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Climate Change Strategy and India's Federalism

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Abstract

This paper calls for a stronger and closer intergovernmental coordinated approach to fighting climate change in India. We argue that the current commonly proposed approach to fighting climate change in India based on sectoral policies (energy generation, transport sectors, etc.) is incomplete because it fails to specify what level of government will be in-charge on regulating and implementing those policies and how they will be financed. This will require understanding how the institutions of fiscal decentralization are framed and operate in India. The paper takes stock of current institutions and practices involving the four pillars of fiscal decentralization. Getting the functional assignment of responsibilities right will offer an answer to the question of who will be charged with regulating and monitoring compliance with the different sectoral policies for decarbonization and adaptation. Getting the other three pillars right will allow us to answer the question of financing. India seems to have the right framework of concurrent assignments of responsibilities, with the union government establishing minimum standards to prevent a race to the bottom among the states. The main problem appears to be that currently standards and regulations are not enforced. States currently work with insufficient revenues, raising questions about the necessary fiscal space to finance their climate change policies. There is also a need to reengineer India's current transfer policies to incentivize the states in fighting climate change. Adapting the last pillar of decentralization, borrowing, will be critical to help finance the large investments, especially in the case of adaptation programs.

Keywords: fiscal federalism; climate change, India

JEL classification: H70, H77, Q54, Q58

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1. Introduction: Aims, stylized facts, and current policy stand

The main aim of this paper is to analyze how the principles of fiscal decentralization design (in expenditure and revenue assignments, transfers and borrowing) can be adapted in India to engage subnational governments more successfully in fighting climate change.[1] This is a stock-taking effort for understanding the institutional and fiscal framework that exists in a large federation like India and to propose how best India can utilize the potential of the sub-national governments in addressing the climate issue. Our aim is to shed light into the institutional and fiscal challenges faced by the various levels of government in addressing some of the core issues of climate adaptation and mitigation challenge, including coordination issues. The main output is to provide recommendations in the short and medium term on how to re-calibrate the existing system of intergovernmental fiscal relations in India to better support climate and development goals, as an input to the recommendations of the next Fiscal Commission, the upcoming G-20 Presidency and the COP 27 discussions.

The need for fighting climate change in India is as obvious as in most other countries in the world from both the causes and effects perspectives.[2] India is among the largest green-house gas (GHG) emitters in the world, even when per capita emissions are relatively low. The projections are that by 2040 India will be the second largest emitter of GHG, representing 13 percent of the world total, all of which puts the country at the center of the global fight against climate change. Several factors are behind that alarming forecast (Goel 2019), including high dependence on coal for power generation and inefficient plants to burn it, very significant population growth (300

[1] The paper partially draws on the methodology proposed in Martinez-Vazquez (2021).

[2] This case for fighting climate change has been made more fully for several other countries, conspicuously for China. See, for example, Chen et al. (2022) for an in-depth analysis of the relevance of climate mitigation for China's development and social wellbeing, which in many ways apply perfectly well in scope and intensity for those in India.

more million), a significant increase in urbanization, large increases in electricity access and marked increases in the overall growth of the economy. In addition to this, India has increasingly experienced extreme weather events, including extreme heat, floods, and high levels of polluted air. This reality has led the Government of India (GoI) to pledge at the recent Glasgow COP26 to achieve carbon neutrality, or net-zero GHG emissions, by 2070.[3]

Achieving those goals will require very significant sustained effort and resources, with little time to lose. Recent analyses (for example, Singh and Sidhu 2021) have already questioned whether the new budget of the Union Government for 2023 reflects the kind of measures needed to meet India's net zero emissions pledge by 2070 and the others by 2030. The budget requirements for the Union government, according to Council on Energy, Environment and Water (CEEW) as reported in Singh and Sidhu (2021), will be a total of $1.4 trillion or an average of $28 billion per year.[4] More recently, The Economic Survey, Government of India (2021) reaffirms that India is relying on domestic resources to implement adaptation and mitigation action for climate change, with the financing considerations remaining critical as the government has increased its targets quite substantially. Preliminary estimates provided by the NDC indicate that India's climate change actions till 2030 will require financial resource of USD 2.5 trillion (at 2014-15 prices). The Economic Survey calls for a clearer assessment of the financial requirement for

[3] In addition to the 2070 pledge, the GoI has made four other pledges achieving by 2030 non-fossil fuel energy capacity of 500 GW, obtaining 50 percent energy requirements from renewable sources, reducing total projected carbon emissions by 1 billion tons, and reducing the carbon intensity of the economy to less than 45 percent.

[4] On the other hand, India appears to be getting low international support to fight climate change (Ministry of Finance 2019). The most recent information is that the GCF (Green Climate Fund) finance to India amounts to only US$ 177 million, with less than half of that being grant based finance. On the other hand, the Government of India has been actively engaging with the GCF. So far, five projects have been approved with a total allocation of USD 514.8 million in diverse areas including water, clean energy, livelihoods and transport (Source: Press Information Bureau, July 18, 2022, Delhi.]

implementing the NDC and the importance of focusing on the possible sources for meeting those requirements.

Given the sectoral nature of the public discourse on climate change agenda in India, it may seem that effectively fighting climate change and meeting the net zero emissions pledge by 2070 may mainly, if not fully, just be a matter of implementing a handful of sectoral policies. For instance, in the 2021 Council on Energy, Environment and Water (CEEW) report, which argues that meeting the 2070 pledge will require investment in the electricity sector (generation, integration, transmission, and distribution), the production of hydrogen, and the manufacturing of electric vehicles (most of which will require investment from overseas, which may be sought on concessional terms). This view of what it will take to win the race against climate change somewhat contrasts with more holistic international studies on the causes and potential remedies for climate change which imply a more direct role for government intervention at all levels, central, state, and local.[5] Ahluwalia and Patel (2022) rightly point out that the multiplicity of interventions and their interconnectedness highlight the need for a 'whole-of-the-economy' approach. It will be necessary for India to coordinate across different ministries, and different levels of government (center and states) and also the private sector. They further note that the energy transition required will involve large investments in the energy and other sectors of the economy. Estimates of the additional investment needed vary, but it could be around 3 percent of India's GDP. Some of this will have to come from the public sector, but since the finances of both the central and state governments are under stress, it is important to ensure the maximum

[5] See, for example, the Stern Review (2006), the World Bank Outlook 2050 (Mukhi et al. 2020) and the World Bank "Decarbonization Development" report (Fay et al. 2015).

possible private sector involvement. This means policies must be designed to encourage private investment, both domestic and foreign.[6]

The Stern (2007) report, for example, lists transport activities as responsible for 14 percent of GHG emissions, land use for 18 percent, buildings for 8 percent, and waste for 3 percent. These activities in general tend to be regulated and taxed by regional and local government. Other significant sources of GHG, such as power generation, industry, or agriculture are also activities that in some decentralized countries may also be regulated and taxed by subnational governments. Adding things up, over 40 percent of GHG emissions may come from activities over which subnational governments typically exert regulatory and taxing powers. This highlights the potential significant role to be played by subnational governments in the design of comprehensive strategies to fight climate change.[7] The analysis in other comprehensive reports, for example, Fay et al. 2015, lead to similar conclusions, including the role of subnational governments in the preservation and expansion of carbon sinks (forest cover, etc.) for the removal of carbon from the atmosphere.

The most salient advantage of a multi-level government approach to the provision of climate related functions is the possibility of catering to geographical differences in needs, better access and information, and for providing a laboratory for innovations that can be replicated in other

[6] and Adrian (2022) suggest several possible ways for governments to further engage the private sectors in fighting climate change, including for government to invest equity (bringing higher risks when the underlying asset loses value) and providing credit, which also reduces risk to the private sector. By taking an equity position in climate investments, the public sector would bear much of the investment risk, but it would also see upside benefits when investments succeed. However, they also recommend capping contingent liabilities to prevent large public debt increases.

[7] For areas where subnational governments are expected to have an impact on fighting climate change, according to Goel (2019), GHG emissions from the transport sector are expected to triple between 2015 and 2040, while buildings are currently the largest energy consumption sector in India.

locations, especially in the case of adaptation programs. The presence of large externalities and economies of scale also demand an important role for central governments.

As multi-level governance systems can be instrumental to more effectively fighting climate change, the potential flawed design of fiscally decentralized systems can also imply that multi-level governance can be a hindrance to more effectively fighting climate change. For example, subnational jurisdictions can compete in a race-to-the-bottom[8] to attract business activity by relaxing environmental standards, or free ride on the policy intervention of their neighbors (Gupta 2014). Empirically, the findings on the impact of multi-level systems on climate change are generally mixed and, not surprisingly, country dependent.[9] The relevant lesson here is that in any country it is equally important to examine how multi-level governance can be leveraged to more effectively forward the climate agenda, as to verify, and rectify as needed, if the current design of the decentralization system is contributing to retarding the climate change policy agenda.

But how involved are in practice subnational governments in India in fighting climate change? Some answers to this question will be offered in the balance of this paper as we examine their role within the four pillars of fiscal decentralization (the assignment of functional expenditure responsibilities, revenue assignments, the system of transfers and borrowing). However, lacking more disaggregated data, measuring that involvement remains a difficult exercise in India and most other countries. One approach could be to quantify the relative share of subnational governments in environmental expenditures, but this provides only a limited view, because

[8] Refers to the policies of subnational governments to try attracting the location of businesses by implementing the lowest taxes and lowest environmental standards.

