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Urban Climate Governance in the Amazon

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Introduction

The Earth System is facing boundaries to high anthropogenic pressures and, to create a safe operating space on Earth, the Planetary Boundary (PB) Framework has estimated nine global boundaries¹ (Rockstrom et al. 2009). Although this framework, provides us with a “planetary playing field”, Raworth (2012) points to its missing “social dimension”: It describes a *safe*, but not necessarily a *just* operating space. With the adoption of the UN Sustainable Development Goals (SDGs) in 2015, Steffen et al. (2015) updated the PB Framework and placed it into the social context of the SDGs but did not provide pathways for just development inside

¹The nine planetary boundaries are: Stratospheric ozone depletion; Loss of biosphere integrity; Chemical pollution; Climate Change; Ocean acidification and the release of novel entities; Freshwater consumption and the global hydrological cycle; Land system change; Nitrogen and phosphorus flows to the biosphere and oceans; and Atmospheric aerosol loading.

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the boundaries. Related to the planetary boundaries are tipping elements: subsystems of the Earth system that can be switched into a different state by small perturbations (Lenton et al. 2008). The Amazon is a tipping element: a combination of global warming and local land use change threaten its future and might turn the tropical forest into dry savannah (Nobre et al. 2016). Because of their potentially large impacts on the ecosystem and human well-being, planetary boundaries and their tipping points are of concern for policymaking and require a restructuring of governance arrangements to increase the resilience of socio-ecological systems (Folke et al. 2010).

Responding to climate change requires actions at multiple scales and the exploration of new governance mechanisms to deal with increased complexity and uncertainty (Biermann et al. 2010). Ostrom (2010b) points to the importance of polycentric governance, facilitating benefits at multiple scales and highlights the role of local efforts to help solve climate change problems. She highlights the failure of international and top-down climate governance and stresses the need for a more bottom-up, inclusive climate governance with polycentric patterns and shared responsibility. Polycentric systems “have multiple governing authorities at different scales rather than a monocentric unit. Each unit... exercises considerable independence to make norms and rules within a specific domain” (Ostrom 2010a).

Continuing Ostrom’s work on polycentric climate governance, Jordan et al. (2018) devote attention to the important role of cities in polycentric climate governance and make three statements on local climate governance: (1) cities often set higher climate governance ambitions than the nation-states they are in; (2) cities are increasingly becoming sites and actors of experimentation with innovative governance instruments, including eco-financing and ‘urban laboratories’ (see Nevens et al. 2013); and (3) cities have begun to break out of traditional top-down, national-regional-local hierarchies and act in trans-local networks (see van der Heijden 2016). However, urban climate governance is a nascent policy field and there is a need for more comparative research on local climate adaptation (Vogel and Henstra 2015).

Bulkeley (2010) reviews cities and the governing of climate change and highlights two gaps. Firstly, most of the literature on cities and climate governance focusses on cities from the Global North. However, the challenges

posed by climate change for cities in the Global South have been identified as more acute (Anguelovski et al. 2014). Secondly, the literature on urban climate governance lacks a more holistic perspective of urban governance. Bulkeley (2010) points to the fact that most studies on climate change and the city look, use an environmental management perspective. However, climate change is a complex problem that needs the involvement of urban governance. Especially in cities in the Global South, political trade-offs between economic development and environment priorities make for a completely different context compared to Northern cities (Chu et al. 2017). Broto (2017) states that the main contribution of combining the debates about climate change and urban governance has been the idea that a city should not only be low-carbon, but also a just one.

Both research on global climate governance and the Amazon (see Nepstad et al. 2008, 2009; Davidson et al. 2012; Nolte et al. 2013; Arima et al. 2014) and urban climate governance (see Nevens et al. 2013; Bulkeley et al. 2014; Aylett 2015; Bulkeley and Betsill 2016) has been rapidly expanding. Nevertheless, Amazonian cities are ‘the elephant in the room’ when it comes to urban climate governance and have received very little attention (Brondizio 2016). This chapter adds to the growing body of literature on climate governance and cities in the Global South, by examining Amazonian cities. The objective of this chapter is to apply the literature on urban climate governance to the Amazon and describe its characteristics and context. Firstly, we interpret data on urban development in the Brazilian and Peruvian Amazon. Secondly, we zoom in on one Peruvian and one Brazilian Amazon city and analyse their climate policy content, paying special attention to how they frame the climate change problem. Thirdly, we look at the implications of these climate policies for equity and inclusive development. The results show that despite their rapid growth, Amazonian cities fail to integrate their climate policies with urban development policies, as well as placing them in a broader justice perspective.

