

Fiscal Transfers for Forest Cover

Aligning National and Subnational Objectives in a Federal Setting

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The costs of preserving forest cover are borne jurisdictionally, but the benefits accrue externally. To compensate for this, the national government has paid an annual forest grant to the states since 2005. We construct a model to show why it has not prevented a decline in cover in highly forested states over 2007–2019, while a rise is seen in states with low initial cover. The implications are explored.

The expansion of forest cover is among the globally accepted imperatives for the mitigation of climate change. Forests provide a wide variety of direct services like soil conservation, groundwater recharge, and preservation of biodiversity benefits that accrue to the immediate region surrounding the forest. But, the benefit of the most important service, the carbon sequestration that slows the march of the planet towards climate change, accrues well beyond the boundaries of the country where forests are located. However, the costs of maintaining land under forests are borne exclusively by the country in whose jurisdiction they lie.

This points to the need for external funding to correct the asymmetry between externalised benefits and internalised costs if forest cover is to be maintained or expanded as a global climate change mitigation strategy. The outcome will be a function of the cost of the preservation effort and the return on the effort (the grant).

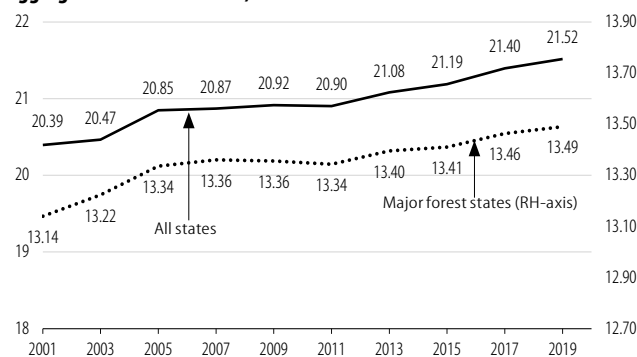
The need for external funding applies also within federally structured countries like India, where forests are among the constitutionally assigned functions of subnational states,¹ with the same asymmetry between benefits and costs. The costs of forest cover include both the costs of maintenance, including preservation from poaching of timber and wildlife, and the opportunity cost of holding back land under forests from other more commercially profitable activities.

This paper will focus on the Indian experience where, prescribed by finance commissions since 2005, there has been a provision for annual statutory transfers from the national government to the states for forest preservation, although the structuring of the provision has varied over time. The data used to understand the pattern of forest cover and its change over time are the biennial State of Forest Reports issued by the Forest Survey of India (FSI) up to the latest report for 2019. The FSI classifies all land of more than one hectare with more than 10% canopy cover as forested land irrespective of legal status and species composition (Forest Survey of India 2019). In addition to large areas under the recorded forest area (RFA),² it includes commercial plantations, orchards, and tea and coffee gardens. From a carbon sequestration perspective, the boundary between the RFA and non-RFA cover is perhaps not as significant as that between categories of density in forest cover. The FSI has three categories: very dense, moderately dense, and open.³

The long-term national target is to increase forest cover to 33% of the country's geographical area first introduced by the National Forest Policy (NFP), 1952 and reiterated in subsequent

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Figure 1: Trends in Forest Cover (Percentage of Geographical Area Aggregated across All States)



(1) On the vertical axis (LH-axis and RH-axis), we measure the percentage of geographical area aggregated across all states.

(2) The 16 major forest states are those that have forest cover greater than 25% of their geographical area.

(3) From the 2007 assessment (published in 2009), FSI switched to a vector-based approach (from the earlier raster-based approach), which improved the cartographic presentation of the output, mapped the changes more accurately, and made the output available in GIS-ready format (Forest Survey of India 2009). The 2009 FSI report revised the figures for 2005 also (shown in the graph) using the new approach. The rise in forest cover between 2003 and 2005 may well be a mere reflection of the revised methodology.

Source: State of Forest Reports (Forest Survey of India, biennial issues 2005–19).

policies of the government, including the NFP, 1988 (Government of India 1952; Ministry of Environment and Forests 1988). The new draft NFP, 2018 also aims to maintain at least one-third of India's total land area under forest and tree cover.⁴ Furthermore, India has committed to creating an additional carbon sink of 2.5 to 3 billion tonnes of carbon dioxide equivalent through additional forest and tree cover by 2030 in its nationally determined contribution (NDC) to the Paris Agreement.⁵

In terms of aggregate forest cover in the country as a whole, the data from 2001–19 suggest a slow increase as shown in Figure 1 (note 3). The aggregate upward trend, although gradual, is promising, but what is critical is the interstate pattern and how this is affected by the structuring of the national to sub-national grants designed to correct the asymmetry between the costs and benefits to a state of maintaining forest cover.