[9] See Martinez-Vazquez (2021) for a summary discussion.

subnational governments are likely involved in other related decarbonization activities (transportation, housing, sanitization, etc.), and adaptation projects are not likely to be reflected among "environmental expenditures." Another approach is to look at the evidence on subnational government involvement in the Nationally Determined Contributions (NDCs) under the Paris Agreement. By those standards the actual role of subnational governments in climate related actions would appear to be modest in India, as it is in most countries.[10] Hence the need to examine more deeply the multiple venues through which subnational governments could become leading agents in the planning and implementation of decarbonization and adaptation policies in India. Many countries around the world still have to effectively engage their states and local governments in their overall climate change strategy and policy developments.

In this paper we will examine how to more effectively fighting climate change in India through coordinated strategies involving the union, state and local levels. However, the big tool at hand, the present system of intergovernmental fiscal relations in India, is in several important dimensions tenuous and less friendly to climate policies and actions at the sub-national level itself.[11] The recent paper by Pillai, Dubash and Bhatia (2021) recommend changes across multiple layers of Indian federalism, from the center to the states and the relationship between them. Specifically, they argue for a focus on three objectives: - (i) augmented capacities at the state level to design and implement policies; (ii) improved coordination mechanisms for the

[10] One issue is that NDCs are defined at the aggregate national level; getting information on the role of subnational governments would require, where it has not been done, mapping the main polluting sectors and activities into the functions and expenditure responsibilities of subnational governments. Insight into the role of subnational governments may also come from the "Strategic Climate Action Plan (SCAP)" of the subnational governments themselves. For an example of SCAP, see King County Climate Action Team (2020).

[11] India has a highly centralized federal structure that sits uneasily with the nature of the climate change challenge. While financial and bureaucratic capacities are concentrated in the center, the locus of climate decisions lies largely in the states because they are responsible for steering energy choices and for responding to the impacts of climate change (Pillai et al. (2021).

smooth flow of information between and within levels; (iii) sharper financial incentives to motivate the states. Thus, part of the answer to more effectively fighting climate change in India's multilevel governance context will necessarily be to fix and strengthen some of its weak performing top-heavy federal institutions of decentralized finance. Indeed, not a small task.

There are two important dimensions of the issues that will not be covered in this paper. First, our focus will almost exclusively be on the role to be played of state governments rather than local governments. As is discussed further below in the paper, this is mostly due to the current reality of the undefined and weak role local governments actually play in India's fiscal federalism structure and institutions, and also because carving out a more explicit role that local governments could play will require time and effort that go beyond the scope of the current paper. The second omission is that we will not be able to explore, again because it is beyond the scope of this paper, what potential role the redesign of political and administrative decentralization institutions in India can play in combating climate change.[12]

The balance of the paper is organized as follows. In section two, we explore how the assignments of expenditure responsibilities among different levels of government in India must be adapted for the most effective multilevel government response to climate challenges. Section three covers the same type of issues in relation to the assignments of taxing powers. Section four explores the role of the different types of transfers, subventions, and agreements that can be used to stimulate action more effectively by subnational governments against climate change. And last, section

[12] A recent paper by Smoke and Cook (2022) analyzes in depth from a world perspective the potential role that administrative decentralization can play for climate change action; in particular, the authors focus on four categories of administrative functions: regulatory, operational, information and analytics, and collaborative governance.

five analyzes the different borrowing instruments and rules that can be used to facilitate subnational climate change action while preserving overall fiscal sustainability.

2. Expenditure assignments

Principles and international practices

How should expenditure responsibilities be assigned between central, regional, and local-level governments to maximize the effectiveness of decarbonization and adaptation policies and programs? The general answer to this question in economics is to apply the "correspondence principle," depending on the geographical scope of the externality.[13] The larger the scope of the externality, the higher the level of government that should seek to remedy it, thus more likely internalizing all effects. This is conceptually simple enough but much more complex to get it right in practice. Other principles also apply. Subnational governments must also have the capacity to plan, monitor and sanction, access to data and other relevant information, and their responsibilities must be financially affordable. These can be binding constraints.

As a general principle of expenditure assignments, exclusivity of responsibility at a single level is desired to promote government accountability. However, the multidimensional and complex nature of climate change causing activities and decarbonization policies very often require the assignment of concurrent responsibilities at two or more levels of government. In this case what becomes important is to ensure coordination and maximum clarity within the concurrent functions; this latter requires clearly identifying what level of government is responsible for the different attributes of the function (regulation, financing, and actual implementation). Muddled responsibility assignments can lead to the undersupply of services, duplications, and other inefficiencies. For adaptation policies, the impact of climate change-related disasters tends to be

[13] See, for example, the discussion in Alm and Banzhaf (2012).

more localized and with a smaller scope for externalities affecting other jurisdictions, and therefore offering the possibility of more exclusive roles for subnational governments. However, slow-onset adaptation needs (e.g., changes in agricultural zones, rising sea level, etc.) require more of a national perspective. Also flood and water management may be better done at the scale of the watershed, because for example risk management upstream creates disasters downstream. Central authorities also need to play a major (insurance) role in financing post-disaster recovery efforts and in regulating general prevention measures. Also, competition across localities can be a significant barrier to risk-informed land-use planning, thus requiring management at a larger scale.

Beyond the lack of clarity in assignments, the largest threat possibly comes from multi-level coordination failures, arising from agency problems due to information asymmetries and from "common pool" problems when financing is mostly carried out via transfers.

In the international practice we can observe three main approaches to expenditure assignments. The most distinctive attribute to differentiate among country approaches to expenditure assignments for climate change is the level of government that is responsible for norming or regulating climate related standards and economy-wide targets to fight climate change.[14] In a first group of countries (for example, Belgium and China), in what we can call a centralized model, climate related standards and economy-wide targets are exclusively centrally mandated/determined, followed by further allocation of targets to sub-national governments for implementation. In a second group of countries (for example, besides India, France, Germany, and Colombia), in what we can call the concurrent or mixed approach model, both central and

[14] Beyond setting and regulating standards, the experience of most countries is to have concurrent responsibilities for the financing and implementation of programs, unless the country is heavily centralized.

subnational governments contribute to the determination of climate related standards and economy-wide targets, generally with national ones working as floor targets (to prevent excessive competition and race to the bottom), and with subnational governments being allowed to innovate and improve on those minimum targets (possibly promoting race to the top). Last, a third group of countries (for example, the Netherlands, Brazil, the United States, and Canada), in what we can call the decentralized model, the setting of standards and regulations is totally decentralized, with no central mandates or targets, which risks not meeting some minimum standards, but it also allows for subnational innovation and initiative pushing national standards upwards.[15] Overall, the second model, the concurrent model appears to be superior in that it offers all the safeguards of the centralized models, but also all the opportunities of the decentralized model.

India's context and issues

In general terms, India fits the concurrent model, with policy targets to fight climate change set in a mix of national and subnational regulations. Functional responsibilities, as described in more detail below, are shared between the union and state governments based on the "National Action Plan on Climate Change (NAPCC)[16]," at the union level and the states' "State Action Plan on Climate Change (SAPCCs)," which are developed and implemented separately by each state governments (Dubash et al. 2013). In 2018, the central government asked the states to revise their SAPCCs and most states appear to have done so. While predominantly focusing on the

[15] In terms of financing and implementation, under the first approach the implementation may be only national or also delegated to subnational governments; with the second and third approaches, subnational government are always also involved with financing and/or implementation of programs.

[16] The NAPCC comprises eight national missions of which two—solar energy and enhanced energy efficiency—were related to mitigation; one mission about forests (green India) was for both adaptation and mitigation; four missions, sustainable habitat, water, Himalayan ecosystem, and agriculture were related to adaptation and there was one overarching mission about strategic knowledge for climate change.

implementation of national level targets, the SAPCCs allow for sufficient flexibility to pursue more ambitious state-level goals, such as in the case of the Climate Change department in the state of Gujarat or the Green Fund in the state of Kerala (Atteridge et al. 2012).[17]

However, there are questions about how diligent and effective in practice the state executive branches have been in implementing policies fighting climate change. India's experience with the State Action Plans on Climate Change (SAPCCs), revealed significant institutional shortcomings. These shortcomings among other factors included - (i) the failure of the federal system to carry the momentum of an initial burst of policy euphoria; (ii) the strategic space for states to build adaptive plans was constrained by a lack of capacity and the normative influence of the National Action Plan on Climate Change (NAPCC) that immediately preceded the SAPCCs (Dubash et. al (2014); (iii) vagueness about financing diminished states' enthusiasm and motivation over time (Kumar 2018)).

Currently there are important union and state governments policy misalignments (Goel 2019). For example, Mandal and Rao (2007) highlight how the failure of the executive to regulate and monitor pollution and forest cover has led to the Supreme Court repeated interventions, with the Court issuing several rulings on the implementation of environmental regulation, practically taking over the role of the executive branch. [18] The fact that several central agencies and other state bodies oversee different aspects of energy, complicating the task of formulating and

[17] Reportedly, prior to the NAPCC and the Prime Minister's urging in August 2009 that all states develop a state action plans consistent with the strategies of the NAPCC, there was little initiative at the state level; reportedly, there are still significant variation across states in recognizing climate change as a policy priority (Atteridge et al. 2012).

