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Transformative governance of biodiversity: insights for sustainable development

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While there is much debate on transformative change among academics and policymakers, the discussion on how to govern such change is still in its infancy. This article argues that transformative governance is needed to enable the transformative change necessary for achieving global sustainability goals. Based on a literature review, the article unpacks this concept of transformative governance. It is: integrative, to ensure local solutions also have sustainable impacts elsewhere (across scales, places, issues and sectors); inclusive, to empower those whose interests are currently not being met and represent values embodying transformative change for sustainability; adaptive, enabling learning, experimentation, and reflexivity, to cope with the complexity of transformative change; and pluralist, recognizing different knowledge systems. We argue that only when these four governance approaches are: implemented in conjunction; operationalized in a specific manner; and focused on addressing the indirect drivers underlying sustainability issues, governance becomes transformative.

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Introduction

The international community is currently not on track to realize the Sustainable Development Goals (SDGs) by their 2030 deadline [1,2], and it has become widely recognized that transformative change is needed to fully realize these ambitions [1,3••,4]. *Transformative change* can be defined as a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values [1]. Such fundamental change is needed since current structures represent the indirect drivers of environmental problems. These *indirect drivers* can be demographic (e.g. human population dynamics), sociocultural (e.g. consumption patterns), economic (e.g. trade), technological, or relating to institutions, governance, conflicts and epidemics, and are

underpinned by societal values and behaviors [1,3••,5]. These indirect drivers represent the underlying causes of the most significant *direct drivers* of global ecosystem change, namely: land and sea-use change, direct exploitation of organisms, climate change, pollution, and invasive alien species [1]. Transformative change is thus meant to comprehensively address the indirect drivers, with sensitivity to different contexts around the world.

The discussion on how to catalyze, accelerate and govern transformative change is still in its infancy. While this debate on transformative governance has recently intensified [6–9,10•], integrating and supplementing earlier work on transitions [11], the concept is not yet clearly defined or operationalized. We here set out to do just that.

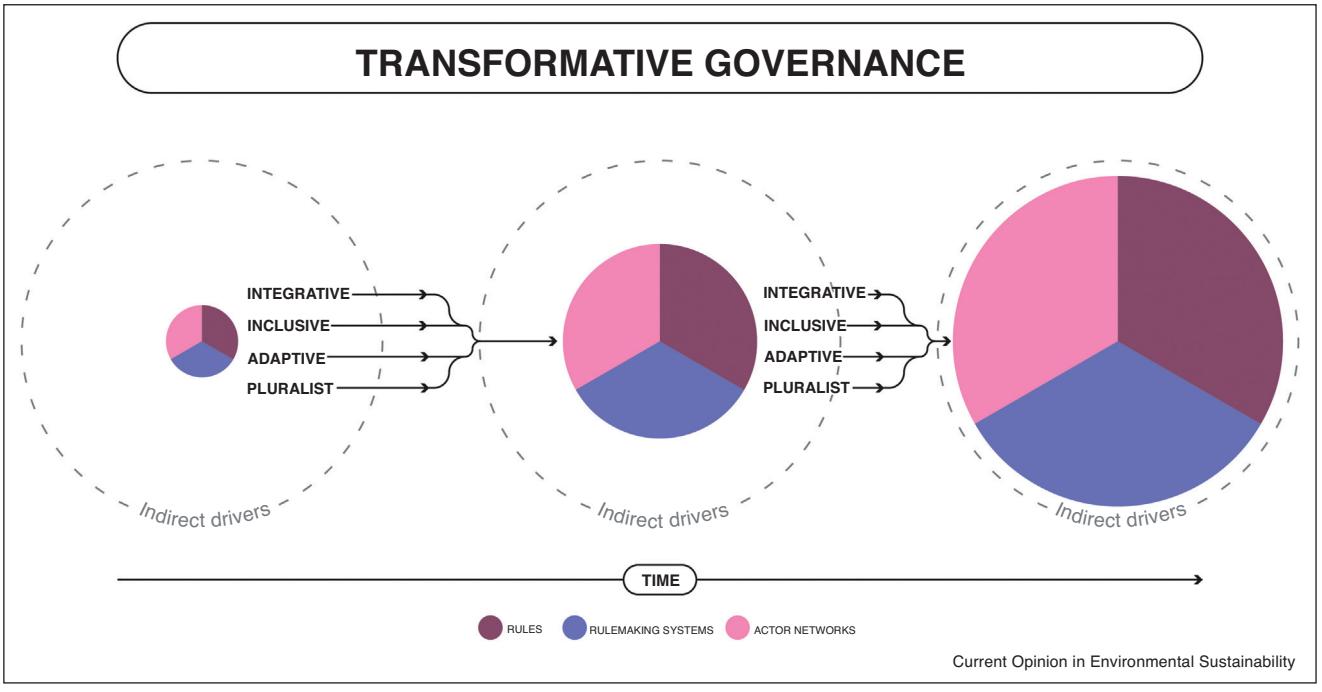
Building on earlier definitions in environmental governance [12], we define *transformative governance* as the formal and informal (public and private) rules, rulemaking systems and actor networks at all levels of human society that enable transformative change, in our case towards sustainability. This makes transformative change and governance inherently political, since the desired direction of transformation is often contested, and power relations will change. Vested interests (including in certain technologies, sectors and institutions) may inhibit, challenge, slow down or downscale transformative change for sustainability [6,13,14].

