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The governance of biodiversity recovery: From global targets to sectoral action: Editorial

The ongoing loss in nature and biodiversity due to human activity, exacerbated by climate change, is one of the most pressing sustainability challenges today (Nielsen et al., 2021). Governments and companies have committed themselves to contributing to global biodiversity targets, for instance, as defined by the Montreal Kunming Global Biodiversity Framework (GBF) of the Convention on Biological Diversity (CBD) and the Sustainable Development Goals (SDGs; particularly SDG14 Life Below Water and SGD15 Life on Land). In 2019 the European Commission launched the Green Deal with ambitious targets for restoring and protecting biodiversity (EC, 2019) and many CBD parties are working on updating their National Biodiversity Strategies and Action Plans (NBSAPs) in order to translate these targets into national action.

For *actual* biodiversity recovery, targets do not suffice, however (e.g., Biermann et al., 2022; Bogers et al., 2022). It is crucial that national governments as well as private companies *integrate* or *'mainstream'* these targets in sectoral policies and plans and implement concrete measures. Mainstreaming biodiversity targets in, for instance, the food and transport sectors, is considered an effective governance approach, because it can directly address the driving forces of biodiversity loss (Runhaar et al., 2020). In this way, the mainstreaming of biodiversity in sectoral policies can complement more classical biodiversity governance based on, e.g., protected areas and programmes for the protection of endangered species (Whitehorn et al., 2019; Eberhard et al., 2022). The call for biodiversity mainstreaming is very prominent in the GBF: not only does the text explicitly refer to mainstreaming, it also becomes visible in agreed-upon targets calling for sectoral policy action to combat a range of biodiversity threats, including a call for integrating biodiversity values in all relevant policies and plants (target 14), integrated planning (target 1), working towards sustainable management of agriculture, aquiculture, forestry, and fisheries (target 10), measures to assure sustainable businesses (15) and sustainable consumption (16), and action to abandon harmful subsidies (18) (CBD, 2022).

Despite these commitments, scientific literature attests little progress on the contribution of biodiversity mainstreaming to biodiversity protection and recovery. A main problem is that biodiversity targets are often traded off against sectoral goals and driving forces of biodiversity loss are not effectively addressed (e.g., Karlsson-Vinkhuyzen et al., 2018). This observation is echoed in scientific research on integration and mainstreaming of other environmental targets in sectoral policies, such as climate mitigation, climate adaptation, pollution, etcetera (Runhaar et al., 2018, 2020). In many reported cases, integration or mainstreaming efforts do not go beyond the adoption of biodiversity targets that are neither coherent nor translated into sectoral policies (Zinngrebe et al., 2022). In addition, there often is a serious 'implementation gap': lacking actions to realise environmental goals formulated in sectoral policies (Runhaar et al., 2020).

Thus far, little insight exists on what factors enable and hamper mainstreaming in sectoral policies as a necessary precondition for effective implementation. In view of alarming rates of biodiversity loss worldwide and the global commitment to biodiversity recovery, with this Special Issue we aim to synthesise and expand our understanding of the integration of biodiversity targets in public and private sectoral policies. With this, we aim to extract insights on the critical enablers, barriers, and challenges that facilitate or impede a stronger integration.

The nine research papers in this Special Issue provide insights from a variety of mainstreaming practices in different sectors and geographical contexts. Two papers analyse mainstreaming in public policy on a national governmental level. **Cardona Santos et al.** (2023, *this issue*) analyse experiences with NBSAPs that were developed to work towards the CBD targets. They argue that raising awareness, mobilising policy change, and fostering accountability are central levers for harnessing the potential of NBSAPs to contribute to mainstreaming. **Pröbstl et al.** (2023, *this issue*) analyse the potential to transform five policy sectors in Germany and identify the transformative potential based on inclusive, integrated, accountable, and adaptive governance strategies. They find that dominant sector interests continue to overpower ideas of multi-functional, biodiversity supporting production systems, and fail to transform harmful subsidies and regulation.

Four papers analyse specific policy options to mainstream biodiversity into productive sectors. **Alblas and Van Zeben** (2023, *this issue*), focusing on agriculture, analyse the risks of goal dilution in the multi-level implementation of Agri-Environmental-Schemes (AES). At each level (national government, regional government, farmers) actors have some discretion, which can lead to a watering down of goals to facilitate implementation. They emphasise the importance of 'appropriate controls and monitoring' to reduce these risks. **Dik et al.** (2023, *this issue*) also focus on AES and examine Dutch farmer collectives, who are responsible for developing regional agrobiodiversity plans, contracting farmers, and monitoring results. They find that the qualification of board members, participating farmers, and field-workers of farmer collectives are a key lever for effective AES. **Rode et al.** (2023, *this issue*) present a transdisciplinary methodology for identifying incentives and support schemes for trees on farms in agricultural landscapes. Applying this methodology in Uganda and Peru they find that fragmented institutional settings and political priorities would have to change in order to support tree-based production system instead of intensified production systems. **Garraud et al.** (2023, *this issue*) explore the potential of ecolabels for

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biodiversity-friendly products to motivate and compensate a behavioural change in fishery practices. Their projections of carrying capacities and profit estimates suggest that an adjusted design and management of Marine Protected Areas combined with a price premium for sustainable fish from these areas can even increase the overall profit.

Two studies analyse the potential of the concepts of bioeconomy and ecosystem services to contribute to mainstreaming. **De Queiroz Stein and Siegel** (2023, *this issue*) analyse the potential of the bioeconomy concept to provide promising strategies for mainstreaming biodiversity. In their view, the sustainability of bioeconomy approaches depends on the recognition of diverse local knowledge and value systems in order to monitor and adjust approaches in their context-specific implementation and assure biodiversity effects and equity. **Zolyomi et al.** (2023, *this issue*) evaluate the potential of ecosystem service concepts for incorporating biodiversity in decision-making on sectoral policies. They find that ecosystem service approaches focus on valuation processes and disregard the need for demonstrating impacts and that they should better link their results to policy and decision-making processes.

The final paper in this Special Issue by **Runhaar et al.** (2024, *this issue, fortcoming*) synthesises the scientific literature on biodiversity mainstreaming and biodiversity policy integration (including the papers from this Special Issue and 35 additional papers). The paper systematically explores the main factors that account for the extent to which biodiversity is mainstreamed into sectoral policies and plans, distinguishing between factors related to processes and more underlying structures.

Overall, the contributions converge around the observation that mainstreaming efforts have not managed to achieve a systematic consideration for biodiversity and policy continues to give priority to conventional production systems. The literature on biodiversity mainstreaming is quite recent and the paper by Runhaar et al. (2024, *this issue, fortcoming*) shows that our understanding of underlying factors is still limited. Specifically, we need to better understand underlying discourses, institutional arrangements, and power structures that continue to reproduce path-dependencies in policy-making including a resistance to mainstreaming efforts. In view of the global commitment to, and high expectations of, biodiversity policy integration or mainstreaming, we encourage Earth System Governance colleagues to intensify research efforts in this area and to build effective science-policy-society interfaces, to maximise our contributions to bending the curve of biodiversity loss.

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