[18] Gupta (2014) argues that there is no clear evidence of any race to the bottom in terms of the states' environmental standards in India and that other factors such as the availability of infrastructure play more important roles in interstate competition for investment. But, more importantly, that given the weak enforcement of environmental laws and regulations, it is unlikely that those standards are perceived as a major cost of doing business in India, although this has been changing with the high degree of judicial activism in these matters.

implementing a unified strategy regarding subsidies and other matters; for example, the Energy Conservation Building Code (ECBC) has not been made mandatory for the states, likely dues that buildings are regulated by the state governments while the ECBC was formulated by the union government.

Formally, India's Constitution assigns substantial expenditure responsibilities to the states; specifically, the 7th Schedule of the Constitution provides for a separate "State List," enumerating the functions over which they have exclusive authority that lies with state governments. The 7th Schedule also enumerates the "Concurrent List" with functions over which the states can also exercise legislative and executive authority, if there is no Union law, in which case this latter prevails.

Nevertheless, as logically expected, India's over 70-year-old Constitution does not specify concrete climate change functions; the closest to those are the environmental related matters (see Box 1).[19] But historically expenditure assignments have not been clear, especially regarding the "Concurrent List." Other relevant facts are first, that a large fraction of state budgets goes to cover committed or non-discretionary expenditures on wages, pensions, and interest, thus leaving little budget space for fighting climate change or even critical social services and infrastructure,[20] and second, that local governments lack any specific assignment of functional responsibilities, including those pertaining to climate change. Another important trend, hinting to what may happen in fighting climate change policies, is that there has been a Union government overreach,

[19] Note that a closely related area, electricity is a concurrent subject, and the central government and the states historically have had differing priorities with respect to this sector, likely to be enhanced with the transition to a greener economy.

[20] In addition, subsidies to state owned enterprises are poorly targeted and regressive, especially in the power sector. Overtime, the losses from low cost-recovery for electric services have been financed by borrowing guaranteed by the states, the accumulation of arrears and the retention of revenues from the state electricity taxes.

converting some of the state exclusive responsibilities into concurrent responsibilities; this has happened with education and in other areas via the Union-implemented centrally sponsored schemes (CSSs).

Box 1. Federal India, Institutional Framework

Historically, India adopted a federal Constitution with strong unitary features and progressed from a two-tiered federal structure to a three-tiered structure in 1992. The 73rd and 74th Constitutional Amendments provided constitutional sanctity to the rural and urban local bodies as the third sphere of local self-governance in India. The center-state relationships in the pre- 1992 period rested on principles largely defined under the colonial rule of centralized governance. As a result, there was a strong bias towards a unitary framework in the Constitution. The devolution of power to the third tier is, however, uneven among states and their participation in public service delivery is marginal.

The core arrangements regarding the sharing of resources and responsibilities are built into the Indian Constitution itself. The Constitution defines the exclusive powers of the center[21] in the union list[22]; exclusive powers of the states are specified in the state list[23]; and those falling under the joint jurisdiction of both the levels are placed in the concurrent list[24].

Constitution of India: Environment related subjects

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

The key institutional arrangement that guides the sharing of resources between the various levels of government in India is entrusted to the Finance Commission. In addition, resource transfers also take place through the Planning Commission[25] and other central ministries. Other institutions of importance in India are the National Development Council and the Inter-State council. In India, the Finance Commission determines a large part of the transfers in

[21] Refers to Federal or the Union or Central government and the words are used interchangeably throughout the paper.

[22] The functions undertaken by the central government can be classified as those required to maintain macroeconomic stability and those assigned for reasons of economies of scale and cost-efficient provision of services. These include issuing currency and coinage, foreign loans, operation of the central bank, foreign exchange, international trade, banking, insurance and stock markets. The functions where economies of scale matter include railways, posts and telegraphs, national highways, energy, space, air transport, inter-state trade and commerce, minerals, inter-state rivers etc.

[23] The subjects assigned to states include- public order, police, public health, agriculture, irrigation, land rights, industries and minerals other than those specified in the union list.

[24] The power of the center has been further augmented by placing a number of additional items in the concurrent list and vesting it with overriding powers in regard to these areas. The concurrent list includes economic and social planning, commercial and industrial monopolies, social security, price control, employment and unemployment etc.

[25] A policy think-tank of GoI, NITI Aayog (National Institution for Transforming India Ayog), has replaced the Planning Commission in 2015 which will provide strategic and technical advice to the Center and state government. Unlike, the Planning Commission the Niti Aayog does not have the power of allocating central funds to States. This will be done by the Finance Ministry.

the form of tax devolution under global sharing and grants, requiring it to determine a significant part of the volume of the vertical transfers. The Finance Commission transfers are supplemented by the Planning Commission[26] grants (till 2015) and other discretionary grants determined by the central government. The FC award remains valid for a five-year period.

According to Rao (2015), total revenue collected in India is about 20.5 percent of GDP and of this, 37.5 percent is raised by the States. About 60 percent of the total public spending in India is incurred by the states. As a share of GDP, states' total spending is around 18.3 percent, of which, the states' raise 8 percent of GDP from its own resources and receive transfers amounting to about 7 percent of GDP and the remaining expenditure is financed through borrowings. The distribution of functional responsibilities places a large burden on the states and to a lesser extent on the local governments. The transfer system closes some of this vertical gap. But because it favors poorer jurisdictions, it reduces the horizontal gap as well. And because much of it is earmarked, it also manipulates the spending by subnational government to favor higher-level government priorities.

Inter-state disparities are quite high in India, and they have increased over time. The per capita revenues vary with per capita incomes due to variations in taxable capacity and effort among different states. Per capita transfers are higher in states with lower per capita incomes; however, inter-governmental transfer system is unable to adequately offset the revenue disabilities of the poorer states and more advanced states spend significantly higher per capita expenditures compared to the poorer states.

Source: Zahir, Farah (2020). "Twenty-Five Years of Finance Commissions in India" in Yilmaz and Zahir (eds), Intergovernmental Transfers in Federations, Edward Elgar, UK

Recommendations

Short-term actionable items

First, there is a need to update the "National Action Plan on Climate Change (NAPCC)" and the states' "State Action Plan on Climate Change (SAPCCs), to reflect the (GoI) pledge at the COP26 to achieve net-zero GHG emissions by 2070 and by 2030 the companion targets on non-fossil fuel energy capacity, use of renewable energy sources, and reduced carbon emissions and carbon intensity of the economy.[27] In another important dimension, these Plans would need to go beyond reflecting policy priorities to fight climate change and incorporate measures to ensure

[26] While the Finance Commission role was confined to the examination of non-plan revenue account of the states' budget, the Planning Commission assessed the overall requirements (in terms of transfers to states) on the plan side. Planning Commission remained a pivotal agency (till 2015) for determining the resource allocation for the public sector in India. Though states were allowed to prepare their plans, but these plans were judged and appraised in terms of the national objectives and norms by the Planning Commission. However, these norms and objectives were established by the extra-constitutional body called the National Development Council.

[27] A comprehensive national fighting climate change strategy would not only coordinate the actions of different levels of government but also include other stakeholders in society including educating the public and involving enterprises across all sectors of the economy. See, for example, Bhattacharya et al. (2021).

implementation, including financing mechanisms attached to them, as well as monitoring systems to track implementation.

Second, the union government needs to analyze venues and policies to make the State Action Plan on Climate Change (SAPCCs) truly operational and enforced. These could include the redesign of some of the existing CSS, but more likely the introduction of performance-based grants specifically designed for this purpose; and the needed funding for the performance-based grants could come from discontinuing some of the existing CSS.[28]

Medium term structural reforms

The gravity and importance of climate change for India (and the rest of the world) call for an explicit reform of the formal expenditure assignments. This reform should make clear the exclusive and concurrent functional roles of the union and state government, and possibly of local governments, in the new array of activities needed to carry out decarbonization and adaptation programs to combat climate change. What would be the expected outcome of this review? First, the review should seek more clarity in the assignment of existing responsibilities. And second, possibly, the reassignment or new assignments at both the subnational and national levels. The latter task would benefit from the mapping of the main sources of GHG expenditure assignments, giving a clearer picture of those activities that would concern the states and local governments in terms of functional responsibilities, including regulatory ones, and taxing powers. But any new assignments would need to be conscious of the existing capabilities to manage and implement programs at the different levels of government.

[28] This issue is further discussed in the subsection below discussing the system of transfers.

All this may require constitutional changes (the 7th Schedule of the Constitution), especially in the case of new assignments. Although there have been some de facto changes in expenditure assignments over the years, these have not involved for the most part climate change related activities, and formal expenditure assignments have not been changed over the past seven decades. These changes are necessary to bring clarity of purpose and urgency to the involvement of the multi-level governance system in India to lead the fight against climate change. Therefore, the need to fight climate change can also provide the synergy for the necessary revision of the lists for the assignment of expenditure responsibilities more in general after 70 years of little or no change.

Although exclusivity of functional assignments is very desirable, it is likely that the newly reformed expenditure assignments to fight climate change will require a high number of concurrent responsibilities, and in which case specific new legislation will be needed to establish a clear assignment of attributes or subfunctions concerning regulatory or norming powers, financing, and actual implementation.

3. Revenue assignments

Principles and international practices

How can revenue assignments in multi-level governance systems can be best adapted to combat climate change? In theory, central and subnational governments can use their own source revenue authority to penalize or reward actions by businesses and households related to climate change.

