Forest Reports*.

Social and Environmental Safeguards

Sole focus on carbon could be detrimental to other ecosystem services provided by forests and biodiversity. Thus, adequate social and environmental safeguards should be built into the grant conditions. Such conditions have been included in Brazil's EFT mechanism (see Box 5).

BOX 5: BRAZIL'S EXPERIENCE WITH ECOLOGICAL FISCAL TRANSFERS

Since the early 1990s, Brazil has introduced EFTs with the main criterion being area under protection. They subsequently included other indicators related to flora and fauna, quality of water resources, and quality of support to producers and local communities. These indicators acted as social and environmental safeguards and helped in improving outcomes of the programme beyond the extent of protected areas (Cassola 2010; May et al. 2012).

Conclusion

We strongly recommend continuation of forest-related criteria in the horizontal devolution formula. Four major reasons underpin this view: (i) it compensates states for incurring an opportunity cost, (ii) it compensates states for expenditure incurred for cross-border ecological benefits, (iii) it supports the need to promote equity among states, and (iv) it continues the policy trajectory adopted by previous FCs. In addition, inclusion of forest-related criteria in the horizontal devolution formula will help to achieve SDGs pertaining to *climate action* and *life on land,* and support the country's international commitments, in accordance with the terms of reference of the 15th FC.

We recommend that equal weight be given to fiscal disability and ecological benefits. To address the fiscal disability faced by states due to forests, RFA is a robust indicator due to the limited opportunities to generate revenue and legal restrictions on the diversion of forest land for non-forest purposes. Additionally, PAs, which are generally accepted as a sub-set of RFA, face even more stringent legal restrictions on land diversion and economic exploitation. Thus, it is proposed to use both RFA and PA as indicators of fiscal disability, with weights assigned to each in proportion of their area in the country, i.e., 0.8 and 0.2, respectively. To further promote equity, we recommend that the proportion of a state's RFA and PA to its geographical area should be considered.

The ecological benefits provided by states' forests cut across state and national borders. States need to be encouraged to retain and improve their forest and tree cover in light of challenges such as water scarcity and air pollution. Thus, it is proposed to include forest and tree cover in the devolution formula, with weighting as per canopy density classes.

The Commission should also consider a targeted performance-based grant to address the pressing issue of climate change. It is proposed to award a one-time performance-based grant for additional carbon sink to incentivize states to enhance their carbon stock. The distribution of the grant among states could be based on the change in carbon stock as reported in the Forest Survey of India's biennial *India State of Forest Reports*.

Endnotes

1. Between 2015 and 2020, the Government of India is estimated to have allocated between INR 47,453 crore to INR 82,497 crore per year to states based on their dense forest cover, making this the world's largest EFT (Busch and Mukherjee 2018). This follows a decade of grants from the 12th and 13th FCs to states for conserving and maintaining forests.
2. Under the United Nations Convention to Combat Desertification.
3. A Forest Division (similar to a district in revenue administration) comprises a few (usually 2-3) Sub-Divisions, each of which is comprised of a few (usually 2-3) Forest Ranges. Thus, a Forest Range is a key field level unit responsible for forest management.
4. This claim was cross verified through official records, *viz.* Assam Forest Department (2011, 2016), Maharashtra Forest Department (2011, 2016), Tamil Nadu Forest Department (2011, 2016).
5. The exact ratio is 0.83:0.17.
6. As per Forest Survey of India, a major part of this increase can be attributed to inclusion of trees outside forests in some districts that could not be included in earlier assessments due to some limitations. However, this does not affect the overall argument that there is considerable difference in performance of states in terms of forest and tree cover.
7. Telangana was carved out of Andhra Pradesh in June 2014. Therefore, for the purpose of this analysis, 2015 data of these two states was combined to maintain comparability with 2006 data.
8. The figure should be calculated only for the states/union territories of India which come under the purview of FC.
9. These figures were calculated based on tax devolution projections of the 14th FC report. The figures will change in 15th FC.