This review builds on the key findings of Chapter 6 of the Global Assessment of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) [15]. The review has been elaborated to operationalize the concept of transformative governance. The discussion below of inclusive, adaptive and pluralist governance is focused on biodiversity-related issues, while the discussion of transformative change and governance and integrative governance pertains to sustainable development more broadly, following the broader scope of these literatures. Our analysis thus contributes especially to ongoing debates on the Post-2020 Global Biodiversity Framework under the Convention on Biological Diversity (CBD), while also drawing more general lessons for sustainable development, since biodiversity governance is embedded in these broader sustainability debates, and the state of biodiversity has significant implications for other SDGs [1].

Conceptualizing transformative governance

Our review of the governance literature relevant to biodiversity and sustainability issues revealed four distinct governance approaches, namely integrative, inclusive,

Figure 1



Transformative governance.
Governance (including rules, rulemaking systems and actor networks) becomes transformative if integrative, inclusive, adaptive and pluralist governance approaches are: 1) implemented in conjunction; 2) operationalized in a specific manner (see Table 1); and 3) focused on addressing the indirect drivers underlying sustainability issues. Over time, governance then becomes increasingly capable of addressing the indirect drivers (as indicated by the growth of the governance system from left to right, that is, over time).

adaptive and pluralist governance. These approaches have been extensively studied senparately, and various authors have studied different combinations of the approaches (see, for example, Refs. [8,9,16–19] and the review below), but none have considered how these approaches need to be combined and operationalized to enable transformative change (Figure 1). Our review leads us to hypothesize that governance will only become transformative when it addresses the indirect drivers underlying sustainability issues and is simultaneously:

a) *Integrative*: operationalized in ways to ensure local solutions also have sustainable impacts at other scales, on other issues, and in other places and sectors (see, for example, Refs. [6,20,21];
b) *Inclusive*: in ways that empower those whose interests are currently not being met and represent values embodying transformative change for sustainability [6,14,22,23];
c) *Adaptive*: since transformative change and governance, and our understanding of them, evolve over time, so governance needs to enable learning, experimentation, reflexivity, monitoring and feedback [6,14,21,24,25]; and
d) *Pluralist:* recognizing and incorporating different scientific and societal knowledge systems [6,26–28].

Integrative governance

Transformative change implies change across places, sectors, issues and scales. However, issues are often still governed independently of each other, producing incoherent and suboptimal outcomes. Integrative governance (IG), defined as the theories and practices focused on the relationships between governance instruments or systems,[21] addresses these challenges [29,30••]. Debates on integrative governance have been ongoing for decades, but have not widely led to more coherent, sustainable policies or practices.

IG approaches can be clustered into three strategies, which need to be used together, and focused on the indirect drivers, in order to become transformative (see Ref. [30••] for an overview of the different approaches). Transformative IG includes:

- *Combination:* Developing smart governance mixes, in which instruments are combined to together simultaneously address the indirect drivers of a specific sustainability issue;
- *Coordination*: Such governance mixes enhance coherence across sectors, issues, governance levels and places (including through landscape and nexus approaches, multi-level governance, telecoupling, interaction management, and metagovernance);
- *Integration*: Integrating sustainability concerns into different sectors (e.g. through environmental policy integration and mainstreaming).