An important qualification from the start is that the functionality of revenue assignments in the context of climate change is quite different from that of revenue assignments in the general context of decentralized governance. In the case of the latter, the most important objective is to

raise revenues with the smallest possible inefficiency costs or impact on economic activity. From the perspective of the former, the main purpose of these taxes is to affect economic behaviors to discourage GHG emissions to the largest extent possible through “Pigouvian taxes,” (pricing the externalities involved) and although these taxes yield a “double dividend” (they discourage the polluting activity and raise revenues), the main objective is not to raise revenues.[29] Nevertheless, there will also be very significant financing needs for infrastructure investment, support to facilitate the transition, invest in innovation, rebuilding after disasters and so on, that will likely not be covered with the revenues from the “double dividend” from green taxes. From this perspective, we will still be in the "normal" situation, in which other additional revenues will have to be raised with the objective of minimizing the efficiency cost of those other taxes. Interestingly, a carbon tax, which we propose further below for adoption in India, is at the intersection of creating better behavioral incentives, and is generally considered as a relatively “good" tax with low collection cost and more limited macroeconomic effects than alternatives. To assess the overall economic impact, one needs to weigh in the overall welfare benefits of reduced polluting activities and how the revenue proceeds will be used. Ultimately, there is also the need to assess how a general carbon tax would affect the growth potential of the country.

How should green taxes be assigned to the different levels of government? The general guiding principle should be the geographical extent of the environmental externalities involved. When the externality is confined to a local area, the responsibility for the proper tax should be local; as that area becomes regional or national, the proper assignment of tax powers should be at the

[29] A potentially relevant issue, that is not further discussed here for space reasons, is whether the revenue proceeds from green taxes and fees should be earmarked to actions and programs related to decarbonization and fighting climate change.

regional or central levels. In addition, the Pigouvian tax should have an origin nature, and not a destination one, thus taxing at the source of the activity that is causing the negative externality.

There are several constraints that also need to be considered in the vertical assignment of green taxes. Most significantly, those assignments should consider the potential high mobility of subnational tax bases (moving out of jurisdictions with green taxes above the average), thus all jurisdictions should be asked to raise the same taxes, and the potential strategic competitive moves by some jurisdictions to lower own green taxes to attract economic activity from neighboring jurisdictions; thus, subnational green taxes should have clear minimum or floor levels. Two other technical issues should be considered. Some forms of environmental or green taxes can be quite complex to administer and may also require ability to measure and monitor pollution emissions levels;[30] both require some minimum level of subnational government administrative capacity.

There are also constraints from a political economy perspective. National authorities need to have the will to grant those taxation powers to subnational governments, which very often don't, and subnational governments also need to have the will to use and fully enforce those "green" taxes. However, often, subnational governments do not use their tax authority; the common presence in decentralized systems of transfer dependence and large vertical imbalances lead to low levels of subnational tax effort. The will to tax at the subnational level gets further weakened when the use of funds is constrained away from subnational spending priorities, or logically when central transfers are reduced as a consequence. One last obstacle for subnational

[30] More specifically, subnational authorities may need to understand the pre-existing pattern of emissions, the abatement opportunities available, and be able to monitor emissions and pollution (Hahn and Noll 1981). Of course, some conditions may facilitate monitoring; for example, for fuel importers, carbon or fuel tax relatively easy because you just need to monitor ports of entry.

government action is the generalized perception that subnational taxes and fees have a regressive incidence, penalizing lower income groups; at the same time, subnational governments have less capability to offset any regressive effects via other taxes or expenditure and transfer policies.[31]

The international experience in green taxation is rich and varied, but the replication of good tax decarbonization practices has been slow across the globe and, therefore, green taxes are still underutilized in many countries; for example, as of 2016, on average OECD countries were raising 1.63 percent of GDP from green taxes, representing only 5.3 percent of total revenues. Thus, there appears to be ample room for both central and subnational governments in general to make much more extensive use of green taxation.

Carbon taxes, sometimes extended to other emissions sources such as methane emissions from extractive industries or agriculture, are among the most popular decarbonization tax measures; they are often accompanied by emissions trading schemes. Carbon taxes yield the right incentives to invest in energy conservation and alternative green sources of energy. Generally, they are implemented on top of existing fuel taxes.[32,33] Although subnational governments can participate in the implementation of carbon taxes, by for example using piggyback arrangements, national coverage and central government implementation is generally required for full effectiveness.

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[31] Subnational governments might also rely on green taxes and fees more as a source revenue collection and financial gains rather than with the purpose of reducing emissions or preserving ecosystems, as Nurfatriani et al. (2015) point out for how forestry fees are used in Indonesia by subnational governments. But, of course, the double dividend property of green taxes implies that there is always a revenue element involved, and which is welcome.

[32] The level of existing fuel taxes will require some calibration of the carbon tax. This is quite relevant to India since it has among the highest excises on fuels in the world (https://energy.economictimes.indiatimes.com/news/oil-and-gas/india-now-has-the-highest-taxes-on-fuel-in-the-world/75590141).

[33] Emissions trading schemes, which can replicate the positive effects of carbon taxes through the auctions of emissions rights, are much more complex to design and enforce, and thus have not been as commonly adopted.

However, there other tax and non-tax green friendly revenue sources that can be used by subnational governments to encourage climate actions by citizens and businesses. These involve charges for the preservation of the environment, involving construction, transportation, forestry, water and so on. Box 2 offers a selection of other subnational green taxes introduced around the world. A more recent related innovation are the "feebates," which are defined as sliding scales of fees on activities or outputs (such as such as transportation, power generation, agriculture, or forestry) which tax above-average emission rates and offer subsidies or rebates for those activities with below average emissions.[34] There are other taxes commonly assigned to subnational governments that have a potential bearing on green taxation, such as taxes on motor vehicles, road taxes, electricity taxes, or water supply, sewage, and waste charges, although often they are not linked to emissions or environmental performance.

Box 2. Examples of subnational green taxes around the world

- Batteries tax and a tires tax in Canada.
- Tax on coal production activities, with rates within the centrally determined range of 2 to 10 percent in China. India has a cess (specific central tax) on coal production (the GST Compensation Cess) of Rs 400 per tonne.
- Regional and local surcharges in the consumption of electricity in France and Italy
- Local tax on air pollution and on imports of radioactive substances in Latvia and Lithuania
- Local environmental tax on tourists visiting the jurisdiction in Norway.
- Local air pollution tax in Poland, Slovakia and Spain.
- Local government ecosystem conservation tax on development projects with a substantial environmental impact in South Korea and Spain.
- Regional taxes on disposable plastic bags, industrial waste, and the storage of spent nuclear and radioactive waste in Spain.
- Local government excavation tax in Sweden.
- State taxes on electronic waste recycling, on hazardous substances, on dry-cleaning activities, on electricity use, on aircraft use, on hazardous chemicals inventory, and on waste tire management in the United States.

Source: Martinez-Vazquez (2021)

Revenue assignments to subnational governments have a stronger rationale in the case of adaptation activities, given the generally smaller role played by externalities. Beyond the role of

[34] See, for example, the discussion in Zhang (2020).

traditional property taxes, subnational governments can use taxes and fees that capture the land value increments created when green infrastructure is installed, such as flood protection or storm water management. Land value capture tax instruments, also called tax increment financing, offer great future potential for implementing many types of adaptation infrastructure developments; however, its uptake has been slow beyond several countries in the American continent (See Box 2). In addition, taxes and other charges can be used by subnational governments to deter certain decisions and behaviors that will tend to increase the costs of adaptation. For example, higher taxes and fees can be imposed on home builders in flood plains if outright forbidding them via zoning is not practical.

India's context and issues

In India, tax assignments among the tiers of government are based on the constitutional principle of separation of tax bases. However, except for the GST (Goods and Services Tax), which recent reforms in 2017 made it equally shared between the union and states governments and the states, the union government has had the monopoly on most other broad-based and more buoyant taxes, including the taxation of non-agricultural income. The emergence of GST likely has been the most important event in the history of center-state relations since the adoption of the Indian Constitution. However, in the process of adoption of GST, the states had to surrender a much higher share of their taxation powers, while the center was still left with many of its buoyant taxes. Even according to the original constitutional arrangement, the states accounted for only 40 percent of the combined revenues of governments, and this asymmetry worsened with the passage of GST (Issac 2022).

Regarding the structure of taxes, indirect taxes dominated the central tax revenue till the 2000s. During the 1980s, it comprised 80 percent of center's gross tax revenue. Gradually, the share of

direct taxes in center's gross tax revenue has expanded to 50 percent in 2016/17. If the state taxes are also considered, the share of the indirect taxes is consistently higher than the share of direct taxes. However, since 2000/01 the share of direct taxes has been increasing but has not been higher than the share of indirect taxes in the last 50 years (Table 1). Many experts have attributed this to the relatively regressive nature of the Indian taxation system.

Table 1. Structure of Indian Taxes, 1970-17

	1970s	1980s	1990s	2000/01 to 09/10	2010/11 to 16/17
Tax to GDP ratio (center)	8.2	9.5	9.0	9.6	10.4
Tax to GDP ratio (states)	3.8	4.9	5.0	5.6	6.2
Memo: % of Center's Gross Tax Revenue					
Indirect Taxes	71.1	76.9	72.5	61.4	57.0
Direct Taxes	28.8	23.1	27.5	38.6	43.0

Source: Handbook of Statistics on Indian Economy, RBI and State Finance Bulletin (various issues)

This has led to a rather permanent large vertical imbalance between the union government and the states, which has been addressed through a complex system of intergovernmental transfers in various forms and through various channels.[35] However, the states have been assigned several other taxes (including the electricity tax, entertainment and hotel tax, luxury tax, professional tax, agricultural income tax, urban property tax and transportation taxes), which remain largely unexploited because of the low tax effort exerted by the states. There are also low cost-recovery rates from economic services provided by the states (e.g., irrigation, power, and transportation). The low tax effort traditionally exercised by the states has been interpreted as symptomatic of a

[35] From the expenditure side of the vertical imbalance, states have most of the responsibility for providing social services and share the responsibility with the union government for many other services including economic services.

soft budget constraint.[36] Local governments are dependent upon their state governments to get tax powers, as local bodies have no direct constitutional authority for taxing any tax base. Generally, local governments have not been empowered with clearly defined own source revenues.

