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A turning point in global biodiversity governance?

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ABSTRACT

In the context of an intensifying global biodiversity crisis, we provide a critical assessment of political and institutional developments in global biodiversity governance between 2022 and 2025. We note that in this period, global biodiversity governance is generating sustained political momentum and institutional innovation consistent with transformative types of change that are needed to mitigate biodiversity loss and ecosystem degradation. We conclude that recent developments in global biodiversity governance contrast markedly with developments in other areas of global environmental governance, and that the adoption of the 2022 Global Biodiversity Framework has likely acted as a catalyst for increased ambition and institutional innovation.

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Introduction

Anthropogenic pressure is causing global biodiversity to decline at an alarming rate (IPBES 2019). The loss of species and ecosystems threatens environmental sustainability and human well-being, particularly in low- and middle-income countries. Global governance responses have expanded in scale, scope, and institutionalization over the past three decades (Petersson and Stoett 2022). However, their aggregate effectiveness has remained limited. Meanwhile, scholars increasingly call for new and innovative governance approaches for facilitating transformative change towards biodiversity conservation and sustainable development via 'fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values' (IPBES 2019), XVIII; see also Visseren-

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Hamakers *et al.* (2021) and Turnhout *et al.* (2021). This requires considerable reform across the entire architecture of global biodiversity governance, consistent with international objectives, notably under the 2022 Kunming-Montreal Global Biodiversity Framework of the United Nations Convention on Biological Diversity (CBD).

In this perspective, we identify potential seedlings of governance transformation. From approximately 2022 to 2025, global biodiversity governance has been characterized by increased political ambition, with goals and resource commitments that exceed the historical baseline; and institutional innovation, as governments are creating novel forms of arrangements while also finding new ways of strengthening existing institutions. Below, we sketch recent political developments across international forums in three issue areas: The protection of species and ecosystems; Digital Sequence Information on genetic resources; and international implementation support measures. All three areas have seen historically remarkable political ambition and institutional innovation over the 2022–2025 period. While there is still room for improvement, particularly regarding implementation support (Zelli 2025), the recent level of ambition and innovation in global biodiversity governance contrasts with other areas of global environmental governance and is even more remarkable considering broader contemporary challenges to multilateralism. We surmise that the adoption of the Global Biodiversity Framework has likely acted as a catalyst for ratcheting up ambition and for driving institutional innovation, potentially opening a credible pathway towards transformative change.

Protection of species and ecosystems

The protection of species and ecosystems is at the heart of biodiversity policy, yet past international efforts have met with limited success (CBD 2020). We note a considerable increase in the ambitiousness of international targets since 2022. The '30 x 30 target' of the 2022 Global Biodiversity Framework aims at the conservation of 30% of terrestrial areas as well as of inland waters and coastal and marine areas, by 2030. This is a considerable step up from the Aichi Targets under the CBD's 2011–2020 strategic plan, which foresaw 17% of terrestrial and inland water areas and 10% of marine and coastal areas globally to be under protection status by 2020. Moreover, the Global Biodiversity Framework strengthens the rights of Indigenous Peoples and local communities (IPLCs) in relation to the establishment and expansion of protected areas as compared to the Aichi Targets (CBD 2022a). Considering that the land and resource use restrictions associated with protected areas have frequently resulted in the further marginalization and impoverishment of IPLCs, the enhanced rights protection in the Global Biodiversity Framework also reflects the ambition towards better reconciliation of

environmental and social dimensions of sustainability. While IPLCs are the stewards of a significant percentage of the world's biodiversity, they face ongoing challenges threatening their territories, cultures, and livelihoods, including resource extraction and commodity production (IPBES 2019). Respect for their rights to land, territories and resources, alongside full and effective participation in international processes, can promote transformative change: IPLCs hold crucial knowledge, which they can apply to achieve biodiversity targets while exercising their rights (Reyes-García *et al.* 2022, Tengö *et al.* 2017).