Most approaches underestimate the politics of IG and assume the possibility of win-win outcomes. In a context of transformative change, this is often not the case, especially in the short term, when those with vested interests in unsustainable practices will need to sacrifice power. To contribute to transformative change, IG thus needs to be combined with inclusive approaches, as operationalized below [31,32]. An interesting example of IG is compassionate conservation, which integrates attention to animal welfare into biodiversity conservation [33••].

Inclusive governance

Inclusive governance refers to enabling a wide range of rights holders, knowledge holders, and stakeholders to participate in decision-making to capture diverse values, enhance capacity, and promote accountability, legitimacy, and just outcomes [34,35]. However, biodiversity-related decision-making processes have often inadequately addressed underrepresented values of nature and the interests of marginalized communities.

To become transformative, inclusive governance must be operationalized in ways that empower those whose interests are currently not being met and represent values underpinning transformative change for sustainability, including bioenvironmental, social greens, deep greens or strong sustainability worldviews and perspectives [36,37]. It must acknowledge practices that give rise to gender, racial or cultural disparities, and unequal social, economic and institutional structures, such as the exclusion of Indigenous Peoples and local communities (IPLC) as central knowledge and rights-holders in environmental decision-making bodies [38•,39–41]. It must also go further to integrate new and innovative rights, such as extending rights to nature and animals to include future generations and non-humans in the process of governance [42,33••].

Inclusive approaches lead to more pluralist governance; for example, rights to information can empower stakeholders to participate in governance and extending stakeholder communities in biodiversity knowledge production improves legitimacy [40,43]. Deliberative approaches are based on the assumption that competing interests and values can only be discovered, constructed and reflected in dialogue with others [44,45]. Examples include citizen juries, consensus conferences, participatory action research, transformation laboratories, and tools for dialogue and collaboration, such as the Whakatane Mechanism or the Akwe: Kon Guidelines [38•].

[21] Governance instruments include public, private and hybrid (public-private) policies and rules. A governance system can be defined as the total of instruments on a certain issue at a specific level of governance [29].

Inclusive governance can be difficult because conflicts often emerge between stakeholders holding different and incommensurable values [46–48]. To counter the capture of inclusive processes by powerful and socially advantaged actors, strengthening coalitions of like-minded actors would foster shared learning and promote collaborative solutions [49]. Although not always implemented in a transformative manner, community-based conservation, for example, can catalyze inclusive conservation approaches [50,51].

Adaptive governance

Transformative governance must be adaptive to reflect the inherent complexity of environmental change. Adaptive governance is characterized as a process to enhance resilience that uses continuous opportunities for iterative learning, adjusting responses to uncertainty, social conflicts, and complexity over time. Key elements of this process include management with feedback loops, networked policy actors, nested scales and polycentricity, and institutional and stakeholder diversity [52•]. Adaptive approaches have been successful in the real world in dealing with biodiversity loss; for example, in the Amazon, rapid deployment of a livelihood scheme to reduce deforestation included governance mixes (technical assistance, cooperative marketing and land titles) and nested, networked actors (farmers, a women's Brazil nut processing group, donors, and state officials) who shared information and provided legitimacy to collective action processes [53]. As another example, IPLC using customary institutions for biodiversity management have long practiced adaptive governance through Indigenous and Local Knowledge (ILK) systems and cultural practices that respond to ecological change [17,45], leading to calls for improved 'biocultural' conservation approaches modelled on these efforts [54]. How adaptive approaches can navigate transformative change is still an open question, however, given the need to reduce root causes of vulnerability and push socio-ecological systems into a new state [55].

There are synergies with other governance approaches; adaptive governance often includes coproduction of knowledge as well as inclusive governance through co-management [56,57]. However, tensions can emerge around intragroup inequalities and failures to address power asymmetries when adaptive approaches increase stakeholder inclusion [58,59]. Further, adaptive approaches can face barriers around disagreement and polarization among actors, or over inflexibility in designing experimental or innovative solutions [52•,60,61]. Specific adaptive tools, such as the 'Open Standards for the Practice of Conservation' and 'Adaptation Action Cycles' can help navigate some of these trade-offs by combining iterative steps in a participatory process to bridge social networks [62].