In India, external grants have not been the only influence on land-use choices. There is another scheme running in parallel, under which the conversion of forest land to non-forest uses is permissible subject to compensatory afforestation. In what follows, these two schemes will be discussed in line.

The next section discusses the experiences of countries across the world that have used intergovernmental transfers as an instrument for compensating subnational governments for providing environmental public goods. Following that, we present a simple model with cost and grant functions to see whether there is such a thing as an optimal level of forest cover for a state, given the grant pattern assumed. These are preparatory to the examination in the subsequent section of the observed interstate change in forest cover since 2007, going up to 2019, the year for which published data are available. This also happened within the period, starting 2005, when the practice of statutory grants from the national level to states was in operation. We further elaborate upon the alternative scheme in operation in India for the conversion of forest to non-forest land, which has not functioned effectively, especially

in heavily forested states. This has reinforced the pattern of interstate change in forest cover observed in an earlier section. The next section explores how external grants might be structured to correct the observed empirical cross-state pattern.

Literature Review

In the literature on fiscal federalism, the principle of fiscal equivalence requires that those regions benefiting from a public good should pay for it (Olson 1969). In case of a spillover of benefits to other regions (that is, in case of positive externality) outside the jurisdictions bearing the costs, the concerned public goods or services will be under-provided or the regions bearing the cost would underspend on these goods. This calls for compensation payments or transfer of resources from the national/federal government to jurisdictions bearing the costs of provision of such goods and services, thereby externalising the costs of such spillovers/externalities (Bird and Smart 2002; Boadway and Shah 2009; Dahlby 1996; Dur and Staal 2008). Consider, for example, the case of forests in India.

While the costs of maintaining land under forests are borne by subnational states in whose jurisdiction they are located, the benefits accrue well beyond their boundaries. This asymmetry between externalised benefits and internalised costs results in the under-provisioning of the commodity in question (that is, forests). This calls for compensating payments to subnational governments for their ecological public services to address this asymmetry between benefits and costs.

Intergovernmental fiscal transfers redistribute national budgets to lower levels of government based on several indicators like population, area, per capita income, etc. Fiscal transfers can be designed incorporating some agreed-upon ecological, environmental principles, and priorities to compensate/incentivise subnational governments for providing the multiple ecological services flowing from forest preservation. Such transfers across different levels of governments are commonly referred to as ecological fiscal transfers (EFTs) in the literature. EFTs are a subset of intergovernmental fiscal transfers redistributing the federal/national revenues to subnational governments based on some agreed-upon ecological/environmental indicators.

The use of EFTs has gained attention in recent years with many countries introducing them to compensate subnational governments/jurisdictions for bearing the costs of providing the ecological goods and services which generate spillover benefits beyond their boundaries. The Brazilian state of Paraná was the first to introduce EFT called the *Imposto sobre Circulação de Mercadorias e Serviços* (ICMS-E) in 1991 for protected areas, redistributing part of the state-level value added tax revenues to the municipalities in proportion to the share of the municipal territory designated as protected areas (May et al 2012, 2002). Subsequently, other Brazilian states implemented their EFTs, and currently, EFTs are in operation in 17 out of 26 Brazilian states (Droste et al 2017; May et al 2012; Ring 2008a). The ICMS-E was originally introduced to compensate municipalities for land-use restrictions imposed by protected areas; but, over the years, it evolved into an incentive to create new protected areas. Using the 1991–2009 data for Brazilian states,

Droste et al (2017) find that the introduction of ICMS-E schemes has incentivised the municipalities to designate additional protected areas and contributed towards the decentralisation of conservation decisions. Other countries introducing EFTs for protected areas include Portugal, which established a municipal EFT scheme in 2007 (Santos et al 2015; Santos et al 2012), and France, which has compensation schemes for municipalities in core areas of national parks (Borie et al 2014). Queensland, Australia uses a multi-criteria analysis for allocating environmental funds via fiscal transfers across regions (Hajkowicz 2007), and in India, an EFT scheme for incentivising sub-national states for preserving forests is in operation since 2005 (Busch and Mukherjee 2018; Finance Commission 2020, 2019, 2014, 2009, 2004; Kumar and Managi 2009). Similar solutions to compensate local jurisdictions for the costs of providing ecological goods and services are being considered in many countries like Indonesia (Irawan et al 2014; Mumbunan et al 2012), Germany (Ring 2008b; Schröter-Schlaack et al 2014), Poland (Schröter-Schlaack et al 2014), and Switzerland (Köllner et al 2002). Droste et al (2018) explore the possible policy design for the European Union-wide implementation of an EFT scheme based on the experience gained from the existing EFT mechanisms.

