

Can Fiscal Transfers Help India Meet Its SDG Goals?

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Abstract

This paper examines the possibility of using fiscal devolution in India to achieve the Sustainable Development Goals. We propose alternative weights and criteria to see how allocation between states would change if the Finance Commission of India (FC) used a framework that incentivizes achievements in social and environmental outcomes. Two different proposals are examined—one where level values of the female–male ratio, female literacy rate and forest cover are used to decide allocations and another where incremental values are used. The advantage of the second proposal is that it reduces historical bias. We calculate the alternative allocation that would emerge using these proposals and compare it with the actual allocation for the last three Finance Commissions—XIII to the XV. We find that the reallocation among the states incentivizes better performers and also help India achieve the goals for sustainable development.

Keywords

Economics and development studies, environmental policy, Indian Finance Commission, public finance

JEL Classification: H77, Q56, Q58

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Introduction

Achieving a gender-just, environmentally sensitive sustainable development trajectory is at the core of the 17 Sustainable Development Goals (SDGs) (UN, 2015). Although there is some degree of overlap of domains between the different SDGs, each has a distinct focus. Better management of public expenditures through fiscal transfers is one of the proposed mechanisms to help developing countries achieve their SDGs (Shotton & Gankhuyag, 2020). There is growing literature on how fiscal devolution can aid countries achieve SDGs. It has been studied in the context of agricultural development and food security in Africa (Wanjiku et al., 2020), climate change in India (Chakraborty, 2021), inclusive development in Nepal (Khemka & Kumar, 2020), biodiversity conservation (Bridgewater et al., 2015) and natural disasters (Skidmore & Toya, 2013), among others. Decentralization (connected to the issue of devolution) is seen as one of the potential pathways for implementing the SDGs (Awortwi, 2016).

In this paper, we examine how India can use its constitutional devolution mechanism within the framework for fiscal federalism. There have been many assessments of the decentralization process in India which peripherally approach the SDGs such as mobilizing communities (Rajasekhar et al., 2022), economic growth (de Xavier et al., 2021), forestry (Busch et al., 2020; Dasgupta & Srikanth, 2021) and ecosystem services (Kumar & Managi, 2009). However, very few studies have examined the issue of fiscal devolution and its impact on multiple SDGs. This study aims to fill this gap. We focus on three SDGs: (a) education (SDG 4), (b) gender equality and women's empowerment (SDG 5) and (c) environment (specifically forests and land degradation (SDG 15)). In this paper, we propose a devolution strategy that could link SDG targets with the devolution of funds to sub-national administrative units within the constitutionally mandated framework in India.

SDG 4 has 10 targets, including access to primary, secondary and higher education, eliminating gender differences and universal literacy. Education is considered the most important SDG to achieve sustainable development (Jana, 2020). Quality education that is inclusive and equitable is deemed vital to achieving social progress in all countries (Pandey, 2018). Drop-out and enrolment rates in school education are crucial indicators for India to attain its target of universal school education (Mehta, 2021). Women's literacy and education have been directly linked to vulnerability to hunger (von Grebmer et al., 2009), making female literacy rates a key target in a development strategy (Pandey, 2019).

SDG 5 has nine targets on violence against women, discrimination and inequality (UN DESA, n.d.). The NITI Aayog (Indian government's highest policy advisory body), in a concept note on SDG 5, summarized that 'sex ratio at birth is ... a major area of concern for our country' (Niti Aayog, 2017). Therefore, improving FMR continues to be a critical social development objective. Without achieving gender parity in education, it is impossible to attain gender equality in other vital areas like healthcare and employment. There is a direct correlation between girls' education and women's security. Gender parity in education will help reverse gendered discrimination patterns deep-rooted in culture and society (Karam, 2013).

SDG 15 has 12 targets dealing with different aspects of life on earth. The preservation and restoration of forests and biodiversity are key targets, and indicator 15.1.1 measures forest cover as a proportion of the total area. Therefore, increasing the forest cover, including its density and biodiversity, is part of SDG's objectives. SDG 15 also aims to curtail and reverse land degradation, occurring rapidly worldwide (UN DESA, n.d.). Land degradation, in this paper, is understood as a reduction in the function, utility and health of the land caused by human or natural forces (Barbier & Hochard, 2018).

A large part of social development occurs through government intervention, either by giving directions to the private sector (ElAlfy et al., 2020; Mishra, 2021; Rosati & Faria, 2019) or by directly making expenditures on social and development sectors (Akenroye et al., 2018). India has a well-established mechanism for social intervention (Bloch, 2020). Given its federal structure, most social development responsibilities lie with the state (regional) government (Chattopadhyay, 2018; Dev & Mooij, 2002). The central (federal) government focuses on supra-regional or national issues such as defence and foreign policy.

India's fiscal federal structure is governed by Article 280(3)(a) of the Indian Constitution (FC, 2019). The Finance Commission (FC) is constituted by the President of India every five years to provide a mechanism for sharing the net proceeds of central taxes between the Centre and states and apportioning these among different states (RBI, 2011). The net proceeds of central taxes are the predominant transfers from the Centre to the states (FC, 2009; RBI, 2019). The FCs have used different criteria for the devolution of shareable taxes to the states. The allocations, in principle, are designed to be efficient and equitable so that macroeconomic stability is ensured (Rao, 2004). To finance these expenditures, India has a constitutional mechanism for devolution funds between the Centre and the states. The process of fiscal devolution of funds is a

contentious issue in India even now. It was evidenced by the response of political leaders as soon as the states' shares were announced by the 15th Finance Commission (FCXV) in India (Kapoor, 2020).

