



Mainstreaming revisited: Experiences from eight countries on the role of National Biodiversity Strategies in practice

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ABSTRACT

Global biodiversity targets have not been met due to weak implementation at the national level. National Biodiversity Strategies and Action Plans (NBSAPs) are central for mainstreaming biodiversity by translating global ambition into national policies. This study analyzes the practical role of global and national biodiversity agendas. Interviews from France, Germany, Honduras, Indonesia, Mexico, Peru, Rwanda, and South Africa show that global targets and NBSAPs have raised awareness, mobilized initiatives, mobilized support for implementation, and fostered accountability. Nevertheless, conflicting interests, weak financial support, and poorly integrated institutional and regulatory structures remain challenges to implementation. Levers for harnessing the role of future NBSAPs to achieve the goals and targets of the Kunming-Montreal Global Biodiversity Framework are: improving communication; defining concrete measures and clear responsibilities; fostering cross-sectoral commitment; enshrining targets into national laws; ensuring adequate public funding; reforming harmful subsidies; ensuring coordination among sectors and levels of governance; and strengthening accountability frameworks.

1. Introduction

Biodiversity and its vital contributions to people are deteriorating worldwide at a higher rate than ever before, mostly due to changes in humans' use of land and the sea, unsustainable management of ecosystems, direct exploitation of organisms, climate change, pollution, and invasive alien species (IPBES, 2019). These direct drivers are the consequence of several underlying causes, or indirect drivers – such as societal values and behaviors, including production and consumption patterns, human population dynamics and trends, trade, and technological factors – that will need to be transformed in order to restore biodiversity and its contributions to the wellbeing of people (IPBES, 2019). Because biodiversity is threatened by activities governed within

non-environmental policy areas, the effectiveness of biodiversity policies will depend on the extent to which they are mainstreamed in all relevant sectors (Runhaar et al., 2014; Karlsson-Vinkhuyzen et al., 2017). The key challenge will be to address direct and indirect drivers of biodiversity loss through national biodiversity targets and to operationalize them within and beyond existing governance structures.

The Global Biodiversity Outlook (GBO) concluded that none of the Aichi Biodiversity Targets had been fully achieved at the global level by 2020 (CBD, 2020). These targets were defined in the Strategic Plan for Biodiversity 2011–2020, a global framework formally adopted by the Parties to the Convention on Biological Diversity (CBD) to address the underlying drivers of biodiversity loss. The GBO reports gaps in both the level of ambition of national commitments to address the Aichi Targets,

Abbreviations: CBD, Convention on Biological Diversity; NBSAP, National Biodiversity Strategy and Action Plan; GBF, Global Biodiversity Framework; COP, Conference of the Parties; NR, National Report; FRA, France; GER, Germany; HND, Honduras; IDN, Indonesia; MEX, Mexico; PER, Peru; RWA, Rwanda; ZAF, South Africa; NGO, Non Governmental Organization.

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as well as in implementation at the national level to reach these commitments. Declarations in Cancun (COP 13, [CBD, 2016a](#)), Sharm El-Sheik (COP 14, [CBD, 2018](#)), and Kunming (COP 15 part 1, [CBD, 2021](#)) stressed the importance of addressing direct and indirect drivers of biodiversity loss and the need for integrated policy approaches and coherent implementation.

In December 2022, the 15th Conference of the Parties (COP 15) to the UN Convention on Biological Diversity adopted the “Kunming-Montreal Global Biodiversity Framework” (GBF) ([CBD, 2022a](#)). The Kunming-Montreal GBF consists of four goals related to the 2050 Vision for Biodiversity and 23 targets to be achieved by 2030 with the overall aim to address the loss of biodiversity, restore natural ecosystems, and set humanity in the direction of a sustainable relationship with nature. The GBF emphasizes specific mainstreaming activities such as integrated planning (Target 1), policy integration (Target 14), sustainable production (Target 15) and consumption (Target 16), as well as phasing out harmful subsidies (Target 18), and calls for a whole-of-government and whole-of-society approach to achieve the 2050 Vision. It brings attention specifically to sustainable agriculture, fisheries, and forestry (Target 11), indicating a particularly strong need for mainstreaming in these sectors.

National Biodiversity Strategies and Action Plans (NBSAPs) are the main national planning instrument for implementing the Convention at the national level, and thus the principal means by which to address the drivers of biodiversity loss by mainstreaming biodiversity across government and society (Article 6 of the CBD). NBSAPs reflect how Parties intend to fulfill the objectives of the Convention, given the specific national context, and determine the measures to be taken. As of early 2023, 194 of 196 Parties have developed at least one NBSAP and 178 countries have successfully updated their NBSAP according to the 2011–2020 Strategic Plan ([CBD, 2023](#)). With the adoption of the Kunming-Montreal GBF, NBSAPs must be revised and updated in alignment with the new targets. The new mechanism on planning, monitoring, reporting, and review ([CBD, 2022b](#)) offers an opportunity to take stock of lessons learned from national implementation in different countries to improve the design of NBSAP structures and accompanying processes.

To monitor and review the implementation of the Convention at the national level, regularly revised national reports provide information on the implementation of the NBSAPs. Parties’ sixth national reports, due in December 2018, conducted a final review of the 2011–2020 Strategic Plan implementation. NBSAPs, forthcoming national reports and cross-cutting indicators will be used to review implementation progress at upcoming COPs in order to redirect and increase national action. This offers an opportunity to increase NBSAPs’ effectiveness by taking stock of lessons learned from national implementation in different countries. However, to date, there is little literature on the practical relevance of NBSAPs for national biodiversity governance and the challenges hindering their implementation.

A comprehensive review conducted as part of this study revealed that literature examining NBSAPs either comprises single case studies (such as [Sarkki et al., 2015](#) and [Akindele et al., 2021](#)) or broad comparative analyses ([Chandra and Idrisova, 2011](#); [Whitehorn et al., 2019](#); [Coffey et al., 2022](#); [Pisupati and Prip, 2015](#); [Prip and Pisupati, 2018](#); [Uetake et al., 2019](#)), with little attention given to stakeholders’ perspectives and context-specific implementation challenges. A review of 144 NBSAPs showed that although mainstreaming is addressed in the strategies of many countries, biodiversity and economic development are not necessarily targeted together, and more efforts are necessary in developed countries to acknowledge the value of biodiversity to their production sectors ([Whitehorn et al., 2019](#)). [Prip and Pisupati \(2018\)](#) describe mainstreaming efforts in NBSAPs as broad and aspirational, and argue that it remains unspecified what institutional and legal steps are required to achieve mainstreaming objectives. Institutional and voluntary measures to support mainstreaming might be undermined by competing responsibilities in the respective sectors ([Sarkki et al., 2015](#)). Building on these insights, there is a need for better understanding the

relevance and functions of NBSAPs in practice, which this paper seeks to address.