A Model for External Grants to Fund Forest Cover

Using the following notation:

- L_i geographical area of the i^{th} state
- L geographical area of the country
- $F_{i,t}$ Forested area in i^{th} state at time t
- F_t Forested area in the country at time t
- $G_{i,t}$ Grant to i^{th} state at time t
- G_t Total grant at time t
- C_i Cost to i^{th} state for preserving forest

Grants function (i^{th} state): Let us assume that the quantum of grant to the i^{th} state is calibrated to the forested area in the state as a percent of the total forested area in the country.

$$G_{i,t} = G_t * \frac{F_{i,t}}{F_t}$$

$\Delta G_i = G_{i,t+1} - G_{i,t}$ represents the change/increase in the grant going to the i^{th} state between two periods.

Let us further assume that there is an increase in the forest area in i^{th} state only. Then we can write

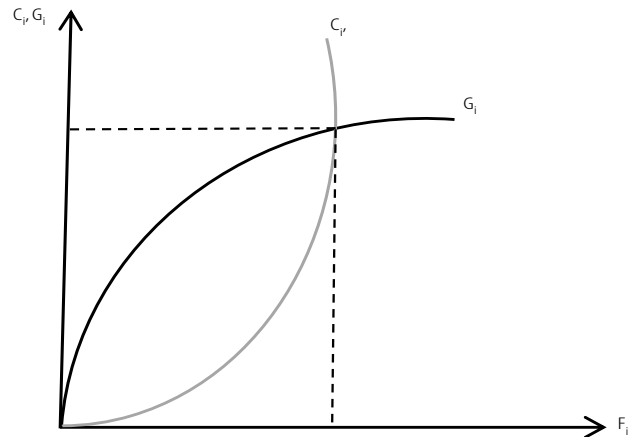
$$\begin{aligned} \Delta G_i &= G_{i,t+1} - G_{i,t} \\ &= G_{t+1} * \left(\frac{F_{i,t+1}}{F_{t+1}}\right) - G_t * \left(\frac{F_{i,t}}{F_t}\right) \\ &= G_{t+1} * \left(\frac{F_{i,t} + \Delta F_i}{F_t + \Delta F_i}\right) - G_t * \left(\frac{F_{i,t}}{F_t}\right) \end{aligned}$$

where $F_{i,t+1} = (F_{i,t} + \Delta F_i)$ and $F_{t+1} = (F_t + \Delta F_i)$,

$$dG_i = G_{t+1} * \left(\frac{F_{i,t} + dF_i}{F_t + dF_i}\right) - G_{i,t}$$

$$\begin{aligned} \frac{dG_i}{dF_i} &= G_{t+1} * \left(\frac{(F_t + dF_i) - (F_{i,t} + dF_i)}{(F_t + dF_i)^2}\right) \\ &= G_{t+1} * \frac{F_t - F_{i,t}}{(F_t + dF_i)^2} > 0 \end{aligned}$$

Figure 2: Cost and External Grants as a Function of the Area under Forests



$$\begin{aligned} \frac{d^2 G_i}{dF_i^2} &= -G_{t+1} * \left(\frac{2(F_t - F_{i,t})(F_t + dF_i)}{(F_t + dF_i)^4}\right) \\ &= -G_{t+1} * \left(\frac{2(F_t - F_{i,t})}{(F_t + dF_i)^3}\right) < 0 \end{aligned}$$

Cost function (i^{th} state): Let us assume the following cost function

$$\frac{C_i}{F_i} = \left(\frac{F_i}{L_i}\right)^2$$

$$C_i = F_i \left(\frac{F_i}{L_i}\right)^2 = \frac{F_i^3}{L_i^2}$$

$$\frac{dC_i}{dF_i} = 3F_i^2 \left(\frac{1}{L_i^2}\right) > 0$$

$$\frac{d^2 C_i}{dF_i^2} = \frac{6}{L_i^2} F_i > 0$$

The hypothesised cost and grants curves for the i^{th} state are presented in Figure 2. Note that the cost function has been given its particular form because the function is calibrated to the share of total (fixed) geographical area of the state which is forested—as this share increases, the opportunity cost of the alternative commercial uses to which the land could be put from the perspective of the state’s need to generate growth and revenue rises at an increasing rate. The essential property of the cost function, the way it has been specified, is its convexity. But the state-specific cost functions will be differently positioned depending upon factors like population density, level of non-farm activities, and whether the forests cover underground mineral deposits. We do not attempt to derive state-specific cost functions.