From the first FC (FCI) to the ninth FC (FCIX), the devolution formula mainly focussed on the principle of equity and catered to the states' varied needs, revenue-raising capacities and cost disabilities. However, this can also create an adverse incentive for states to over-project needs, cost disabilities and under-report revenue capacities (FC, various years). To offset this, the principle of efficiency was also added as a guiding principle from the tenth FC (FCX). This was meant to incentivize states to utilize their resource base effectively and undertake their fiscal operations efficiently (FC, 2000). From the FCX up to the FCXV, equity and efficiency have been the two guiding principles while determining tax devolution. One more consideration came into the decision matrix in the FCXV when it used demographic outcome as a component for deciding devolution. This has been welcomed by well-performing states which had earlier felt that they were unfairly allocated because of better performance on various developmental targets (FC, 2014).

The rest of the paper is organized as follows. In Section 2, we present the background for our proposal, and in Section 3, the Material and Methods used in this study are discussed. Section 4 presents our results and analysis: the devolution that emerges by using alternate criteria. Section 5 concludes this study by discussing our findings and their implications for public policy.

Background: Evolution of Weights and Criteria

In India, from the FCI to the FCX, the main shareable taxes (collected by the Centre and then distributed between the Centre and the states) were income tax and Union excise duties. In 2000, a constitutional amendment under Article 270 decreed that the states were entitled to receive a fixed share from all central taxes and duties (except for central sales tax, consignment tax, surcharges and cesses) (RBI, 2011). The main shareable central taxes included corporation tax, income tax, customs, excise duty and service tax (RBI, 2016). In July 2017, the government abolished many of the taxes levied and collected by the Centre and state, including excise taxes, service taxes, state VAT and central sales taxes. These taxes were replaced with the Goods and Services Tax (GST) (CBIC, 2019). Given the recent changes due to GST, a discussion involving the GST may be premature. We, therefore, leave out GST and its impact from the scope of this paper.

Population

The FCI to the seventh FC (FCVII) considered only population and collection as criteria for devolution of income tax. The population was regarded as a simple, unbiased and transparent criterion that reflects the expenditure requirements of a state. This resulted in equal transfers to all states in per capita terms without considering cost disabilities across states (FC, 2000, 2009).

Collection/ Contribution to Income Tax

The main reason to use the collection as a criterion was to consider the income at the point of origin. Some states opposed the collection criterion as they felt that income generation, particularly with regard to non-agricultural activities, is spatially inter-connected. There are linkages involved on the input side as well as the demand side. The final output may have used inputs produced in other states, which would have denied the benefit of value addition. The collection criteria were dropped from FCX (FC, 1994).

The main criteria used to determine the states' share of the Union excise duties were population, fiscal weakness and economic backwardness. Initially, as in the case of income taxes, the devolution of the Union excise duties was based on population as the main criterion. Its weight was reduced from 100% in FCI to 75% in the sixth FC (FCVI). This was further reduced to 25% by the seventh FC (FCVII).

From the eighth FC (FCVIII) onwards, there was an effort to bring unanimity in the formula used for devolution of both the Union excise duties and the income tax. The FCVIII also, for the first time, disbursed a part of the Union excise duties based on state deficits after the devolution of central taxes. The problem with this criterion was that it gave states an adverse incentive to increase the deficit to attract larger allocation. This was discontinued by the eleventh FC (FCXI) to maintain transparency and reduce the problem of adverse selection by states (FC, 2000).

Income Criterion

The fifth FC (FCV) introduced an income distance criterion (FC, 1969) to bring in an equalizing component for the first time. The states whose

per capita income (PCI) was less than the average PCI of all states would receive a higher share of Union excise duties. This measure was normalized using the population of the states.

The sixth FC (FCVI) used a revised measure of income distance for all states. Each state's PCI was subtracted from that of the highest state. The state with the highest PCI had zero distance. The FCVII introduced the revenue equalization and inverse income criteria. The revenue equalization criteria estimated each state's revenue potential by regressing each state's revenue per capita on its PCI. The distance of each state's estimated own revenue potential was calculated from the state with the highest estimated own revenue potential. Finally, the distance calculated for each state was divided by the aggregate distance for all states weighted by population (FC, 1978). The inverse income criteria used each state's population and weighted it by the inverse of the PCI to arrive at an inverse income-adjusted population. The share of each state was then measured by the percentage of inverse income-adjusted population of that state to the aggregate inverse income-adjusted population of all states (FC, 1984).

The FCVIII and FCIX used the inverse income formula (introduced earlier by FCVII) and the income distance formula (introduced by FCVI). However, for the income distance criteria, they ensured that the state with the highest PCI was also given a share based on the distance of its PCI from that of the next highest state. This was adopted by the successive FCs as well.

The FCX used only the income distance criteria, discontinuing the inverse income criteria. In a slight deviation, the FCX did not use a single state for benchmarking the highest level. Instead, it chose the average of the three highest per capita income states to measure the distance of the income of lower PCI states. The eleventh and twelfth FCs followed the method used by FCX in income distance measure (FC, 2004). The fourteenth FC (FCXIV) and FCXV reverted to the income distance formula used by FCVIII and FCIX.

Fiscal Capacity Distance Criterion

Instead of using the income distance criteria, the thirteenth FC (FCXIII) introduced the fiscal capacity distance criterion. This criterion is measured based on the distance between each state's taxable capacity (per capita) and that of the highest state. The fiscal capacity distance of each

state was calculated using its tax–GSDP ratio. However, it differentiated between the general category states and the special states. Various arguments were placed for this methodological change. While the GSDP can capture a state's economic activity level, it does not reflect the taxable base, which would depend on the sectoral income distribution. Those states with a larger share of agricultural income would have a lower tax capacity since agriculture (except for plantations) is not effectively taxable. Secondly, GSDP estimates are measured at factor cost, leaving out remittances. Thus, the state average tax–GSDP ratio is higher for general category states as compared to special category states. Group-specific averages were applied to the two categories to better measure the distance in fiscal capacity between states (FC, 2009).