Urban Development in the Amazon

The Amazon, shared by nine South American countries,² sustains about 40% of the world's remaining tropical rainforests, making it an essential provider of environmental services, including biodiversity conservation, carbon storage, and the regulation of regional hydrological cycles, among others (Fearnside 2008). However, the Amazon is in transition and the pressure on the forest has drastically increased in recent years (Davidson et al. 2012). Drivers of Amazon deforestation are diverse and complex, including socio-economic, political and demographic factors (Perz et al. 2008). Examples of socio-economic drivers of deforestation include expanding urban, energy and transport infrastructures (Malhi et al. 2008). An economy based on agricultural expansion and logging—instead of forest maintenance—also rapidly increases deforestation rates (Fearnside 2008; Davidson et al. 2012). Political factors that increase deforestation include: a lack of cooperation in forest governance (Nagendra and Ostrom 2012) and limited enforcement to monitor deforestation (Gibbs and Rausch 2015). Lastly, rural-urban migration, often related to land tenure problems and inequality in land ownership, fuels deforestation (Lapola et al. 2013).

Literature on urban climate governance in the Amazon is almost non-existing, as the core of researchers looks at the region from a more natural science perspective (see for example Malhi et al. 2008; Nobre and Borma 2009; Davidson et al. 2012). An exception was the late Brazilian geographer Berta Becker. In her last work *Forest and the City* (2013), Becker looks at the dialectic relation between the city and the forest and attempts to answer the question why Amazon cities did not bring the regional development their countries had hoped for. She highlights how Amazon cities are at the margin of their countries and with a relationship of hierarchical subordination to the external demands of world metropolises. Moreover, the focus in the Amazon is on the geopolitics of territorial control and the creation of new administrative institutions without social development.

²The nine countries that share the Amazon are: Brazil, Peru, Colombia, Bolivia, Venezuela, Guyana, Suriname, Ecuador and French Guiana.

The region still suffers from a lack of complete productive chains, structuring and integrating the production sectors, with a predominance of informal economy and great dependency on the Brazilian State.

In her work on the role of Brazil's Amazonian municipalities in global climate governance, Inoue (2012) describes two dynamics: (1) the national Brazilian policy to 'name and shame' municipalities with the highest deforestation rates, forcing a reaction in the form of multilevel arrangements to help the cities decreasing their rates; and (2) municipalities getting involved in the international climate negotiation process, strengthening their role in climate networks. Malhado et al (2017) highlight the autonomy and critical role of Brazilian municipal administrations to develop environmental policies as well as regulating agricultural expansion and urban development but conclude that their low level of institutional capacity prevents them from taking proactive measures to reduce their environmental vulnerability.

Urban Development in the Brazilian Amazon

With 64% of the Amazonian rainforest inside its borders, Brazil holds the largest share of the Amazonian rainforest (Global Forest Atlas 2018). Brazil is geographically divided into five regions,³ with the Amazon mainly situated in the Northern region, including seven federal states.⁴ It is important to point out that the Brazilian Amazon—also known as the Legal Amazon (*Amazonia Legal*)—is shared by nine Brazilian states, and also includes Mato Grosso (Central West) and Maranhão (Northeast). Table 15.1 contains demographic data for the Brazilian States that are situated in the Amazon and shows how almost all Amazonian states have a low density, compared to the national density. We can also see that, except for the state of Amapá, all other Amazonian States have a lower relative percentage of urban population for 2010 than the national value of 84.36%.

Table 15.1 also provides data on the Amazonian capital cities, with three 'over-a-million-inhabitants' cities: Manaus, Belém and São Luís. For the

³Brazil's five regions are: North, Northeast, Central West, Southeast and South.

⁴The seven federal states that form the Northern region are: Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins.