This institutional background and current state of revenue assignments is quite relevant for the prospects of introducing or strengthening multi-level green taxation in India. Other contextual factors are also relevant. For example, the improved taxation of electricity and carbon use (but much of the same also applies to the taxation of transportation) will be complicated by the perennial crisis most of the electricity sector has lived in.

Electricity taxes are levied by the states on consumption of electricity and are potentially a major source of tax revenues. However, as this tax is collected though power distribution companies in the state sector, which run large losses, the tax revenues collected are often retained by the electricity boards as partial payment of the states' obligations to provide subsidies to cover the operating losses of the power utilities (because of the low tariff recovery). Distribution companies are often in arrears to power generating companies, and these latter, in turn, are in arrears with mineral carbon providing companies. The Reserve Bank of India recently estimated that if another bailout is to be structured along the lines of UDAY,[37] then along with the cash infusion that will be needed to pay off their power purchase dues, it would cost state governments Rs 4.32 lakh crore (or 1.83 percent of GDP).

[36] Providing further tax autonomy is not a sufficient condition for reducing vertical imbalances; sub-national governments must feel the need to use the assigned revenue powers, and this latter requires for them to operate under a hard budget constraint.

[37] The Ujwal DISCOM Assurance Yojana (UDAY) Scheme launched in November 2015 had the objective of providing a permanent solution to the DISCOM (distribution companies) issues, mainly losses and accumulated arrears to the power generating companies and eventually to coal mining companies.

Also relevant for the conventional toolbox of subnational green taxes, transportation taxes in India, like taxes on vehicles and transportation of passengers and merchandise, also offer a complex scenario, with problems of permit issuance, low tax effort and effective tax collections. Given these situations, it is less likely that any new taxes on power generation and distribution/consumption will generate revenues and lead to reductions in GHG emissions.

Green taxation in India still will need further development. Most significantly, India currently does not have a nationwide carbon tax or an emissions trading scheme ETS. [38] However, some state governments have imposed their own taxes to capture the costs of negative externalities from carbon emissions—such as the Green Cess implemented in Goa and the Eco Tax on vehicles entering Mussoorie. In addition, recent reforms have significantly increased fuel excise taxes and the cess (or tax) on coal extraction.

In India, fuel (petrol and diesel) is taxed at both the central and state levels, although it is kept out of the GST coverage. The central government taxes the production of petroleum products,[39] while states tax their sale.[40] The final retail price of petrol and diesel purchased at a petrol pump has multiple components. The base price of the auto fuel, including the freight, accounts for 56 percent of the final selling price for petrol and 60 percent for diesel.

The taxation of coal extraction has experienced important changes over the past decade. In 2010 the central government introduced the Clean Energy Cess which aimed to incentivize the use of

[38] See for example the blog "More Countries Are Pricing Carbon, but Emissions Are Still Too Cheap" – IMF Blog, published in August 2022.

[39] The central charges excise duty on the base price accounting for 26 percent and 23 percent of the final price of petrol and diesel, respectively. The excise duty is charged at a fixed rate per liter and has various components. The dealer's commission amounts to another 4 and 3 percent of the selling price of the two petroleum products.

[40] The States levy value-added tax (VAT) on the cost of petrol and diesel, including excise duty and dealer's commission. States have been given a free hand in structuring and taxing fuel in their States. Many States/UTs such as Arunachal Pradesh, Delhi, Odisha, and Telangana charge just VAT at a certain rate applied to the cost of the petrol.

clean fuels by increasing the cost of consuming coal and using a portion of the revenue collected to fund research and clean energy projects. However, with the introduction of Goods and Services Tax (GST) in 2017, the Clean Energy Cess was abolished. In its place, a Compensation Cess on coal production at Rs.400 per tonne was introduced for all types of coal, which is still in force, but supposed to be phased out at the end of 2022.

Recommendations

Short-term actionable items at the state and central level

India should adopt a national carbon tax. In this regard, for example, Ahmad and Stern (2009) discuss the possibilities for implementing a carbon tax , in the context of India and Pakistan, assigning it to the federal level, and levying it as an excise tax at the production or import stage (as a specific, as opposed to ad valorem, excise tax) based on quantities imported and produced domestically as opposed to a state/regional tax at the final point of sale.

As and Adrian (2022)[41] point out robust and predictable carbon pricing will also generate incentives for private investment in low-carbon projects, promote a more transparent market and allow investors to make informed decisions.

The case for retiring older coal plants would become much stronger if a carbon tax is levied. India currently has a cess of INR 400 on per ton of coal, which is approximately $3.5/ton-CO2. A recent IMF Staff Paper has proposed imposition of a graded tax on CO2 ranging from $25/ton CO2 for India, $50 for China and $75 for the US and the EU (Parry et al. 2021). If a tax is levied at the level recommended by the IMF paper, the price of coal will increase substantially. It would raise the cost of coal-based electricity by at least 37 percent leading to an earlier phase-out of

[41] See for example the blog by Georgieva, Kristalina and Tobias Adrian. 2022. "Public Sector Must Play Major Role in Catalyzing Private Climate Finance – IMF Blog." IMF Blog.

coal power plants with a faster shift to renewables; all this, of course, assumes that the current problems surrounding the power distributions companies (DISCOMS) are adequately addressed. Consumption of petrol and diesel should also be liable to such a carbon tax, but these fuels are already very heavily taxed in India and some fraction of the existing taxes could be redesignated as a carbon tax perhaps without any need for additional taxation or increase in consumer prices.

The introduction of carbon taxation will not only help to accelerate the transition to Renewable Energy (RE), but it will also generate revenues to help finance other elements of the climate management plan and to provide support to those adversely affected. Given the persistent fiscal constraints of both the center and the states there is a strong case for considering some form of carbon taxation.[42] In this regard, the Government of Gujarat has recently announced to implement a cap-and-trade market for restricting carbon emissions from large industries and power plants in the state. Given the political economy difficulties surrounding the introduction of a general carbon tax, this is as an initiative to be followed and replicated by other states.

Canada provides a useful example for a diversified approach. The Pan-Canadian Framework Implementation aiming to meet the 2030 emissions reduction target relies largely on "Pricing Carbon Pollution arrangement" under which the federal government introduced a carbon-pricing benchmark in 2016 and allows provinces and territories to implement the pricing system of their choice (a carbon tax, a carbon levy and performance-based emission system, or a cap-and-trade system).

[42] However, we must point out that there are potential challenges tied to the implementation of a nationwide carbon tax. Some of these challenges include political opposition, possible negative public perception, the intricacies of tax administration, and the short-term repercussions on energy-intensive industries.

More generally, non-exclusive use of tax bases and piggyback arrangements, if properly coordinated, have been shown to simplify tax administration, reduce compliance costs, and provide sub-national governments with access to buoyant sources of revenue. Thus, the union government could also consider allowing state governments to levy piggyback special excise taxes on transportation fuels and other GHG emission sources. [43]

All these reforms will require significant political will and resourcefulness but as the introduction of the new GST in 2017 shows, it can be done.

Medium-term structural reform

In the longer term, the problem of low revenue autonomy and the potential continuance of a soft budget constraint must be tackled, otherwise the states will still fail to fully use any new green taxing authority. Although on an operational yearly basis the GOI enforces a hard budget constraint through deficit and borrowing limits, over the longer term, the states have been reluctant to increase their own tax effort and have preferred and relied on periodic increases in the overall volume of transfers from the central government. Enforcing a hard budget constraint is, of course, a huge challenge, probably the largest, within the context of intergovernmental fiscal relations in India. Hopefully the tremendous importance of fighting climate change will become the catalyst for this reform.

[43] Of course, reductions in oil consumption will also mean reductions in tax revenues from those sources; eventually new taxes and sources of revenues will need to be found in a more decarbonized economy. For example, reductions in motor vehicle fuel excise taxes can be substituted by a new vehicle miles travelled (VMT) tax. See, for example, Metcalf (2022).

4. The system of transfers

Principles and international practices

Intergovernmental fiscal transfers are likely the most suitable instrument for internalizing spatial externalities associated with conservation and preservation policies against climate change as well as for financing adaptation programs, especially those showing inter-jurisdictional externalities. Transfers, subsidies, and direct performance contracts and agreements between the central and subnational governments represent the most versatile and direct set of tools to influence the subnational policies to fight climate change.

The different forms of intergovernmental fiscal transfers, from conditional grants to performance-based grants and contracts, are likely the most suitable intergovernmental finance instrument that can be used to address the spatial externalities associated with decarbonization and adaptation policies. On the other hand, the well- accepted general principle of transfer design that a separate transfer instrument should be used for each different objective pursued generally rules out using unconditional grants such as revenue sharing and equalization transfers for involving subnational governments in fighting climate change.[44] Currently, and under the advice from the 14th and 15th Finance Commissions, India uses the states' forest cover as a criterion for the expenditure needs formula of the general equalization transfer to the states. The arguments for and against this practice are further discussed below.