Area

The FCX, for the first time, introduced the area as a criterion. The reason was that a state with a larger area had to undertake greater administrative costs to provide comparable services. However, it was felt that though the service provision costs increased with the size of a state, it was at a diminishing rate and after a certain point, these incremental costs would become insignificant. Further, states with smaller areas have to undertake certain minimum administrative and public service provision costs. These costs may be higher in many smaller states because of the unfavourable geographical terrain. Considering these concerns, the FCX and FCXI used an adjustment procedure whereby a ceiling of 10% and a floor of 2% were introduced. The twelfth FC (FCXII) introduced a floor of 2% but did not fix any upper limit. This was followed by FCXIII, FCXIV and FCXV (FC, 2004, 2009, 2019).

Incentives for Fiscal Discipline and Tax Effort

More recent FCs have tried to incorporate incentives for fiscal efficiency (like fiscal discipline and tax effort) in determining devolution. The FCX had begun in this direction by introducing a tax effort index criterion. A state's tax effort was calculated by dividing its tax revenue by its PCI. This ratio was further weighted by the inverse of its PCI as it ensured that if a poorer state exerted as much tax effort as a richer state, it would get additional funds. The FCXI used the same formula as the FCX for tax

effort but changed the weight assigned to it. In addition to tax effort, the FCXI and FCXII also included an index of fiscal discipline. While calculating this index, the FCXI used the ratio of the state's own revenue to its revenue expenditure divided by the average ratio of its own revenue to revenue expenditure for all states. The ratio measures the change in the fiscal discipline index between two periods (i.e., the reference period compared to a base period). An improvement could result from higher own revenues, lower revenue expenditure or a combination of the two. If all states perform badly, then the state that performs comparatively better is rewarded.

Similarly, if the revenue balance is improving for all states, the state where improvement is comparatively greater is rewarded more. The FCXIII dropped tax effort and solely used fiscal discipline as a criterion (FC, 2004, 2009). The FCXIV did not use any fiscal efficiency index to devolve funds to states, while FCXV used only tax effort as a fiscal efficiency criterion (FC, 2019).

From the FCX onwards, the devolution criteria have more or less focussed on (a) population and income distance to reflect need factors, (b) area and infrastructure index to reflect cost disability factors and (c) tax effort and fiscal discipline to reflect fiscal efficiency indicators (FC, 2014).

Environment and Demographic Considerations

The FCXIV, for the first time, introduced forest cover as a criterion in the devolution of central taxes to states. We believe that states' measures to maintain and increase the supply of environmental public goods have resulted in positive environmental externalities and benefitted the nation. However, states have an opportunity cost of maintaining environmental goods like forests, which could have been depleted for commercial purposes. Hence, environmental services are important in constructing optimal intergovernmental fiscal arrangements (FC, 2009, 2014). States were compensated for keeping their forests intact rather than converting them for development purposes. In a certain way, it was sending out the message that states with larger green cover would get larger allocations. We feel that this was a very forward-looking inclusion, given that one of humanity's grand challenges is climate change. In another departure from convention, FCXV, for the first time, introduced a demographic performance indicator.

A Proposal to Include Social Indicators

As forest conservation is incentivized by FCXIV and fertility reduction is incentivized by FCXV, we feel that future FCs should also incentivize social change. The states that have achieved better on these social parameters should rightfully be allotted a larger share of resources. States that have greater gender equality (FMR) and human capital (FLR) perform better, in terms of both human development and economic growth (Ghosh, 2018). Gender equality and sustainable development (economic, social and environmental) have reinforced each other (UN, 2014). It increases the competitiveness of the labour markets and reduces corruption (Ward et al., 2010). An increase in female literacy rates will help to reduce child mortality rates as well as fertility rates and it will also influence the educational level of future generations (Karam, 2013). It has been argued that FLR is a better predictor of fertility and mortality rates, resulting from empowerment indicators like FLR (Saurabh et al., 2013).

Even after 70 years of planned social development in India, there is considerable gender disparity evidenced by most indicators like the FMR and FLR. This is more pronounced in rural areas and amongst disadvantaged groups (ET, 2015; Raghavendra, 2020). There are significant religion-wise disparities in FMR and caste-wise disparities in FLR (MOSPI, 2018). It, therefore, makes it even more urgent that policy incentivizes progress in social development as measured by such outcomes rather than perpetuating patriarchal structures that can get camouflaged in broad measures like population and area.

Our discussion suggests that very few contributions compare an outcome-based approach with the conventional gap-filling approach in the devolution in India. Our study aims to provide evidence of how allocations would change if devolutions of funds were based on incentive or outcome-based criteria. We go a step further to suggest that these targets could be some of India's key SDG commitments at the 2015 UN summit. We look back at how devolutions would change for each state from the FCXIII to the FCXV if an outcome-based approach had been used.

Material and Methods

The Indian economy has transitioned from a command-and-control economy to a liberal, market-oriented economy since early 1990 (Kotwal et al., 2011). The emphasis of market-oriented systems is to ensure

efficiency and optimal outcomes. We examine how the devolution mechanism could be made more sensitive to outcome criteria focusing primarily on the three most recent FCs, namely FCXIII, FCXIV and FCXV (2020–2021).

We take the original criteria used by the FCXIII, FCXIV and FCXV but add seven additional criteria from the Social Development Goals—the female–male ratio (FMR), gender parity index (GPI), female literacy rate (FLR), gross enrolment ratio (GER), drop-out rate (DR) and environmental outcomes (see Table 1). While forest cover was first included by FCXIV and demographic concerns (measured by the fertility rates) by FCXV, we improve upon these by including an incremental change option for the newly proposed criteria. This helps overcome any bias that may arise due to legacy issues and allows measuring performance rather than on historically determined values.

The original criteria of FCXIII to FCXV are discussed in the Supplementary Information (Appendix) for the interested reader. We propose two alternative possibilities for these FCs that could help move the devolution mechanism in India to meet SDG commitments. As discussed earlier, we wish to include social development indicators pertaining to education and gender parity and environmental indicators like land degradation and improve on the forest criteria already in use since FCXIV. The first option is to use the absolute values of these three criteria as proposed below. We, after that, consider an incremental option of the same criteria.