In the model, the grants function has been constructed in such a way that it is the return to the i^{th} state for increasing its forested area, all other states remaining the same. The i^{th} state knows that in response to the incentive implicit in the grant formula, the other ($n-1$) states will respond, but their responses are not known to the i^{th} state. The response of the other states will depend on where they are positioned with respect to what is optimal for them.

This further raises the issue of what the optimum forested share will be for any state. The grant function is not known with enough certainty for the optimum to be specified at the point where the slopes of the grant and cost curves are equal. All that the i^{th} state knows, at any point on the F_i axis, is that the grant it is currently receiving, as specified every five years (that is, when the Finance Commission recommends the quantum of earmarked grants/forest-linked transfers to the states), and whether it exceeds or falls below the cost. If a state is to the right of the intersection point (of the grants and cost curves), it will reduce its forest cover since the total cost exceeds the grant received, while states to the left of the intersection point will increase their forest cover in response to the inducement of the grant.

The Pattern of Change in Forest Cover in India

The scatter plots shows the percent change in forest cover over 2007–19 on the vertical axis against the initial percent of forest to the total area of the state on the horizontal axis (Figure 3). The linear fit has a negative slope that is statistically significant. The regression equation of the fitted line is presented in Table 1. It is clear from the scatter that the states to the extreme right on the horizontal axis, with a high percentage of forest to total land area, have experienced a loss of forest cover (negative change over the period). States to the left with lower initial forest cover as a percent of total land area have experienced positive change, which however declines with rightward movement on the horizontal axis. This bears out the predictions of the model that there is an optimum level of forest cover for each state whose actual location will be determined by the cost function specific to that state. States to the right of the optimum on the horizontal axis will reduce forest cover because of the high opportunity cost of land under forest in terms of commercial activities foregone. States to the left will increase their forest cover in response to the inducement of the grant.

It is clear that an overall (small) increase in percent area under forests in aggregate across all states, observed in Figure 1, is an outcome of an increase in states with a lower initial area under forests, compensating for states with a higher initial area under forests.

Compensatory Afforestation Scheme

The Indian Constitution assigns subject areas of the government functioning to the central list (jurisdiction of the national “union” government), the state list (jurisdiction of subnational

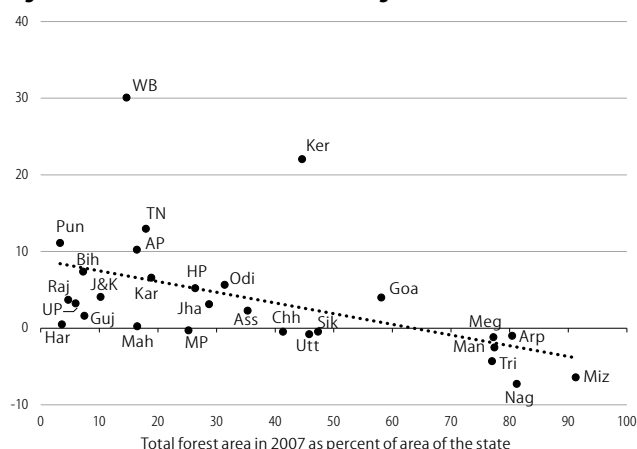
Table 1: Percentage Change in the Forest Area at the State Level (2007–19)

	Dependent Variable Percentage Change in Forest Area between 2007 and 2019
Percent of states' area that is forested (2007)	-0.140*** (-2.90)
Constant	8.880*** (4.09)
No of observations	28
R-sq	0.244
Adj R-sq	0.215

Figures in parenthesis refer to t-values; *** refers to significance at 1%.

Source: Authors' calculations.

