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## Hot topics in governance for forests and trees: Towards a (just) transformative research agenda

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### ABSTRACT

We are living in a time of crisis on planet Earth. Urgent calls for transformational change are getting louder. Technical solutions have an important role to play in addressing pressing global challenges, but alone they are not enough. After all, who decides what kind of transformation is needed, of what, and for whom? What principles guide those decisions, and how are decision-makers held accountable? This commentary article argues that these governance questions are central in any solution, in order to simultaneously address the planetary crises of forest and biodiversity loss and degradation *and* growing inequality. To this end, we examine governance in forests and around trees, in landscapes and on farms, through the lens of power and social justice. For applied research aimed at actionable solutions to these global problems, we propose a governance research agenda for the next decade that is both transformative and just.

### 1. Introduction

The planet is in crisis, and we hear urgent calls for transformational change from multiple quarters – for example, wherever climate change is taken seriously. We clearly need to change the way we live on this planet, and forests and trees in landscapes and on farms have an important role in addressing global challenges. But it is not enough to focus solely on biophysical approaches and environmental outcomes.

Who decides what kind of transformation is needed, of what and for whom (see [Blythe et al., 2018](#))? What principles guide those decisions, and how are decision-makers held accountable? Who will win and who will lose?

This commentary argues that governance questions are integral to developing solutions that simultaneously address the crises of forest and biodiversity loss and degradation and of growing inequality. To this end, we examine governance in forests and around trees through the lens of

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power and social justice and propose a governance research agenda for the next decade that is both transformative and just. We refer specifically to the kind of applied governance research undertaken by the authors' organizations, which includes but is not limited to action research, and which both studies governance and engages with governance institutions for actionable solutions.

### 1.1. Why forests and trees?

Climate change has figured prominently on the global agenda for the past decade, and the COVID-19 pandemic and associated economic crisis, as well as the deep-rooted inequalities that it has brought to the fore, are now dominating the headlines. Forests and trees are central to planetary health (Rosenstock et al., 2019). Agriculture, forests and other land uses (AFOLU) contribute 23% of global greenhouse gas (GHG) emissions (IPCC, 2019) but could deliver up to 37% of the GHG emissions reductions needed to avoid 2 degree warming by 2030 (Griscom et al., 2017). With COVID-19 there is growing understanding of the role of deforestation and biodiversity loss in the spread of such viruses (Gibb et al., 2020).

Whereas agricultural expansion is responsible for about 73% of tropical deforestation (FAO and UNEP, 2020), biodiversity enhancing agricultural systems such as agroforestry can support ecosystem services and contribute to climate change mitigation without compromising yields, thus supporting food security and income opportunities of farmers (Tamburini et al., 2020). In addition, some 1.6 billion Indigenous Peoples and local communities live in and around forests and depend on them (Newton et al., 2020; RRI, 2020). During times of hardship, increased extraction of environmental resources is one of the most important income-generating coping strategies for many poor households (Angelsen and Dokken, 2018; see also Reed et al., 2017). And, of course, the entire planet benefits from the environmental services that forests and trees provide (see Katila et al., 2019).

This is the moment to act, as the end of the coming decade by all accounts marks the zero hour for action to avert further catastrophe, and the exhaustion of our carbon budget (Shetty, 2020). 2020 marked the deadline for countries to submit their emission reduction strategies, 2030 marks the deadline for meeting the Sustainable Development Goals, and, in addition, the UN Decade on Ecosystem Restoration began in 2021.

### 1.2. Why governance?

From 1990 to 2018, almost 10 times more funding for climate change research went to the natural and technical sciences than to the social sciences and humanities (Overland and Sovacool, 2020). However, we will not solve problems related to land, trees and forests contributing to our global crises if we do not understand and address the governance challenges (Maryudi et al., 2018). Governance research is essential to understanding how to bring about transformational change in policies, institutions and behaviors (see Rahman et al., 2018).

We define governance as the set of institutions and social relations related to decision-making processes, policy and implementation. It is about how decisions and rules, including decision-making rules, are made, by whom and why. Such decision-making may be just or unjust and is embedded in power relations. For forests and trees, governance is relevant across scales (from global policies and challenges to local land-use practices) and is inherently multi-actor and multilevel (see also Arts, 2014 on forest governance). What happens in forests depends only in part on the decisions of people living in and around those forests, which they are not likely to own (RRI, 2018); similarly, what happens on and around farms depends only in part on the decisions of individual farmers. Local practices are greatly influenced by broader governance processes and institutions, from land and resource rights to customs, policies, regulations and markets that shape incentives and the decision-making context.