The objective of our study is to examine the practical role of NBSAPs in national biodiversity governance, and to identify levers to further strengthen their role in order to achieve the 2050 Vision for Biodiversity. Our findings are based on a qualitative analysis of implementing stakeholders’ perceptions. We conducted interviews in eight countries across four different continents representing diverse social, environmental, institutional, and economic contexts: France, Germany, Honduras, Indonesia, Mexico, Peru, Rwanda, and South Africa. The interviews were guided by four research questions:

1. What is the role of the CBD Aichi Targets at the national level in practice?
2. What is the role of NBSAPs for national biodiversity governance in practice?
3. What are challenges to implementation?
4. What are the priorities to be addressed by future NBSAPs?

While our study does not provide a representative sample to assess the level of mainstreaming in these countries, its exploratory approach allows us to identify leverage points for harnessing the potential of future NBSAPs in fostering mainstreaming and addressing implementation challenges. In Section 2, we introduce the case study countries and projects as well as the methods for data collection and analysis. In Section 3, we present the results according to the research questions. In Section 4, we discuss the results in light of literature on biodiversity governance, policy integration and transformative change. In Section 5, we present our conclusion and policy recommendations to enhance the role of future NBSAPs in national biodiversity governance.

2. Methodology

In order to assess the practical relevance of the Aichi Targets and NBSAPs, the challenges to their implementation, and the potential to strengthen their role in national biodiversity governance, we combine the findings of interviews conducted in three research projects: “Trees on Farms” led by the International Climate Initiative (IKI), “International biodiversity governance: laying the groundwork for post-2020” led by the Institute for Sustainable Development and International Relations (IDDRI), and “NBS Post 2020 - Consultation process for the further development of the NBS” led by the Helmholtz Centre for Environmental Research (UFZ). The combined projects cover eight countries and a variety of biodiversity policy backgrounds (see [Table 1](#)).

2.1. Case studies

The ‘Trees on Farms’ project (2017–2024) was funded by the International Climate Initiative (IKI), managed by the German Ministry for Environment. The objective of the project was to harness the potential of trees on farms to implement national biodiversity targets in agricultural landscapes. During the project, 74 expert interviews were conducted in Honduras, Indonesia, Peru, and Rwanda. The interviewees in this project were primarily selected at the interfaces between environment, agriculture, and forestry. They include representatives from governmental institutions, scientific institutions, farmers’ associations, NGOs, and the private sector. All interviews in this project were conducted and recorded in in-person meetings in the main language of the country, then translated for analysis.

‘International biodiversity governance: laying the groundwork for post-2020’ (2017–2020) was a project funded by the French Biodiversity Agency (OFB) whose overall objective was to support the strengthening of ambition and efficiency of international biodiversity governance post-2020, as well as to guide the revision of the French NBSAP by evaluating France’s implementation of the CBD. The research specifically aimed to improve understanding of how the CBD’s

Table 1

Overview of background information of the different National Biodiversity Strategies and Action Plans (NBSAP) and National Reports (NR) for each of the case study countries.

National Strategies and Action Plans (NBSAPs) and National Reports (NR)								
Case studies	France (FRA)	Germany (GER)	Honduras (HND)	Indonesia (IDN)	Mexico (MEX)	Peru (PER)	Rwanda (RWA)	South Africa (ZAF)
Current NBSAP	2011	2007	2017	2016	2016	2015	2016	2015
Total NBSAPs	2	1	2	3	2	2	2	2
National Report	2019 (6NR)	2021 (6NR)	2018 (6NR)	2019 (6NR)	2018 (6NR)	2018 (6NR)	2020 (6NR)	2018 (6NR)

2011–2020 Strategic Plan, and the Aichi Targets specifically, have been used by different actors in different national contexts. The interviews were centered around stakeholders' perceptions of experiences with the 2011–2020 Strategic Plan, perceived limits to implementation, and stakeholders' views regarding useful developments to strengthen implementation of the global post-2020 framework, which was under development during the project's duration. In total, 72 interviews were conducted in French and English by one representative of the author team and the project coordinator in France, Mexico, and South Africa. In each country, at least five interviews were conducted with actors from four main actor groups: national governments, scientific researchers, NGOs, and the private sector. Interviewees were selected based on snowball sampling, using the primary CBD National Focal Point in each country as an entry point.

'NBS Post-2020 - Consultation process for the further development of the NBS' (2020–2023), a project funded by the German Federal Agency for Nature Conservation (BfN), assessed experiences with Germany's current strategy (published in 2007) and its implementation. This first strategy was adopted under a whole-of-government approach to guide the actions of all ministries and political levels (BMU, 2017). The Indicator Report of 2014 (BMUB, 2014) showed that only two of the 13 indicators assessed were close to the adopted target values. In 2015, the ministry responded with a sectoral program of action with 40 measures for ten priority fields of action (BMUB, 2015). Nevertheless, implementation deficits persist, according to the 2017 accountability report (BMU, 2017). The national biodiversity strategy 2030 is currently being developed under the leadership of the Federal Ministry for the Environment. As part of this process, 33 qualitative interviews were conducted in German with experts from political authorities, interest groups, scientific institutions, as well as companies.

2.2. Interview design and analysis

All projects used comparable interview strategies including expert sampling and interview guidelines. A total of 179 semi-structured interviews were conducted between 2018 and 2021. Across all projects, interviewed experts included representatives from governments (both national and sub-national), NGOs (advocating for the interests of civil society and for nature protection), academia (scientific researchers working in research institutes or universities), consultants (independent agents or organizations aiming to provide expert analysis and recommendations to policymakers, government officials, and the general public), businesses (companies whose production processes directly impact biodiversity, for example chocolate producers), and farmers' associations.

Experts were selected based on their familiarity with CBD processes and involvement in the development and implementation of NBSAPs in each country. Additional interviewees were identified through snowball sampling, as primary interviewees were asked to recommend additional experts. The perception of these interviewees provides important insights since a successful mainstreaming would imply that implementing stakeholders are familiar with biodiversity targets and that measures to achieve them are being implemented across the sectors and levels of governance the experts interviewed are involved with.

Table 2 provides a detailed overview of the expert composition for each country. Of the 179 experts interviewed, the three most strongly represented groups in all 8 countries were government representatives (36%), NGOs (27%), and academia (21%). Interviews ranged between 20 and 80 min. The interview guidelines included questions about experiences with global and national biodiversity agendas as well as levers for and barriers to implementation (see Appendix A). All interviews were recorded and transcribed. To analyze the transcripts, we conducted a qualitative content analysis according to Mayring (2010). The statements of the interview subjects were openly coded and assigned to the corresponding research questions. The coding identified phenomena responding to the research questions and were not intended to extract specific wording or terminology.