Figure 3: Cross-state Scatter of Percent Change in Forest Cover over 2007–19



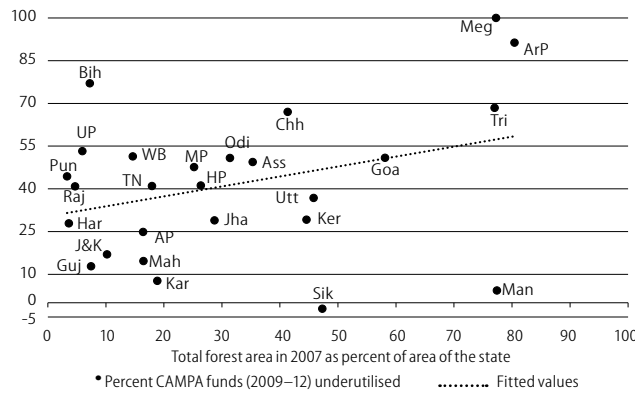
* Percent change in total forest area between 2007 and 2019 Fitted values
Source: Forest Survey of India.

state governments), and a concurrent list (shared jurisdiction). Following the transfer of forests and protection of wild animals and birds from the State List to the Concurrent List by the Constitution (Forty-second Amendment) Act, 1976, Parliament enacted the Forest (Conservation) Act, 1980 restricting the use of forest land for non-forest purposes by states.⁶ It became mandatory for states to seek approval from the union government for diverting forest land to non-forest uses. Following a Supreme Court judgment in 2002,⁷ there is in place a nationally uniform approach for compensatory afforestation and net present value (NPV) payments⁸ when forests are cut down for industrial or other purposes. These payments are to flow into a Compensatory Afforestation Fund, which remains distinct from the general revenues of the union or state governments and is to be managed by a Compensatory Afforestation Fund Management and Planning Authority (CAMPA). This authority was created in 2004, but because CAMPA did not immediately become legislatively operational, the Supreme Court in May 2006 ordered the constitution of an ad hoc CAMPA and recommended all payments recovered and lying with the state governments to be transferred to this ad hoc body. Funds started flowing into the ad hoc CAMPA from 16 May 2006. As substantial funds were being received by the ad hoc CAMPA, the Supreme Court in July 2009 permitted it to release ₹10 billion annually (roughly one-tenth of the aggregate collection) to the respective states' CAMPA in proportion to jurisdictional collections over five years.⁹

With the passage of the Compensatory Afforestation Fund Act, 2016 and associated Compensatory Afforestation Fund Rules, 2018,¹⁰ states are now free to use the remaining accumulated funds lying with the ad hoc CAMPA.¹¹ The union government released ₹474.36 billion of CAMPA funds to the states on 29 August 2019.¹²

Statewise data show that the percentage of forest land diverted is higher in states having a higher share in the total forested area in the country (Table 2, spec 1, p 54). The result holds even when we drop two outlier states where the share in diverted land was unusually high—Arunachal Pradesh and Madhya Pradesh (Table 2, spec 2).

Figure 4: Cross-state Scatter of Underutilisation of CAMPA Funds against the Share of Forest Area in 2007



Source: Forest data from the Forest Survey of India and on underutilisation of the CAMPA funds during 2009–12 from CAG (2013).

Consequently, these states also account for a large share of compensatory afforestation funds accumulated with the ad hoc CAMPA (Table 2, spec 3 for estimation results of the fitted line).

Figure 4 shows a scatter of the percent unspent CAMPA funds released from the ad hoc CAMPA between 2009 and 2012 on the vertical axis and the percent forested of states' geographical area on the horizontal axis. The data are from a 2013 report of the Comptroller and Auditor General of India (CAG). In aggregate, 39% of the funds released to the states remained unspent. The unspent percent was very high in Arunachal Pradesh (91%), and some other states have a high share of own land under forest. The linear fit has a positive slope and is statistically significant.

The equation of the fitted line is presented in Table 3. The CAG (2013) report points out that the

amounts released by the ad hoc CAMPA were against the annual plan of operations (APOS) which also included schemes that were identified at the stage of granting clearance and for which land was also claimed to have been identified at the time of giving clearances. The fact remained that large sums of monies released based on approved plans could not be utilised.

This evidence that the purpose of CAMPA was defeated is from the national auditor.

These regression results on the underutilisation of funds for compensatory afforestation in highly forested states bear out the scatter in Figure 3, showing a decline in forest cover in states with high initial cover, and the corresponding regression results in Table 1.

A Suggested Design for External Grants to Promote Forest Cover

In India, two funding schemes have run in parallel. There has been a provision for annual statutory transfers from the national government to states for forest preservation since 2005, as recommended by successive finance commissions.¹³ There is also the compensatory afforestation scheme—CAMPA outlined in the previous section. The intent of the two channels differs. The CAMPA is directed at ensuring absolute standstill in the forest cover of states by making non-forest users of forested land pay

for equivalent forest cover elsewhere in the state. The annual statutory transfers prescribed by the finance commissions, on the contrary, reward states for their share in the total national forest cover and implicitly incentivise states to increase their forest cover relative to other states.