Pluralist governance

Biodiversity governance has traditionally relied on natural science-based tools such as indicator frameworks, or integrated assessment models to assess the state of species and ecosystems and drivers of change, or methods to quantify the economic value of nature [28,63,64]. While these tools are means to assess the biophysical impact and footprints of human action on biodiversity, they do not reflect pluralist perspectives and knowledge systems. Transformative governance requires recognizing the multiple legitimate ways of knowing, defining, valuing, and representing biodiversity, incorporating broader sets of information and indicators, including those that reflect non-Western worldviews on nature, well-being and prosperity [65,66••]. This in turn requires a sustained shift across sectors in how ILK systems are recognized, affirmed, and valued [40,43]. Such pluralist knowledge is also important to assess processes of transformation, evaluate their non-linear and unpredictable consequences, track how costs and benefits of transformation are (unevenly) distributed, and adapt where necessary.

Bringing about these changes requires transforming the process of knowledge production [67]. Collaborative approaches to knowledge production have shown positive results in generating credible, legitimate and actionable knowledge outcomes [28,68,69,70•,71]. Widespread adoption of these approaches is however lagging. Bridging the knowledge systems of policy-makers, scientists, practitioners, and IPLC is challenging because they are often not compatible in terms of definitions, concepts and practices and diverse, potentially incommensurable knowledge claims are often met with resistance since they challenge the dominance of science. One example where this resistance was overcome is the Loweswater Care project, which involved the creation of a knowledge collective consisting of local stakeholders and natural and social scientists. Crucial for the success of the project was that it created space for the open discussion (and contestation) of diverse knowledge claims. In other words, pluralist governance requires the explicit recognition of difference [72,73••,74,75].

Discussion and conclusions

In this article we have operationalized transformative governance as incorporating four governance approaches, operationalized in a specific manner, and focused on the indirect drivers of sustainability challenges. This hypothesis builds on contributions by different authors, including those making the case for combining different governance approaches, proposing how to operationalize them, or highlighting the need to focus on the underlying causes of environmental change, albeit using different concepts and not combining these three arguments [20,76,77].

Others have identified key gaps in enabling transformative change, including insufficient transdisciplinarity [78], failures to address root causes [79], insufficient centering of justice and equity [80], and the need for more emancipatory grassroots inclusivity [81] and for more attention to

be paid to developing institutional capacity for such systemic change in developing countries [82,83].

Various scholars discuss the political nature of transformative change and governance [84,85], including the importance of inclusion, transformative leadership, social learning, and reflexivity [83,85,86]. Power and power asymmetries play a role in all four governance approaches reviewed above, and transformative governance, as operationalized here, is meant to start addressing these power asymmetries by including all relevant aspects, enabling emancipation of vulnerable groups and those representing values embodying transformative change, incorporating different types of knowledge, and regularly reflecting on the extent to which these approaches are working.

We have argued that all four governance approaches are needed for governance to become transformative. Integrative governance ensures all sustainability aspects (across places, governance levels, sectors and issues) are addressed, and combining integrative and inclusive approaches is necessary to ensure that stakeholders across these sectors, places, issues and governance levels are involved. Pluralist governance ensures the representation and application of different knowledge types, and through adaptive governance, stakeholders reflect on the extent to which governance is becoming and remains transformative. Transformative governance then becomes a reflective process in which stakeholders ensure governance is on track to transform our currently unsustainable societies into truly sustainable societies and take the initiative to improve and elaborate governance mixes in order to do so.

However, 'simply' combining the four governance approaches is not a guarantee for achieving sustainable societies — they are all four necessary but not sufficient. They should be operationalized with a view to empower those who represent values, paradigms and goals that embody transformative change for sustainability (see Table 1 for the manners in which the governance approaches need to be operationalized). Transformative governance thus is in essence about changing power dynamics to emancipate those stakeholders who hold transformative sustainability values.