In addition, it may be possible to embed climate change concerns in existing conditional grants. Given the extensive expenditure assignments that subnational governments have in many countries in areas such as housing and transport, redesigning existing transfers in those areas in

[44] Equalization transfers pursue the objective of reducing horizontal fiscal disparities, while general revenue sharing has the main objective of reducing vertical fiscal imbalances.

climate-sensitive ways may be quite desirable. The "one objective per transfer" principle of transfer design is still respected if transfers are redesigned by embedding climate sensitive issues, for example incentivizing green means of transportation or house building codes.[45]

Conditional transfers can be used to encourage subnational governments to spend on decarbonization activities, by for example introducing protective land-use restrictions and other conservation activities within their jurisdictions. In particular, matching transfers can be effective in incentivizing subnational governments to provide more adequate levels of environmental protection, even when inter-jurisdictional competition for geographically mobile resources pushes subnational governments to ignore emissions and keep green levies low. Box 3 offers examples around the world for how conditional grants are used with those purposes.

Box 3. Country examples of conditional transfers to subnational governments to fight climate change

- In Brazil, the ecological "ICMS"[1] is used by many states as part of their revenue sharing formula with their local governments based on the performance of ecological indicators. One good practice aspect of the ecological ICMS is that it keeps the different objectives—devolution via destination basis and land preservation—in different transfer instruments.
- In Portugal and France, the ecological fiscal transfers for land conservation provide significant incentives for those local governments that set aside a large proportion of their land under protected status.
- In Germany and the Netherlands, central transfers to local governments incentivize energy efficiency in municipal buildings, in transport and traffic flows, and in water and sewage services.
- In Australia, the federal government uses several types of intergovernmental contracts or agreements, which essentially work as conditional transfers, for the pursuit of climate change objectives at the subnational level. These include "national partnerships" with time-limited funding agreements in the environment for example for disaster risk reduction, and "project agreements" for smaller environmental projects. Interestingly, there are also "national agreements' which set out multi-level shared policy objectives and performance measures, although no direct funding is provided.
- In Mexico, many states implement decarbonization projects, and some assist their municipalities to also do that. For example, the state of Jalisco has created a framework to provide funds to municipalities as well as to associations of municipalities to implement climate protection projects, often in matching arrangements.
- In the United Kingdom, performance-based grants are being used to reward good subnational government performance on previously agreed indicators related to climate decarbonization targets and adaptation outcomes.
- In the United States, the federal and state governments offer a large variety of green subsidies businesses and households for reducing emission, saving energy, and introducing green types of energy production.

[45] This will require a case-by-case analysis making sure that the embedding of green goals does not distort the original objective design of the transfer.

Source: Martinez-Vazquez, J. 2021. "Adapting Fiscal Decentralization Design to Combat Climate Change," Climate Governance Papers. 2021 International Bank for Reconstruction and Development / The World Bank and International Center for Public Policy Working Paper 21-05, Georgia State University.

Conditional grants can also be used effectively to incentivize subnational governments to spend on climate adaption, for example by compensating them for enforcing environmentally cautious land use zoning,[46] or subsidizing investments on large infrastructure projects such as seawalls and flood prevention landscaping. Nevertheless, the international experience is scarcer in terms of established transfer programs in support of adaptation objectives, as opposed to ad hoc aid programs following catastrophic events. In terms of mitigation, it is possible to differentiate between grants that motivate subnational governments' initiative and grants that motivate standard policy setting, such as asking the states all states to make climate action plans backed by resources.

India's context and issues

In recent times there have been significant improvements in the implementation of conditional grants with the abolition of the Planning Commission and its flawed grant-loan instrument as well as with the streamlining in the number of Central Sponsored Schemes (CSS) to less than half between 2012 and 2013. Nevertheless, many observers agree that the effectiveness and efficiency of many CSS are still lacking and that there is ample room left for increasing the targeting, performance and accountability in the use of conditional grants (Rajaraman 2017; Rao 2017).[47]

[46] For example, the federal government of the United States provides subsidies to local governments to purchase homes in highly prone to flooding and have them torn down.

[47] Other criticisms that have been directed to the CSS include providing a backdoor for the federal government to micro-manage decisions that are ostensibly the responsibility of the states, burdening the administrative capacity of the states, distorting state decision-making and priorities, and blurring the lines of responsibility in the minds of voters.

Another relevant institutional development accompanying the abolition of the Planning Commission is that the 14th FC declined in its deliberations to make any specific purpose or conditional grant recommendation, leaving that activity exclusively to the executive government, and thus de facto clearly delimitating general purpose unconditional grants as the exclusive task of the Finance Commission, and conditional or specific purpose grants as the exclusive task of the federal executive (Rao 2017).[48] This means that the design of conditional grants for decarbonization and adaptation policies is entirely up to the union government line ministries.

Currently, India's government major thrusts into conditional grants for combating climate change rest on two fundamental pillars. The first is some form of ecological fiscal transfer (EFT), as part of the formula for the overall revenue sharing between the Union and state governments, which effectively allocates more of the funds to those states with a higher (ecological indicator of) forest cover. The second is the "Compensatory Afforestation Scheme" which aims to keeping at least one-third of India's total land area under forest and tree cover and works through the implementation of a nationwide uniform approach for compensatory afforestation and net present value payments to a fund (the Compensatory Afforestation Fund) when forests are cut down for whatever purpose. The long-term national target of maintaining 33 percent of the national territory with forest was first introduced by the National Forest Policy (NFP) of 1952 and reiterated the latest in the NFP of 2018.[49] The history, current design and policy effectiveness of these two schemes have been examined in two recent papers, Rajaraman

[48] To be noted, the 14th FC increased the states' share in the divisible pool of Union tax revenues from 32 percent to 42 percent, which left less fiscal space for conditional grants to be implemented by the union government.

[49] In addition, the GOI in its nationally determined contribution (NDC) to the 2015 Paris Agreement committed through additional forest cover to the additional carbon sinking of 2.5 to 3 billion tonnes of carbon dioxide equivalent by 2030.

and Gupta (2022) and Busch and Mukherjee (2020). The discussion that follows builds on those two contributions.

Let's first start with the quasi-EFT currently embedded in the overall revenue sharing formula between the Union and state governments designed by the Finance Commission. Yilmaz and Zahir (2022) note that the general principle of transfer system design is correcting for vertical and horizontal fiscal imbalances. However, the traditional definition of imbalance doesn't include differences in geography or climate. The variables capturing fiscal imbalances in designing intergovernmental systems remain benign variables accounting for differences in unequal distribution of resource endowments. However, in the context of climate change, designing functioning multi-level government systems is forcing us to think about variables that can capture the cost of climate action. In that sense, the recent trend in designing ecological transfers, incorporating of climate change related variables such as forest area into transfer formula, is an important step forward in thinking about climate change issues in an intergovernmental context. It helps avoiding what we call natural resource trap. The concept of natural resource trap can be described as localities perceiving their natural resource endowments as liabilities rather than assets when central government impose land use restrictions. The compensation to the states for the maintenance of their forest cover dates from 2005 with the clear objective of compensating for their forest preservation and mitigate climate change through carbon sequestration, although its form has changed over the years.

Initially, the 12th FC provided a grant of INR 10 billion for the period 2005–10 with an allocation formula reflecting the share of each state in the total forest cover and without any conditionalities. Next, the 13th FC awarded a grant of INR 50 billion for the period 2010–15, with an allocation formula that besides the share of each state in the total forest cover included

the quality of forest cover measured by density, and an index of economic disability proxied by the percentage the forest cover represented of the area of each state. While the first two years the funds had no conditionalities, the states were supposed to prepare "working plans" for their respective forest divisions; for the last three years of the award period, the release of the funds was linked to the number of approved working plans.[50]

The 14th FC implemented a significant change of approach for its award period of 2015–20 by discontinuing the separate grants and instead including the share of states in the total forest cover area as a criterion in the tax sharing devolution formula, for the entirely unconditional allocation of funds. The 15th FC completely validated the change of approach by the 14th FC and increased the weight for the forest cover criterion in the tax devolution formula from 7.5 percent to 10 percent.

The 15th FC in its "Strengthening India's Forest Sector Recommendations" (2022) strongly recommends the continuation of forest-related criteria in the horizontal devolution formula, because it compensates the states for incurring an opportunity cost and because it compensates the states for expenditure incurred for cross-border ecological benefits. The 15th FC also recommends giving equal weights to fiscal disability and ecological benefits in the devolution formula, and 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. For the ecological benefits states need to be encouraged to retain and improve their forest and tree cover, so that it justifies including forest and tree cover in the devolution formula, with weighting as per canopy density classes.

[50] Of these plans, only one quarter was earmarked for preserving forest cover while three-fourths were dedicated to other developmental goals.

How effective have been the different forms of the EFT either as an explicit separate grant or as embedded in the revenue sharing formula with the states. First, Rajaraman and Gupta (2022) find that during the period 2005-19, the different forms of the EFT did not result in higher budget allocations for forest cover preservation and expansion during the mandates of the 12th to the 14th FC. In fact, what they report is a drop in the share of expenditure on forests and wildlife relative to total expenditures aggregated across all states, falling from 0.91 percent to 0.72 percent over the period.[51] Similarly, Busch and Mukherjee (2020) report that even though forestry budgets increase in absolute terms, as a share of overall state budgets they shrank over the period; in addition states that got a larger share of their budget from the EFTs did not disproportionately increase their forestry budget.

