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## **Fiscal Tools for Subnational Ecosystem and Climate Action**

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**ANDREW YOUNG SCHOOL**  
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# Fiscal Tools for Subnational Ecosystem and Climate Action

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## Abstract

The benefits of climate change action at all levels of government accrue to the overall population nationally as well as globally. Therefore, there is a role for all kinds of governmental institutions—local, regional, national and international—in climate action. The challenge is to identify effective public policy tools and fiscal instruments that reconcile local costs and global benefits. In this paper, we analyze the potential of including three recent payment schemes pioneered for compensating costs incurred for climate action into intergovernmental fiscal toolbox. The focus is whether payment for ecosystem services (PES), reducing emissions from deforestation and forest degradation plus conservation, sustainable management of forests, and enhancing forest carbon stocks (REDD+) and ecological fiscal transfers (EFT) provide sufficient incentives to subnational governments to take on climate action.

**Keywords:** climate change, fiscal transfers, ecosystem services, subnational government

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## I. Introduction

There is an emerging consensus that preservation of the ecosystem is a public good (Ring 2008).<sup>1</sup> Nature-based ecosystem services complement climate change mitigation efforts by reducing overall economic cost of decarbonization and creating climate co-benefits through the protection of biodiversity. The benefits of biodiversity conservation<sup>2</sup> and the sustainable provision of ecosystem services,<sup>3</sup> both at the national and subnational levels, accrue to the overall population nationally and globally.<sup>4</sup> Therefore, in the provision of biodiversity and ecosystem services, there is a role for all kinds of governmental institutions—local, regional, national and international (Ring and Barton 2015).

The importance of multi-level governance has long been recognized in climate action (Paavola et al. 2009; Ring 2008). The challenge is to identify effective policy tools and instruments that reconcile local costs and global benefits (Ring and Barton 2015). The costs and benefits of climate action are unequally distributed in space across local jurisdictions as well as between central and local levels, therefore it calls for instruments capable of addressing interactions between levels of government (Ring and Barton 2015). Without proper compensation mechanism for local climate action, subnational governments would bear the cost while the benefits extend far beyond their boundaries. Thus, incorporating climate action related fiscal

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<sup>1</sup> Throughout the text, we will use the terms “ecosystem services”, “biodiversity conservation” and “environmental services” “climate action” interchangeably. We do recognize that environmental scientists have specific definitions for these technical terms, however, for the purpose of this paper and the design of intergovernmental fiscal interventions to stimulate subnational action these terms have similar consequences.<sup>2</sup> Biodiversity covers all life on earth from the genetic level to terrestrial, freshwater and marine habitats and ecosystems (Ring and Barton 2015).

<sup>2</sup> Biodiversity covers all life on earth from the genetic level to terrestrial, freshwater and marine habitats and ecosystems (Ring and Barton 2015).

<sup>3</sup> The Millennium Ecosystem Assessment report categorizes the world’s ecosystems services into four: (i) Provisioning Services or the provision of food, fresh water, fuel, fiber, and other goods; (ii) Regulating Services such as climate, water, and disease regulation as well as pollination; (iii) Supporting Services such as soil formation and nutrient cycling; and (iv) Cultural Services such as educational, aesthetic, and cultural heritage values as well as recreation and tourism. For more information about Millennium Ecosystem Assessment visit Millennium Ecosystem Assessment ([millenniumassessment.org](http://millenniumassessment.org)).

<sup>4</sup> The provision of ecosystem services, including biodiversity conservation, play a positive role in decreasing slow onset environmental change. In that sense, we consider them as tools for climate change mitigation.

tools into the intergovernmental toolbox is important as a means to reconcile the climate action costs at local levels with the benefits received at higher levels of governance.

In this paper, we analyze three recent payment schemes pioneered for compensating costs incurred for biodiversity and ecosystem services. The focus is whether these three innovative fiscal instruments provide sufficient incentives to subnational governments to take on climate action:

- *Payments for ecosystem services (PES)*: a name given to a variety of arrangements through which the beneficiaries of nature-based ecosystem interventions, from watershed protection and forest conservation to carbon sequestration and landscape beauty, reward those whose lands provide these services.
- Payments for *reducing emissions from deforestation and forest degradation plus conservation, sustainable management of forests, and enhancing forest carbon stocks (REDD+)*: ex post payments to governments for verified activities to reduce emissions (which is expected to motivate them to protect forests).
- *Ecological fiscal transfers (EFTs)*: distributing budgetary resources based on ecological variables.

On an elementary level, the three tools seek to achieve the same or similar outcomes, using similar methods: better outcomes for nature or ecosystem in large, through incentivizing less harmful practices via pecuniary transfers or benefits. Therefore, they should be understood as circumstantial parallels rather than defined and distinct providers. PES has a micro focus which is more granular and facilitates economic benefits to landowners/farmers to render out a particular ecological service. PES schemes are designed appropriate to local conditions and local environment. Compared to PES, EFT has a macro focus in the sense that many subnational governments benefit from it and endeavors to promote good practices through direct transfers. REDD+ is a specific intervention devised by the United Nations Framework Convention on

Climate Change (UNFCCC) to focus on deforestation and conservation in developing countries. Notably, REDD+ takes a broader approach and apart from carbon emission reduction, it also aligns itself with conservatory activities and increasing existing carbon forest stocks.

Borrowing from the fiscal federalism literature the next section will first discuss the theoretical arguments for subnational provision of biodiversity conservation and ecosystem services. It will analyze economic theory behind the involvement of subnational governments in providing such services and assigning revenue sources for financing them. The rest of the chapter will zoom in three fiscal tools for financing subnational climate action: PES, REDD+ and EFT. The third section will provide ideas on how the first two tools, PES and REDD+, can be adopted by central governments to incentivize climate action by subnational governments. PES and REDD+ are schemes usually initiated by donors in low-income countries to finance ecosystem services. Based on experiences in a selected number of countries, the section will explore ideas for how these three fiscal tools can be incorporated into a country's intergovernmental fiscal toolbox to incentivize climate action by subnational governments.

The last section will conclude with broad guidance to policy makers on how to use these intergovernmental fiscal tools to incentivize subnational governments into climate action.