Governance research related to forests and trees in landscapes and on farms covers a range of subjects.<sup>1</sup> In this commentary, rather than engaging each of these subjects, we take a more conceptual approach to help understand how, where and why governance should be researched and acted upon. We refer to governance here not only as a subject of research, but also as the nature of engagement between research, practice and policy, and as a set of tools to understand how to foster more sustainable and equitable outcomes. For applied research, these three somewhat distinct<sup>2</sup> arenas form interrelated strands of a solution-oriented agenda.

### 1.3. Why (and what) transformation?

'Transformational change' is subject to multiple interpretations but is now a central goal in the global climate, development and environmental governance arenas (Feola, 2015). Compiling a variety of definitions,<sup>3</sup> it is referred to as fundamental, strategic, disruptive, catalytic and complex change that promotes large-scale and sustainable shifts in systems, institutions, markets (and power relations) towards a carbon-neutral, climate resilient – and only sometimes, just and equitable<sup>4</sup> – future (see also Atmadja et al., 2021). But what does this mean? And what does it mean specifically that ideas of equality and justice are not always firmly integrated into these definitions?<sup>5</sup> Hence it is essential to ask *what* transformation is sought, by whom, how and why.

At their core, these are governance questions. For forests and trees the governance challenge, then, is that decision-making in relation to land use and land-use change should not only foster more sustainable practices but also greater equality, including for rural women and youth, for Indigenous Peoples and other marginalized and often underrepresented groups. Raworth's *Doughnut Economics* (Raworth, 2018) provides a useful model that combines environmental and social targets; based on the biophysical outer limits ("environmental ceiling") and socio-political inner limits ("social foundation"), the donut suggests a "safe and just space for humanity" (emphasis added).<sup>6</sup>

## 2. A governance approach to transformation: Power and justice

The science documenting the severity of environmental challenges in forests and tree-based landscapes, as well as in associated agricultural

<sup>1</sup> For example: legality, illegal trade and corruption; PES and other incentive systems; participatory processes; multilevel governance, decentralization and jurisdictional approaches; common property systems; the role of the state; rights-based approaches; environmental justice; sustainable value chains and certification processes; zero-deforestation commitments; REDD+ policy; land and forest tenure reforms and control over resources; expert v local knowledge; gender-responsiveness; politics and political economy; conflict resolution mechanisms; science and knowledge production; top-down versus bottom-up solutions, and more.

<sup>2</sup> Only *somewhat* distinct because research (e.g. the questions asked, the interests of the people involved) is not often entirely separate from policy and practice, or power and politics.

<sup>3</sup> E.g. Climate Investment Funds. <https://www.climateinvestmentfunds.org/tclp/>; SDG Transformations Forum. <https://transformationsforum.net/>; Nama Facility. <https://www.nama-facility.org/concept-and-approach/transformational-change/>; GIZ, 2020. Transforming our work: Getting ready for transformational projects: Guidance. Eschborn, Germany: GIZ. [https://www.giz.de/fachexpertise/downloads/Transformation%20Guidance\\_GIZ\\_02%202020.pdf](https://www.giz.de/fachexpertise/downloads/Transformation%20Guidance_GIZ_02%202020.pdf).

<sup>4</sup> see <https://www.climateinvestmentfunds.org/topics/just-transition>

<sup>5</sup> Other views of transformation highlight the importance of decolonizing knowledge, social relations and international collaborations as one of the key challenges for overcoming marginalization in development and conservation practices (Lepore et al., 2020; Rodríguez and Inturias, 2018; Wijsman and Feagan, 2019).

<sup>6</sup> Also other ways of knowing can be combined to those more western theories (de Santos et al., 2008).

and pasturelands, is abundant and persuasive (Sunderland and Rowland, 2019; Olsson et al., 2019), yet positive change is hard to find. ‘Business-as-usual’ practices such as overconsumption in wealthy countries and investments in fossil fuels, mining and agricultural commodities that drive deforestation and degradation (Maeda et al., 2021) endure, and so do related dynamics such as forced migration (McLeman, 2017) and land/green grabbing (Batterbury and Ndi, 2018). It is increasingly recognized, if not widely accepted, that a socially and environmentally sustainable future will require moving beyond a growth paradigm (Otero et al., 2020; Elder and Olsen, 2019; Raworth, 2018; Hickel, 2020). With the economic downturn of 2020, although there is talk of ‘building back better’, some countries are choosing to ‘build back faster’, loosening environmental restrictions and social safeguards (see *The Guardian*, 2021<sup>7</sup>), thus setting aside both environmental and justice concerns. This section lays out our understanding of this business-as-usual situation as a governance problem, first from the perspective of politics and power, then from the perspective of social justice.