We inductively identified four categories within our findings regarding the perceived role of global and national targets for national biodiversity governance in practice, which we use to present our findings on challenges and priorities to be addressed by future NBSAPs. These categories do not alter the results and are merely used to structure the presentation of the findings, which are discussed in Section 4 based on existing debates on NBSAPs, policy integration, and transformative change, in order to develop recommendations.

The first category, "raising awareness," relates to the *policy frame* dimension of policy integration (Candel and Biesbroek, 2016). It refers to how biodiversity is perceived within a given governance system and whether biodiversity loss is considered as a cross-cutting problem. The second category, "mobilizing initiatives for biodiversity" is strongly related to the dimensions of *inclusion*, *operationalization*, and *coherence* in biodiversity policy integration (Zinngrebe, 2018). These dimensions refer to the extent to which sector-specific biodiversity targets have been defined, policy mechanisms and instruments have been adopted to implement biodiversity objectives, and different objectives and policy instruments within sectors complement each other without resulting in conflicting incentives or compromising each other's effectiveness. The third category, "mobilizing support for implementation," relates to the dimension of *capacity* in biodiversity policy integration (Zinngrebe, 2018). This dimension refers to institutional development, available resources, and political mechanisms that ensure the implementation of biodiversity objectives in sectoral practices. The fourth category, "fostering accountability," also relates to the dimension of *capacity* (Zinngrebe, 2018) and is a key characteristic of a transformative biodiversity agenda. Transformative biodiversity governance requires the development of clear responsibilities and accountability mechanisms so that all key actors assume their responsibilities in governance processes (Visseren-Hamakers and Kok, 2022; Wittmer et al., 2021).

3. Results

3.1. Perceived role of the CBD Aichi Biodiversity Targets at the national level in practice

Our results indicate that there is a lack of knowledge on the CBD on the ground, particularly at the local level. Only experts directly or indirectly involved in CBD processes are aware of the global Aichi Targets. The remaining interviewed experts indicated that they were

Table 2
Overview of the number of interviews conducted with different experts in each country.

Expert selection	FRA	GER	HND	IDN	MEX	PER	RWA	ZAF	Total
Government	7	10	6	6	10	10	5	10	64
NGOs	5	6	7	5	10	3	8	5	49
Academia	5	9	7	3	5	1	5	2	37
Consultants		5				2			7
Business	6	3			6			1	16
Farmers' associations			4				2		6
In total	23	33	24	14	31	16	20	18	179

more familiar with the national strategies and their respective targets. The experts familiar with the global Strategic Plan referred to several ways in which the Aichi Targets influenced national biodiversity governance in practice. Based on an inductive analysis of interviews across all countries, we divide these perceived roles into four main categories: raising awareness, mobilizing initiatives for biodiversity, mobilizing support for implementation, and fostering accountability. For each category, we further detail the different aspects most frequently mentioned by the experts interviewed. An overview of the summarized findings by country is provided in Table 3. It is important to note that the absence of markers does not indicate that those aspects do not apply to those countries, but rather that they were not specifically identified by the experts interviewed in this study.

3.1.1. Raising awareness

Due to a perceived lack of knowledge about biodiversity issues across countries, experts discussed various ways the Aichi Targets have served to raise awareness to catalyze action among different stakeholders. Experts in France, Germany, and Indonesia stressed their importance in creating a political mandate for action on biodiversity at the national level. Experts from Mexico and Rwanda commented that the Aichi Targets were helpful as a high-level political commitment that could be used to support national target setting. In Mexico, France, and South Africa, global targets were used by NGOs to lobby for more action on biodiversity in policy-making, for example to change fishing policies in France to meet Aichi Target 6. In Germany, the CBD mobilized The Economics of Ecosystems and Biodiversity (TEEB) process in 2007, a global initiative to mainstream the values of biodiversity and ecosystem services into decision-making at all levels, providing economic arguments for conservation to a broad audience. The Aichi Targets were also used as a reference in education in Mexico and Germany, raising awareness and supporting students' understanding of biodiversity loss and governance.

3.1.2. Mobilizing initiatives for biodiversity

The Aichi Targets were considered important in establishing a mandate and guiding the development of national biodiversity targets in some countries. Experts from almost all countries indicated their value for guiding national biodiversity policies. In Indonesia, they even guided the development of national legislation, for example the regulation on protected plant and wildlife species by the Ministry of Environment and Forestry and the Strategy and Action Plan for Conservation of Rangkong Gading. Experts in Germany stressed the role of the CBD for guiding the legislation of the European Union, for example the Habitat Directive, the Water Framework Directive, and the Common Agricultural Policy. In Mexico, the CBD prompted legislative changes, such as to the Forest Law (Ley General de Desarrollo Forestal Sustentable), especially after Mexico hosted COP 13. Mexico's leadership for COP 13 also mobilized the establishment of the first center on biodiversity mainstreaming in the Ministry of Agriculture (SAGARPA).

The Aichi Targets mobilized action to protect biodiversity in Rwanda and South Africa, and motivated the involvement of the private sector in France, Mexico, and Germany. Experts in Rwanda referred to

governmental action (for example, restoration measures in the Nyandungu Eco-park and sustainable practices in agricultural land to meet Aichi Target 7) and to activities undertaken by civil society organizations (for example, the conservation of freshwater and mountain biodiversity). In France, the Aichi Targets were used to structure discussions and actions and to evaluate supply chains, particularly on the implications of the Nagoya Protocol for the private sector. The government has also used the CBD as a justification to push for the incorporation of biodiversity considerations in trade agreements. The Mexican Alliance for Business and Biodiversity (AMEBIN) and the German Business for Biodiversity (UBi) were established to promote dialogue and actions between the private sector and civil society organizations to contribute to biodiversity conservation, sustainable use, and restoration. The Aichi Targets were also used to advocate for the expansion and strengthened governance of protection of areas. In South Africa, they were used in the development of the National Protected Area Expansion Strategy and for the Phakisa strategy, which focuses on unlocking the economic potential of South Africa's oceans.