Annexes

Annex 1 : Forests and the United Nations' Sustainable Development Goals

Source: Seymour and Busch 2017

Image adapted from Faruqi et al. 2018

Annex 2 : List of stakeholders consulted

ICFRE-TERI Stakeholder Consultation on
'Forest Conservation through Fiscal Federalism'

August 31, 2018
Dehradun, Uttarakhand

Sr No	Name	Designation	Organization
1	Dr. Suresh Gairola	Director General	ICFRE
2	Mr. M. S. Negi	Additional Director General of Forests	MoEFCC
3	Dr. J. V. Sharma	Director	TERI
4	Mr. Sudhir Kumar	ADG (EM)	ICFRE
5	Dr. Shamila Kalia	ADG (Media & Ext.)	ICFRE
6	Mr. D. C. Khanduri	Retd. IFS; Consultant	–
7	Dr. Ashish Chaturvedi	Director - Climate Change	GIZ
8	Dr. Kundan Burnwal	Technical Advisor	GIZ
9	Dr. Purnamita Dasgupta	Professor	IEG
10	Mr. S. K. Chaturvedi	APCCF (FM)	Gujarat Forest Department
11	Mr. A. S. Rawat	DDG (Admin)	ICFRE
12	Mr. Jagdish Chander	APCCF	Haryana Forest Department
13	Mr. Rakesh Sood	APCCF (Finance)	Himachal Pradesh Forest Department
14	Dr. A. K. Pathak	APCCF (Plan, Program & Afforestation)	Odisha Forest Department
15	Dr. Rekha Pai	Retd. IFS (Uttarakhand); Consultant	–
16	Dr. Ashok Pai	Retd. IFS (Uttarakhand); Consultant	–
17	Mr. C. P. Marak	PCCF (HoFF)	Meghalaya Forest Department
18	Ms. Naini Jayasalen	Consultant	–
19	Mr. Priya Ranjan	CCF (Plan)	Rajasthan Forest Department
20	Mr. Kandarp V. Patel	Dy. Director	15th Finance Commission
21	Mr. Jai Raj	PCCF (HoFF)	Uttarakhand Forest Department
22	Mr. I. Panger Jamir	PCCF (HoFF)	Nagaland Forest Department
23	Dr. Savita	Director	Forest Research Institute
24	Mr. D. J. K. Sharma	APCCF (Environment & Climate Change)	Uttarakhand Forest Department

Sr No	Name	Designation	Organization
25	Ms. Meenakshi Joshi	Joint Director	FSI
26	Mr. Pushkar Singh	APCCF (Development)	Madhya Pradesh Forest Department
27	Dr. Sushil Saigal	Program Lead – Lands	The Nature Conservancy
28	Dr. Neelu Gera	DDG (Education)	ICFRE
29	Mr. Rajeev Kumar Tiwari	Secretary	ICFRE
30	Mr. Sandeep Kujur	ADG (Admin)	ICFRE
31	Mr. C. S. Jha	Group Director	NRSC (ISRO)
32	Prof. Ganga Singh	Professor	IGNFA
33	Ms. Nidhi Srivastava	Consultant	TERI
34	Dr. Divya Datt	Sr. Fellow	TERI
35	Dr. Manish Kumar	DCF (WP)	Punjab Forest Department
36	Mr. Mukul Trivedi	CCF (Forest Regulation)	Maharashtra Forest Department
37	Dr. R. S. Rawat	Scientist	ICFRE
38	Dr. S. P. S. Rawat	ADG (EP)	ICFRE
39	Dr. Anil Negi	ADG (Educ & RB)	ICFRE
40	Dr. Manish Kumar	Scientist B	ICFRE
41	Ms. Joyita Ghose	Associate Fellow	TERI
42	Ms. Priyanka	Research Associate	TERI

Multi-Stakeholder Consultation on 'Forest Conservation through Fiscal Federalism'