## **II. Theoretical Arguments for Subnational Climate Action**

In delivering biodiversity conservation and ecosystem services, governments rely on a “policy mix’ (Ring and Barton 2015). The concept refers to “a combination of policy instruments ... to influence the quantity and quality of biodiversity conservation and ecosystem service provision in public and private sectors” (Ring and Schroter-Schlaack 2011: 15). Ring and Barton (2015) identify three major instrument categories:

- Regulatory instruments for protecting the environment, such as building permits, protected area regulations, conservation planning, standard setting, and area zoning and planning.
- Fiscal instruments for delivering and financing environmental services as well as pricing environmentally harmful activities.
- Informational instruments to target individuals and communities for behavioral change.

All these instruments have a role to play in reconciling local costs and global benefits of subnational climate action. In terms of climate action, economic theory offers limited guidance for assigning responsibilities as well as financing sources among different levels of government.<sup>5</sup> The fiscal federalism theory makes a distinction between national and local public services suggesting that the former should be provided by central and the latter by subnational governments.

The general principle of transfer system design is to correct for vertical and horizontal fiscal imbalances. However, the traditional definition of imbalance does not include differences in geography or climate impacts. Environmental assets such as natural parks or biosphere reserves impose costs to local jurisdictions, but the benefits accrue to all jurisdictions. Subnational governments may be unwilling to provide an efficient level of services to protect environmental assets if they believe that people who reside outside the locality will enjoy most of the resulting benefits. Similarly, subnational governments may be unwilling to curtail activities that have adverse environmental impacts, such pollution, if the negative externalities are felt by other jurisdictions. In such cases, central government transfers can help generate positive externalities

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<sup>5</sup> In terms of assigning revenues to subnational governments, fiscal federalism theory suggests that subnational governments should rely predominantly upon user charges and taxes on immobile tax bases. In case of environmental protection, the main policy instrument is a Pigouvian tax. As Martinez-Vazquez (2021) points out a good subnational tax and a tax for climate action have very different properties. For a Pigouvian tax instrument, the goal is to set the rate equal to the marginal environmental damage to create proper incentives to reduce pollution. Therefore, a Pigouvian tax aims to reduce environmental damage not revenue raising. Whereas, for a subnational tax instrument the goal is to minimize economic distortions and raising sufficient amount of revenues (buoyancy).

(in case of protection of natural parks) and/or minimizing negative externalities (in case of pollution). Consequently, the design of intergovernmental transfers for climate change purposes has a bearing on achieving climate related outcomes (Martinez-Vazquez 2021). In the context of climate change, the design of multi-level government systems forces us to think about variables that can capture the cost of climate action and the protection of environmental assets.

The compensation of sub-national governments for the protection of environmental assets can help avoid what we call the 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 restrictions on the use of these natural endowments (such as restrictions on land use and the exploitation of environmental assets). When subnational governments are denied the use of economic assets for development, they experience a natural resource trap: losing potential economic benefits from their natural resource endowments. This is a typical example of opportunity cost. There are intergovernmental fiscal tools to address opportunity cost issue to avoid creating natural resources traps.

### **III. Practice of Fiscal Tools for Environmental Conservation around the World**

In this section, we review three fiscal tools (PES, REDD+, EFT) used to finance climate action to examine their effectiveness for avoiding natural resource traps and their potential for inclusion into the intergovernmental fiscal toolbox.

#### **a. Payments for ecosystem services—PES**

Payments for ecosystem services (PES) are conceptualized with the thinking that the undersupply of ecosystem services is a direct result of market failures: providers of ecosystem services (such as watershed protection) need to be compensated for managing environmental assets in such a way as to generate positive environmental externalities and limit negative

externalities. For example, in the case of watershed protection, downstream water users pay upstream farmers for adopting programs that limit soil erosion and flooding risks.

Wunder (2007) defines PES as a voluntary transaction between two parties, a payer and a payee, in which payments for well-defined environmental services are conditional on the continuous provision of the services. The payments thus provide incentives to conserve the ecosystem.

According to Wunder (2007: 49), the idea of PES “is that external beneficiaries of environmental services make direct contractual quid pro quo payments to local landowners and land users in return for adopting land and resource uses that secure ecosystem conservation and restoration.”

In principle, PES schemes should help to address environmental externalities.<sup>6</sup> PES is possible if financial losses of ecoservice providers (e.g., upstream landowners) are compensated by the users (e.g., downstream water users). Wunder (2013: 232) suggests that “no PES deal is possible if users’ maximum willingness to pay (WTP) falls short of providers’ minimum willingness to accept (WTA) compensation....If the economics of WTP and WTA do not square, there is no basis for PES.” Accordingly, Wunder (2005) lists five criteria as the key features of PES: “(1) a voluntary transaction in which (2) a well-defined environmental service (or a land use likely to secure that service) (3) is bought by a (minimum of one) buyer (4) from a (minimum of one) provider (5) if and only if the provider continuously secures the provision of the service (conditionality).”

In a PES scheme, both the buyer and provider can be private or public entities.<sup>7</sup> In public sector PES schemes, the state uses taxpayers’ money to buy environmental services from public or

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<sup>6</sup> Economic theory suggest that some form of subsidy will create optimal conditions for environmental services (Pigou 1920) if transaction costs are low and property rights are established (Coase 1960).

<sup>7</sup> Smith, de Groot and Bergkamp (2006) identify three types of PES schemes: (i) Private PES, self-organized schemes between private entities; (ii) Cap and Trade; and (iii) Public PES, government driven schemes which involve public sector entities and

private entities.<sup>8</sup> In China, for example, PES schemes are used widely in different forms. It is viewed as a public institutional arrangement for internalizing the externalities of ecosystem services (Xu 2013, cited in Pan et al. 2017). PES framework in China (see Table 1) has been established with government dominated funding reflecting the unique institutional set up in the country—the public ownership of natural resources (Pan et al. 2017).<sup>9</sup>

**Table 1: PES Schemes in China**

Scheme	Payer	Payee	Conditionality	Payment principles
PES for key eco-functional zones	Central government	County governments	Industrialization and urbanization restricted; conservation efforts made	Steward rewarded
PES for non-commercial forest	Central government and local governments	Owners of private and communal forests, steward agents of state-owned forests	Commercial logging stopped and sustainable management practiced	Steward rewarded
PES for grassland conservation	Central government	Herders	Grazing abandoned or sustainable grazing practiced	Steward rewarded
PES for watershed conservation	Depends on agreement	Depends on agreement	Water quality and quantity met agreed standards	Steward rewarded/ polluter pays
PES for restoring mining sites	Central government and developers	Local governments and restorers	Mining sites restored environmentally	Beneficiary pays

Source: Pan et al. (2017)

Note: (a) The first PES on key national ecological functional zones (a.k.a National Key Ecological Function Areas—NKEFA) compensates county governments for ecosystem services; (b) second scheme, Central government transfers funds to provincial governments for the compensation of steward agents of ecological forests; (c) third scheme, Central government transfers resources to provincial governments with a quota for grassland abandoned grazing and sustainable pasturing and they are required to decide how to allocate resources to herders; (d) fourth scheme focuses on water pollution controls using different mechanism such as water conservation and sustainable water supply; (e) fifth scheme, all provincial governments developed restoration guidelines—example of regulatory instrument—to apply mining sites.