### 2.1. Politics and power in research, policy and practice

The governance context for negotiation and collaboration in forest and tree landscapes is shaped by power and politics (Di Gregorio et al., 2019; Ravikumar et al., 2018). Though power has many dimensions, with both positive (e.g. power with) and negative (e.g. power over) connotations,<sup>8</sup> in this section we refer primarily to Weber’s (1978) definition of power as the “probability that one actor within a social relationship will be in a position to carry out his [sic] own will despite resistance” (Weber, 1978). Politics refers to the political arena, which is the arena of public policy but is rarely transparent or devoid of personal interests: it is shaped by power relations (Béland and Cox, 2016; Waarden, 1992; Moulaert and Cabaret, 2006). This section considers power in relation to research, the state and the private sector in turn, all of which shape outcomes in any specific landscape.

Despite claims of neutrality, science has never been, nor can be, value-free, and results may be misused in practice (see Giessen et al., 2009 for a discussion). Researchers (and others) who enter landscapes as ‘experts’ have often failed to respect local experience or traditional knowledge (Briggs, 2005). Research aimed at policy change has to engage with the political arena (e.g. of democracy, representation, deliberation), in which technical data and arguments enter into a broader debate on the appropriate course of action (Pielke Jr, 2007). Further, “transformational sustainability research” encourages scientists to “immerse themselves into decision processes [...] and build socially robust knowledge” to support transformational change (Wiek et al., 2012). Nevertheless, there is still a tendency to see politics as something to be avoided rather than as a necessary part of the process (Li, 2007; Myers et al., 2018; Ravikumar et al., 2018), not only in research but also in other efforts to bring change (see Dasandi et al., 2019 for an exception). Applied research in development is therefore in a unique position to build the research process around engagements with populations and governance institutions, thus monitoring the use of research insights and the relevant political processes while providing the opportunity for learning and adapting to improve the translation from research to practice.

The state is probably the most obvious governance arena in relation to power regarding forests, trees and related landscapes, particularly as the primary global “owner” of forestlands, claiming legal and administrative authority to over 70% of the world’s forests (RRI, 2018). This

<sup>7</sup> <https://www.theguardian.com/environment/2021/feb/18/indigenous-peoples-face-rise-in-rights-abuses-during-covid-pandemic-report-aoe>

<sup>8</sup> Power in environmental politics usually refers to “power over”, “power with” and “power to” (Partzsch, 2017), as well as empowerment (see also Gaventa’s power cube, 2006).

gives states extraordinary power over these resources in spite of claims, for example, by Indigenous peoples and local communities. The topic of politics and power raises questions about the nature and legitimacy of the nation state, democratic process (or not) and multilevel governance regarding land and resources. Authoritarian governments can make and rapidly enforce sweeping policy changes, but at a cost. Democracies can be substantially manipulated to serve the interests of a powerful minority. These challenges are as relevant at national as at subnational levels, as are the common power struggles between central and local governments (Béné et al., 2009; Larson and Soto, 2008).

Policies and programs supporting sustainable practices are often housed in weaker environmental offices with virtually no influence over agriculture or other sectors driving deforestation (Brockhaus et al., 2014; Brockhaus and Di Gregorio, 2014; Wibowo and Giessen, 2015). Even if policy wins are achieved, they may never be implemented (Chomba et al., 2015; e.g. NDCs, Aichi targets, zero deforestation targets, and so on). And in spite of the obvious importance of working across sectors and ministries, this rarely occurs in practice (Gazley, 2017; England et al., 2018). Change is hard: not only is business-as-usual entrenched in existing path-dependent institutional arrangements, but also powerful and wealthy groups or individuals (e.g. government officials and large-scale private investors) benefit most from maintaining the status quo (Dryzek and Pickering, 2018).