October 9, 2018
Hyderabad, Telangana

Sr No	Name	Designation	Organization
1	Mr. P. K. Jha	PCCF (HoFF)	Telangana Forest Department
2	Dr. J. V. Sharma	Director	TERI
3	Mr. M. Lokeswara Rao	Retd. PCCF (HoFF)	–
4	Dr. V. B. Ramana Murthy	PCCF	Andhra Pradesh Forest Department
5	Mr. Ajai Misra	APCCF	Karnataka Forest Department
6	Dr. Divya Datt	Director	TERI
7	Ms. Nidhi Srivastava	Consultant	TERI
8	Dr. Rohini Chaturvedi	Independent Consultant	–
9	Mr. Siddhartha Barari	PCCF	West Bengal Forest Department
10	Dr. Bhibu Prasad Nayak	Associate Professor	Tata Institute of Social Sciences
11	Dr. K. M. Jayahari	Consultant	WRI India
12	Mr. Anuj Gangwal	Programme Officer	TATA Trusts
13	Mr. Sushant	Consultant	The Nature Conservancy
14	Mr. Chandra Shekar Nayak	Deputy Secretary	Karnataka Finance Department
15	Dr. Pia Sethi	Senior Fellow	TERI
16	Dr. Purnamita Dasgupta	Professor	IEG
17	Mr. Nitin Kakodkar	APCCF	Maharashtra Forest Department
18	Mr. Ravi Chellam	CEO	Metastring Foundation
19	Mr. Sugato Dutt	APCCF	Tamil Nadu Forest Department
20	Dr. A. K. Bhattacharya	Head, Green Highways Division	NHAI
21	Mr. Munindra	APCCF	Telangana Forest Department
22	Ms. Naini Jayaseelan	Consultant	–

Stakeholder Consultation on 'Harnessing the Potential of Trees outside Forests to Meet India's NDC Commitment'

November 27, 2018
New Delhi

Sr No	Name	Designation	Organization
1	Mr. Siddhanta Das	Director General of Forests & Special Secretary	MoEFCC
2	Mr. M. S. Negi	Additional Director General of Forests	MoEFCC
3	Mr. Piare Lal	Technical Advisor	Pragati Biotechnologies
4	Dr. Alka Bhargav	Joint Secretary (NRM & IC)	Ministry of Agriculture & Farmers Welfare
5	Dr. Savita	Director	Forest Research Institute
6	Dr. J. V. Sharma	Director, Forestry and Biodiversity Division	TERI
7	Dr. Devendra Pandey	Former DG (FSI) & PCCF (HoFF); Consultant	–
8	Dr. Divya Datt	Director	TERI
9	Mr. Saurabh Gupta	CCF	Punjab Forest Department
10	Ms. Anita S. Arekal	APCCF	Karnataka Forest Department
11	Dr. Kuruvilla Thomas	CCF	Uttar Pradesh Forest Department
12	Mr. Vivek Saxena	Chief General Manager	Haryana Forest Development Corporation
13	Dr. A. K. Bhattacharya	Head, Green Highways Division	NHAI
14	Ms. Devashree Nayak	Agroforestry and Gender Research Scientist	World Agroforestry Center (ICRAF), South Asia Program
15	Dr. H. D. Kulkarni	Chief Consultant Retd. VP(P), ITC Ltd.	Sarvabhauma Forestry & Environmental Consultancy Services
16	Mr. R. K. Sapra	Former PCCF	Haryana Forest Department
17	Mr. J. K. Bihani	President	Haryana Plywood Manufacturers Association
18	Dr. P. P. Bhojvaid	Retd. PCCF (HoFF)	Haryana Forest Department
19	Dr. K. M. Jayahari	Consultant	WRI India
20	Ms. Kavitha Srikanth	Research Analyst	IEG
21	Dr. Sushil Saigal	Program Lead – Lands	The Nature Conservancy
22	Mr. Sushant	Consultant	The Nature Conservancy