In all of these different PES schemes in China, there is a role for subnational governments whether as the beneficiary of the central government funds or co-contributors of funds for

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include user fees, land purchase and granting of rights to use land resources as well as fiscal mechanisms based on taxes and subsidies.

<sup>8</sup> Wunder, Engel, and Pagiola (2008) argue that government-financed PES schemes usually have multiple side-objectives such as poverty alleviation, job creation and regional development as well as electoral motives. Therefore, PES schemes that involve government may not be cost-effective because of these policy objectives.

<sup>9</sup> Because of this characteristic, some researchers categorize them as ecological fiscal transfers (Busch et al. 2021).

ecological services or as the enforcer of environmental standards. World Bank (2021) categorizes PES schemes in four groups based on the role of each level of government. According to World Bank intra-provincial programs are the biggest PES schemes, followed by national, subnational hybrid and interprovincial programs (see Table 2 below).

**Table 2. PES Programs by Government Role and Resource Management Issue in China**

			By Government Role				
			National Framework	Nationally Led interprovincial	Nationally Catalyzed Intra-provincial	Subnational Hybrid	
<b>By Objective</b>	ALL		29.4 %	4.4 %	39.7 %	26.5 %	
	Forestry		25.0 %	24.3 %	0 %	0 %	
	Water	Watershed	8.8 %	0 %	0 %	1.0 %	7.4 %
		Cross-border	24.3 %	0 %	4.4 %	19.9 %	0 %
		Water Source Protection	17.6 %	0 %	0 %	1.0 %	16.9 %
	Soil Erosion Prevention/Control		0.7 %	0.7 %	0 %	0 %	0 %
	Wetland		8.1 %	3.0 %	0 %	5.2 %	0 %
	Grassland		8.1 %	0.7 %	0 %	6.6 %	0.7 %
	Agriculture		3.7 %	0 %	0 %	3.7 %	0 %
	Conservation		3.7 %	0.7 %	0 %	1.5 %	1.5 %

Source: World Bank (2021)

Other examples of public PES schemes are found in Latin America (Greiber 2009). In Brazil, the municipality of Extrema in the State of Minas Gerais established the Water Steward Program to protect water supply in the Sao Paulo region. This municipality-initiated program makes payments to rural landowners who (i) adopts soil conservation practices in order to decrease soil erosion and sedimentation; (ii) implements wastewater and solid waste treatment; and (iii) maintains vegetal cover in areas of permanent preservation and reserves according to federal and state laws.

In Bolivia's Santa Rosa region, Los Negros River Watershed PES scheme compensated farmers of Santa Rosa (upstream community) to protect certain forests or to reforest deforested areas. In the Fundacion NATURA established PES scheme the irrigators of downstream Los Negros

community provided the funds through Pampagrande Municipality. Based on this pilot project other municipalities in the region, such as Mairana and Comarapa, started their own PES schemes for the protection of their watersheds. These initiatives were designed and implemented with the active involvement of local municipalities, Fundacion NATURA and water cooperatives in the region.

### Intergovernmental application of PES

According to Wunder (2007), there is a need for new conservation paradigms as environmental services previously provided for free are becoming increasingly threatened. In the context of intergovernmental relations, PES can be viewed as a public institutional arrangement for internalizing the externalities of ecosystem services through fiscal transfers, lateral payments, or market trade (Pan et al. 2017). PES schemes allow “external beneficiaries of environmental services make direct contractual quid pro quo payments .....in return for adopting land and resource uses that secure ecosystem conservation and restoration” (Wunder 2007: 49).

In an intergovernmental context, a PES scheme can be designed in two different ways:

1. Central government (or subnational government) as buyer of climate action (payer) and subnational governments as providers (payee). The potential applications of such a PES scheme may include:
  - *Carbon sequestration and storage*: payments by central government (or subnational government) to local governments for carbon sequestration activities such as afforestation, soil conservation and wetland protection.
  - *Biodiversity protection*: payments by central government to compensate local governments for set-aside areas for parks, protected ecosystems and biological corridors.
  - *Watershed protection*: payments by downstream local governments to upstream local governments to compensate for limiting soil erosion and flooding risks.

- *Protection of landscape beauty*: payments by central governments to local governments, especially in touristic areas, for the protection of landscape beauty.
2. Central and subnational governments as joint buyers of climate action (payers) from public and private entities as providers (payees). In these kinds of arrangements, central and subnational governments can jointly finance PES schemes. They can buy environmental services from public and private entities through programs limiting commercial logging and soil erosion, promoting sustainable grazing practices, and reducing flooding risks.

#### Challenges in implementing PES in an intergovernmental context

There are two potential implementation challenges with PES schemes (Pattanayak et al. 2010): hidden information (adverse selection) and hidden action (moral hazard). Hidden information problem arises when environmental service providers have more information about the circumstances than buyers. In an intergovernmental context, this means local governments have more information about local conditions than a central government (classical proximity argument) which might lead to adverse selection in terms of targeting environmental assets and allocation of financial resources. Hidden information makes it difficult for central governments to design PES schemes to target right assets and allocate an adequate amount of budgetary resources—hidden information problem can make a PES scheme unnecessarily costly for the payer.

Another important challenge is monitoring the impact. It is at the heart of PES schemes. In the context of monitoring impact in a public PES scheme, the buyer (central government) should be well equipped to monitor conditionality, additionality and leakage of PES schemes.

Conditionality requires that resource transfers to subnational governments (providers) should be based on strict monitoring to ensure that providers deliver the intended outcomes. Additionality requires that changes on the ground should be directly linked to the PES intervention and would not have taken place without the PES intervention. Leakage happens when a PES intervention

gives negative incentives to neighboring jurisdictions. For example, a carbon PES scheme might finance reforestation of a certain area, but it puts deforestation pressures in a neighboring area (Wunder 2007).