In fact, the private sector is often a powerful government ally, sometimes co-opting government for its own interests. When a company’s practices are challenged by a state entity or level, it can use allies elsewhere within the state structure to its advantage (Ravikumar et al., 2018); and companies sometimes foster power abuse and corruption (Sundström, 2016). Unequal power relations are also apparent in exploitative value chain relations, land acquisition procedures and probusiness sustainability standards (including ‘greenwashing’). At the same time, the corporate sector is increasingly challenged to incorporate more explicitly triple-bottom-line<sup>9</sup> principles into their value propositions and consider society and the environment as corporate stakeholders<sup>10</sup> for creating shared value (Porter and Kramer, 2011). New inclusive business models involving smallholders and sustainability standards reflect alternative governance mechanisms (Cerutti et al., 2017; Potts et al., 2018). These don’t always work for smallholders, however, as such inclusion may trap them in a vicious cycle of debt (see Maryudi and Myers, 2018; Maryudi et al., 2020). Sustainability standards may exacerbate barriers to market participation, and zero deforestation commitments threaten to increase competition for farmland (Pinto and McDermott, 2013). In addition, standards rarely address the need to share information, benefits and risks, which are critical aspects for poverty reduction and livelihoods; these are essentially left to the bargaining power between the two parties, with smallholders often left on their own (Orr et al., 2018).

### 2.2. Justice for IPLCs, smallholder farmers and women

Power is intertwined with all forms of equity and justice. Indigenous Peoples, local communities (IPLCs) and smallholders, and women or young people within these groups, often have minimal political power and thus little influence in the governance arena.<sup>11</sup> At the same time, with regard to climate change, these groups are the most vulnerable to

<sup>9</sup> Equally considering social and environmental principles together with profits.

<sup>10</sup> Not so in zero-deforestation commitments, however. They have important roles to play in the accountability regime of zero-deforestation commitments, but not as “corporate stakeholders” in the traditional understanding of the term.

<sup>11</sup> Although the political power of the global indigenous movement, building on national and regional federations, is important and notable, this does not always translate to political power in the national context. Small-scale farmers generally do not have similar organizations.

the effects of a problem they did not create – and are now being asked to carry the burden to solve it. For example, advocates of Reducing Emissions from Deforestation and Forest Degradation (REDD+) argued that it would be easier to change behavior in forests than to change energy consumption (especially in the North), a primary driver of climate change. It is generally seen as easier to change the behavior of smallholders and other less powerful actors than of the companies and investors driving land use change. Just transformation would challenge this, putting questions of equality and empowerment front and center in the search for solutions at all levels.

In forests, both sustainable forest management and legality approaches have tended not to meet the needs of communities or smallholders. They have been excluded from the design process (Beisheim and Simon, 2016), may have more trouble meeting sustainability standards and thus risk being shut out of “green” value chains (Mausch et al., 2020; Pacheco et al., 2017). In some cases, they are even held to higher standards (Pulhin and Ramirez, 2016; Larson and Pulhin, 2012), while only rarely community-based forest enterprises enjoy prioritized access to forest resources (Bray, 2020; Gnych et al., 2020; Sharma et al., 2020; Stoian et al., 2018). Even in those cases, community and forest governance may be fragile in light of conflicting claims (Butler, 2021).

Rural communities, for their part, do not escape challenges of power and differentiation in their own internal governance systems (Stocks, 2005). Dynamics of marginalization and exclusion are often influenced by intersecting axes of social differentiation and power, including gender, class, ethnicity, caste and generation (Colfer et al., 2018; Djoudi et al., 2016).<sup>12</sup> Gender inequalities shape the ways women and men participate in decision-making, benefit from forest and tree resources, and experience landscape changes (Sijapati Basnett et al., 2017). Gender biases in the wider policy environment, discriminatory social norms and inequitable power relations result in gender gaps in access to and control of resources (Kabeer, 2005; Cornwall, 2003). Similarly, young people do not consider agriculture as an attractive option and are moving away from agriculture and forestry at unprecedented rates (Elias et al., 2018; Bezu and Holden, 2014; Burnet et al., 2017; Giuliani et al., 2017; Sumberg et al., 2017), at least sometimes due to the lack of opportunity and voice in rural development rather than an aspiration towards urban lifestyles (LaRue et al., 2021).

Local dynamics are often aggravated by the expansion of commodity-driven agriculture into public or customary lands, particularly in forestlands. This may displace traditional/Indigenous Peoples without secure property rights, such as where customary systems predominate (German et al., 2013), undermining more sustainable traditional land management systems (Lawrence et al., 2019). Indigenous Peoples and local communities are estimated to hold, through customary practice, about half of the world’s land but have formally recognized rights to only 26% (RRI, 2020). Laws governing access to forests and trees, as well as controlling some traditional practices like shifting cultivation, have been broadly designed and implemented without taking into account the reality of local and Indigenous communities. Hence, informal practices remain widespread, and local and Indigenous communities are often unjustly criminalized (Duffy, 2020; Maryudi and Myers, 2018; Myers et al., 2020).