Sr No	Name	Designation	Organization
23	Dr. Varghese Paul	Senior Forestry Advisor	U. S. Agency for International Development
24	Mr. Tomio Shichir	Country Director / Representative in India	Food and Agriculture Organization of the United Nations
25	Mr. S. P. Singh	Chief Executive	IFFDC
26	Dr. Harish Gena	Project Manager	IFFDC
27	Mr. Naveed Hamid	Chief Consultant (MIDH)	Ministry of Agriculture & Farmer's Welfare
28	Ms. Deepanwita Pandey	Project Associate	CII-CESD
29	Dr. A. K. Handa	Principal Scientist	ICAR-CAFRI, Jhansi
30	Mr. Avanindra Kumar	PO	Ministry of Rural Development
31	Dr. Manda Verma	Assistant Commissioner	DAC & FW
32	Dr. Divya Shah	Consultant	DAC & FW
33	Ms. Joyita Ghose	Associate Fellow	TERI
34	Ms. Nidhi Srivastava	Consultant	TERI
35	Ms. Aparna Tyagi	Research Associate	TERI
36	Ms. Priyanka	Research Associate	TERI
37	Dr. Syed Arif Wali	Fellow	TERI
38	Mr. Pankaj Kalyani	Project Associate	TERI
39	Mr. Anirudh	Research Associate	TERI
40	Mr. Nishant Jain	Associate Fellow	TERI

Roundtable on the Role of Inter-governmental Fiscal Transfers in Promoting Indian Forest Sector's Environment and Social Goals

November 30, 2018
New Delhi

Sr No	Name	Designation	Organization
1	Mr. A. Arunachalam	Fellow	Indian Council of Agricultural Research
2	Mr. Ashwin A. S.	Senior Manager, Forestry and Ecosystem Services	IORA Ecological Solutions Pvt. Ltd.
3	Dr. Sushil Saigal	Program Lead – Lands	The Nature Conservancy
4	Mr. Sushant	Project Lead	The Nature Conservancy
5	Mr. Anuj Gangwal	Program Officer, Sustainability and Special Projects	TATA Trusts
6	Ms. Seema Paul	Managing Director	The Nature Conservancy
7	Ms. Nidhi Srivastava	Consultant	TERI
8	Mr. Kunal Sharma	Director of Programmes	The Nature Conservancy
9	Dr. Divya Datt	Senior Fellow & Director, Resource Efficiency & Governance	TERI
10	Dr. Purnamita Dasgupta	Professor	IEG
11	Ms. Kavitha Srikanth	Research Officer	IEG
12	Mr. Ravi Chellam	Chief Executive Officer	Metastring Foundation
13	Ms. Rita Pandey	Professor	National Institute of Public Finance and Policy
14	Dr. Rohini Chaturvedi	Independent Consultant	–
15	Mr. T. R. Manoharan	Senior Advisor	Forest Stewardship Council India
16	Mr. Promode Kant	Director	Institute of Global Warming & Ecological Studies
17	Dr. Ruchika Singh	Interim Director, Sustainable Landscapes and Restoration	WRI India
18	Dr. K. M. Jayahari	Consultant, Sustainable Landscapes and Restoration	WRI India
19	Ms. Marie Duraisami	Senior Project Associate, Sustainable Landscapes and Restoration	WRI India
20	Mr. Sidhtharthan Segarin	Research Analyst, Sustainable Landscapes and Restoration	WRI India
21	Ms. Meenakshi Kakar	Consultant, Sustainable Landscapes and Restoration	WRI India

Roundtable on the Role of Inter-Governmental Fiscal Transfers in Promoting Indian Forest Sector's Environment and Social Goals

February 27, 2019
Guwahati, Assam

Sr No	Name	Designation	Organization
1	Mr. Kailash Karthik	Joint Secretary & Web Information Manager	Assam Finance Department
2	Mr. A. M. Singh	PCCF (HoFF)	Assam Forest Department
3	Mr. Pavan Kumar	APCCF	Assam Forest Department
4	Mr. M. K. Yadava	APCCF	Assam Forest Department
5	Mr. M. C. Malakar	Retd. Chief Wildlife Warden, Assam	–
6	Mr. Indrani Laskar	Joint Director, CPRD	Assam Panchayat & Rural Development Department
7	Mr. Abhijit Misra	State Project Manager	Commissionerate of Rural Development, Government of Assam
8	Mr. S. K. Seal Sarma	Consultant	WRI India
9	Dr. Ruchika Singh	Director, Sustainable Landscapes and Restoration	WRI India
10	Dr. K. M. Jayahari	Consultant, Sustainable Landscapes and Restoration	WRI India
11	Ms. Marie Duraisami	Senior Project Associate, Sustainable Landscapes and Restoration	WRI India