Last but not least, institutional issues of trust, transaction costs and property rights (ownership of natural resources) are important. In the context of PES implementation, especially in developing countries where informal institutions are prevalent than formal institutions, research shows that creating trusting relationship between payers and payees is important. Wunder (2013) suggests that without basic trust PES agreements will not materialize.

**b. Payments for reducing emissions from deforestation and forest degradation—REDD+**

Reducing emissions from deforestation and forest degradation (REDD+), is an incentive-based scheme that aims to reduce greenhouse gas emissions by protecting tropical forests. REDD+ constitutes a group of international programs and projects to reward landowners, communities and countries in tropical regions for eliminating deforestation and forest degradation to stabilize the climate. Payments are made where the beneficiaries demonstrate reductions in the rate of deforestation and/or the area and quality of forest cover against a baseline (Angelsen et al. 2009). REDD+ was envisioned as a catalyst for transformational change towards sustainable climate mitigation in the forestry and land use sectors (Brockhaus and Angelsen, 2012, Di Gregorio et al., 2015, Angelsen et al., 2018).

Although REDD+ started as a global initiative and much of the initial debate has focused on the global REDD+ architecture and how REDD+ can be included in a post-2012 climate agreement, the debates and the focus of actions have increasingly moved to national and local levels. More than 40 countries are developing national REDD+ strategies and policies, and hundreds of

REDD+ projects have been initiated across the tropics. The design of REDD+ programs incorporate lessons-learned from PES.

As REDD+ has moved from an idea into the real world, the challenges have mounted. The initial idea was simple: REDD+ would financially reward developing nations for protecting, restoring and sustainably managing forests. With healthy forests absorbing up to a third of all greenhouse gases (GHGs), and deforestation causing about a fifth of all emissions, advocates of this instrument saw REDD+ as one of the quickest ways to slow the pace of climate change. However, the implementation of REDD+ poses both technical and political challenges – from how to measure and monitor the carbon emissions that have been avoided by leaving a forest standing, to deciding who should get the money generated by REDD+, to achieving coordination between local, regional, national and international levels of governance.

According to Angelsen *et al.* (2018) even though REDD+ has been unable to halt global tropical deforestation so far, it has established mechanisms for successful interventions. Some 600 REDD+ projects have been initiated to date (with some 400 still active), mostly implemented by social and environmental NGOs or for-profit project developers and financed by more than \$10 billion in donor funds in more than 65 countries. Much of the attention has focused on tropical rainforests: REDD+ schemes are concentrated in Southeast Asia and Latin America regions. In total, the REDD+ activities listed in the Lima Information Hub<sup>10</sup> for REDD+ resulted in emission reductions of 6.3 billion t CO<sub>2</sub> eq.<sup>11</sup>

While REDD+ has taken on many forms over the years — ranging from small-scale project-based approaches to national and jurisdictional-level schemes under the UNFCCC — the

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<sup>10</sup> [redd.unfccc.int/info-hub.html](http://redd.unfccc.int/info-hub.html)

<sup>11</sup> The equivalent of removing 1 billion cars from the road for one year ([twitter.com/USAID/status/1591128956681453568](https://twitter.com/USAID/status/1591128956681453568))

overarching framework uses incentives (often financial payments) to reward reductions in deforestation. The implementation of REDD+ activities is voluntary and depends on the national circumstances, capacities and capabilities of each country and the level of support received (see Table 3). Implementation of REDD+ has varied across regions (see Table 3).

National REDD+ strategies and country-level responses vary considerably in their emphasis- including whether they focus on avoiding deforestation, degraded forests management, afforestation, reforestation, or other "plus" elements. Private sector interest in developing REDD+ pilots was highest immediately after the issuance of the Bali Action Plan, with private banks, conservation entrepreneurs, and government entities initiating projects. The organization and scope of pilots have varied, from the level of district governments to centrally issued forest concessions and provincial governments. Some have sought to align themselves with voluntary carbon market standards, but no systematic assessment of lessons was conducted of the emerging experience in the South-East Asia (SEA) region.

Most public sector REDD+ efforts center on readiness work, though there are early experiments with organizing and generating financing. This follows directly from the emphasis given under the major support mechanisms such as Forest Carbon Partnership Facility (FCPF). In some countries there has been a proliferation of REDD+ pilot projects, many of which are only weakly sanctioned or related to national REDD+ strategies. The approaches being taken to REDD+ strategies reflect contrasting national and subnational conditions in Brazil and Indonesia. Table 3 presents stylized national and subnational facts about the Juma Project: REDD+ in Amazon, Brazil and Indonesia as well as REDD+ in the Archipelago.

**Table 3: REDD+ in Amazon, Brazil and Indonesia & REDD+ in the Archipelago**

The Juma Project: REDD+ in Amazon, Brazil	Indonesia & Norway: REDD+ in the Archipelago
<ul style="list-style-type: none"> <li>— As Amazon’s first REDD project - The Juma Sustainable Development Reserve Project in Amazon, Brazil has been independently validated and has provided promising results.</li> <li>— The Juma project is part of the wider Bolsa Floresta program – now making payments to more than 6000 families in 14 threatened conservation areas, covering over 10 million hectares.</li> <li>— Bolsa Floresta has four main ways of making payments – one dispersed through a purpose-designed debit card system run by a mainstream bank – which create a balance of incentives that make a pledge towards zero deforestation economically palatable at family and community level.</li> </ul>	<ul style="list-style-type: none"> <li>— A USAID report on Asia’s forests estimates around \$130 million is needed per year to effectively manage Indonesia’s protected forests, which are the largest forest areas in Asia.</li> <li>— Under a bilateral agreement with the Government of Norway, the Indonesian government had identified eight forested provinces – Aceh, Jambi, Riau, South Sumatra, West Kalimantan, East Kalimantan, Central Kalimantan, Papua and West Papua– to receive financial and technical assistance for implementing REDD+ projects.</li> <li>— The agreement stipulated that the Indonesian government had to draft a national strategy as well as a provincial strategy for the selected provinces.</li> </ul>

Intergovernmental aspect of REDD+

REDD+ at the national level can be assessed through the lens of four inter-related themes: (i) institutions and processes to build the REDD+ framework; (ii) broad policy reforms to enable REDD+ implementation; (iii) sectoral policies to change incentives; (iv) and demonstration activities to test and learn from different approaches. There are no ‘one size fits all’ recommendations. However, REDD+ suffers from the same information asymmetry, adverse selection and additionality risks as PES with an additional complication in that it is unclear who should be the beneficiary given that property rights over large areas of forest are not defined and may be held by indigenous communities.