3.1.3. Mobilizing support for implementation

The Aichi Targets supported national implementation processes through the mobilization of resources by fostering collaboration and providing legitimization to activities related to biodiversity. Experts in several countries perceived the Aichi Targets as having played an important role in mobilizing financial resources and informing budget spending. More specifically, they were mentioned as useful for legitimizing and mobilizing funds for NGOs in Mexico, Peru, and South Africa, and for scientific research projects in Rwanda, Peru, and France. The Aichi Targets informed the development of the Rwanda Green Fund and the creation of new funding schemes through BIOFIN in Indonesia (for example, the Green Sukuk or Islamic bond, a faith-based, ecological financial instrument). In South Africa, a governmental officer claimed that the Aichi Targets informed budget spending at the municipal level. Furthermore, the Aichi Targets were perceived to foster collaboration (for example, between NGOs and academia) and the formation of NGO networks (for example, the CBD Alliance) in Peru and Germany, and to provide legitimacy to biodiversity related activities of various institutions in France, such as ministries and agencies within the national government, development agencies, and the research sector.

3.1.4. Fostering accountability

In some countries, the Aichi Targets were considered important for fostering accountability, in particular by enhancing national data collection and reporting on biodiversity. In Indonesia, experts referred to the establishment of mechanisms for monitoring, evaluation, and reporting (i.e., national reports), and for a biodiversity clearing house designed to share information on scientific results, management, and policy aspects associated with biodiversity. In Rwanda, the Aichi Targets were perceived as helpful to assess progress in implementation and to develop tools and monitoring metrics. In Mexico, experts pointed to the relevance of the CBD mandate to write national reports, and discussed that it has been useful for keeping track of how different stakeholders' work contributes to targets, to assess progress in implementation, and to

Table 3

Summary of the perceived roles of the Aichi Targets at the national level in practice, according to at least one of the experts interviewed in the marked countries, respectively. Marked cells indicate that a certain aspect was mentioned by interviewed experts in the correspondent country.

Perceived role of the CBD Aichi Biodiversity Targets at the national level in practice										
Categories	Aspects mentioned	FRA	GER	HND	IDN	MEX	PER	RWA	ZAF	
Raising awareness	Political mandate for biodiversity									
	Increased high-level political commitment									
	Reference to lobby for biodiversity protection									
	Reference for education									
Mobilizing initiatives for biodiversity	Guidance for national biodiversity targets									
	Guidance for biodiversity policies									
	Guidance for conservation activities									
	Mobilization of private sector initiatives									
Mobilizing support for implementation	Mobilization of financial resources									
	Foster collaboration									
	Legitimize activities related to biodiversity									
Fostering accountability	Reporting									
	Data collection									

help with transparency regarding the disclosure of data. Similarly, the Aichi Targets were used by a Peruvian NGO to guide its reports.

3.2. Perceived role of NBSAPs for national biodiversity governance in practice

Experts discussed many ways in which NBSAPs contribute to national biodiversity governance in practice. We provide an overview of these findings in Table 4, structured according to the categories described in Section 3.1.

3.2.1. Raising awareness

Experts discussed different ways in which NBSAPs contributed to the visibility of the problem of biodiversity loss for different stakeholders. France’s strategy was considered to be useful for raising awareness within companies. In Rwanda and Indonesia, the strategies were considered useful to raise awareness among communities on biodiversity conservation. In Rwanda, the strategy was used by NGOs as a reference in policy briefs to influence policy-making and to mobilize discussions on biodiversity issues with different stakeholders. The Peruvian strategy was perceived to give other sectors new directions and a vision beyond resource extraction (for example, the new directorate of climate change and biodiversity of fisheries and aquaculture in the

Table 4

Overview of the perceived role of NBSAPs for national policy and implementation and shows their relevance according to four major categories. Marked cells indicate that a certain aspect was mentioned by at least one of the experts in the correspondent country.

Perceived role of NBSAPs for national biodiversity governance in practice										
Categories	Aspects mentioned	FRA	GER	HND	IDN	MEX	PER	RWA	ZAF	
Raising awareness	Raise awareness in the private sector									
	Raise awareness among communities									
	Promote dialogue									
	Provide a vision for other sectors									
	Reference for education									
Mobilizing initiatives for biodiversity	Guide national biodiversity policies									
	Advocacy tool in parliament									
	Guidance for conservation activities									
	Guidance for other sectors									
	Reference for NGOs									
Mobilizing support for implementation	Mobilization of financial resources									
	Guide budget spending									
	Staff and capacity building									
	Foster collaboration									
	Legitimacy for projects and activities									
Fostering accountability	Accountability reports									
	Mobilizing data collection									

Ministry of Production). NBSAPs were used as a reference for education in Honduras, Indonesia, and Germany.

3.2.2. Mobilizing initiatives for biodiversity

In France and Peru, NBSAPs were explicitly mentioned to have guided national policies. Experts in France referred specifically to the Biodiversity Law¹ in 2016 (which includes measures directly impacting specific sectors, such as the banning of neonicotinoid pesticides in the agricultural sector) and its mandate for the establishment of the French Biodiversity Agency. The French strategy was useful for establishing new principles in the Environmental Code and Civil Code, including the “no net loss of biodiversity” objective.

NBSAPs were also used to advocate for biodiversity conservation. In Germany, for example, the NBSAP was used in political debates for the 2% wilderness target and the 5% natural forest development target. In South Africa, it was used as an advocacy tool in parliamentary hearings when facing conflicting goals, for example in hearings related to mining rights in protected areas.

Moreover, NBSAPs were perceived to guide activities related to biodiversity, even in sectors beyond conservation. For example, the German strategy guided the strong landscape criteria for organic farming; the Peruvian strategy guided activities in the agriculture and forestry sectors through the Ministry of Agricultural Development and Irrigation (MINAGRI) and the National Forestry and Wildlife Service (SERFOR); and in Indonesia, the strategy guided cross-sectoral development plans, increasing the role of non-environmental ministries, such as the Ministry of Agriculture. Experts referred to several activities related to biodiversity that were mobilized by NBSAPs, including governmental activities, private initiatives, and the activities of NGOs. In Rwanda, for example, the strategy informed the regeneration of threatened species and best practices for pollinators, and it motivated the restoration of degraded forests with indigenous species and the establishment of ecological corridors (Gazetting Gishwati Mukura National Park). In Peru, it informed the master plans of protected areas and the integration of aspects relevant for biodiversity in landscape approaches.

3.2.3. Mobilizing support for implementation

Experts discussed the role of NBSAPs for mobilizing financial resources, staff and collaboration, and for legitimizing activities related to biodiversity. Experts in Honduras, Indonesia, and Germany referred to the mobilization of varied financial resources (for example, donations to non-profit organizations in Indonesia and national expenditure in Germany, such as for its insect protection program). In Rwanda, the NBSAP guided the selection of funded projects on climate resilience and environmental protection. NBSAPs contributed to the mobilization of governmental staff in France, the enhancement of capacity-building processes in Peru, and the establishment of collaborations in Indonesia (for example, between government and non-governmental stakeholders at national and sub-national levels). The NBSAPs’ role in providing legitimacy to projects and activities, particularly in the environmental ministries, was mentioned in France, Germany, Mexico, and Peru.