Roundtable on the Role of Inter-Governmental Fiscal Transfers in Promoting Indian Forest Sector's Environment and Social Goals

March 7, 2019
Mumbai, Maharashtra

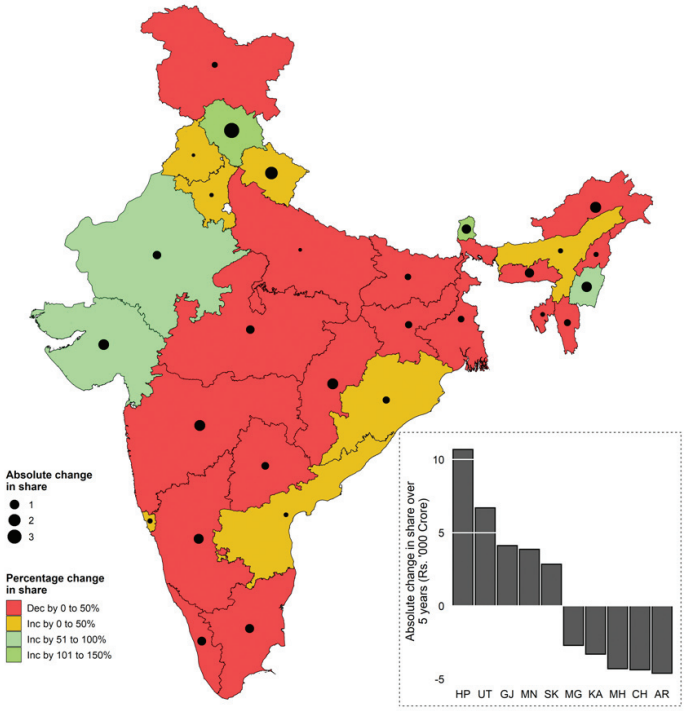
Sr No	Name	Designation	Organization
1	Mr. Vikas Kharage	Principal Secretary (Forests)	Maharashtra Revenue & Forests Department
2	Mr. Nitin Kakodkar	PCCF (Wildlife)	Maharashtra Forest Department
3	Mr. G. Saiprakash	PCCF (Budget Planning & Development)	Maharashtra Forest Department
4	Mr. N. Vasudevan	APCCF (Mangroves)	Maharashtra Forest Department
5	Mr. Virendra Tiwari	APCCF (Mantralaya)	Maharashtra Forest Department
6	Mr. Deepak Khadke	CM Fellow	Chief Minister's Office Maharashtra
7	Ms. Meghana Palepu	Program Officer, Sustainability and Special Projects	TATA Trusts
8	Mr. Anuj Gangwal	Program Officer, Sustainability and Special Projects	TATA Trusts
9	Dr. Ruchika Singh	Director, Sustainable Landscapes and Restoration	WRI India
10	Dr. K. M. Jayahari	Consultant, Sustainable Landscapes and Restoration	WRI India
11	Ms. Marie Duraisami	Senior Project Associate, Sustainable Landscapes and Restoration	WRI India
12	Ms. Karishma Shelar	Senior Research Associate, Sustainable Landscapes and Restoration	WRI India

Roundtable on the Role of Inter-Governmental Fiscal Transfers in Promoting Indian Forest Sector's Environment and Social Goals