The Weights and Criteria: Alternate Proposal

We will discuss the criteria and propose a weighing schema required to include additional criteria.

New Criteria I (NCI)

- a. *FMR distance*. It would measure the distance of each state from the one with the lowest FMR. This distance is divided by the total distances of all states. The state with the lowest FMR is given a value (absolute value) equal to the distance from the next lowest state. The share of each state is estimated as follows:

$$S_i^m = FMRD_i^t / \sum_{i=1}^n (FMRD_i^t) \quad (1)$$

Table 1. Criteria and Weights for Devolution FCXIII–FCXV (Actual and Alternate).

Sr. No	Criteria for Devolution	Actual Weights (FCXIII)		Actual Weights (FC-XV)		Alt I - Alternative Weights (FCXIII)		Alt II - Alternative Weights (FCXIII)		Alt I - Alternative Weights (FCXIV)		Alt II - Alternative Weights (FCXIV)		Alt I - Alternative Weights (FCXV)		Alt II - Alternative Weights (FCXV)	
		C	D	E	F	G	H	I	J	K							
1	Population 1971	25	17.5	15	25	25	17.5	17.5	17.5	15	15	15	15	15	15	15	15
2	Area	10	15	15	10	10	15	15	15	15	15	15	15	15	15	15	15
3	Fiscal capacity distance	47.5	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0
4	Fiscal discipline	17.5			17.5	17.5	0	0	0	0	0	0	0	0	0	0	0
5	Income distance	0	50	45	0	0	35	35	35	32.5	32.5	35	35	32.5	32.5	32.5	32.5
6	Demographic change	0	10	12.5	0	0	10	10	10	12.5	12.5	10	10	12.5	12.5	12.5	12.5
7	Forest cover	0	7.5	10	3.75	7.5	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
8	Land degradation	0	0	0	3.75	0	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
9	FMR	0	0	0	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
10	GPI	0	0	0	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
11	FLR	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
12	GER	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
13	Drop-out rate	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
14	Tax effort	0	0	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Column C: (FC 2009); Column D: (FC 2014); Column E: (FC 2019).

where

$FMRD_i^t$ = Distance of the FMR of i th state from the state with the lowest FMR.

where

$t = 2001$ for FCXIII

$t = 2011$ for FCXIV

$t = 2011$ for FCXV

- b. *GPI distance*: It would measure the distance of each state from the one with the lowest GPI. This distance is divided by the total distances of all states. The state with the lowest GPI is given a value (absolute value) equal to the distance from the next lowest state. According to the availability of data, we used the GPI (all categories) for classes I–VIII (elementary level) for FCXIII and GPI for classes I–V (primary level) for FCXIV and FCXV. The share of each state is estimated as follows:

$$S_i^m = GPI_i^t / \sum_{i=1}^n (GPI_i^t) \quad (2)$$

where

GPI_i^t = Distance of the GPI of i th state from the state with the lowest GPI.

where

$t = 2009$ – 2010 for FCXIII

$t = 2014$ – 2015 for FCXIV

$t = 2019$ – 2020 for FCXV

- c. *FLR distance*: It would measure the distance of each state from the state with the lowest FLR. This distance is divided by the total distances for all states. The state with the lowest FLR is given a value (absolute value) equal to the distance from the next lowest state. The share of each state is estimated as follows:

$$S_i^m = FLRD_i^t / \sum_{i=1}^n (FLRD_i^t) \quad (3)$$

where

$FLRD_i^t$ = Distance of the FLR of i th state from the state with the lowest FLR

where

$t = 2001$ for FCXIII
 $t = 2011$ for FCXIV
 $t = 2011$ for FCXV

- d. *GER distance*: It measures the distance of each state from the one with the lowest GER. This distance is divided by the total distances of all states. The state with the lowest GER is given a value (absolute value) equal to the distance from the next lowest state. Here, the GER is for the elementary level (classes I–VIII) for all categories. The share of each state is estimated as follows:

$$S_i^m = GER_i^t / \sum_{i=1}^n (GER_i^t) \quad (4)$$

where

GER_i^t = Distance of the GER of i th state from the state with the lowest GER.

where

$t = 2009–2010$ for FCXIII
 $t = 2014–2015$ for FCXIV
 $t = 2019–2020$ for FCXV

- e. *Drop-out rate distance (DR)*: measures the distance of each state from the one with the highest DR. This is done to reward states with Lower DR. This distance is divided by the total distances of all states. The state with the highest DR is given a value (absolute value) equal to the distance from the next highest state. Here, DR is calculated for classes I–V (primary level) for all categories. The share of each state is estimated as follows:

$$S_i^m = DR_i^t / \sum_{i=1}^n (DR_i^t) \quad (5)$$

where

DR_i^t = Distance of the DR of i th state from the state with the highest DR.

where

$t = 2009–2010$ for FCXIII

$t = 2014\text{--}2015$ for FCXIV

$t = 2019\text{--}2020$ for FCXV

- f. Forest cover (FOR): A version of the environmental criterion (FOR) had already been adopted by FCXIV. To recollect, the FCXIV had used the state's share of forest (dense and moderately dense) cover in the country's total forest cover. We propose a modification to this criterion. We use forest cover (measured as the very dense and moderately dense forest cover in each state) as a ratio of its own total geographical area. This ratio for each state is then divided by the ratio of all states. The share of each state is estimated as follows:

$$S_i^m = \frac{\text{FOR}_i^t}{\text{total area of } i\text{th state}} / \sum_{i=1}^n \frac{\text{FOR}_i^t}{\text{total area of } i\text{th state}_i} \quad (6)$$

where

$t = 2007$ for FCXIII

$t = 2013$ for FCXIV

$t = 2017$ for FCXV

- g. Land degradation distance (LD): We calculate the total land degradation as a percentage of the total geographical area of each state. This ratio for each state is then divided by the ratio of all states. Finally, we take the inverse of this ratio or one divided by this ratio. An inverse ratio is taken so that states with less degradation are rewarded more. The reason for choosing these years is determined by the data availability and to match the respective FC period. The share of each state is estimated as follows:

$$S_i^m = 1 / (LD_i^t / \sum_{i=1}^n (LD_i^t)) \quad (7)$$

where

LD_i^t represents land degradation–geographical area ratio of the i th state.