A core idea behind underlying REDD+ is to make performance-based payments, that is, to pay forest owners and users to reduce emissions and increase carbon removals.<sup>12</sup> Such payments for

<sup>12</sup> REDD+ performance-based programs, climate or green bonds issued by governments (at local, regional or national level) or companies, and impact bonds linked to projects or programs are currently receiving significant attention as a way of mobilizing upfront financing as well as incentivizing emissions reductions (Lowery et al, 2014; The Global Canopy Program et al, 2014).

environmental (or ecosystem) services (PES) have its merits as noted in the previous section, it provides strong incentives directly to forest owners and users to manage forests better and clear less forestland. Well managed and well selected REDD+ will fully compensate carbon rights holders<sup>13</sup> that find forest conservation more lucrative than the alternatives. They simply sell forest carbon credits and less cattle, coffee, cocoa or charcoal. REDD+ can be used at the subnational level effectively as it will help setting up spatially specific deforestation targets.<sup>14</sup> The benefits of REDD+ go beyond emissions reductions and include forest conservation, sustainable economic development, and biodiversity preservation. Countries should seek ways to incorporate results from local level monitoring into their national reporting systems, since overall REDD+ impact depends on land use decisions on the ground.<sup>15</sup> However, climate impacts will require long-term retention of cover which would entail long-term and potentially escalating payments. Therefore, one has to answer the following key questions: over what time frame and how should compensation be paid? should compensation still be paid when the asset no longer generates the benefits?

#### Challenges in implementing REDD+ in an intergovernmental context

A key premise of REDD+ was a strong national focus, whereby country governments would be the leading actors in forest conservation. But, so far, most REDD+ funding has been awarded to local and subnational project-based initiatives. “Many of them can be successful projects, but if they become conservation islands in the midst of a jungle of deforestation – that will not make much of a difference,” as noted by Angelsen et al. (2012). Angelsen et al. (2012) believe that broad reforms at the national level – including establishing protected areas, the reform of forest

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<sup>13</sup> The key issue here is who is the carbon right holder: the landowner, the community, the government?

<sup>14</sup> The benefits of REDD+ go beyond emissions reductions and include forest conservation, sustainable economic development, and biodiversity preservation.

<sup>15</sup> Astrid B Bos et al 2017 Environ. Res. Lett. 12 074007

concession policies, integrating environmental concerns into road and infrastructure planning, and removing perverse incentives – are important for REDD+, but have been difficult to achieve due to strong opposition from powerful actors who stand to lose. Some REDD+ countries have begun forging connections between local, national and global actors to counteract the lack of coordination.

Although various REDD+ systems for forest conservation have been running for some time, there are barriers for wider scale application. Land tenure and carbon rights must be clearly defined, yet most deforestation hotspots are characterized by unclear and contested land rights. Forest carbon must be monitored regularly at the scale where payments are made. Institutional and governance structures must be established to manage payments and information, and to link local PES systems to national (or global) REDD+ systems. Credible reference levels, reflecting what would have happened without REDD+ interventions, must be established.

Effective implementation of REDD+ therefore calls for a broader set of policies. These include institutional reforms in the areas of governance, tenure, decentralization, and community forest management (CFM). Agricultural policies can limit the demand for new agricultural land. Energy policies can limit the pressure on forest degradation caused by wood fuel harvesting, while reduced impact logging (RIL) practices can limit the harmful impacts of timber extraction. Setting up protected areas (PAs) has proved effective in conserving forest, and – although being far from perfect – support for PAs should be considered as part of any comprehensive national REDD+ strategy.

Di Gregorio et al. (2019) found that 89 out of 99 tropical countries had “very large to medium” gaps between what is required for REDD+ monitoring and the countries’ current capacities. This meant these countries have been providing incomplete and inaccurate estimates of forest loss and

GHG emissions. Responsibility for building robust systems for measurement, reporting and verification (MRV) of GHG emissions is expected to lie with the developing countries themselves – however, most do not have the capacity for this highly technical task, the study found. REDD+ is assumed to be a performance-based mechanism and its supporters need to be realistic about what developing countries can do in terms of MRV (Verchot et al. 2012). Studies point out that the international community needs to commit the human and financial resources to address the gaps in MRV capacity if they want REDD+ to work. In a nutshell, performance-based REDD+ systems require high capacity in monitoring and enforcement at the center and technical and managerial capacity at the subnational level, thereby supporting a more resilient, durable and capability-based framework for REDD+ implementation. In addition, MRV helps to buttress the point that the subnational planning needs should be aligned with higher-level policy goals and development of holistic planning frameworks and performance metrics for intergovernmental coordination will go a long way in addressing REDD+ in a multi-level governance framework.

**c. Ecological fiscal transfers—EFT**

Ecological Fiscal Transfers (EFTs) distribute a share of intergovernmental fiscal transfers and/or national revenues according to ecological indicators such as protected areas or watershed management areas. These conservation areas thus become a source of income for the receiving governments. EFT is an instrument for financing subnational climate action alongside PES and REDD+.

EFT can be incorporated into the existing intergovernmental fiscal transfer (IGFT) system easily without going through the process of approval of new, additional or annual outlays. It has been

already established in five countries and 18 states in Brazil. Table 4 provides a worldwide overview EFTs including indicators used to distribute funds and sources of funds.

According to Busch *et al.* (2021: p.756) “...‘ecological’ refers to ecological public functions of governments, which encompass both nature conservation and abatement of environmental pollution. EFT may transfer revenue ‘vertically’ from higher-level to lower-level governments or ‘horizontally’ between governments at the same level. EFT may be ‘general-purpose’ transfers to subnational government budgets that can be spent on any priority of recipient jurisdictions, whether ecological or non-ecological. Or they may be ‘specific-purpose’ transfers earmarked for a particular ecological use, for example, reforestation or water treatment.”

EFT is an innovative approach to finance subnational climate action. It “...can compensate subnational governments for the management costs of conserving ecosystems and the opportunity costs of forgone tax receipts from revenue-generating activities” (Busch et al. 2021: 756). In theory, EFT will incentivize subnational governments to take climate action thereby contributing to global efforts to fight climate change.