March 19, 2019
Chennai, Tamil Nadu

Sr No	Name	Designation	Organization
1	Dr. H. Malleshappa	PCCF & HoD	Tamil Nadu Forest Department
2	Mr. Sanjay Kumar Srivatsava	PCCF & Chief Wildlife Warden	Tamil Nadu Forest Department
3	Mr. Syed Muzammil Abbas	PCCF & Chief Project Director, TBGP	Tamil Nadu Forest Department
4	Mr. S. Yuvraj	APCCF (FCA)	Tamil Nadu Forest Department
5	Mr. Ashok Upretti	APCCF (CAMPA)	Tamil Nadu Forest Department
6	Mr. Subrat Mohapatra	APCCF (WP)	Tamil Nadu Forest Department
7	Dr. Shekhar Kumar Niraj	APCCF; Director AWRI, Vandalur	Tamil Nadu Forest Department
8	Mr. Vijendra Sigh Malik	APCCF (Codes and Manual)	Tamil Nadu Forest Department
9	Ms. Mita Banerji	APCCF (IT)	Tamil Nadu Forest Department
10	Mr. P. Rajeswari	APCCF (P&B)	Tamil Nadu Forest Department
11	Mr. Rakesh Kumar Jagania	CF (Wasteland Board)	Tamil Nadu Forest Department
12	Dr. S. Balaji (Retd. PCCF)	Advisor	Care Earth Trust, Chennai
13	Dr. Sushil Saigal	Program Lead – Lands	The Nature Conservancy
14	Dr. Jayshree Vencatesan	Managing Trustee	Care Earth Trust, Chennai
15	Mr. G. Ramprasad	Independent Consultant	–

Annex 3 : State-wise distribution under the recommended formula in comparison to the 14th Finance Commission award



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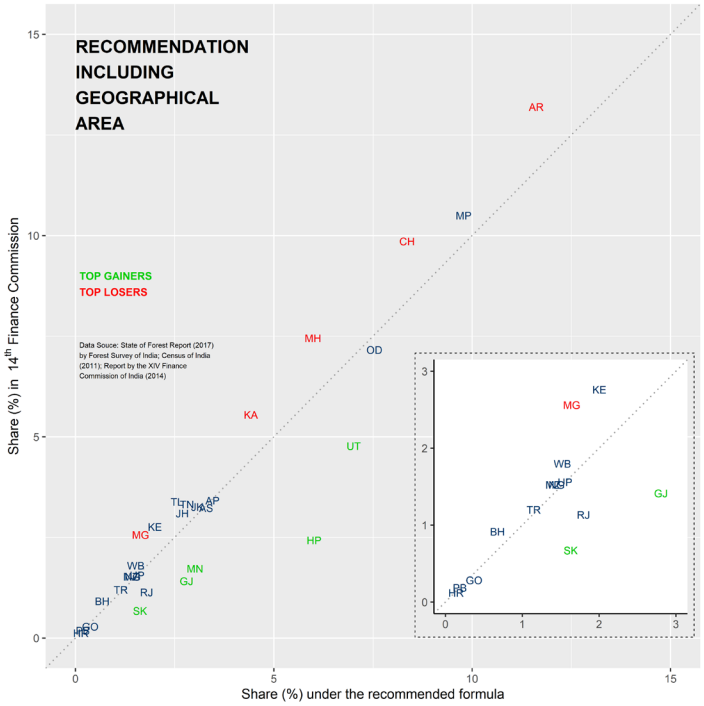


Annex 4 : State-wise distribution under the recommended formula

Sr No	State	14th Finance Commission (% share)	Recommendation (% share)
1	Andhra Pradesh	3.418	3.464
2	Arunachal Pradesh	13.198	11.639
3	Assam	3.231	3.303
4	Bihar	0.916	0.678
5	Chhattisgarh	9.857	8.381
6	Gujarat	1.414	2.806
7	Goa	0.285	0.373
9	Himachal Pradesh	2.426	6.035
10	Haryana	0.121	0.139
10	Jharkhand	3.096	2.704
11	Jammu and Kashmir	3.259	3.078
12	Karnataka	5.547	4.430
13	Kerala	2.761	2.008
14	Meghalaya	2.561	1.649
15	Maharashtra	7.450	5.997
16	Manipur	1.723	3.027
17	Madhya Pradesh	10.497	9.807
18	Mizoram	1.525	1.197
19	Nagaland	1.524	1.452
20	Odisha	7.159	7.556
21	Punjab	0.186	0.186
22	Rajasthan	1.136	1.801
23	Sikkim	0.672	1.634
24	Telangana	3.385	2.566
25	Tamil Nadu	3.321	2.820
26	Tripura	1.200	1.152
27	Uttar Pradesh	1.559	1.557
28	Uttarakhand	4.774	7.035
29	West Bengal	1.798	1.524