$t = 2005\text{--}2006$ for FCXIII

$t = 2011\text{--}2013$ for FCXIV

$t = 2015\text{--}2016$ for FCXV

However, one criticism of adopting the absolute values (of FMR, FLR, GER, GPI, DR, LD and FOR) is that it does not measure change (improvement), and states could be rewarded or penalized based on historical values and may suffer from legacy bias.

New Criteria II (NCII)

To control for any such legacy bias, we have proposed an alternative method based on relative performance and incremental change. So, we use the change in FMR, FLR, GER, GPI, DR, LD and FOR. This change in a state is divided by the total change for all states and therefore measures relative performance.

(1A) Incremental FMR: The share of each state is estimated as follows:

$$S_i^m = dFMR_i^t / \sum_{i=1}^n (dFMR_i^t) \quad (8)$$

where

$$dFMR_i^t = FMR_i^{2001} - FMR_i^{1991} \quad \text{for FCXIII} \quad (8a)$$

$$dFMR_i^t = FMR_i^{2011} - FMR_i^{2001} \quad \text{for FCXIV} \quad (8b)$$

$$dFMR_i^t = FMR_i^{2011} - FMR_i^{2001} \quad \text{for FCXV} \quad (8c)$$

(2A) Incremental GPI: The improvement ratio is calculated by taking the difference in the GPI in 't' as compared to a period preceding it ('t - 1'). The value for each state is then subtracted from the state with the least improvement ratio and the total is summed for all states. This subtracted value is then normalized by dividing it by the total. The share of each state is estimated as follows:

$$S_i^m = dGPI_i^t / \sum_{i=1}^n (dGPI_i^t) \quad (9)$$

where

$$dGPI_i^t = ((GPI_i^{2009} - GPI_i^{2006}) - \text{(state with least improvement ratio)}) \quad \text{for FCXIII} \quad (9a)$$

$$dGPI_i^t = ((GPI_i^{2014} - GPI_i^{2009}) - \text{(state with least improvement ratio)}) \text{ for FCXIV (9b)}$$

$$dGPI_i^t = ((GPI_i^{2019} - GPI_i^{2014}) - \text{(state with least improvement ratio)}) \text{ for FCXV (9c)}$$

(3A) Incremental FLR: The share of each state is estimated as follows:

$$S_i^m = dFLR_i^t / \sum_{i=1}^n (dFLR_i^t) \tag{10}$$

where

$$dFLR_i^t = FLR_i^{2001} - FLR_i^{1991} \text{ for FCXIII (10a)}$$

$$dFLR_i^t = FLR_i^{2011} - FLR_i^{2001} \text{ for FCXIV (10b)}$$

$$dFLR_i^t = FLR_i^{2011} - FLR_i^{2001} \text{ for FCXV (10c)}$$

(4A) Incremental GER: *The improvement ratio is calculated by taking the difference in the GER in ‘t’ as compared to a period preceding it (‘t – 1’). The value for each state is then subtracted from the state with the least improvement ratio. This ratio is then divided by the total summation for all states. The share of each state is estimated as follows:

$$S_i^m = dGER_i^t / \sum_{i=1}^n (dGER_i^t) \tag{11}$$

where

$$dGER_i^t = ((GER_i^{2009} - GER_i^{2006}) - \text{(state with least improvement ratio)}) \text{ for FCXIII (11a)}$$

$$dGER_i^t = ((GER_i^{2014} - GER_i^{2009}) - \text{(state with least improvement ratio)}) \text{ for FCXIV (11b)}$$

$$dGER_i^t = ((GER_i^{2019} - GER_i^{2014}) - \text{(state with least improvement ratio)}) \text{ for FCXV (11c)}$$

- (5A) Incremental DR: The improvement ratio is calculated by taking the difference in the DR in 't' as compared to a period preceding it ('t - 1'). The value for each state is then subtracted from the state with the least improvement ratio and the total is summed for all states. This subtracted value is then normalized by dividing it by the total for all states. The share of each state is estimated as follows:

$$S_i^m = dDR_i^t / \sum_{i=1}^n (dDR_i^t) \quad (12)$$

where

$$dDR_i^t = \left(\text{(state with least improvement ratio)} - (DR_i^{2009} - DR_i^{2006}) \right) \text{ for FCXIII} \quad (12a)$$

$$dDR_i^t = \left(\text{(state with least improvement ratio)} - (DR_i^{2014} - DR_i^{2009}) \right) \text{ for FCXIV} \quad (12b)$$

$$dDR_i^t = \left(\text{(state with least improvement ratio)} - (DR_i^{2019} - DR_i^{2014}) \right) \text{ for FCXV} \quad (12c)$$

- (6A) Incremental FOR: The improvement ratio is calculated by taking the difference in the forest—geographical area ratio in 't' as compared to a period preceding it ('t - 1'). The value for each state is then subtracted from the state with the least improvement ratio and the total is summed for all states. This subtracted value is then normalized by dividing it by the total. The reason for choosing these years is determined by data availability and to match the respective FC period. The share of each state is estimated as follows:

$$S_i^m = dFOR_i^t / \sum_{i=1}^n (dFOR_i^t) \quad (13)$$

where

FOR_i^t represents the forest–geographical area ratio of the i th state

$$dFOR_i^t = ((FOR_i^{2007} - FOR_i^{2003}) - (\text{state with least improvement ratio}))$$

for FCXIII (13a)

$$dFOR_i^t = ((FOR_i^{2013} - FOR_i^{2009}) - (\text{state with least improvement ratio}))$$

for FCXIV (13b)

$$dFOR_i^t = ((FOR_i^{2017} - FOR_i^{2015}) - (\text{state with least improvement ratio}))$$

for FCXV (13c)

Having laid out the criteria, we now discuss the proposed weights for all criteria (existing and proposed).