In addition to general progress on area-based conservation, much progress has specifically been made in the area of marine conservation in the CBD and beyond. The 2023 Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction ('BBNJ Agreement') complements the 30×30 target under the Global Biodiversity Framework. It provides robust legal mechanisms for protecting biodiversity in international waters through Area-Based Management Tools, for instance, by specifying the conditions under which the Conference of the Parties (COP) to the BBNJ Agreement has the power to establish new high seas marine protected areas. This marks a milestone in ocean and biodiversity governance. Additional decisions by the CBD COP 16 in 2024 highlight the increasingly tight interface between international biodiversity institutions in addressing marine ecosystems. A decision on Ecologically or Biologically Significant Marine Areas after 'eight years of difficult, delicate, and sometimes deadlocked negotiation' (ENB 2024, p. 19) provides new scientific tools for enhancing cooperation and the implementation of marine biodiversity conservation targets under the Global Biodiversity Framework and the BBNJ Agreement.

Another crucial development at the biodiversity-ocean interface is the emerging moratorium on deep-sea mining. The past few years have seen increasing commercial interest in the extraction of valuable mineral resources from the ocean floor. Regulations on the extraction of such mineral resources have been under negotiation in the International Seabed Authority, which operates under the Law of the Sea Convention, since the 1980s (Blanchard *et al.* 2023). Yet deep-sea mining remains extraordinarily contentious due to the inevitable adverse impacts it would have on marine biodiversity (Alger *et al.* 2025), including for species that are presently unknown and might be irredeemably lost. Within the International Seabed Authority, an increasing number of governments have therefore been calling for a moratorium, precautionary pause, or outright ban on deep-sea mining since 2022. Yet, in February 2024, it was the 14th Conference of the Parties to the Convention on Migratory Species that adopted a resolution urging parties 'not to engage in, or support, deep-seabed mineral exploitation activities until sufficient and robust scientific information has been obtained

to ensure that deep-seabed mineral exploitation activities do not cause harmful effects to migratory species, their prey and their ecosystems' (CMS 2024). The emerging moratorium presents a remarkable discontinuity with a process that had been leading towards regulated exploitation of deep-sea minerals since the 1980s. It also highlights how an increasing number of governments prioritize the protection of marine biodiversity over the uncertain contributions of deep-sea mining for the extraction of critical metals.[1]

Digital sequence information on genetic resources

Diverse international mechanisms have emerged over the past three decades for linking the utilization of genetic resources, meaning valuable materials of 'plant, animal, microbial or other origin containing functional units of heredity' (CBD Article 2), to biodiversity conservation. The starting point for these mechanisms is that biodiversity provides genetic materials usable in diverse commercial applications, from pharmaceuticals to plant breeding, as well as non-commercial applications, including public research and food and healthcare by IPLCs. By encouraging or requiring users of genetic resources to share derived benefits, financial or otherwise, resources can, in principle, be mobilized for enhancing conservation efforts. Systems that regulate access to genetic resources and promote fair and equitable sharing of benefits exist under the CBD and its 2010 Nagoya Protocol, while the 2001 International Treaty on Plant Genetic Resources for Food and Agriculture ('Plant Treaty') provides a multilateral system of exchanges adapted to the agricultural sector. However, access and benefit-sharing mechanisms are increasingly coming under pressure due to a shift in contemporary biotechnological applications from the utilization of physical genetic resources to the utilization of associated Digital Sequence Information (DSI), which increasingly renders the collection of physical samples unnecessary. In contrast to physical specimens, DSI has hitherto not been covered by international instruments. The trend toward the digitalization of biotechnology thus threatens to undermine the logic of leveraging biotechnological innovation for biodiversity conservation as well as benefit-sharing (Nawaz *et al.* 2021).

While the international politics of DSI had remained deadlocked for more than a decade, the years since 2022 have seen rapid progress across multiple international forums. The 2023 BBNJ Agreement is the first binding international treaty to create mandatory benefit-sharing obligations for DSI on marine genetic resources. In 2022 and 2024, CBD COPs 15 and 16 adopted decisions that created a multilateral mechanism for benefit-sharing from DSI based on voluntary payments (CBD 2022b, 2024). This mechanism diverges from the bilateral approach that has conventionally been used for access and benefit-sharing under the CBD: as it does not require the prior informed consent of providers, and the establishment of mutually agreed terms

between providers and users, it reduces transaction costs and eliminates monitoring requirements for fast-paced digital transfers of DSI. Commercial users of DSI are encouraged to pay up to 1% of profits or up to 0.1% of revenue into the new Cali Fund, which will make disbursements for biodiversity conservation mainly in countries of the Global South. Considering the scale of the commercial operations of large DSI users from the pharmaceuticals sectors, but also big tech companies that use DSI for the training of advanced Artificial Intelligence models, significant resources could be mobilized in principle, particularly if CBD parties follow up with national implementing legislation. This arrangement should also be facilitated by the World Intellectual Property Organization's Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge, signed in May 2024, which stipulates that patent applicants must disclose the origin or source of any genetic resource or traditional knowledge used in their invention. In the wake of these developments, negotiations on a larger reform package for the Plant Treaty, where DSI had previously turned out to be the dealbreaker, have restarted as well.