3.2.4. Fostering accountability

In some countries, NBSAPs were perceived to enable the assessment of implementation progress and accountability. In Germany, the NBSAP provided a standardized structure for the biennial accountability reports. In Rwanda, the NBSAP was perceived as useful to engage stakeholders and mobilize biodiversity data; the Centre of Excellence in Biodiversity and Natural Resources Management collaborated with the Ministry of Environment and NGOs to initiate a biodiversity information

management framework that established the “Rwanda Biodiversity Information System”, a platform that records biodiversity data in Rwanda. In Indonesia, the NBSAP contributed to the compilation of data. NBSAP processes have also led key institutions to update the country’s biodiversity status and to develop the Indonesian National Biodiversity Information System (INABIF).

3.3. Perceived challenges to implementation

Experts discussed a variety of challenges to effective national implementation of NBSAPs in their respective countries. We summarize these findings in Table 5, according to the same categories identified in Section 3.1, and discuss each in detail below.

3.3.1. Raising awareness

Several experts perceived national strategies as documents only written as a requirement for compliance with the CBD. Experts in most countries perceived a missing awareness of NBSAPs as planning and mainstreaming tools, especially at the local level. Similarly, experts in Peru referred to a limited use of the Aichi Targets, implying a limited reach of national or international targets at the local level. Experts in Rwanda noted that many stakeholders even within the conservation sector are not aware of the NBSAP, referring specifically to public servants, and especially to local authorities. They also pointed to the need to raise awareness among farming communities to ensure that biodiversity challenges are well understood, and to increase their knowledge on strategies to conserve biodiversity in agricultural landscapes. Experts discussed that NBSAPs fail to effectively target different segments of society. In Mexico, many perceived the strategy to mainly be used by people working on biodiversity conservation. In France, the strategy was claimed not to be clear enough for businesses, and “not precise enough to influence some government actors’ work”.

The lack of environmental awareness and education were perceived as a major challenge for implementation in all countries except Germany. In Germany, experts referred to a focus on profit maximization and to increasing alienation from nature. A lack of awareness of the economic value of biodiversity was specifically mentioned in South Africa. Short-term thinking was mentioned in Mexico as a major obstacle for biodiversity conservation, particularly in sectors such as fisheries and farming, where the loss of biodiversity is a threat to productivity and resilience in the long run. Experts referred to a lack of interest from government officials in Honduras. Stakeholders working in the private sector in France either did not perceive the relevance of biodiversity to their corporate activities or expressed difficulties in convincing colleagues within the company of the benefits of taking corporate action to preserve biodiversity. In Rwanda, experts mentioned the lack of awareness, specifically among farming communities and financial actors, as a major driver of biodiversity loss.

3.3.2. Mobilizing initiatives for biodiversity

Implementation is perceived to be hindered by the presence of conflicting interests in all countries, with opposition to stronger action from both the public and private sectors. In South Africa, experts mentioned a perception that the environmental sector was stifling development and referred to a strong “pro-environment” versus “pro-development” divide. In France, experts noted the risk of “making many enemies” by working on biodiversity policies.

Experts across all countries discussed specific sectors which play a strong role in driving biodiversity loss and opposing stronger implementation. The agricultural sector was highlighted as a main driver of biodiversity loss in all countries. Experts from France, Germany, Honduras, Mexico, and Rwanda referred to actors in the agricultural sector as a major force of political opposition against biodiversity conservation. Further sectors perceived as an opposing force to biodiversity conservation were the mining sector in Peru, Indonesia, Mexico, and South Africa; the forestry sector, transport, and tourism in Germany;

¹ “Loi n° 2016-1087 du 8 août 2016 pour la reconquête de la biodiversité, de la nature et des paysages” (See <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000033016237>).

Table 5

Overview of the perceived challenges to the implementation of NBSAPs according to four major categories. Marked cells indicate that a certain aspect was mentioned by at least one of the experts in the correspondent country.

Perceived challenges to implementation		FRA	GER	HND	IDN	MEX	PER	RWA	ZAF
Raising awareness	Societal awareness								
	Visibility of the strategy								
	Targeting different segments of society								
Mobilizing initiatives for biodiversity	Conflicting interests								
	Cross-sectoral commitment								
	Guidance for local implementation								
	Ownership at all levels of implementation								
Mobilizing support for implementation	Financial resources								
	Enforcement of regulations								
	Staff and capacity building								
	Coordination with sub-national levels								
	Inter-ministerial coordination								
Fostering accountability	Responsibilities								
	Monitoring								
	Data availability and use								

fisheries in Mexico and France; and resource extraction in general in Rwanda and South Africa. Land-use conflicts were perceived to challenge implementation in France, Germany, Peru, Rwanda, and Indonesia. Experts in Germany referred to land use conflicts related to the production of wind power, the re-dynamization of rivers, infrastructure projects, and rewetting of agricultural land. Sustainable land use was claimed to come at a high political cost in Mexico. Many biodiversity conservation initiatives in France were perceived to yield only marginal results because the majority do not address the main drivers of loss, in particular intensive agriculture.

Mainstreaming was perceived as a major challenge, especially due to a lack of cross-sectoral commitment and a strong opposition of groups with conflicting interests. Experts from Mexico and France pointed to a lack of political prioritization of biodiversity. A regional governmental official in Peru commented: “*We can develop another [NBSAP] document, but implementation depends on the commitment of all sectors. We have to demonstrate that the strategy matters*”. The conservation sector was explicitly labeled as “siloeed” or separate from other policy areas in Mexico, France, Germany, and South Africa. In France, perspectives from the private sector showed that “*many businesses do not use the NBSAP to structure their activities, but rather to tick boxes retroactively for corporate reporting, except when targets are translated into specific regulations*”.

Experts across most countries argued that, without the definition of concrete measures, NBSAPs cannot serve as guidance for biodiversity conservation at the local level. Experts in Mexico pointed to the need to “*land [the strategy] on the ground*”. Experts in Peru, Rwanda, Honduras, and France specifically mentioned that NBSAPs cannot be helpful for planning local activities, strategic processes, technical management nor strategic implementation, unless they have realistic targets attached to concrete implementation measures. Experts stressed the importance of fostering coordination with sub-national levels. The strategies in France, Peru, and Indonesia were specifically labeled as ineffective in integrating all levels of governance and inducing ownership at different levels of implementation.