Moreover, the governance approaches need to be focused specifically on addressing indirect drivers of unsustainability. Transformative governance should be based on a thorough understanding of the dynamics of, and interactions among, the main indirect drivers underlying a physical environmental problem in a specific context, and should aim to address these indirect drivers. This focus on indirect drivers, and therefore fundamental and systemic societal change, is one of the main differences between transformative and conventional approaches to environmental governance, the latter of which have often had little impact in stemming global biodiversity loss, as they have not successfully addressed indirect drivers [1]. We recognize that this is a heavy lift — transformative change involves major shifts in the values underpinning our societies, economies and lives.

Table 1

Operationalization of the governance approaches in transformative governance

Governance approach	Manner of operationalization in transformative governance
Integrative	Includes governance mixes focused on indirect drivers Requires coordination, integration and combination strategies
Inclusive	Addresses power asymmetries Empowers underrepresented rights-, knowledge-, and stake-holders Recognizes new and innovative rights Emancipates those representing transformative sustainability values
Adaptive	Stimulates dialogue, learning and reflection Reflects complexity
Pluralist	Reflects diverse values, perspectives and knowledge systems Adopts collaborative knowledge production systems Builds capacity for transformative governance

The rather abstract concept of 'indirect drivers' may hide the extent of societal change needed. O'Brien [87] argues that transformative change must take place across three embedded spheres of the practical, political, and personal: the practical involves needed specific actions, which are shaped by political constraints and personal paradigms. Thus, shifting both personal and cultural paradigms can be a powerful way to encourage transformative action. The IPBES conceptual framework [5] conceptualizes these paradigms as views on what a 'good quality of life' entails, and the IPBES Global Assessment defines transformative change as incorporating social aspects, 'including goals, paradigms and values'.

Such fundamental change cannot be achieved through single initiatives or governance instruments, but only by concerted efforts at all levels of governance and in multiple places, coming together in 'governance mixes' aimed at simultaneously addressing the indirect drivers. Goals, paradigms and values cannot be changed by simply providing information or through deliberation. Instead, a multi-faceted process of societal change is needed, in which changes reinforce one another, with, for example, changes in practices enabling institutional change and *vice versa*. Over time, governance systems (made up of rules, rulemaking systems and actor networks) evolve to become increasingly able to enable transformative change for sustainability, as indirect drivers are progressively being addressed and thereby increasingly support instead

of inhibit change in other indirect drivers. Governance mixes therefore can and should change over time to enable and reflect this evolution. Coalitions of like-minded actors representing transformative values (including individuals working for government, market actors, civil society, or research organizations) can enable such fundamental change through transformative governance (see, for example, Refs. [49,88,89]).

Our article highlights that transformative governance of biodiversity, and sustainable development more broadly, represents a radically different approach to governance than conventional approaches. This has significant consequences for the Post-2020 Global Biodiversity Framework: the ambition for transformative change and governance should represent the foundation of the Framework. This ambition cannot be simply added to an otherwise conventional framework — it influences its focus (on indirect drivers instead of only direct drivers), the development of governance mixes (to effectively address the indirect drivers), and the operationalization of governance approaches (ensuring the required coherence, empowerment, flexibility and knowledge base). The ambition for transformative change should equally inform the further governance of the implementation of the SDGs in order to realize their full transformative potential.

The international community can draw important lessons from the fact that the vast majority of the previous targets of the CBD, the Aichi Biodiversity Targets, have not been achieved by their 2020 deadline. While the Aichi Targets included attention to underlying causes of biodiversity loss, these have not been adequately addressed. The Post-2020 Global Biodiversity Framework should thus not only incorporate a focus on indirect drivers, but also explicitly operationalize governance in light of this focus. More attention is needed not only to the 'why', but especially to the 'how' of transformative change.

As stated in the introduction, the debate on transformative governance is relatively new. Further research is needed to analyze governance instruments addressing indirect drivers, for example, how different instruments can support changes in values, what sustainable economic systems entail in detail and how these can be realized, and which indirect drivers most urgently need to be addressed for specific sustainability issues. Policymakers, practitioners and researchers can collaborate to together design, implement and evaluate governance mixes aimed at enabling transformative change through transdisciplinary action research agendas. In this manner we can build the knowledge base required for governing transformations towards a global sustainable society.

Conflict of interest statement

Nothing declared.

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