**Table 4: Overview of EFTs in the World**

Country	Year Enacted	SNG Level	Indicator	% of IGFT	Source of funds
Portugal	2007	N-M	Protected areas	2.5-2.7	National general budget
France	2007	N-M	Strictly protected terrestrial area; marine park	0.02	National general budget
China	2010	N-C	Multi-element formula to local governments with NKEFA	0.95	National general budget
China	2012	P-P	Water quality	100	Provincial and national general budgets
India	2015	N-S	Area of high or moderately dense forest	2015–20: 7.5 2020–20: 10	National tax revenue
Brazilian States					
Paraná	1991	S-M	PA; IT; water protection	5	State VAT
São Paulo	1993	S-M	PA; water protection	1	State VAT
Mato Grosso do Sul	1994	S-M	PA; IT; waste treatment	5	State VAT

Country	Year Enacted	SNG Level	Indicator	% of IGFT	Source of funds
Minas Gerais	1995	S-M	PA; IT; waste treatment; forest area; water resources	1.35	State VAT
Rondônia	1996	S-M	PA; IT	5	State VAT
Rio Grande do Sul	1997	S-M	PA; IT; environmental quality index; waste treatment	7	State VAT
Amapá	1998	S-M	PA; IT	1.4	State VAT
Mato Grosso	2000	S-M	PA; IT; sanitation	7	State VAT
Pernambuco	2000	S-M	PA; waste treatment	3	State VAT
Tocantins	2002	S-M	PA; IT; water conservation; forest fire control; soil conservation; environmental policy	13	State VAT
Acre	2004	S-M	PA	20	State VAT
Rio de Janeiro	2007	S-M	PA; water quality; waste treatment	2.5	State VAT
Goiás	2007	S-M	PA; watershed protection	5	State VAT
Ceará	2007	S-M	Waste treatment	2	State VAT
Piauí	2008	S-M	Environmental seal (an award based on nine indicators)	5	State VAT
Paraíba	2011	S-M	PA	5	State VAT
Pará	2012	S-M	PA; IT; deforestation reduction; cadastral registration	8	State VAT
Alagoas	2020	S-M	Biodiversity conservation; related criteria	3	State VAT

N is the national, S the state/provincial level and M the county/municipal level. PA, protected area; IT, indigenous territories; VAT, value-added tax. Year enacted in Brazil refers to year of initial legislation

Source: Busch et al. (2021)

## ***Brazil***

Brazil is the first country in the world to introduce EFT (*ICMS Ecológico*) to compensate municipalities for land use restrictions imposed to protect protected areas (PA) (May et al. 2002; Ring 2008). The federal constitution allows Brazilian states to levy tax on commerce and services (*Imposto sobre Circulação de Mercadorias e Serviços*, ICMS). States are constitutionally mandated to transfer 25 percent of the proceeds to municipalities on derivation basis. Of this 25 percent, three-quarters must be distributed to municipalities proportional to each municipality's contribution to the state's ICMS collection. The remaining quarter, which is 6.25 percent of total ICMS collection, is distributed according to criteria established by the state government. Parana state was the first to include protected areas for biodiversity into its ICMS formula in 1991 alongside indicators related to agriculture, population, rural and urban areas

(Busch et al. 2021). It was intended to incentivize municipalities to protect PAs. In the following years other states followed Parana to include ecological indicators in distributing state-level value-added tax revenues to municipalities. As of 2020, 18 of Brazil's 27 states included some type of ecological indicator in its ICMS distribution formula. According to Busch et al. (2021) ICMS in various states transferred around US\$8.8 billion to municipalities.

Although EFT revenues are formally unconditional block grants to municipalities, in reality, the transfer system is performance-based as municipal governments have to achieve results determined by state governments, such as the protection of PAs, to receive funds but they are not obligated to spend the money on a specified expenditure item. Research on the impact of EFT on PA size and designation found positive results—for example, Droste et al. (2017) find that the introduction of ICMS in states correlates with a larger share of PA in states. However, political economy dynamics play an important role in adopting EFT schemes (de Paulo et al. 2019). The probability of adopting EFT during non-election years is higher than in election years.

### ***Portugal***

Since 1993 municipalities in Portugal are formally permitted to designate their own protected areas<sup>16</sup> and a reform on the Local Finances Law widened the range of municipal conservation competencies. With the modification of the fiscal law in 2007, Portugal became the first country in Europe to initiate biodiversity protection by transfers to municipalities for hosting protected areas. In 2007, Portugal introduced EFT into its intergovernmental fiscal transfer system to compensate municipalities for land-use restrictions for PA and Natura 2000 sites.<sup>17</sup> However,

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<sup>16</sup> The competencies regarding the designation of PA in Portugal are divided between the national, the local, and the private level.

<sup>17</sup> Natura 2000 is a list of natural habitats for the endangered species in the European Union. See Natura 2000 - Environment - European Commission (europa.eu).

EFT is not earmarked or conditional and municipalities have total flexibility on how to use transfer resources.

The ecological criteria introduced by the revised 2007 Local Finances Law are “total area under protection” and “percentage of municipal land designated as PA” (Santos et al. 2012). Both of them are among the set of criteria to allocate the General Municipal Fund (FGM) which makes up 50 percent of the Financial Equilibrium Fund (FEF) (Schröter-Schlaack et al. 20014). 30 percent of the FGM is allocated across municipalities based on total area and the amount of land designated as conservation areas (Natura 2000 sites or any other national PA):<sup>18</sup>

- In municipalities with less than 70 percent of their land area under Natura 2000 or national PAs, 25 percent of FGM is allocated in proportion to area, weighted by elevation levels, and 5 percent in proportion to land designated as conservation area.
- In municipalities with more than 70 percent of their land area under Natura 2000 or national PAs, 20 percent of FGM is allocated in proportion to area, weighted by elevation levels, and 10 percent in proportion to land designated as conservation area.

According to Busch et al. (2021), the EFT in Portugal transferred between €789-852 million to municipalities between 2008-2000 which represented 2.5-2.7 percent of total transfers. More importantly, EFT transfer resources made up of a significant share of total transfer revenues for certain municipalities (Santos et al. 2012). Therefore, their impact on ecosystem services needs to be analyzed.

The key lesson from Portugal’s model is to give emphasis on the municipal conservation competencies and the role of local decision makers in the identification of PA at the local level in concurrence with the national PA designations.

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<sup>18</sup> The other 70 percent is allocated as follows: 5 percent is distributed equally, and 65 percent is allocated as a function of population density (benefiting less populated areas) and overnight stays in hotels or on campsites.