3.3.3. Mobilizing support for implementation

Experts considered that implementation is hindered by challenges in mobilizing financial resources in all countries except Germany. Specifically, experts discussed limited financial resources for restoration, agroforestry, and capacity building in Rwanda; limited financial

resources for capacity training at the governmental level in Honduras and Peru; inadequate availability of public funds, especially for local communities, in Indonesia and South Africa; budget cuts in public spending in Mexico and South Africa; missing corporate budgets for the implementation of the strategy in the private sector in South Africa; and a lack of sufficient funds for research on biodiversity in France. An expert on biodiversity financing in Mexico considered that national strategies are only “*good wishes*” since experts designing the strategies “*don’t think about how much the identified priorities are going to cost and what kinds of stakeholders [will be needed] to actually do it*.” Representatives from South African NGOs and the environmental ministry echoed this concern. Experts across countries referred to a need to increase both public and private expenditure on biodiversity. The importance of ensuring continuity through long-term financing was specifically mentioned in Peru.

The weak enforcement of existing regulations was a further aspect mentioned in several countries. Experts in most countries also referred to a lack of staff and capacity building. In Mexico, representatives from NGOs specifically referred to the difficulty of remaining up to date on CBD processes due to limited staff. In Rwanda, experts discussed both missing technical capacity and technical staff, for example at the Rwanda Environment Management Authority (REMA). Experts in Rwanda also mentioned the lack of skilled people for implementation at the local level, for example public officers and technicians.

Lastly, support for implementation was hindered by insufficient coordination structures and the presence of policy incoherence at multiple levels. The lack of coordination and collaboration between national and local levels was mentioned in Honduras, Rwanda, and France. In Rwanda, the strategy was mentioned not to be mainstreamed in different sectors, resulting in a lack of coordinated planning. In most countries, missing inter-ministerial coordination and collaboration structures were specifically mentioned to hinder policy harmonization. Experts pointed to contradictions in activities and policies in all countries, for example to the presence of strong policy incentives encouraging practices which threaten biodiversity, notably in the agricultural sector. In Germany, experts referred specifically to the Common Agricultural Policy of the European Union, highlighting weak environmental requirements and payment schemes that support practices with negative impacts on biodiversity. Similarly, harmful subsidies are in place in South Africa, where experts explained that such agricultural subsidies are justified by a narrative of poverty alleviation. In Rwanda, experts

referred to contradictory policies incentivizing an increase in land use for agriculture and mining on the one hand, alongside the introduction of Payments for Ecosystem Services on the other. In Mexico, harmful subsidies were mentioned as a notable example of how the crisis of funding for biodiversity is a question of allocation rather than availability of funds.

3.3.4. *Fostering accountability*

Experts in all countries aside from France discussed the lack of clear roles and responsibilities for biodiversity policy implementation. A governmental officer in Peru noted: “The deforestation rate and biodiversity loss are increasing because there is no clarity about who is responsible for stopping it”. In Mexico, the NBSAP was labeled as a governmental strategy that does not foster co-responsibility of productive sectors, and responsibility for biodiversity was mentioned to be dispersed across different federal ministries. Experts in Honduras and Rwanda referred to the challenge of aligning responsibilities; ineffective accountability was claimed in Rwanda as a result of scattered biodiversity conservation responsibilities across different institutions, for example the Centre of Excellence in Biodiversity and Natural Resources Management and REMA. In Germany and Indonesia, experts referred to the need to designate responsibilities and coordinate implementation across political sectors and political levels.

Among the challenges related to monitoring biodiversity, experts mentioned a lack of indicators, baseline statistics on the prior status of ecosystems, and reporting systems in Mexico, as well as a lack of access to governmental monitoring data. Academics in South Africa expressed concern regarding a lack of monitoring of climate change impacts on biodiversity, and referred to a lack of clarity on different authorities’ roles in producing and managing data. In Indonesia, experts referred to conflicts between responsible agencies on how to calculate indicators for NBSAP targets, as well as to problems in accessing data: “The challenge is that data is everywhere, the availability of data becomes information that should be accommodated in a clearing mechanism”.

3.4. *Perceived priorities to be addressed by future NBSAPs*

Experts referred to several aspects that they considered essential to prioritize in future NBSAPs. We provide an overview of these findings in Table 6, structured according to the categories identified in Section 3.1. More detail is provided below.

3.4.1. *Raising awareness*

The need for more education on biodiversity issues was mentioned in all countries. In Indonesia, experts suggested building public awareness through conservation campaigns targeting unsustainable consumption patterns and showing that protecting ecosystems is something to be proud of. Experts in France referred to the importance of engaging the public and increasing public support for policy action, for example through high level political speeches about the importance of biodiversity and by communicating flagship initiatives and projects to show success in addressing key issues. Experts in different countries stressed the need to change development paradigms and narratives and to raise awareness by making the contributions of biodiversity visible to society. An expert from Honduras referred to the need to change dominant culture from a consumerist model to one in harmony with conservation. Mexican experts pointed to the need to shift public focus more on quality of life than on economic growth, for example through big educational campaigns. Experts from South Africa pointed to the need to improve science communication in a way that makes information comprehensible and useful for policymakers.

3.4.2. *Mobilizing initiatives for biodiversity*

Several experts in all countries referred to mainstreaming as a key priority to be addressed. They stressed the need for collaboration with different sectors, particularly agriculture and finance, as well as synergistic policies, for example for sustainable agri-food systems and trade policies. Experts in Mexico and South Africa explicitly mentioned the importance of mobilizing the private sector, in particular the “big players”, such as companies in the banking sector and the extractive industry, who are not numerous but whose activities have a large impact on biodiversity.

Experts emphasized that a higher prioritization of biodiversity conservation on political agendas is necessary for future NBSAPs to mobilize action beyond the environmental sector. In order to enable this, Mexican experts called for strong legal frameworks with long-term commitments beyond election periods, and expressed the need to mainstream biodiversity-related actions into overarching governmental strategies, for example national development plans. They referred, moreover, to the need to assess the long-term effectiveness and cross-sectoral effects of policies for both biodiversity and the economy, linking policy planning and budgeting.

Experts from several countries stressed that linking targets to specific implementation measures and developing incentives for the conservation of biodiversity in different policy fields are key priorities to be

Table 6
Overview of the perceived priorities to be addressed by future NBSAPs, according to at least one of the experts from the countries marked.