Table 15.1 The Brazilian Amazon states and their capital cities

Amazon state	% urban pop.	Density inhab./km ²	Capital city	Inhab. 2010	% living in capital
Acre	72	4.47	Rio Branco	336,038	46
Amapá	89	4.69	Macapá	398,204	59
Amazonas	79	2.23	Manaus	1,802,014	52
Pará	68	6.07	Belém	1,393,399	18
Rondônia	74	6.58	Porto Velho	428,527	27
Roraima	77	2.01	Boa Vista	284,313	63
Tocantins	79	4.98	Palmas	228,332	17
Maranhão	63	19.81	São Luís	1,014,837	15
Mato Grosso	82	3.36	Cuiaba	551,098	18
<i>Brazil</i>	<i>84</i>	<i>22.43</i>			
<i>North</i>	<i>73</i>	<i>4.12</i>			

Data source 2010 Brazilian National Census (IBGE 2011)

Amazonian states of Acre, Amapá, Amazonas and Roraima, we can see the importance of their respective capital cities with over 40% of their population living in the capital.

Urban Development in the Peruvian Amazon

With 10% of the Amazon on Peruvian territory, it holds the second largest share of the Amazonian rainforest (Global Forest Atlas 2018). Peru's latest national census was conducted in 2017 and therefore with more recent data in comparison to the Brazilian census. It is important to point out that Peru's census does not provide data on inhabitants per city, but per province and district in accordance with their administrative division. As of 2017, Peru is divided into 24 departments, 196 provinces and 1874 districts. The country is divided into three natural regions: the coast (*costa*), the Andes (*sierra*) and the Amazon (*selva*). Out of these, the coast is the most populated (58% of the total population), followed by the Andes and lastly the Amazon.

Table 15.2 Peruvian Amazon departments and their capital cities

Department	Annual growth rate pop. 2007–2017 in %	% urban 2017	Capital city	Inhab. 2017	Variation 2007–2017 (%)	% inhab. department in capital
Amazonas	0.1	42	Chachapoyas	55,506	12	15
Loreto	–0.1	69	Iquitos	479,866	–3	54
Madre de Dios	2.6	83	Puerto Maldonado	111,474	42	79
San Martin	1.1	68	Moyobamba	122,365	6	15
Ucayali	1.4	81	Pucallpa	384,168	15	77
<i>Peru</i>	<i>0.7</i>	<i>79</i>				

Data source 2017 Peruvian National Census (INEI 2018)

Out of Peru's 24 regional departments, five belong to the Amazon.⁵ Table 15.2 illustrates that three out of the five Amazon departments have a higher annual growth rate of their population in comparison to the national rate: Madre de Dios, San Martin and Ucayali. Also, compared to the national percentage of urban population of 79%, two departments show a larger urban population than the national percentage for 2017: in Madre de Dios, 83% of the inhabitants live in urban areas, and in Ucayali 81% of its total inhabitants.

The Peruvian Amazon, compared to its Brazilian counterpart, does not have cities with over a million inhabitants. Looking at capital cities in the Peruvian Amazon (Table 15.2), we see that except for the city of Iquitos, all other capital cities are rapidly expanding. The city of Puerto Maldonado, capital of the department of Madre de Dios, grew by 42% between 2007–2017. In three of the five Amazonian departments (Loreto, Madre de Dios and Ucayali), more than 50% of its inhabitants live in the capital. With respectively 79 and 77% of its inhabitants living in the capital, Madre de Dios (Puerto Maldonado) and Ucayali (Pucallpa) show the extreme importance of and dependency on the departments' capitals.

⁵The five regional departments that make up the Peruvian Amazon are: Amazonas, Loreto, San Martin, Ucayali and Madre de Dios.

Methods

In order to analyse the implications of urban climate governance in the Amazon, we chose two capital cities with more than 200,000 inhabitants, as our case studies: Rio Branco in Brazil and Pucallpa in Peru. Both cities are situated in the southwestern Amazon, which falls within the altitudinal gradient that defines the ecological transition from the Amazonian lowlands to the Andean highlands, making it highly biodiverse (Myers et al. 2000). The biodiversity of its forests makes the southwestern Amazon an important region for timber and non-timber forest products (Perz 2016).