Annex 5 : Forest-dependent population to promote inter-state equity

A large proportion of India's population is dependent on forests for their livelihood and sustenance. This forest-dependent population impacts opportunity cost in two ways. First, states with high RFA and PA have lesser areas available for raising resources to provide developmental services to the forest-dependent population like access to health care, sanitation, and water supply. Second, states need to spend resources to preserve forests and thereby strengthen livelihoods of the dependent population. Given the above, there is a strong need to scale the opportunity cost imposed by forests by the number of forest-dependent people in the state. This number has been estimated from Census of India, 2011.

States with relatively high forest-dependent population need additional resources to provide basic amenities as well as generate livelihoods. In view of this, the 15th FC may consider including forest-dependent population as an additional indicator of fiscal disability to calculate the states' share (Share $A3_i$):

$$Share\ A3_i = \left[\left(0.5 \times \frac{X_i}{\sum X_i}\right) + \left(0.5 \times \frac{AdjFC_i}{\sum AdjFC_i}\right)\right] \times 100$$

$$X_i = \left[\left(0.8 \times \frac{AdjRFA_i}{\sum AdjRFA_i}\right) + \left(0.2 \times \frac{AdjPA_i}{\sum AdjPA_i}\right)\right] \times \left(\frac{FDPop_i}{\sum FDPop_i}\right)$$

where,

$FDPop_i$ is forest-dependent population in the state

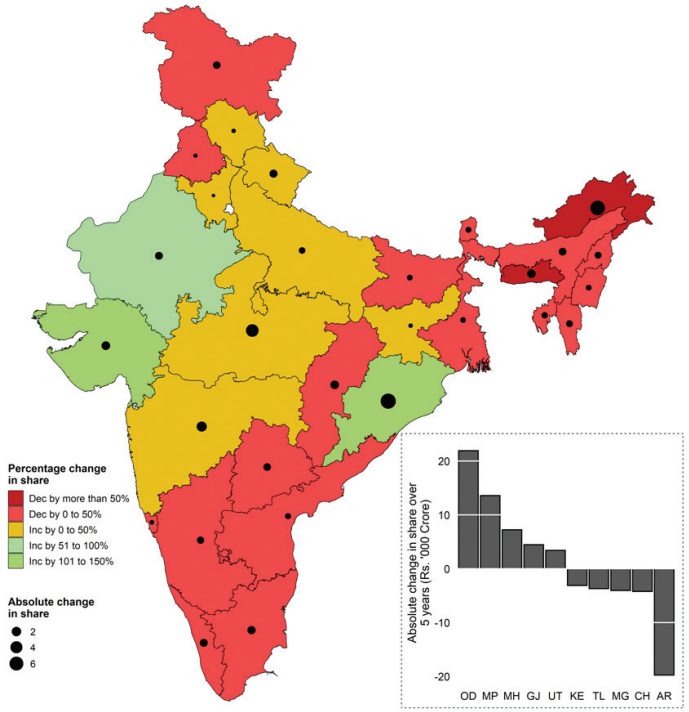
$\sum FDPop_i$ is total forest-dependent population[8]

The $AdjFC_{i,}$, $AdjRFA_i$, and $AdjPA_i$ are calculated as earlier.