## ***France***

In 2011, France changed the distribution of fiscal transfers, called *dotation global de fonctionnement* (DGF), to include an ecological allocation share for municipalities that lie within national parks or natural marine parks. The DGF has two main components: (1) 85 percent of the total DGF is distributed according to five criteria (a lump-sum allocation) and (2) an equalization allocation. The five criteria for the distribution of lump-sum allocation include: population, surface area and geographical conditions, income loss from elimination of local taxes, complementary allocation to stabilize revenues and ecological allocation. This last criterion allocates resources to municipalities situated in the core area of a national park or within the perimeter of a marine park (Borie et al. 2014). In 2019, France added a third type of protected area: Natura 2000 sites, which much more widespread than national parks or marina parks. Natura 2000 sites cover around 13 percent of French territory (Busch et al. 2021). Of the total EFT amount, 40 percent is apportioned to municipalities with territory in core national park areas, 5 percent to municipalities with marine parks and 55 percent to municipalities with 75 percent of their territory within a Natura 2000 area (Busch et al. 2021).

Although, DGF in France is the major source of revenue for municipalities, the EFT portion is very small and not visible (Schröter-Schlaack et al. 20014). The “ecological allocation” amounted to €3 million or just 0.02 percent of the total transfer amount of €13.6 billion (Busch et al. 2021). More importantly, like Brazil and Portugal, the resources are not earmarked to spending on ecoservices. Therefore, it is not clear if it gives enough incentives to municipalities to invest into the protection of these areas.

Prior to 2007, the DGF did not even have an ecological component. It was only following the 2006 reform of the law for national parks, that this ecological allocation was introduced

(Government of France 2006, 2011) to integrate the surface area of the municipality in the core area of the National Park where regulatory protection is enforced.

This allocation integrates socioeconomic inequalities among municipalities, ecological considerations remain marginal. The ecological allocation takes into consideration relative land-use restrictions due to protected areas and is not determined on a per hectare basis (same as Brazil).

### *Nepal*

In Nepal, provincial governments collect vehicle taxes and share 40 percent of that revenue with their constituent local government. The National Natural Resources and Fiscal Commission (NNRFC) is charged in the Constitution with recommending/determining the distribution of revenues to provincial and local governments from the consolidated fund. In 2019, the NNRFC has included forest cover as one of the indicators in the motor vehicle tax revenue sharing formula between local governments and provincial governments to mitigate carbon emissions.

### *India*

In India, EFT is meant to reward states that protect their forests. India's EFTs differ from REDD+ programs in that they pay for states' stock of forest area in the recent past rather than reductions in the rate of forest carbon loss in the near future. Nevertheless, India's EFTs focus on a single outcome and have many recipient governments, significant financial scale, universal participation, and long-term data collection. These features make India's EFTs especially useful for testing the payment-for performance premise of REDD+ (Busch, 2018).

In India, the 14<sup>th</sup> Finance Commission used the opportunity cost argument to introduce forest cover in the horizontal devolution formula:<sup>19</sup>

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

The opportunity cost of forests in terms of area unavailable for other economic activities has been raised by various states (CAG 2013) and acknowledged by several previous finance commissions (FCs) in India. Reports of the previous three FCs highlighted the “restrictions on the exploitation of forest wealth, which has a consequential impact on states’ revenues”, the need for “compensation to states for the opportunity loss”, and the necessity “to compensate the decline in the revenues due to existing policy prescriptions” (Twelfth Finance Commission 2004; Thirteenth Finance Commission 2009; Fourteenth Finance Commission 2014). In 2015, the 14<sup>th</sup> Finance Commission explicitly introduced forest cover<sup>20</sup> variable to the transfer formula. The formula distributed 7.5 percent of transfer pool to states in proportion to states’ forest cover area as measured by the India State of Forest Report. The forest cover definition includes both high value ecosystems and commercial monocultures and the formula effectively rewards states for replacing the former with the latter. Within the total center-state disbursement, 7.5 percent was set aside to be divided among states based on the area of forests within states (by 14th Finance Commission).

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<sup>19</sup> The scale of opportunity cost is substantial in India. The Indian Institute of Forest Management estimated the opportunity cost of forest land that could be converted to other land uses such as horticulture and cultivation of cereal crops at INR 2,44,000 crore [ INR 2440 billion] annually in terms of GDP contribution (Verma et al. 2014).

<sup>20</sup> Forests provide a range of ecological benefits such as regulation of the hydrological cycle, ground water recharge, soil conservation, carbon sequestration, and conservation of biodiversity. While there are local benefits provided by forests, most forest ecosystem services “by their very nature, accrue beyond the boundaries of the state in which the forest lies” (Thirteenth Finance Commission 2009). These positive externalities are generally not accounted for, resulting in inadequate allocation of funds for preserving and maintaining forests (CAG 2013). The 14th FC recognized these ecological benefits and the need to “support states in shouldering the responsibility of managing the environment” (Fourteenth Finance Commission 2014).

States that preserved forests stood to gain in terms of greater disbursement from the center. However, a major shortcoming of the Indian EFT is that the funding is not related to forest quality nor to carbon sequestration value. In addition, these funds are not tied to state forestry budget; they are unconditional grants (as such states are free to spend on any purpose). The primary motivation of the 14th Finance Commission in adding forest cover to the formula was to compensate states for the “fiscal disability” caused by forgone opportunities to convert forests to other uses resulting from implementation of the 1988 National Forest Policy.

In 15th Finance Commission report tabled in Parliament in February 2021, the forest and ecology-based indicator with 10 percent weightage is both a forward-looking incentive and a reward for past performance for maintaining the forest. This recommendation is significant in the context of India’s commitment to reduce its emission intensity by 33-35 percent by 2030 compared to 2005 levels. Today, EFTs are often seen as an instrument that incentivizes decentralized conservation efforts.

Nevertheless, recent research shows that the impact was minimal: “States increased their budgets for forestry by 19 percent in the three years after the introduction of EFTs relative to the three years prior to the introduction of EFTs. However, this increase was probably not due to the introduction of EFTs, for three reasons. First, state budgets went up across the board over the same time period by a considerably larger amount (42 percent), meaning that the share of state budgets devoted to forestry decreased by 16 percent. Second, the increase in states’ forestry budgets can be at least partially explained by increases in states’ overall budgets. And third, the states that benefited the most from EFTs did not disproportionately increase their forestry budgets” (Busch, Kapur and Mukherjee 2020).