Rio Branco, capital of the Brazilian State of Acre, was chosen because of its State System of Incentives for Environmental Services: one of the world's most advanced statewide programmes in low-emission rural development (Stickler 2014). Pucallpa, the capital of the Peruvian department of Ucayali, is an interesting case study, because of the department's land conflicts with its indigenous populations and climate governance structures (Leal et al. 2015). Although Acre-Brazil and Ucayali-Peru share borders and their capital cities are geographically close to each other,⁶ there is no means of transportation connecting them.

Using MaxQDA qualitative coding software, we conducted a two-folded policy analysis for the two case study Amazonian cities, a qualitative content analysis on: (1) the main objectives with relation to climate change, and (2) the implications of the policies to justice and equity.

The analysed policy documents include: the regional climate strategy, the regional development strategy and the ecological and economic zoning strategy (ZEE) for both Rio Branco-Acre and Pucallpa-Ucayali. With regard to the local policies, it is important to note that neither Rio Branco in the Brazilian Amazon, nor Pucallpa in the Peruvian Amazon, have local climate policies, but rely on their regional climate plans and strategies, respectively from the state of Acre and the department of Ucayali. Therefore, the local policies that were used for this analysis are both cities' urban development plans. Table 15.3 shows the eight regional and local policy documents that were qualitatively analysed: four policy documents from Rio Branco-Brazil and four documents from Pucallpa-Peru.

⁶The distance between the two capital cities is approximately 750 km in a straight line.

Table 15.3 Regional and local policy documents qualitatively analysed

Rio Branco-Brazil		Pucallpa-Peru	
Policy	Year	Policy	Year
Acre State System for Incentives of Environmental Services (SISA)	2012	Regional Climate Change Strategy Ucayali	2014
Ecological and Economic Zoning Acre, Phase II (ZEE)	2010	Ecological and Economic Zoning of the Ucayali Region (ZEE)	2017
Pluri-Annual Plan 2016–2019 Acre (PPA)	2015	Regional Development Plan Ucayali 2011–2021	2011
Directive Plan of Rio Branco	2016	Urban Development Plan of Coronel Portillo	2017

Following the framework for comparative climate policy analysis by Vogel and Henstra (2015), we applied theoretical prepositions on climate change framing and climate justice to the regional and local policies. We used a coding system to describe if climate change was mentioned and how climate change in the urban areas was framed in the policy documents. Vogel and Henstra (2015) sort climate adaptation framing into four different categories: (1) a hazard frame: emphasising the future threat of climate change; (2) a risk frame: looking at climate as a potential but uncertain risk that can be managed; (3) a vulnerability frame: focusing on reducing the core determinants of vulnerability, such as poverty and inequality; and (4) a resilience frame: emphasising a community's capacity to deal with climate related stresses and learn from them.

Depending on the way climate change was framed, secondly, we used sub-coding to look at if and how the climate change challenge was linked to justice and equity. Okereke and Dooley (2010) describe three forms of injustice in climate governance, injustice related to: (1) contributions to climate change, (2) impacts of climate change, and (3) participation in climate governance. We used the three forms of injustice in climate governance as sub-codes in our qualitative content analysis of the policy documents.

Results

Framing Urban Climate Governance

Regional and Local Policy Analysis for Rio Branco-Brazil

Analysis of the climate policies in the Brazilian state of Acre and its implications for its urban areas in general and the state capital Rio Branco in specific, show a focus on climate change as a hazard and a risk. Climate change is discussed in relation to natural resources, biodiversity, possible natural hazards and the need to create low-emission development. Climate change is framed in direct relation to local land use and deforestation and therefore high importance is given to the policies of the United Nations Reducing Emissions of Deforestation and Degradation (UN-REDD).

Acre's State System for Incentives of Environmental Services (SISA) has as its main objective "to promote a progressive reduction of the greenhouse gas emissions coming from deforestation and forest degradation" (Acre 2010). Acre's Pluri-Annual Plan for 2016–2019 (PPA) describes global climate governance as an opportunity to receive international funding, in the form of innovative mechanisms that finance a low-carbon economy. It highlights Acre's role as a pioneer in forest conservation. Acre is a partner in the REDD for Early Movers (REM) programme and has received financing from the German development bank KfW. In its policy document on ecological and economic zoning (ZEE), Acre highlights its Policy for Valuing Forest Environmental Assets, which comprises different state programmes and projects that promote forest-dependent livelihoods by a certification system and payment for ecosystem services, such as carbon storage and biodiversity conservation.