Attempted “solutions” come in all kinds of packages, from those that genuinely engage local communities to those that see communities as “the problem” and seek to control them (see Skutsch and Turnhout,

<sup>12</sup> More extreme instances of environmental injustice include attacks on environmental and/or land rights defenders, sometimes, it appears, with the tacit consent of governments, demonstrated by the failure to investigate or hold offenders to account (Menton and Le Billon, 2021). Other types of rights violations may be less obvious, but they include, for example, the failure to respect international conventions protecting indigenous rights to free, prior and informed consent and to self-determination, or to their land (Jodoin, 2017; Sarmiento Barletti and Larson, 2017).

2020). Substantial efforts have been made in many countries to recognize community forest rights<sup>13</sup> but not without ongoing challenges (Larson and Springer, 2016) and attempts to rollback progress (RRI, 2016). Also, it should not be assumed that recognizing rights is enough to sustain livelihoods or assure resource conservation: many communities need support for this (Larson et al., 2019) as well as to defend their lands from encroachment (Larson et al., 2010; Larson and Springer, 2016).

Traditional development and conservation solutions, as well as agricultural extension models, still favor uniform, top-down models of change, which fail to address or engage with the diversity of local contexts (Dilley et al., 2021; Myers et al., 2020; see also Sarmiento Barletti et al., 2020); this is true even of participatory models that are delivered in a top-down manner (Waddington et al., 2014; Lund, 2015). As a global climate solution, REDD+ is an example – it only took rights concerns seriously into account in response to action by indigenous organizations and their allies (Jodoin, 2017; see Satyal et al., 2020 for one analysis of “justice-related challenges” in REDD+).<sup>14</sup> Important studies supporting more recent forest landscape restoration (FLR) initiatives similarly fail to address land tenure<sup>15</sup> and local peoples (e.g. Bastin et al., 2019), though this is improving. As the climate crisis deepens, the call for urgency risks exacerbating the turn to top-down responses, and even authoritarianism (Hulme, 2011).

To reach just and effective outcomes, it is important to engage with governance approaches that go beyond the more negative ‘power over’ framing to include an emancipatory formulation of power as ‘positive yet unrealized’. Moving beyond the frequent framing of communities, Indigenous Peoples and women as ‘victims’ and ‘powerless’ actors may shift paradigms towards power as an enabling force of bottom-up transformational change (Morrison et al., 2019).

### 3. Governance in transformational change: Research for the coming decade

Governments, the private sector and civil society need to have a better, contextually grounded understanding of options for achieving effective and inclusive governance of forests and trees. The bottom line is that marginalized peoples need to be empowered to be part of the solution, while global structures are changed – reimagined – in ways that incentivize sustainable practices and level the playing field. Top-down solutions often put off the people who need to be core partners in the coalition for change – for a change that benefits them and not just the environment. This would be strategic for transformation, to build a solid constituency for change – eventually strong enough to sway the currently more powerful detractors.

A governance research agenda for forest and trees should focus on supporting this just transformation towards sustainability. Ultimately, transformative change is about changing entire systems. For governance to support this is then an issue of aligning incentive structures, reimagining accountability systems and levelling the playing field, grounded in an understanding of power and justice, across and within sustainability and societal domains.

The challenges as outlined above are enormous, and the urgency required raises alarm bells – for urgency can override, both accidentally and deliberately, the slow and messy processes of participation and democracy, and of assuring the rights and livelihoods of Indigenous, local community and smallholder women and men. We argue that a research and action agenda for transformation should be principled,

<sup>13</sup> See <https://www.cifor.org/gcs-tenure/>.

<sup>14</sup> Each individual REDD+ initiative, of course, demonstrates more or less responsiveness to local people or concern for safeguards, but there is no question that the topic of rights and safeguards is now integral to the overall discussion.

<sup>15</sup> But some do, e.g. McLain et al., 2021.

theoretically grounded and engaged.