Usage of forest and ecology criterion by the FC in a “compensation mechanism” and incentive mechanism” (Busch et al. 2020) have led to the commitment of the state government on the action plans of the climate change. The state government commitment will be reflected on the prioritization of the finance commission transfers. The formula-based finance commission transfers are unconditional in nature without being tied to the department of forest or ecology.

One school of thought has always debated on the non-existence of the direct relationship between climate change and dense forest cover. They have always advocated for inclusion of the other dimensions of the climate change in the ecological fiscal transfers. Inclusion of the forest criteria in the 15<sup>th</sup> FC is attributed to the “impact on the revenue disabilities and expenditure needs of States, and also for the huge ecological benefits to the nation and for meeting our international commitments”.

In India, there is no direct linkages on public expenditure on climate change commitments. In various subnational government, using a demand for grants for forestry is the proxy for climate change related expenditure needs to be extended by review the growth in ETF in other countries like Brazil. The impact of inclusion of other climate change variable in EFT and its impact on overall climate change in the country needs to be studied and adapted appropriately.

### ***Indonesia***

In Indonesia, discussions are revolving around implementation of Ecological-based National Budget Transfer (TANE) from the central government to the local government. The concept of Ecological-based Provincial Budget Transfer (TAPE) and Ecological-based District Budget Transfer (TAKE) is in existence since 2018 (adopted in six regions out of 39). The Transfer to Regional and Village Funds (TKDD) scheme for ecology has now been implemented through the Natural Resources Revenue Sharing Fund (DBH-SDA) especially DBH Reforestation Fund,

Special Allocation Fund (DAK), DID, regional grants and Village Funds. Another feature of Indonesia's experience with ecological transfers is the inclusion of civil society groups. At all levels of government, civil society activists are involved in ecological transfer issues. In the Riau province, for example, there is a strong involvement of local elites and advocacy of civil society organizations for the formulation ecological transfers (Kabullah 2022).

#### Challenges in implementing EFT

The current practice of EFT does not necessarily incentivize climate action. In the examples we covered above one or more climate related variables are included into the existing general purpose unconditional transfers. The generally desirable unconditional use of funds in block grants and addressing disparities in expenditure needs make these types of transfers not well suited to coordinated climate change policy action among central and subnational governments (Martinez-Vazquez 2021).

The integration of EFT as an indicator into general purpose transfers with the flexibility to spend resources on any priority, ecological or non-ecological, does not provide enough incentives for climate action related use. For EFTs to be effective their proceeds need to be earmarked for the management of conserving ecosystems or compensating for the opportunity cost of forgone revenues. In addition, the integration of environmental criteria into a general-purpose block grant dilutes and distorts its equalization function. In that sense, conditional and/or performance-based transfers seem to be the most appropriate tool for addressing spatial externalities and incentivizing subnational governments for climate action. In case conditional grants, the use funds are *ex ante* conditioned on climate change related expenditures, whereas, in case of performance-based grants, subnational governments are expected to meet certain targets (*ex post*). In both cases, there needs to be a high capacity at the center in terms of tracking

subnational expenditures and monitoring of outcomes with subnational climate change interventions. Monitoring capacity at the central level is essential for an effective EFT system. Improved monitoring capacity at the central level would facilitate better use of EFT resources; thus, achieving results on the ground. Furthermore, the goal of EFTs should not be limited to only one aspect of climate change challenge, the design of EFT should incentivize subnational governments to take climate action in multiple areas such as reforestation, water treatment etc. Last but not least, as part of an EFT, there needs to be special-purpose grants for training and capacity building of subnational governments. Together with the improvements in monitoring and evaluation capacity at the central level, the design of EFT system should address technical and managerial capacity at the subnational level for the design and implementation of climate interventions.

#### **IV. Conclusion**

Subnational governments play an important role in the fight against climate change. Although the literatures on environmental economics and fiscal federalism provide helpful pointers, practitioners are wrestling with the issue of reconciling local costs and global benefits in climate action. Without proper compensation mechanism for local climate action, subnational governments would bear the cost while the benefits extend far beyond their boundaries. This will inevitably lead to a suboptimal equilibrium level of climate action.

Ring (2008) highlights the spatial characteristics of ecosystem services which rely on actions by multiple levels of government, ranging from local and regional to the national level. The fact that climate action benefits accrue to a larger spatial scale than a single subnational jurisdiction<sup>21</sup>

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<sup>21</sup> This is the case for services like protection of nature reserves, conservation of endangered wildlife, designation of protected areas and land-use restrictions. In these cases, the consequence of national decisions is mainly borne by local actors. Similarly, land related environmental issues demand action at a larger spatial scale where national or regional governments set standards and local governments take action (Ring 2008). Likewise, pollution control is a broad category where national governments make decisions

requires thinking about new funding instruments. In that context, incorporating climate action related fiscal tools into the intergovernmental toolbox is important. In this chapter we focused on three fiscal instruments for financing of subnational climate action where benefits of environmental protection accrue to all. PES, REDD+ and EFT can potentially play a role in reconciling local costs and global benefits of subnational climate action

Payments for ecosystem services (PES) are used in addressing market failures to provide adequate level of ecosystem services. The experience of public PES schemes, especially as practiced in China, offers opportunities to be used in a multi-level governance context. However, intergovernmental systems, especially monitoring systems, need to be established to address hidden information and hidden action issues.

Reducing emissions from deforestation and forest degradation (REDD+) can be used in a multi-level governance context by setting up spatially specific deforestation targets. However, effective implementation of REDD+ in subnational jurisdictions require defining land tenure and carbon rights. In addition, forest carbon must be monitored at the local level and intergovernmental institutional structures must be established to manage payments.

Ecological Fiscal Transfers (EFTs) is an innovative approach to compensate subnational governments for climate action. However, unconditional design of ETF does not necessarily guarantee climate action. The integration of EFT into general purpose transfer system with the flexibility to spend resources on ecological or non-ecological priorities does not provide enough incentives for subnational climate action. The design of an EFT scheme should consider earmarking the use of transfer resources on various dimensions of subnational climate action

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for the whole nation with local consequences. Within the broad category of pollution control subnational governments can play an important role in emission inspections or solid waste disposal according to the subsidiarity principle.

including reforestation, building green infrastructure, and promoting regulations to reduce carbon emissions.

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