Regarding its urban areas, Acre's sustainable policies highlight the peculiarities of the State's cities as being *forest cities* and the importance of breaking the barriers between the urban and rural dimension. It also highlights the importance of participation and *Florestania* (Forest Citizenship) in an Amazonian twenty-first-century city. An important first step of Acre's *Florestania* was the implementation of ZEE in 2010. ZEE divides the state of Acre into different territorial zones depending on their land use activities, such as agriculture, forest preservation, indigenous territories and forest

production. Its strategy to create a balance between rural, urban, forest areas is focused on making the rural and forest areas more attractive to the population.

The Municipal Director Plan for Rio Branco does not mention mitigation nor adaptation to climate change on the city level, although one of its five objectives is related to sustainable development, defined as: socially fair, environmentally balanced and economically viable local development, as well as ensuring the quality of life for present and future generations (Rio Branco 2016). It describes the mechanisms of environmental compensation as well as the importance of urban afforestation.

Regional and Local Policy Analysis for Pucallpa-Peru

Climate policies of the department of Ucayali also frame climate change as a hazard and risk and highlight that the city of Pucallpa has the highest vulnerability for extreme events such as landslides, floods and gales. The regional climate strategy points to poor sanitation and health problems related to heat waves, because of rapid urbanisation. However, there are no programmes of rehabilitation or urban renewal, inducing overcrowding, especially in the department's capital city Pucallpa. One of the objectives mentioned in Ucayali's regional climate policy is to develop urban development plans with a focus on climate change and risk management on the provincial and district level.

The main vision for 2030 of the regional climate policy is a region less vulnerable and with increased resilience towards climate change on the regional and local level, leading to productive sustainable development. The climate policy, divided into a mitigation and adaptation component, has two main objectives: (1) decreasing vulnerability through increasing the adaptive capacity of the population, the economic sectors and all government levels; and (2) conserving carbon storage and contributing to the reduction of greenhouse gas emissions through the promotion of sustainable development (Ucayali 2014).

Ucayali's regional development plan for 2011–2021 does not mention climate change and shows a strong focus on socio-economic potential, GDP and private sector involvement, especially for timber extraction and

agricultural expansion, but lacks information on the social and cultural perception of the changing environment. One of its five strategic dimensions is related to natural resources and the environment, but its focus is on the commodification of the region's natural resources.

Pucallpa's urban development plan mentions climate change and frames it as a risk, relating it to possible environmental degradation. It is mentioned as a threat to the degradation of agricultural land. Therefore, it recommends evaluating climate change in Pucallpa in relation to crops, livestock, productivity and production costs. Climate change is described in relation to its possible impacts on economic growth and production and the importance of integrating climate change policies with spatial planning. Lastly, the policy mentions the physical infrastructure of the city and its unpreparedness in relation to possible disasters. It recommends identifying appropriate technologies for climate change in the construction of buildings and urban management.

Climate Justice in Amazonian Cities

Climate Justice in Rio Branco-Brazil

In relation to injustice in climate policies, the policies' main focus is on addressing injustices in participation. The analysed regional and local policies for Rio Branco, all mention the importance of civil society participation in the formulation, management, monitoring, evaluation and review of the policies. Especially Acre's pioneering State System for Incentives of Environmental Services shows great concern in relation to civil society participation. Its governance structure includes a Commission for Validation and Accompaniment (CEVA—*Comissão Estadual de Validação e Acompanhamento*), comprised of four civil society organisations and four governmental organisation and responsible for monitoring the state system. An important component of CEVA is the Indigenous Working Group, representing the needs and demands of Acre's 15 ethnic groups. Acre's Pluri-Annual Plan 2016–2019 also emphasises its focus on linking sustainable development with social inclusion but does not explicitly mention climate change.

Injustices related to the impacts of climate change are not mentioned by all policy documents. Acre's PPA points to the importance of using environmental education to raise awareness on environmental impacts among the most vulnerable groups of its population. ZEE mentions the impacts of droughts and forest fires and highlights the importance to act for future perspectives of the Amazonian societies. SISA does not mention injustices related to the impacts of climate change. On the municipal level, in relation to adaptation to climate change, the city of Rio Branco has created its *Cidade do Povo* (City of the People), a programme that has constructed social housing for around 50,000 inhabitants, who were living in areas vulnerable to flooding of the Acre river.