(7A) Incremental LD: The incremental ratio is calculated by taking the difference in the LD in ‘ t ’ as compared to a period preceding it (‘ $t - 1$ ’). The value for each state is then subtracted from the state with the least improvement ratio and the total is summed for all states. This subtracted value is then normalized by dividing it by the total. We did not use the incremental ratio of LD for FCXIII due to the unavailability of data required for this study.

The share of each state is estimated as follows:

$$S_i^m = dLD_i^t / \sum_{i=1}^n (dLD_i^t) \tag{14}$$

where

$$dLD_i^t = ((\text{state with least improvement ratio} - (LD_i^{2014} - LD_i^{2009})))$$

for FCXIV (14 a)

$$dLD_i^t = ((\text{state with least improvement ratio} - (LD_i^{2019} - LD_i^{2014})))$$

for FCXV (14b)

Alternate Weights

Introducing three new criteria requires reconfiguring weights amongst the existing criteria (see Table 1, columns F–K). We propose the following in the absence of any defined method in the FC framework for assigning weights. We have included social and environmental indicators to represent SDG 4, SDG 5 and SDG 15. We assign an equal weight of 7.5% in totality to each SDG. This method has a precedent in FC methodology—the FCXIV used a weighing allocation method to introduce forest cover as a criterion. We have used FLR, GER and drop-out rate to represent SDG 4 (quality education), which have been given an equal weight of 2.5% each, totalling 7.5% for SDG 4. FMR and GPI have been used to represent SDG 5 (gender equality) and given an equal weight of 3.75% each, totalling 7.5%. Similarly, forest cover and land degradation have been used to represent SDG 15 (environment) and given an equal weight of 3.75% each, which totals 7.5%.

FCXIII: In the revised FCXIII weights in our schema, the weight of fiscal capacity distance could be reduced from 47.5% to 25% so that the total weights sum up to 100.

FCXIV: In the revised FCXIV weights in our schema, the weight of income distance criteria was reduced from 50% to 35% to arrive at a total of 100%.

FCXV: In the revised FCXV weights in our schema, we reduce the weight of the environment criterion to 7.5% (from earlier 10%). This also required reconfiguring the weight of income distance criteria, which was reduced from 45% to 32.5 % to restore the total to 100%.

Data

Information on FMR and FLR is taken from the Census' decadal surveys of 1991–2011 (MOSPI 2014; 2018). The FLR was not available for 1991 for Jammu, Kashmir and Jharkhand. We extrapolated a value for 1991 by taking the difference between the FLR of 2011 over 2001, and we subtracted this value from the 2001 value to arrive at the value for 1991 for these two states. Data on drop-out rates for 2006–2007, 2009–2010, 2014–2015 and 2019–2020 were taken from respective state report cards (NUEPA 2016; 2008; 2012; GOI, 2021). Drop-out rates for 2009–2010

and 2014–2015 were unavailable for Kerala, and we extrapolated their values. Data on GPI and GER for the years 2006–2007, 2009–2010, 2014–2015 and 2019–2020 were taken from (GOI, 2021; MHRD, 2018; MOSPI, 2022). Data on forest cover for 2003, 2007, 2009, 2013, 2015 and 2017 are taken from the FSI (2005, 2009, 2011, 2013 and 2017). Data on land degradation for 2003–2005, 2005–2006, 2011–2013 and 2015–2016 were taken from (CSO, 2018; NSO, 2020). FCXIV provided the tax share for 29 states which includes the newly formed state of Telangana. However, for reasons of compatibility with earlier years, we have merged Telangana with its original state (Andhra Pradesh) and derived the state shares for 28 states. We averaged the value of GPI, GER and drop-out rates of Andhra Pradesh and Telangana to merge these states. A similar exercise was done for the FCXV, wherein we derived the share of 27 states (excluding Jammu and Kashmir due to the Jammu and Kashmir Reorganisation Act, 2019). This was done mainly due to the unavailability of data for the additional criteria incorporated into the devolution formula. Data for the original criteria was accessed from the various FC reports.

In the next section, we present our findings and analysis.

We now briefly discuss the data that we have used in our calculations.

Results

When we apply the alternative criteria and the weights stated above, we find changes in each state's share (see Tables 2–4, criteria-wise detailed estimates are presented in SI Tables A1–A6). We first discuss the outcomes based on new criteria I (NCI) and then the outcomes based on NCII.

Revised Allocation for NCI

FCXIII: We find that Andhra Pradesh, Assam, Bihar, Jharkhand, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal would have received a lower share than they did from the FCXIII (see Table 2). Uttar Pradesh has a drastic reduction (5%) in its share, followed by Bihar (3%). Goa would have seen an increase in its share to 1.06 compared to the actual share of 0.27. Most of the high-income states would have seen an increased share.

Table 2. FCXIII: Actual and Alternate Shares Using Alternative Criteria (NCI and NCII).