Under this formula (Share $A3_i$), the states with high forest-dependent population will have a proportionately high share. Thus, the five states with the maximum share would be Madhya Pradesh, Odisha, Maharashtra, Chhattisgarh, and Arunachal Pradesh; while the states with the lowest share would be Haryana, Punjab, Goa, Sikkim, and Bihar. In terms of percentage change in state share with respect to the 14th FC, the states that would gain the most would be Gujarat (107%), Odisha (103%), Rajasthan (97%), Madhya Pradesh (44%), and Uttar Pradesh (36%); while maximum loss would be for Meghalaya (-53%), Arunachal Pradesh (-51%), Sikkim (-46%), Nagaland (-42%), and Mizoram (-40%). In absolute terms with respect to the 14th FC, Odisha (INR 21,926 crore), Madhya Pradesh (INR 13,590 crore), Maharashtra (INR 7,227 crore), Gujarat (INR 4,467 crore), and Uttarakhand (INR 3,411 crore) will gain the most. Cumulatively, the share of the top five states will be 37.51 times that of the bottom five states. The distribution of all states under this formula vis-à-vis the 14th FC and a detailed state-wise distribution is provided on next page.

Sr No	State	14th Finance Commission (% share)	Recommendation including forest-dependent population (% share)
1	Andhra Pradesh	3.418	3.034
2	Arunachal Pradesh	13.198	6.521
3	Assam	3.231	2.210
4	Bihar	0.916	0.623
5	Chhattisgarh	9.857	8.427
6	Gujarat	1.414	2.922
7	Goa	0.285	0.177
9	Himachal Pradesh	2.426	2.496
10	Haryana	0.121	0.129
10	Jharkhand	3.096	3.155
11	Jammu and Kashmir	3.259	2.304
12	Karnataka	5.547	4.730
13	Kerala	2.761	1.709
14	Meghalaya	2.561	1.197
15	Maharashtra	7.450	9.891
16	Manipur	1.723	1.434
17	Madhya Pradesh	10.497	15.087
18	Mizoram	1.525	0.920
19	Nagaland	1.524	0.878
20	Odisha	7.159	14.564
21	Punjab	0.186	0.158
22	Rajasthan	1.136	2.236
23	Sikkim	0.672	0.365
24	Telangana	3.385	2.134
25	Tamil Nadu	3.321	2.401
26	Tripura	1.200	0.731
27	Uttar Pradesh	1.559	2.126
28	Uttarakhand	4.774	5.926
29	West Bengal	1.798	1.516

State-wise distribution under the forest-dependent population formula in comparison to the 14th Finance Commission



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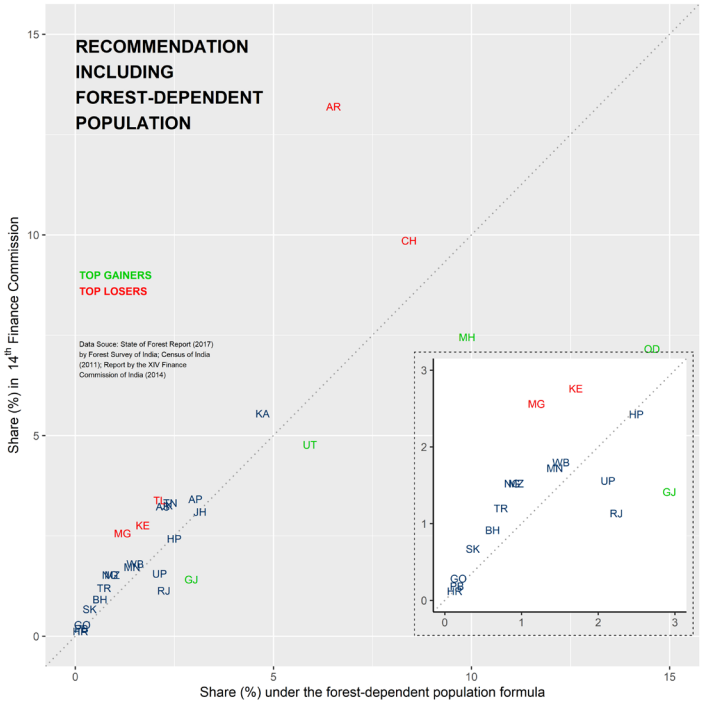

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