The finance commission statutory transfers have varied across commissions. While the Twelfth and Thirteenth Finance Commission's prescribed earmarked absolute grants specifically for forests, the Fourteenth Finance Commission included forests as one of the criteria in its tax devolution formula whereby states get an unconditional share in the total tax revenue of the national government. The Fifteenth Finance Commission in its interim report for 2020–21¹⁴ and final report for 2021–26 also opted to go with forest cover as a criterion in its tax devolution formula.

In the earlier grant form, the Twelfth Finance Commission provided a grant of ₹10 billion to states for its award period 2005–10, distributed according to the share of each state in the total forested acreage in the country (Finance Commission 2004) with no usage specifications. The Thirteenth Finance Commission recommended a grant of ₹50 billion for its award period 2010–15, which was calibrated to (i) the share of the national forested area falling in a state, (ii) the economic disability as measured by the percentage of forested area in each state, and (iii) the quality of forest as measured by density.¹⁵ Although for the initial two years the grant was untied, the states were expected to give priority to the preparation of working plans for all forest divisions within their respective jurisdiction. For the remaining three years of the commission's award period, the release of the grant was linked to the number of approved working plans, of which only 25% was specifically earmarked for preserving forests and the remaining 75% was to be used for other developmental

Table 2: States' Share in Total Forest Land Diverted to Non-forest Use

	Dependent Variable States' Share in Total Forest Land Diverted to Non-forest Use		Dependent Variable States' Share in CAMPA Funds
	1	2	3
States' share in total area forested in the country (2007)	1.301*** (5.67)	0.510** (2.63)	0.925*** (5.00)
Constant	-1.078 (-1.02)	0.791 (1.09)	0.267 (0.31)
No of observations	28	26	28
R-sq	0.553	0.223	0.490
Adj R-sq	0.536	0.191	0.471

Figures in parenthesis refer to t-values; *** and ** refers to significance at 1% and 5%, respectively.
Source: Authors' calculations based on data from CAG (2013) on underutilisation of the CAMPA funds during 2009–12.

Table 3: Percent of Underutilised CAMPA Funds (2009–12)

Dependent Variable: Percent of Underutilised CAMPA Funds during 2009–12	1
Percent of states' area that is forested (2007)	0.349* (1.79)
Constant	30.36*** (3.87)
No of observations	26
R-sq	0.118
Adj R-sq	0.081

Figures in parenthesis refer to t-values; *** and * refer to significance at 1% and 10%, respectively.
Source: Authors' calculations.

purposes by the states (Finance Commission 2009). From the available data, we find that in aggregate, releases of the forest grant recommended by the two commissions were quite high as a percent of allocations—93.38% for Twelfth Finance Commission and 88.64% for the Thirteenth Finance Commission.¹⁶

The Fourteenth Finance Commission for the award period 2015–20, as mentioned earlier, included the share of states in the total (moderate and dense) forested area in its tax devolution formula so that forested states got a higher tax share than they would otherwise have. The Fifteenth Finance Commission carried forward the approach of the Fourteenth Finance Commission, with an enhancement of the weight for forest cover in the tax devolution formula from 7.5% to 10% (Finance Commission 2020, 2019). Between the two forms of federal flows, an earmarked grant is more likely to reach the forest department in the intra-state allocation of resources, particularly in the post-COVID-19 era, when interdepartmental rivalry for funding has intensified.

Forest preservation in whatever form did not result in higher allocations for forests by the states across the periods covered by the Twelfth, Thirteenth, and Fourteenth Finance Commissions. This is evident from the declining share of expenditure on forests and wildlife aggregated across all states in total expenditure, which declined from 0.91% during the award period of the Twelfth Finance Commission (2005–06 to 2009–10) to 0.87% during the award period of the Thirteenth Finance Commission (2010–11 to 2014–15) and

further to 0.72% during the first three years of the award of the Fourteenth Finance Commission (2015–16 to 2017–18). Similar results have been reported in aggregate for 25 states covering the last three years (2012–13 to 2014–15) of the award period of the Thirteenth Finance Commission, which had an earmarked grant, and the first three years (2015–16 to 2017–18) of the Fourteenth Finance Commission period (Busch et al 2019). The Finance Commission grants did not prevent highly forested states from reducing their forest cover. The quantum of earmarked grants recommended by the Twelfth and Thirteenth Finance Commissions was perhaps too low to prevent the conversion of forest land to other more commercially profitable activities. Moreover, there would have been uncertainty regarding the use of contemporary forest cover as a criterion in tax distribution formulae by future finance commissions.