First, an applied governance research agenda, aimed at action for transformational change, should be based on a set of guiding governance principles, while helping us to understand those principles and their everyday ramifications. Though there are many, we consider these to be essential:

- *Participation, representation and empowerment*, grounded in a human rights and justice-based agenda (Fraser, 2009; see also Gaventa and Barrett, 2010 on citizenship; Pitkin, 1967 on representation; Evans et al., 2021 on social inclusion, empowerment);
- *Transparency* (Mehrrouya and Salles-Djelic, 2019), while recognizing that this is embedded in power relations and can be used as an instrument to obscure actions (Kosack and Fung, 2014; Gupta and Mason, 2016);
- *Accountability*, which aims to reduce power advantages, fostering the mechanisms and capacity, or 'countervailing power', for weaker actors to take strategic action on their own behalf (Agrawal and Ribot, 1999; Fung and Wright, 2003; Fox, 2020);
- *Justice and equality*, as equally important as resource or climate goals (Menton et al., 2020; Martin et al., 2020; see Arora-Jonsson et al., 2019 on gender equality); and
- *Adaptive learning*, assuring ongoing monitoring, reflection and adjustment to the course of action, thus recognizing, with humility, that we all have much to learn (Sarmiento Barletti et al., 2020; Ros-Tonen et al., 2014; Colfer et al., 2021).

Second, an ambitious agenda also needs to be grounded in an understanding of how change occurs, from policy processes to behavioral change, from research to impact. Hence applied governance research should carefully consider how the research process, engagements and tools will interact with the relevant context, using strategic planning tools such as Theories of Change (ToC). This includes actions implemented in the name of largely top-down visions, such as REDD+, zero deforestation commitments, nature-based solutions, climate-smart agriculture, and so on: they will not succeed if they do not understand change on the ground. Enhancing understanding may require, on the one hand, research on governance to improve outcomes, and, on the other, expertise in social theory to advise on project design. It should recognize the need to navigate existing structures and processes, including engagement approaches that bring together diverse knowledge and evidence to inform and improve both practice and policy. ToCs should be based on *strategies* that define goals and pathways to reach them, diagnosing power inequalities and the possibility that the correlation of forces may need to change before sustainability and equity goals will be achievable, as those with more power are likely to be the ones defending the status quo. Based on the principles above, ToCs will build monitoring, learning and reflection into implementation. Governance tools used in service of strategies for justice and sustainability, for decision-support, analysis of trade-offs, and reflection on inclusion or behavior can help with adherence to the principles and to ensure just and effective implementation and outcomes.

Finally, a governance research agenda should be engaged – not only with policy makers but also with those whose voice is usually marginalized in decision-making processes: underrepresented citizens and rightsholders. This includes engaging with both top-down and bottom-up processes that shape forests, landscapes and farms, building trust and improving the ability to bridge among different perspectives. In particular, assuring that the evidence considered includes the needs of the marginal and excluded, and is aimed for the general public good, will support processes that reshape notions of power. Multi-pronged strategies are needed to focus on enhancing capacities of researchers and promoting strategic partnerships for transformational change and the rights of Indigenous, local and smallholder communities.

## Author Contributions

**Anne Larson:** Conceptualization, Writing – original and subsequent drafts, review & editing, supervision. **Kai Mausch:** Conceptualization, Writing – subsequent drafts, review & editing. **Mieke Bourne:** Conceptualization, Writing – review & editing. **Cecilia Luttrell:** Writing – review & editing. **George Schoneveld:** Conceptualization, Writing – review & editing. **Peter Cronkleton:** Conceptualization, Writing – review & editing. **Bruno Locatelli:** Conceptualization, Writing – review & editing. **Delia Catacutan:** Conceptualization, Writing – review & editing. **Paolo Cerutti:** Conceptualization, Writing – review & editing. **Susan Chomba:** Conceptualization, Writing – review & editing. **Houria Djoudi:** Conceptualization, Writing – review & editing. **Markus Ihalaenen:** Writing – review & editing. **Steven Lawry:** Writing – review & editing. **Peter Minang:** Conceptualization, Writing – review & editing. **Iliana Monterroso:** Conceptualization, Writing – review & editing. **Rodd Myers:** Writing – review & editing. **Daisuke Naito:** Writing – review & editing. **Thu Thuy Pham:** Conceptualization, Writing – review & editing. **James Reed:** Writing – review & editing. **Juan Pablo Sarmiento Barletti:** Conceptualization, Writing – review & editing. **Phosiso Sola:** Conceptualization, Writing – review & editing. **Dietmar Stoian:** Writing – review & editing.

## Declaration of Competing Interest

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