States	Actual	Share	Gains (+)	Share	Gains (+)
	Share in FCXIII	Computed Using NCI	/ Loss (-) (Column 3 - 2)	Computed Using NCII	/ Loss (-) (Column 5 - 2)
1	2	3	4	5	6
Andhra Pradesh	6.94	6.19	-0.75	6.30	-0.64
Arunachal Pradesh	0.33	1.15	0.82	1.50	1.17
Assam	3.63	3.17	-0.46	3.35	-0.28
Bihar	10.92	7.62	-3.30	8.21	-2.71
Chhattisgarh	2.47	2.69	0.22	2.67	0.20
Goa	0.27	1.06	0.79	0.50	0.23
Gujarat	3.04	3.39	0.35	3.24	0.20
Haryana	1.05	1.42	0.37	1.49	0.44
Himachal Pradesh	0.78	1.45	0.67	1.18	0.40
Jammu & Kashmir	1.55	1.73	0.18	2.03	0.48
Jharkhand	2.8	2.57	-0.23	3.15	0.35
Karnataka	4.33	4.28	-0.05	4.26	-0.07
Kerala	2.34	3.17	0.83	3.27	0.93
Madhya Pradesh	7.21	5.91	-1.30	5.99	-1.22
Maharashtra	5.2	5.44	0.24	5.19	-0.01
Manipur	0.45	1.27	0.82	1.13	0.68
Meghalaya	0.41	1.35	0.94	2.60	2.19
Mizoram	0.27	1.16	0.89	0.83	0.56
Nagaland	0.31	0.92	0.61	0.98	0.67
Odisha	4.78	4.28	-0.50	4.27	-0.51
Punjab	1.39	1.85	0.46	1.83	0.44
Rajasthan	5.85	4.84	-1.01	5.32	-0.53
Sikkim	0.24	1.06	0.82	1.15	0.91
Tamil Nadu	4.97	5.12	0.15	5.14	0.17
Tripura	0.51	1.38	0.87	0.87	0.36
Uttar Pradesh	19.68	14.30	-5.38	14.98	-4.70
Uttarakhand	1.12	1.72	0.60	1.94	0.82
West Bengal	7.26	6.21	-1.05	6.63	-0.63

Source: FC (2009) and authors' calculations.

FCXIV: The states that see reduced allocation are Andhra Pradesh, Assam, Bihar Chhattisgarh, Jharkhand, Jammu and Kashmir, Karnataka, Maharashtra, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal. The states which gain are Goa, Gujarat, Punjab, Haryana, Himachal Pradesh, Uttarakhand, Kerala, Tamil Nadu, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Arunachal Pradesh (Table 3).

Table 3. FCXIV Actual and Alternate Shares Using Alternative Criteria (NCI and NCII).

States	Actual Share in FCXIV	Actual Share in FCXIV (Using AP Merged with Telangana)	Alternate Share Computed NCI	Gains (+) / Loss (-) (Column 4 - 3)	Alternate Share Computed NCII	Gains (+) / Loss (-) (Column 6 - 3)
1	2	3	4	5	6	7
Andhra Pradesh	4.31	6.69	5.86	-0.83	6.06	-0.63
Arunachal Pradesh	1.37	1.37	1.41	0.04	1.55	0.18
Assam	3.31	3.3	3.15	-0.15	3.37	0.07
Bihar	9.67	9.63	8.00	-1.63	8.67	-0.96
Chhattisgarh	3.08	3.07	2.74	-0.33	2.73	-0.34
Goa	0.38	0.4	1.27	0.87	1.28	0.88
Gujarat	3.08	3.08	3.25	0.17	3.37	0.29
Haryana	1.08	1.36	1.69	0.33	2.12	0.76
Himachal Pradesh	0.71	0.71	1.27	0.56	1.14	0.43
Jammu & Kashmir	1.85	1.85	1.81	-0.04	1.97	0.12
Jharkhand	3.14	3.13	2.90	-0.23	3.11	-0.02
Karnataka	4.71	4.7	4.30	-0.40	4.42	-0.28
Kerala	2.5	2.49	3.08	0.59	2.86	0.37
Madhya Pradesh	7.55	7.53	6.02	-1.51	6.13	-1.40
Maharashtra	5.52	5.51	5.19	-0.32	5.34	-0.17
Manipur	0.62	0.62	1.32	0.70	1.54	0.92
Meghalaya	0.64	0.64	1.47	0.83	1.43	0.79
Mizoram	0.46	0.46	1.21	0.75	1.10	0.64
Nagaland	0.5	0.5	1.08	0.58	1.20	0.70
Odisha	4.64	4.63	3.99	-0.64	4.03	-0.60
Punjab	1.58	1.57	1.99	0.42	2.31	0.74
Rajasthan	5.5	5.48	4.90	-0.58	5.28	-0.20
Sikkim	0.37	0.37	1.07	0.70	1.06	0.69
Tamil Nadu	4.02	4.02	4.11	0.09	4.03	0.01
Tripura	0.64	0.64	1.48	0.84	1.17	0.53
Uttar Pradesh	17.96	17.89	14.53	-3.36	14.93	-2.96
Uttarakhand	1.05	1.05	1.44	0.39	1.25	0.20
West Bengal	7.32	7.16	6.39	-0.77	6.54	-0.62

Source: FC (2014) and authors' calculations.

Table 4. FCXV: Actual and Alternate Shares Using Alternative Criteria (NCI and NCII).