Perceived priorities to be addressed by future NBSAPs									
Categories	Aspects mentioned	FRA	GER	HND	IDN	MEX	PER	RWA	ZAF
Raising awareness	Education on biodiversity	■							
	Communicating contribution of biodiversity	■							
	Changing narratives			■					
Mobilizing initiatives for biodiversity	Biodiversity targets in sectoral strategies	■							
	Private sector engagement					■			■
	Establishing legal framework					■			
	Incentivizing biodiversity conservation	■				■			
	Reforming harmful subsidies					■			
	Addressing trade-offs	■							
Mobilizing support for implementation	Stakeholder collaboration and coordination	■	■		■	■	■	■	■
	Providing adequate funding	■		■			■	■	■
Fostering accountability	Accountability structures	■		■		■			
	Sanction mechanisms				■	■			
	Improving monitoring	■						■	

addressed. In Peru, experts specifically referred to the reduction of taxes for sustainable land use practices. Experts from Mexico and France mentioned the need to reform harmful sectoral subsidies and to redirect public financing towards sustainable practices. In the case of France, a full assessment of harmful public subsidies was conducted in 2019, but the identified subsidies and taxes have not been subsequently reformed (Sainteny et al., 2011). French interviewees stressed the importance of addressing the trade-offs between biodiversity conservation and economic development.

3.4.3. Mobilizing support for implementation

Enhancing collaboration structures at different levels was perceived as a key priority in most countries. Experts discussed, for example, the need to increase coordination between different levels of governance, in particular between national and regional agencies in France. In Indonesia, experts referred to the need to improve coordination between agencies (for example, LIPI, BAPPENAS, and the Ministry of Environment and Forestry). The need to increase the effectiveness of inter-ministerial coordination was explicitly mentioned in Mexico. In South Africa, experts stressed the need to engage and collaborate with the private sector. A further aspect highlighted by several experts across countries is the importance of providing adequate capacities for implementation. Among the examples mentioned are the need for appropriate budgets for national and subnational governments to carry out protected area strategies in South Africa, funding for ecosystem restoration in France, and staff to protect forests in Indonesia.

3.4.4. Fostering accountability

Monitoring progress and fostering accountability were discussed by experts in several countries, but were less often addressed than other priorities discussed above. French experts perceived the establishment of accountability structures as a key priority to be addressed by the future NBSAP. They suggested that accountability could be enhanced by assigning responsibilities to specific actors, developing indicators for consistent reporting, and having clear objectives to hold governments accountable, as well as establishing review periods to maintain momentum (for example, adopting an accountability framework similar to NDCs). Experts in Honduras also referred to the need to hold different stakeholders responsible for the conservation of biodiversity. In Indonesia and Mexico, experts referred to the establishment and implementation of sanctioning mechanisms as key priorities to be addressed in future NBSAPs, such as legal consequences for the destruction of nature or for failing to protect biodiversity. Experts from Rwanda pointed to the potential to improve monitoring through the development of new tools to collect and manage biodiversity data.

4. Discussion

Based on the experiences of national experts from eight countries, we can attest to the strong potential of global agendas, NBSAPs, and complementary national processes to identify, integrate and support national implementation of biodiversity policies. Our study analyzes the practical value of global and national targets for national biodiversity governance, challenges to implementation of biodiversity policies, and the key priorities to be addressed by future NBSAPs. In this section, we discuss key elements for fostering mainstreaming and linking global agendas to stronger national implementation by leveraging NBSAPs as central policy instruments for biodiversity governance.

4.1. Harnessing the potential of global targets for national biodiversity governance

Our interviews with national experts across a range of countries in the Global North and Global South demonstrate that the Aichi Targets have influenced national biodiversity governance in several ways. Firstly, they have raised awareness on the importance of biodiversity

and generated a political mandate for biodiversity governance, mostly within environmental sectors. Our results align with work showing that, while the biodiversity regime complex ensures that biodiversity is “on the menu” of the national policy agenda, biodiversity might not be sufficiently prioritized in light of items with higher political priority and support (Smallwood et al., 2022). Similarly to evaluations on the impact of the Sustainable Development Goals (SDGs) (Biermann et al., 2022), there is a risk that biodiversity is added as an additional agenda item without penetrating institutional routines, nor being coherently integrated into thematic political agendas.

Secondly, experts perceived that the Aichi Targets were taken up by different stakeholders to justify and guide initiatives to protect biodiversity. They discussed how the Aichi Targets were used to guide the development of NBSAPs, public policies, and certain activities within governments, civil society, and the private sector. At the same time, the targets were not considered to have high relevance for sectors outside of conservation at the national level, and less so for sub-national levels. Despite attempts to coordinate and integrate biodiversity in other multilateral agreements and international policy agendas (such as, for example, in the SDGs), national biodiversity policy does not have the visibility and institutional strength to challenge dominant development paradigms linked to indirect drivers of biodiversity loss (Smallwood et al., 2022). There is doubt regarding the transformative potential of global biodiversity targets, if they are not complemented with an inclusive and proactive approach to engage stakeholders and to overcome potential resistance (Bulkeley et al., 2020). Weak collaboration between national experts working on CBD issues and those working on implementation appears as a key issue to be addressed.

Thirdly, the Aichi Targets were perceived to mobilize multi-stakeholder collaboration and resource mobilization, as well as to provide legitimacy for activities and institutions related to biodiversity. In this sense, ties between the GBF and public and private commitments could unleash new innovative efforts for implementation (Pattberg et al., 2019). Finally, the Aichi Targets were perceived to be very relevant in some countries for enhancing evaluation processes and increasing their transparency. Complementing efforts to protect biodiversity with appropriate indicators and accountability frameworks (Campbell and Gray, 2019; Lemieux et al., 2019) is necessary to ensure their effectiveness, as experiences with targets on expanding protected areas show (for example, Aichi Target 11 or SDG 14.5).

4.2. Harnessing the potential of NBSAPs to strengthen mainstreaming and to address challenges in implementation

As NBSAPs are intended to be the tool that translates global targets into the social and political context of Parties to the CBD, it is not surprising that their existence and content were more familiar to national experts than the Aichi Targets. Analyzing experiences with NBSAPs and national biodiversity governance, we identified a number of leverage points to harness their potential for fostering mainstreaming and further supporting implementation.

4.2.1. Raising awareness

Raising awareness and strengthening the political mandate for biodiversity is still undermined by a low perceived importance of biodiversity in non-environmental sectors. Experts pointed to education as key to increasing awareness across society. Akindele et al., ‘s 2021 study on Nigeria demonstrates this trend at the national level: there is low public awareness of the NBSAP and a need to step up campaigns and education on biodiversity conservation (Akindele et al., 2021).