The CAMPA scheme is needed since it imposes a payment structure on the conversion of forest land to non-forest uses, something that would happen even without the scheme. A much steeper payment gradient for states with high forest cover might make CAMPA more effective. The ratio between the maximum and minimum rates based on NPV rose from less than 2 during the period before 2008 to around 2.4 after 2008. In the new structure proposed in 2014, it has risen to around 5.6, but there is no evidence as to whether this has been implemented. There is a strong case for further raising the ratio high enough to essentially prohibit the diversion of forest

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land for non-forest use in states with high forest cover. The raised ratio will necessarily have to be accompanied by a statutory grant to states, which differentially compensate states by a structure with per hectare compensation increasing steeply in percent of state land under forest cover.

Summary

India, as a federally structured country, presents in microcosm the global problem of having to protect forest cover, where the costs of protection (principally commercial land-use opportunities foregone) are borne locally, while the benefits accrue externally. Clearly, this calls for a system of externally funded grants calibrated to reduce the incentive for deforestation at the country level or at the subnational level in a federal country.

The stylised facts for India are that over 2007–19, the percent of land under forests in aggregate rose slightly from 20.87% to 21.52%, but states with high initial forest cover lost forested acreage, while states with lower initial cover gained. This pattern is predicted by a simple model in the paper, showing that there is an optimal forested area percentage in any state beyond which the incremental cost of preserving forest area outweighs the incremental grant (of the form typically used for annual statutory grants from the national government to subnational states for forest preservation over the period). Although the structuring of the provisions varied over time, states were typically rewarded based on their share in the total forested area in the country. This approach did not incentivise the more forested states into retaining their forest cover, nor did it prevent the share of expenditure on forests and wildlife aggregated across all states in total expenditure from declining.

Another provision, running in parallel starting from 2002, rendered permissible is the conversion of forested land to non-forest uses subject to the condition that compensation was collected from the user for the NPV of the forested area foregone (in amounts dictated by the judgments of the Supreme Court) to be used towards compensatory afforestation within the state. This was a standstill provision to prevent the use of the forested area for industrial purposes from reducing the forested area in the state. However, the purpose of the scheme was defeated by severe underutilisation of the compensatory funds collected, as reported by the 2013 report of the national auditor, the CAG, with underutilisation percentages especially high in states with a high percentage of land under forest cover. The impediments to compensatory afforestation appear, *inter alia*, to be the acquisition of equivalent land. Perhaps for that reason, a recent policy statement¹⁷ appears to have jettisoned even the objective of compensatory afforestation in favour of using the funds towards water conservation projects.

The conclusions from this investigation are that a grant with the conventional structuring is not sufficient for preserving forested land in highly forested jurisdictions. A straightforward reward of the kind we have posited with our grant function with an implicit assumption of a common opportunity cost does not seem to have achieved more forest in the Indian case. Any levy on the conversion of forest land into non-forest uses has to be so calibrated as to essentially pre-empt such conversion in states where a high percentage of the land is under forest cover. This calls for external grants to have an equivalent non-linearity in structuring, such that highly forested jurisdictions receive more per forested acre than a jurisdiction with a lower percent of forested acreage.

NOTES

- 1 Forests were transferred from the state list to the concurrent list through the 42nd amendment to the Constitution of India in 1976, thus giving national government shared jurisdictional authority.
- 2 Recorded forest area (RFA) refers to all the geographic areas recorded as “forests” in government records irrespective of actual forest canopy cover on ground. It consists of reserved forests (RFs) and protected forests (PFs) which have been constituted under the provisions of the Indian Forest Act, 1927. RFs do not permit any activity without special permission; PFs permit all activities unless prohibited. Besides RFs and PFs, the RFA may also include all such areas that have been recorded as forests in the revenue records or have been constituted so under any state act or local law. Although most of the RFA has vegetation cover on it, yet there are areas with no canopy cover or canopy density less than 10% within it. Around 70% of the RFA has canopy density of 10% or more and is included in the forest cover (Forest Survey of India 2019).
- 3 All lands with tree canopy density of (i) 70% and above are classified as very dense forest, (ii) 40% and above but less than 70% are classified as moderately dense forest, and (iii) 10% and above but less than 40% are called open forest (Forest Survey of India 2017: 21).
- 4 The new draft NFP of March 2018 aims to address the new realities—climate change,

human–animal conflict, and declining green cover (Ministry of Environment, Forest and Climate Change 2018a).