The policy documents do not explicitly mention climate injustices related to contributions to climate change.

Climate Justice in Pucallpa-Peru

Like in the Brazilian case, the Peruvian policy documents all mention the importance of civil society participation in all stages of the policy circle. Ucayali's climate strategy mentions the value of stakeholders in the document's preparation and implementation, "generating a creative atmosphere of reflection and an analysis on the beliefs, attitudes and practices that are part of reality" (Ucayali 2014).

The policy documents highlight the need for more decentralisation and increased local participation, as most decisions are taken in Peru's capital Lima, where they lack a more 'Amazonian' and intercultural viewpoint. The input of different local indigenous ethnic groups and the creation of a regional working group on indigenous peoples, shows the importance given to a more intercultural perspective.

With respect to injustices regarding the impacts of climate change, Ucayali's climate strategy focuses on the impacts on different economic sectors and not on the impacts on the most vulnerable populations. Pucallpa's urban development plan has the promotion of urban social equity as one of its objectives, including a programme of environmental education and civil defence.

The policy documents do not explicitly mention climate injustices related to contributions to climate change.

Discussion and Conclusions

Our results show that cities in both the Peruvian and Brazilian Amazon are rapidly growing, which is increasing their vulnerability towards climate change and increases already existing structures of inequality (Bulkeley et al. 2013). Urban climate governance involves much more than CO₂ and is actually about governing other things than the climate; It is not merely a technical or accounting issue, but a political project which carries far-reaching implications for both the powerful and the powerless (Hulme 2017). Although working on the local level can enhance societal participation, transparency and accountability, it might also increase inequality and injustice, by not framing climate change as a systemic, socio-technical problem. Both case studies show how climate change is framed as a hazard and risk, and not inside a vulnerability or resilience framework, which explains their lack of policy integration between climate policies and equity related policies.

Cities in the Amazon show particular characteristics that are of importance for their governance system. In the first place, they challenge the division between urban and rural and can be described as Forest Cities. The Brazilian case study, with its Forest Citizenship, shows the dynamic interaction between the city and its surrounding forests. However, the analysed policy documents showed a very external viewpoint, looking at the forest as possible carbon credits, not taking the local viewpoint into consideration. The policy documents do not explicitly mention climate injustices related to contributions to climate change. However, Acre's SISA is based on international financing of low-emission development in the Amazon. This means that high carbon emission countries in the Global North finance low-carbon development in the Global South.

Another characteristic of Amazonian cities is their intercultural diversity. The climate policies mention the importance of civil society participation, social inclusion and intercultural development, but do not explicitly state how they take indigenous knowledge and worldviews into

consideration. Both the Peruvian and the Brazilian case study have created indigenous working groups, but it remains unclear how the input of these working groups is being used. Also, there is a lack of intercultural dialogue on the framing of climate change and its implications.

The multilevel governance of climate change in the Amazon is a great challenge. Local, regional and national governments might have different political viewpoints and there is a lack of cohesion between their climate documents. Also, as shown by our case studies, on the local level there is often no local climate strategy, making the Amazonian cities dependent on their regional governments. In their work, Malhado et al. (2017), demonstrate that municipalities in the Brazilian Legal Amazon are generally poorly prepared to deal with the challenges of biodiversity conservation and environmental change, and one of their recommendations is on the need for further efforts by federal and state governments, environmental NGOs and private organisations to more effectively engage Amazonian municipalities. We also want to add the importance of the capacity building of local Amazonian governments on a more systemic approach towards climate change and a new standard of regional development, with a more internal and Amazonian focus, capable of improving the life conditions of Amazonian populations and overcoming the threats to their sustainability.

UN REDD policies highlight the importance of the standing forest as a compatible commodity, to face the energy, climate and economic crises and leads to the concept of Amazonian forest cities, and the recovery of Amazonian cities as logistical knots in networks and the creation of complete productive chains. Instead of looking at the Amazonian cities and urban development as a threat to sustainability, we need a paradigm shift towards Amazonian cities as an opportunity for a more just and effective climate governance.

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