States	Actual Share in FCXV (Using AP Merged with Telangana)		Alternate Share Computed NCI	Gains (+) / Loss (-) (Column 4 – 3)	Alternate Share Computed NCII		Gains (+) / Loss (-) (Column 6 – 3)
	Actual Share in FCXV						
1	2	3	4	5	6	7	
Andhra Pradesh	4.111	6.24	5.67	-0.57	5.85	-0.39	
Arunachal Pradesh	1.76	1.76	1.27	-0.49	1.56	-0.20	
Assam	3.131	3.13	3.04	-0.09	3.26	0.13	
Bihar	10.061	10.06	8.34	-1.72	8.42	-1.64	
Chhattisgarh	3.418	3.42	2.80	-0.62	2.62	-0.80	
Goa	0.386	0.39	1.28	0.89	1.07	0.68	
Gujarat	3.398	3.4	3.54	0.14	3.60	0.20	
Haryana	1.082	1.08	1.48	0.40	1.79	0.71	
Himachal Pradesh	0.799	0.8	1.30	0.50	1.12	0.32	
Jharkhand	3.313	3.31	2.93	-0.38	3.08	-0.23	
Karnataka	3.646	3.65	3.53	-0.12	3.66	0.01	
Kerala	1.943	1.94	2.70	0.76	2.45	0.51	
Madhya Pradesh	7.886	7.89	6.24	-1.65	6.67	-1.22	
Maharashtra	6.135	6.14	5.70	-0.44	5.75	-0.39	
Manipur	0.718	0.72	1.35	0.63	1.60	0.88	
Meghalaya	0.765	0.76	1.57	0.81	1.28	0.52	
Mizoram	0.506	0.51	1.23	0.72	1.34	0.83	
Nagaland	0.573	0.57	1.12	0.55	1.61	1.04	
Odisha	4.629	4.63	3.96	-0.67	4.08	-0.55	
Punjab	1.788	1.79	2.15	0.36	2.25	0.46	
Rajasthan	5.979	5.98	5.44	-0.54	5.97	-0.01	
Sikkim	0.388	0.39	1.00	0.61	1.09	0.70	
Tamil Nadu	4.189	4.19	4.28	0.09	4.25	0.06	
Tripura	0.709	0.71	1.60	0.89	2.22	1.51	
Uttar Pradesh	17.931	17.93	14.83	-3.10	15.17	-2.76	
Uttarakhand	1.104	1.1	1.48	0.38	1.23	0.13	
West Bengal	7.519	7.52	6.79	-0.73	6.92	-0.60	

Source: FC (2019) and authors' calculations.

FCXV: We find that Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal would receive a lower share than they did from the FCXV. Most high-income states, including Goa, Haryana, Punjab and Gujarat, would increase their share under NCI (Table 4).

We now present the outcomes with NCII.

Revised Allocation for NCII

XIII FC: We find that the shares of states again alter considerably. The states with a decline in share are Andhra Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal (see Table 2).

FCXIV: The states which lose out are Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Karnataka, Maharashtra, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal. The states which gain are Arunachal Pradesh, Assam, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Mizoram Manipur, Meghalaya, Nagaland, Punjab, Sikkim, Tripura, Uttarakhand, Tamil Nadu and Kerala (see Table 3).

FCXV: The states which lose out are Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh, Uttarakhand and West Bengal. The states which gain are mostly the higher-income states like Goa, Gujarat, Haryana, Punjab and special category states (see Table 4).

Analysis

We now compare the differences in the outcomes between the NCI and NCII schemes in the context of the FCXIII, FCXIV and FCXV (Tables 5 and 7).

For the FCXIII, the states that lose when either NCI or NCII are used are Andhra Pradesh, Assam, Bihar, Jammu and Kashmir, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal (Table 5). The states that gain in both are Arunachal Pradesh, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand. The state that gains in NCI but loses in NCII is Maharashtra. The state that loses in NCI but gains in NCII is Jharkhand.

For the FCXIV, the states that lose when either NCI or NCII are used are Andhra Pradesh, Chhattisgarh, Bihar, Jharkhand, Karnataka, Maharashtra, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal. The states that gained in both cases are Arunachal Pradesh, Goa, Gujarat, Haryana, Himachal Pradesh, Kerala, Manipur, Mizoram, Meghalaya, Nagaland, Punjab, Sikkim, Tripura, Tamil Nadu and Uttarakhand. The states that lose in NCI but gain in NCII are Assam and Jammu and Kashmir. There are no states that gain in NCI but lose in NCII (see Table 6).

For the FCXV, the states that lose when either NCI or NCII are used are Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal. The states that gained in both cases are Goa, Gujarat, Haryana, Himachal Pradesh, Kerala, Manipur, Mizoram, Meghalaya, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand. The states that lose in NCI but gain in NCII are Assam and Karnataka. There are no states that gain in NCI but lose in NCII (see Table 7).

Conclusion and Discussion

In this paper, we have examined an alternate framework for the devolution of funds among states through the Finance Commission of India. We have explored the changes that would emerge if FCs adopted an

Table 5. FCXIII Summary of Gainers and Losers Using NCI and NCII.

	Gainers	Losers
NCI	Arunachal Pradesh, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand	Andhra Pradesh, Assam, Bihar, Jharkhand, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal
NCII	Arunachal Pradesh, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Manipur, Mizoram, Meghalaya, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand	Andhra Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal

Table 6. FCXIV: Summary of Gainers and Losers Using NCI and NCII.

	Gainers	Losers
NCI	Arunachal Pradesh, Goa, Gujarat, Haryana, Himachal Pradesh, Kerala, Punjab, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura and Uttarakhand	Andhra Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal
NCII	Arunachal Pradesh, Assam, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Manipur, Mizoram, Meghalaya, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand	Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Odisha, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal

Table 7. FCXV: Summary of Gainers and Losers Using NCI and NCII.

	Gainers	Losers
NCI	Goa, Gujarat, Haryana, Himachal Pradesh, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand	Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal
NCII	Assam, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Manipur, Mizoram, Meghalaya, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and Uttarakhand.	Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal

incentive-based framework, whether it is based on absolute or relative achievements. We used social indicators as alternative criteria to determine the states' share, namely the FMR, GPI, FLR, GER, drop-out rate, forest cover and land degradation. Earlier FCs may not have used any outcome indicators to determine transfers to states as this strategy would benefit mainly the high-income states. In comparison, the states that lose out are the comparatively lower-income states. This could happen if we used the level values of these indicators. However, if we use incremental values of the indicators, it would help us overcome the problem of

historical bias and may incentivize states to use the funds more efficiently and direct them towards attaining social and development outcomes. At least three SDGs would directly be impacted by our proposed framework, namely, SDG 4 (education), SDG 5 (gender) and SDG 15 (environment).

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