- 5 India ratified the Paris Agreement on climate change on 2 October 2016.
- 6 Per the Forest (Conservation) Act 1980, whenever forest land is to be diverted for non-forestry purpose, equivalent non-forest land for compensatory afforestation and funds for compensatory afforestation (CA), additional compensatory afforestation (ACA), and penal compensatory afforestation (PCA) are to be provided. The funds for CA, ACA, and PCA are to be recovered from the user agencies on the basis of the rates fixed by the state forest department, which were site specific and varied according to the species, type of forest, and site.
- 7 The Supreme Court of India began playing a proactive role in the matters of forest policy governance from 1995 onwards following its intervention in the case *T N Godavarman Thirumulpad v Union of India* (Writ Petition (Civil) No 202 of 1995).
- 8 To compensate for the loss of tangible as well as intangible benefits from forest lands diverted for non-forest use, the Supreme Court on 29 October 2002 directed that the user agency pay into the Compensatory Afforestation Fund the NPV of the forest land diverted at rates in the range ₹5.80 lakh to ₹9.20 lakh per hectare depending upon the density of forest. The Supreme Court re-fixed the rate range of NPV on 28 March 2008 to ₹4.38 lakh to ₹10.43 lakh

per hectare, for a period of three years (Ministry of Environment and Forests 2009). The rates were due for re-fixation in 2012. The MoEF assigned a study in November 2012 to IIFM Bhopal, who proposed NPV rates in the range ₹9.87 lakh to ₹55.55 lakh per hectare (Verma et al 2014).

- 9 Press Information Bureau, 29 August 2019 (<https://pib.gov.in/PressReleaseDetail.aspx?PRID=1583452>) accessed on 30 August 2019. As of 31 March 2018, the total funds remaining in the Compensatory Afforestation Fund managed by the ad hoc CAMPA was ₹518.8 billion (Lok Sabha un-starred question No 3938, answered on 10 August 2018). This includes the principal and interest earned on it.
- 10 The Compensatory Afforestation Fund Act, 2016 (No 38 of 2016) received the assent of the President on 3 August 2016, while the Compensatory Afforestation Fund Rules, 2018 were notified on 10 August 2018 (Ministry of Environment, Forest and Climate Change 2018b; Ministry of Law and Justice 2016).
- 11 Ninety percent of all funds lying with the ad hoc CAMPA and the interest accrued thereon is to be distributed to the corresponding state compensatory afforestation funds in accordance with the jurisdiction in which the diversion of forest land took place. The balance 10% and the interest accrued thereon goes to the national compensatory afforestation fund and would be utilised for (i) the non-recurring and recurring expenditure for the

- management of the national authority, including the salary and allowances payable to its officers and other employees, (ii) the expenditure incurred on monitoring and evaluation of works executed by the national authority and each state authority, and (iii) the expenditure incurred on specific schemes approved by the governing body of the national authority.
- 12 Press Information Bureau, 29 August 2019, (<https://pib.gov.in/PressReleaseDetail.aspx?PRID=1583452>) viewed on 30 August 2019.
- 13 Finance commissions are constitutional bodies set up by the President of India (Article 280 of the Constitution) every five years. Their primary task is determining the sharing of centrally collected tax proceeds between the national and state governments, and distribution of grants-in-aid of revenues across states. The First Finance Commission was constituted in November 1951 and covered the five-year period from 1952 to 1956. Since then, there have been 15 finance commissions. The Fifteenth Finance Commission prescription runs up to 2026.
- 14 As an exception on account of economic uncertainty, the Fifteenth Finance Commission gave an interim report for only one year and a final report for 2021–26.
- 15 The Thirteenth Finance Commission used the following formula for *inter se* allocation of forest grants within all states:
- $$G_i = \frac{\left\{ \frac{F_i}{\sum F_i} + R_i \right\} X \left[1 + \left(\frac{M_i + 2H_i}{A_i} \right) \right]}{\sum_{i=1}^n \left\{ \frac{F_i}{\sum F_i} + R_i \right\} X \left[1 + \left(\frac{M_i + 2H_i}{A_i} \right) \right]}$$
- 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 ; and
- $$R_i = \max \left\{ 0, \left(\frac{F_i}{A_i} - \frac{\sum F_i}{\sum A_i} \right) / 100 \right\} \text{ (Finance Commission 2009).}$$
- 16 Details can be had from the authors on request.
- 17 Union Budget, July 2019, Ministry of Finance, Government of India.
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