After many years in which DSI constituted a major stumbling block for international negotiations across multiple forums, major institutional innovation and an increased willingness to craft political compromises have thus characterized the field in the 2022–2025 period. The innovative mechanisms under the CBD and the BBNJ Agreement could mobilize considerable resources for biodiversity conservation. Under the Plant Treaty, DSI remains a major issue standing in the way of a comprehensive reform package that would grant farmers and breeders worldwide access to most crop genetic resources held in the public collections of member states and would ensure that commercial users contribute financially to the system (see Tsioumani 2020).

International implementation support

International mechanisms for implementation support provide scientific and technical advice, contribute to the mobilization of financial and other resources, and can ensure reporting, monitoring, and review. They are crucial for ensuring adequate implementation of international commitments at the domestic level. For decades, a key deficit of global biodiversity governance has been a considerable gap between ambition and implementation. Yet on biodiversity finance in particular, recent progress has been remarkable. In 2022, COP 15 created a special trust fund to support the Global Biodiversity Framework, while the Global Biodiversity Framework, in its Target 19, provided for the first time a quantified biodiversity finance target. Going into COP 16, developing countries were wary of insufficient resource mobilization by developed

countries, while also insisting on the creation of alternative institutional arrangements for biodiversity finance outside of the Global Environment Facility with its arguably inefficient procedures and untransparent decision-making structure (Johnston and Kor 2024). At COP 16 in Cali, parties were initially unable to negotiate a suitable package but achieved a breakthrough on resource mobilization and associated financial arrangements when the COP resumed in February 2025. There, the COP established a time-bound process to determine the institutional structure of permanently operating the CBD's financial mechanism under the authority of the COP, including concrete deliverables to ensure implementation, and a list of criteria that this structure should satisfy (ENB 2025a).

At the resumed COP 16, parties also adopted a decision establishing a process for a global review of collective process on the implementation of the Global Biodiversity Framework, with the first one to take place at COP 17 in 2026. Mirroring the global stocktake held under the Paris Agreement on climate change, this global review is designed as a party-driven process but will include the preparation of a global report by an *ad hoc* scientific and technical advisory group. The process is led by the CBD's Subsidiary Body on Implementation and is expected to culminate in a later COP decision aiming to assess and improve implementation. A further major development in implementation support is the decision by COP 16 to establish a new subsidiary body with a mandate to advise the COP on matters related to IPLCs. While a conclusive assessment of the gains that such a body will provide is premature, IPLCs themselves perceived it as a significant shift with regard to their meaningful inclusion. By empowering those who make critical contributions to biodiversity conservation worldwide, this body might indirectly enhance implementation efforts on the ground (see Parks and Tsioumani 2023). Finally, implementation support will likely be strengthened by the new multilateral mechanism on DSI, as commercial users of DSI are expected to make financial contributions to the Cali Fund.

Under the BBNJ agreement, important institutional innovations on implementation support have emerged as well. This includes the new Scientific and Technical Body which carries responsibility for Area-based Management Tools and Environmental Impact Assessments, new institutional arrangements for capacity-building and marine technology transfer, as well as a dedicated financial mechanism and clearing house mechanism. Developments in marine biodiversity under the BBNJ Agreement are furthermore supported by the CBD's COP 16 outcomes that give the convention's secretariat influence in shaping the future identification of Ecologically or Biologically Significant Marine Areas.