How about the real outcome of interest, the total forest cover? Rajaraman and Gupta (2022) find that the cover for the whole country increased only very slowly in the period from 2001 to 2019, and it was mostly due to increases from states with lower initial forest covers compensating for the decreases in states with higher initial forest covers.

In conclusion, according to Rajaraman and Gupta (2022), the EFTs from the different Finance Commissions failed to prevent a reduction in the forest cover of highly forested states. This was so perhaps because the volume of the grants from the 12th and 13th FCs were too small, while the promise of funds under the 14th were considered as temporary. Busch and Mukherjee (2020) also speculate that the lack of a positive impact may have been due to insufficient incentives in

[51] In purely budgetary terms, for how resources get allocated inter-agency, Rajaraman and Gupta (2022) reasonable argue that the earlier form of explicit separate grants during the 12th and 13th FC probably facilitated the funds directly reaching the state forest departments by comparison to the general grant unconditional grant under the 14th FC.

the first form of EFTs and low expectations that forest cover support would be continued in the case of the second form of EFTs.[52]

Let's now turn to the "Compensatory Afforestation Scheme," which has had a difficult trajectory. As reported by Rajaraman and Gupta (2022), ensuing the Forty-second Amendment Act of 1976, which made the functional responsibility for forests and wildlife protection no longer part of the State List but part of the Concurrent List, Parliament enacted the 1980 Forest Conservation Act. This law significantly curtailed states' discretion over forest management, requiring them to seek central government approval for diverting any forest land to non-forest uses.

After a Supreme Court verdict in 2002, a nationwide plan was introduced for compensating the states for afforestation initiatives and penalizing them for deforestation activities imposing on them proportionate (net present value) payments, which accrue into a "Compensatory Afforestation Fund." The fund is managed by the Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which was created in 2004. However, CAMPA did not become operational and required again the intervention of the Supreme Court, which in 2006 ordered the creation of an ad hoc CAMPA and required all related existing funds to be transferred to this institution. These matters were finally resolved with the Compensatory Afforestation Fund Act of 2016 and its governing rules approved and release of withheld funds in 2018 by the union government.

[52] As disappointing as those overall results may be, of course, we do not know the counterfactual, or what would have happened if the EFTs were not present.

How about the impact effectiveness of CAMPA? Based on the available evidence, CAMPA has not been that successful either, with the largest share of forest land diverted coming from states with the higher share in the total forest cover area in the country. Rajaraman and Gupta (2022) argue for a significantly steeper payment gradient for states with high forest cover as a potential way to make CAMPA more effective.

How about climate adaptation needs? The general practice internationally is to implement separate capital transfers for the infrastructure needs of subnational governments, including those for climate adaptation. In India, the 14th Finance Commission, following the discontinuation of the Planning Commission in 2014, made the decision to incorporate capital expenditure needs considerations in the general devolution sharing formula. Before that, there had been distinctive and separate capital grants—although with many problematic features—implemented by the Planning Commission.

Recommendations

Short-term actionable items at the state and central level

One of the most peremptory needs in India is to seek greater effectiveness in the EFTs currently employed in India. Should the approach, introduced by the 14th FC and endorsed by the 15th FC, of utilizing "forest cover" as an expenditure need criterion in the general revenue sharing devolution formula be continued?

What is at issue is not whether maintaining or expanding the forest cover is an expenditure need of the state governments. Generally, we can consider as expenditure needs any assigned responsibilities allotted to subnational governments including those for mitigation and adaptation

policies related to climate change.[53] The most important issue is how best to incentivize[54] state governments to keep and expand their forest cover. Admittedly, this a question with more than an answer. We believe that a separate performance based conditional transfer would be the most effective way to go.

As has been already argued by Rajaraman and Gupta (2022) using grants as straight rewards for the opportunity cost of keeping the existing forest cover have not been very successful in India. The strong empirical evidence is that the existing approach has not been as effective. However, compensating and incentivizing the states to expand their forest cover is clearly desirable as a positive measure against climate change.

We have argued that it is at the least questionable that such an important tool to fight climate change be rather obscurely embedded into an equalization grant, as opposed to a separate conditional transfer.[55] From a political economy angle, the attraction in India, and elsewhere, of using the equalization grant or other large existing transfers as a vehicle to pursue environmental and climate change objectives is that the pool of funds involved is indeed large and probably much larger than those funds potentially available for climate-oriented transfers. Using the forest cover as a variable in the devolution formula does not guarantee, that, at the state level, the Forest and Environment Departments receive larger or commensurate budgets; at least that has

[53] For further discussion, see Ring (2002).

[54] Pillai et al. (2021) noted that the institutional framework for a resilient and sustainable climate policy is incomplete if states are not incentivized enough to engage in climate policy making.

[55] Another important question is how equalizing this variable (forest cover) may be in comparison to other variables that for example, and as reported by the 14th FC, some states had been pushing for their inclusion in the devolution formula such as: The Human Development Index (HDI), poverty measures, an index of social and economic backwardness, lack of infrastructure and communication facilities, and so on. Those states with greater ability to implement forest conservation may not be those that need more equalization in fiscal capacity and general expenditures needs.

been the experience until now.[56] This has been one of the shortcomings of the untied transfer system at the state level which makes the embedded criterion elusive.

One possibility would be to introduce a separate performance-based conditional grant to pay for net additions to the forest cover with a non-linear payment schedule so that states with a larger percentage of forest cover receiving increasingly higher payments for additions to their overall forest cover. This proposal is like that in Rajaraman and Gupta (2022), although they seem to still be thinking of using payments for the opportunity cost concept.

The 15th FC also recommended the union government to consider a targeted performance-based grant to address climate change, in the form of 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.

In case of CAMPA,[57] the taxes on the conversion of forest land into non-forest uses must also be calibrated upwards to pre-empt such conversions. There is an urgent need to re-configure the existing Centrally Sponsored Schemes to be more climate sensitive. There is also a need to promote experimentation and innovation at the state and local level, by investing in state capacities and strengthening the institutional framework at the subnational level. A stock taking of the total spending outside of the Finance Commission transfers for climate action and policy would also be a useful exercise to understand better the resources available at the state level for

[56] Finding a way to "separate" and highlight what are the funds being received for actions related to forest cover could be a potential solution to this problem; however, that assumes that state budget officials currently are unaware or unable to identify what share of the funds are related to the forest cover in the well-known devolution formula.

[57] Refers to Compensatory Afforestation Fund Management and Planning Authority.

climate action/implementation. So far, the funding for climate change is spread thinly across various schemes and budget heads and it makes policy making difficult and more siloed.

In addition, for adaptation purposes the GOI could explore using conditional matching grants for capital infrastructure purposes for flood prevention, sea level rising, and so on, based on need according to indices of infrastructure deprivation. There will also be a need for emergency spending needs, like post-disaster reconstruction. These transfers could be administered by the Ministry of Finance or by line ministries responsible for climate change and disaster relief.

Medium term structural reform

In the longer term, there is a need for the GOI to rethink its overall strategy for engaging subnational governments in the fight against climate change. One possible approach is that adopted in Australia, where the Federal Government uses four types of intergovernmental agreements for the pursuit of climate change objectives: (i) the Intergovernmental Agreement on Federal Financial Relations (IGA-FFR) is an envelope agreement which includes the distribution of federal transfers, including GST revenues, among the states as well as funding for natural disasters; (ii) National Agreements which set out policy objectives and performance measures in many sectors but through which no funding is provided; (iii) National Partnerships with time-limited funding agreements in a variety of sectors including the environment (examples include disaster risk reduction; grants assistance to primary producers impacted by the north Queensland floods; and the National Water Infrastructure Development Fund); and (iv) Project Agreements with simpler time-limited funding for low cost and/or low risk service or projects including the environment (for example, Improving Great Artesian Basin Drought Resilience). A complementary move would be to develop “Strategic Climate Action Plan (SCAP)” by the state governments themselves and serving as an input into India’s NDC.

5. Subnational borrowing and fiscal rules

Principles and international practices

Borrowing represents a powerful resource for enabling subnational governments to invest in infrastructure projects for decarbonization and adaptation activities in combatting climate change. However, subnational borrowing also carries potential threats to macro stability and fiscal sustainability which need to be heeded. As in the case of the other three pillars of fiscal decentralization, the basic question in this section is how to assess the potential role that borrowing may play in devising more effective policies for climate change in a multilevel government context.

Borrowing to finance subnational capital infrastructure is desirable from both efficiency and equity perspectives. Generally, those conclusions apply equally to infrastructure investment for decarbonization and adaptation to climate change. But in the case of the latter an additional question must be asked. Is there a case for especially subsidizing subnational borrowing for climate change and facilitating access to national and international climate finance?

In this regard, an important innovation that has been introduced in an increasing number of countries is the issuance of "green bonds." Green bonds (also known as climate bonds) are a special type of bond or fixed-income instrument for which the raised funds are earmarked for environmental and climate change investment projects.[58] Very often green bonds offer tax advantages, such as exemptions and credits, making them more attractive to investors vis-à-vis other types of bonds. These bonds are backed by the full faith and credit of the issuing government, as in the case of other bonds, and so they carry the same credit ratings.

[58] See, for example, IBRD and World Bank 2015.

For example, Australia's states regularly issue green bonds to finance projects with environmental and climate change objectives, and these bonds are certified by the Climate Bond Initiative.[59] In France, subnational governments (regions, departments, and municipalities) also have the authority to raise revenue by issuing green bonds. In the case of Denmark, Finland, Norway, and Sweden, green bonds are intermediated through Local Government Funding Agencies (LGFAs). In the case of developing countries, green bonds are less frequently utilized; however, a big user is China, where many provincial and local governments have issued green bonds. International agencies, like the World Bank, also frequently issue green bonds.

India's context and issues

The successful adaptation of green bond financing and other recent credit market developments in support of subnational government efforts to combat climate change in India may be a bit compromised by the recent history of over borrowing and weak fiscal discipline by subnational governments. Over the years, many Indian states have run large fiscal deficits and accumulated high debt burdens and contingent liabilities, with attendant risks of default. Meanwhile, the central government generally has come at times short of exercising its constitutional role of controlling over state borrowing, in part because of the states use of off-budget borrowings and guarantees. There is also a history of the central government rescheduling state debt and granted waivers of interest and principal, although linked to states' agreement to eliminate deficits and adopt fiscal responsibility laws. All those factors combined may have created bailout expectations and incentivized the states to behave in less than a fiscally prudent manner.

[59] In addition, for some states, the Climate Board Initiative (CBI), a London-based not-for-profit organization, verifies the "greenness" of the projects funded by the green bonds.

Recommendations

Short-term actionable items at the state and central level

The adoption of green bond financing, replicating contemporaneous practices around the world will bring potentially significant financing opportunities to India's subnational governments to finance programs and policies to fight climate change, especially in terms of adaption measures.

However, the recent history of overborrowing and lack of fiscal discipline at the state level calls for a prudential and measured approach to the adoption of green bond financing. The outside risk is that a permissive use of these instruments could contribute to the existing fiscal discipline woes of many state governments.

Medium term structural reform

States still need to be encouraged to adopt stronger fiscal responsibility laws, with current balanced budgets, the golden rule of borrowing only for capital expenditures, adopting biding prudential debt limits, and to act overall with greater fiscal discipline. That will provide more solid basis for the states to borrow in a sustainable manner for their climate adaptation programs.

6. Conclusion, Climate Ready Federal System

This paper is a call for a stronger and closer intergovernmental coordinated approach to fighting climate change in India. We first argue that the current commonly proposed approach to fighting climate change in India based on sectoral policies (energy generation, transport sectors, etc.) is incomplete because it fails to specify what level of government will oversee regulating and implementing those policies and how those activities will be financed.

This report argues that a successful strategy to fight climate change in India needs to account for the intergovernmental relations framework in the context of India's current federal institutions to address the questions of who will be in charge of regulating and implementing all the necessary

policies for decarbonization and adaptation programs and how those operations will be financed. Thus, understanding how the institutions of fiscal decentralization are framed and operate in India is the first step for trying to best adapt them to help fight climate change. The two tiers of subnational governments, the states, and the local governments, have an obvious role to play in a comprehensive national strategy to fight climate change. This paper focuses mostly on the role of state governments, leaving to explore the role of local governments for future work. The main reason for doing this is the complexity of state-local relations and the still largely undefined (and underfunded) role of local governments in India's fiscal federalism system.

Several significant general challenges stand in the way of a stronger and closer intergovernmental coordinated approach to fighting climate change in India. One, shared with many other decentralized countries, is that institutional reform is often slow and hard to implement, and decentralization design is concerned with other significant worthwhile objectives, which sometimes may be considered as or more important than fighting climate change. A second one is that India's system of intergovernmental relations is in several important dimensions in need of reform, which will require not only the adaptation of existing institutions but also fixing and strengthening some of them.

The paper takes stock of current institutions and practices involving the four pillars of fiscal decentralization: the assignment of functional expenditure responsibilities, the assignment of taxes and revenues in general, the system of transfers, and borrowing, and calls for a stronger and closer intergovernmental coordinated approach to fighting climate change in India.

Getting the functional assignment of responsibilities right will offer an answer to the question of who will be charged with regulating and monitoring compliance with the different sectoral

policies for decarbonization and adaptation. Getting the other three pillars right will allow us to answer the question of financing.

Regarding the assignment of expenditure responsibilities, India seems to have the right framework of concurrent assignments at the union and state level, with the union government establishing minimum standards to prevent a race to the bottom among the states, but with enough institutional flexibility left to encourage the states to engage in race to the top, in fighting climate change. The main problem appears to be that currently standards and regulations are not enforced. Going forward there needs to be a reassessment of functional responsibilities for fighting climate change to have clarity of responsibilities and find ways to strengthen enforcement at the state level. However, given the difficulties of pursuing constitutional amendments in the assignment of responsibilities, it may be more advantageous if policies for better inter-governmental coordination and collaboration between the central and state governments are forged. In the shorter run it will be pertinent to carry out analyses of different classes of subnational functions—service delivery, regulation (from land use to building standards to energy efficiency requirements), data analysis and management, etc. and to be more explicit about how fiscal mechanisms might be used to promote their effective implementation.

Regarding financing, the states, despite the existing soft budget constraint, appear to work with insufficient revenues still currently, which raises the overall question of where they will be able to find the fiscal space to finance their climate change policies. The first step will be to reconsider the assignment of taxes. The states have little tax revenue autonomy and the little they have, they do not use it effectively because of a de facto soft budget constraint, always asking and eventually getting some increases in federal transfers. As for functional assignments, tax assignments are also a constitutional matter, which imposes a serious institutional constraint.

However, India does not have a carbon tax, and other green taxes are scarce or nonexistent. Therefore, there are wide opportunities and possibilities. For example, a state level carbon tax—with minimum national rates—could be a large source of revenue, much of which could be earmarked to adaptation and decarbonization programs. However, related traditional taxes, such as electricity taxes and transport taxes, are not effectively managed due to rather complex reasons.

The system of transfers potentially offers the most versatile form of support for state level decarbonization and adaption programs. Beyond the multitude of centrally sponsored schemes (CSSs), which are specific conditional grants to the states for a large variety of purposes and some of which could be climate change related, currently, India's government major thrusts into using grants for combating climate change rest on two fundamental pillars. The first is some form of ecological fiscal transfer (EFT), as part of the tax revenue devolution formula to the state governments, which effectively allocates more of the funds to those states with a higher (ecological indicator of) forest cover. The second is the "Compensatory Afforestation Scheme" which works through compensatory afforestation to the states adding forest cover and net present value payments to a fund (the Compensatory Afforestation Fund, CAMPA) when forests are cut down for whatever purpose. There is another CSS called the Green India Mission which is now an umbrella scheme including CAMPA.

The EFT embedded in the devolution formula, introduced by the 14th FC, and reaffirmed by the 15th FC, has not been effective in incentivizing states' investment and further development of their forest cover, despite the considerable sums effectively transferred. It would appear that the states are using those funds for many other purposes. Based on the available evidence, the

Compensatory Afforestation Fund has not been that successful either, because payments in and rewards from the fund have lacked salience.

Therefore, there is a need to reengineer India's current transfer policies to incentivize the states in fighting climate change. This could take the form of a performance-based grant that compensates the states for net additions to their forest cover with a nonlinear payment schedule offering proportionally higher compensation to those with relatively larger covers. The use of performance-based grants is likely to present some challenges. For example, they may overlook the issues of equity and equalization, although these latter important concerns can be addressed by compensating reforms in the revenue devolution formula by the Finance Commission. The measurement of performance could also be a complex affair and the observation period for performance could be out of sync with the regular timing of transfers, and therefore some budget flexibility may be required.

Similarly, the "Compensatory Afforestation Scheme" would require an upward recalibration of tax penalties and compensations. Adaptation and further decarbonization programs will require the design of other conditional grants, and a concerted effort should go into "greening up" existing CSSs. That is, by embedding climate change concerns into those existing conditional grants. Probably, rationalizing and restructuring the CSS is the most effective instrument at hand in the short run, because it will enable the central government to push, within the available fiscal space, investments into key areas for effectively fighting climate change at the subnational level.

The cost for funding climate adaptation and mitigation will be huge and it is best not to give up on any instrument of financing like EFT. An important objective will be to more effectively incentivize states' Finance Departments to allocate higher budgets for the environment and forest departments.

Adapting the last pillar of decentralization, borrowing, will be critical to help finance the large investments needs to fight climate change at the subnational level, especially in the case of adaptation programs. For example, many other countries are using new instruments, such as green bonds to do that. However, the troubled recent history with subnational fiscal discipline in India calls for a gradual and sequenced approach to doing that.

Getting all the above policies right will require a great deal of coordination and planning. In this regard it is fitting to close this paper with the list of requirements for good green public finance listed in the recent IMF (2022) fiscal monitor: These practices include the following - (i) requiring that national and sectoral development strategies are aligned with governments' commitments on mitigation and adaptation to climate change; (ii) preparing a medium-term fiscal framework that considers revenue and spending implications of climate policies; (iii) setting requirements for the systematic analysis of the climate impact of new fiscal measures before their adoption; (iv) identifying and monitoring climate change-related expenditure items in the budget and lastly; (v) publishing regular ex post reviews of climate outcomes of budget policies.

To conclude, there is considerable work ahead to bring about the policy changes outlined in this paper for enhancing climate mitigation policies in India. A general caveat is that future research still will be needed to analyze and address in more depth, within the fiscal federalism framework, adaptation and investing in resilience policies in India.

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