Conclusions

Global biodiversity governance has seen seedlings of transformative change between 2022 and 2025, including the 30 × 30 target and strengthened IPLCs rights protection, the quantified resource mobilization target, the emerging deep-sea mining moratorium, the new subsidiary body for IPLCs, new mechanisms for benefit-sharing from DSI, progress on resource mobilization and the CBD's financial mechanism, marine protected areas under the BBNJ agreement, as well as the CBD's process for a review of collective progress. Across these and other items, we see considerable political ambition, as parties are committing to targets, including financial ones, beyond the historical baseline. We also identify strong institutional innovation, particularly regarding a strengthened role for IPLCs or the participation of the private sector in biodiversity finance through the multilateral mechanism on DSI. Finally, we observe how institutional innovation can strengthen existing arrangements, as with the strong role of the Subsidiary Body on Implementation in the CBD's global stocktake.

This level of ambition and innovation over the 2022–2025 period is exceptional. It contrasts considerably with other areas of global environmental governance in the same time frame. Consider that negotiations on a global plastics treaty have faltered between 2024 and 2025 largely due to opposition from large oil-producing countries (ENB 2025b). In late 2024, the Framework Convention on Climate Change failed to agree on an ambitious resource mobilization target and to follow up on a critical commitment towards a fossil fuel phase-out adopted the year before (Carbon Brief 2024). At COP 16 of the Convention to Combat Desertification, in December 2024, expectations to develop a new framework for combating drought, potentially in the form of a binding protocol, fell flat. Ambition and innovation in global biodiversity governance stand in contrast to these other environmental negotiations.

A systematic exploration of potential causes is beyond the scope of this paper. Nevertheless, we surmise that the primary factor that has driven the unusually positive outcomes in global biodiversity governance in the recent past is related to the impact of the Global Biodiversity Framework on the wider biodiversity governance architecture. The Framework itself represents an extraordinarily broad package deal enabled by the wide functional scope of the CBD itself. Inside the CBD, the Framework has likely contributed to greater political momentum and ambition, thus driving the COP 16 outcomes. Outside the CBD, the Framework has served to indicate numerous areas of political agreement on matters related to global biodiversity, thus facilitating the adoption of aligned outcomes in other forums. Overall, it appears plausible that the Framework has caused a catalyzing effect that, in the years since its

adoption, has rippled across the global biodiversity governance architecture, driving political ambition and institutional innovation (see Chan *et al.* 2023). This creates a situation in which the global biodiversity governance architecture may be opening up a credible pathway towards transformative change.

The future prospects of global biodiversity governance critically depend on the evolution of the CBD and its Global Biodiversity Framework as the regulatory core of the broader governance architecture. Despite progress at the resumed COP 16, resource mobilization and associated financial arrangements will likely remain major stumbling blocks. For one, in the coming years, parties will have to honor their hard-won agreement to develop a new financial mechanism under the authority of the COP. The ability to reverse the trend of biodiversity loss in low- and middle-income countries hinges on this support. Moreover, we still need to see the political will to actually mobilize and sustain the promised funds (Zelli 2025). Without the political will, high-income countries could renegotiate their commitments, which would send a risky signal to those making voluntary and private investments. An option for improving resource mobilization could be for major regional blocs, notably the European Union (EU), to support the implementation of the multilateral mechanism on DSI through binding domestic regulation. Benefit-sharing streams from DSI could mobilize resources for biodiversity conservation, contributing to the implementation of the Global Biodiversity Framework while also signaling a strong commitment towards multilateralism and global equity. While the DSI mechanism is non-binding in nature and its benefit-sharing targets are merely indicative, nothing prevents the EU from enforcing regulatory compliance on large users of DSI operating within Union territory. The 2014 EU implementing regulation for the Nagoya Protocol provides a precedent for the EU to move ahead with regulatory action also as a means of maintaining its international stature and leadership in global environmental governance (Oberthür and Rabitz 2014).

There is also a need for synchronization across forums. For example, with breakthroughs on DSI under the BBNJ Agreement and the CBD, there is now room for moving ahead at full speed with a comprehensive reform of the Multilateral System of the Plant Treaty. This would unlock an ambitious global solution to agricultural biodiversity loss, while also contributing to food security and sustainable development more broadly. The increasing momentum towards the extension and effective implementation of marine protected areas should encourage the International Seabed Authority to step up and prohibit the extraction of deep-sea minerals and thus contribute to the safeguarding of marine biodiversity. There is thus ample opportunity to move global biodiversity governance ahead in what may be a limited time window before critical tipping points are transgressed.

Note

1. The recent indications that the US government may be willing to authorize deep-sea mining by the Canadian operator The Metals Company is a notable exception from this overall trend and raises complicated questions under the law of the sea.

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