Our results indicate that once developed, NBSAPs do not have sufficient visibility within institutions involved in biodiversity conservation nor receive sufficient attention from policymakers. The recognition of biodiversity loss as a cross-cutting problem determines the potential to mainstream biodiversity, and to promote integration in policymaking and implementation across different sectors and levels (Candel and

Biesbroek, 2016). Literature on biodiversity policy implementation shows that incorporating different political stakeholders, interest groups, and local actors necessitates considering different value systems, needs, rights, perspectives, and knowledge systems to enable successful policy integration and to induce ownership (Sarkki et al., 2015; Karlsson-Vinkhuyzen et al., 2018; Persson and Runhaar, 2018). As a barrier to this engagement, current political visions and decision-making processes are dominated by non-sustainable visions of growth and expansion, downplaying values and views aligning with biodiversity targets (IPBES, 2022). The transformative potential of NBSAPs is tied to their ability to reflect multiple stakeholder views and perceptions, supporting a plurality of possible implementation pathways (Zinngrebe et al., 2022). In contrast, our findings indicate that the communication and wording of NBSAPs are not necessarily effective in reaching different target groups beyond the conservation community. Thus, a targeted communication of the strategy is key for NBSAPs to foster mainstreaming.

4.2.2. Mobilizing initiatives for biodiversity

NBSAPs have the potential to guide biodiversity activities in both governmental policies and private sector initiatives. Nevertheless, experts consider the low level of mainstreaming to be explained by a low political prioritization and an insufficient legal mandate in policies that regulate direct and indirect drivers of biodiversity in key sectors, such as mining, agriculture, and fisheries. Hence, general aspirational targets and commitments are not reflected in institutional settings and show a low level of enforcement. The missing integration between NBSAPs and sectoral policies becomes apparent as both fail to explicitly reference each other. As such, very few NBSAPs explicitly address economic activities and potential trade-offs between, for instance, agriculture and conservation (Whitehorn et al., 2019). At the same time, agricultural agendas do not cross-reference NBSAPs (Pe'er et al., 2019; Zinngrebe, 2018). Experts explicitly referred to conflicting interest groups reinforcing this political fragmentation, and pointed to a need to develop legal frameworks and integrated agendas that identify and incentivize biodiversity-sound practices. In order to facilitate implementation, operationalization must consider the suitability between measures and organizational routines (Runhaar, 2016; Zinngrebe, 2018) and link to concrete implementation measures and defined responsibilities. Experts in several countries perceived that NBSAPs need to provide more specific guidance on how to address country-specific drivers, resulting trade-offs of potential pathways, and opportunities for sustainable innovation at all levels.

Mainstreaming through NBSAP processes can be strengthened through the inclusion of relevant sectors (for example, agriculture, fishery, forestry, and finance) in the process of co-creating a joint vision for biodiversity conservation and its sustainable use. The political impact of this pluralist participation and joint effort depends, however, on the extent to which these negotiated visions and targets are translated into binding responsibilities and incorporated into sectoral strategies (Barbut et al., 2020; Zinngrebe, 2018). Securing high-level political ownership and commitment across sectors in the NBSAP process requires additional negotiation efforts, but has the potential to increase effectiveness in mainstreaming and addressing drivers of biodiversity loss (Pisupati and Prip, 2015). Furthermore, the relevance of NBSAPs can be institutionalized by stipulating requirements to reference them, for example in sectoral planning, implementation processes, and project proposals.

4.2.3. Mobilizing support for implementation

Interviewed experts perceived NBSAPs as an important argument to justify mobilization of resources and staff, to enhance capacity building, and to legitimize activities. Financial limitations in public budgets, the short-term availability of financing, and the lack of corporate investments were, however, perceived as challenges to implementation. This complements findings by Prip and Pisupati (2018), who argue that

most NBSAPs lack resource mobilization strategies. Experts also referred to perverse financial incentives which support activities driving biodiversity loss in different sectors, such as, notably, in the agricultural sector, forestry, and urban development (Colsaet et al., 2018; IPBES, 2019). Experts discussed the underlying social concerns, such as food security and poverty alleviation, driving these subsidies which do not consider potential secondary effects on biodiversity. Several experts emphasized the need for the joint consideration of biodiversity and other social goals, as biodiversity conservation has been shown to have numerous synergies with health and the reduction of poverty and inequalities (CBD, 2016b; IPBES, 2019; IPBES, 2020). The importance of reforming current incentives harming biodiversity was mentioned in most countries. New research estimates that 1.8 trillion USD per year is spent globally in subsidies contributing to water pollution, climate change, biodiversity loss, and land degradation (Koplow and Steenblik, 2022), and OECD countries provided \$100 billion in direct and indirect harmful subsidies to the agricultural sector alone (OECD, 2019). Redirecting public funds through the reform of harmful subsidies and tax incentives will be key to enabling implementation. An evaluation process in financial planning procedures would ensure that public spending is redirected and aligned with the targets and measures defined in parties' NBSAPs.

The extent to which NBSAPs mobilize agency for implementation depends on collaborative structures and the perceived ownership of actors. Interviewees referred to missing coordination structures between ministries to ensure policy coherence, as well as missing coordination and collaboration structures between national and sub-national levels. Analyses of actor networks in the governance of agricultural landscapes have shown that interactions and collaborative arrangements are organized in institutional settings that favor non-sustainable land use (Zinngrebe et al., 2022). Effective mainstreaming will require reconfiguring these collaborative settings (Persson and Runhaar, 2018) and positioning NBSAPs in sectoral and sub-national action plans (Prip and Pisupati, 2018). Moreover, experts also referred to the unused potential of engaging the financial sector and businesses, notably in countries where engagement with the private sector has been limited. Earlier interview-based research focusing on national delegates and representatives from NGOs points to the potential of NBSAPs to create linkages across relevant decision makers within a country to enhance the transformation of domestic political relationships (Adenle et al., 2015). Through our interviews, we further identify the facilitation of knowledge, the establishment of collaborative structures with regional and local agents, and more proactive communication as levers for more effective implementation.

4.2.4. Fostering accountability

Our results demonstrate how NBSAPs play a role in fostering accountability, for example by enhancing the compilation of biodiversity data and by serving as a framework for accountability reports. In the light of complex challenges and uncertainty, effective governance must be adaptive and respond to a continuous reflection, evaluation, and learning process (Wittmer et al., 2021). In the context of sensitive evaluation and planning processes, such as environmental impact assessments, project monitoring, or land use planning, NBSAPs could serve as a powerful reference for providing monitoring data and target values (Zinngrebe, 2018). In our analyzed cases, however, experts point to insufficient monitoring as well as difficulties with the accessibility of data. Furthermore, ensuring continuity and including follow-up processes was considered necessary for effective implementation. Thus, the centralized and easily accessible provision of data as well as continuous participatory reflections of evaluations can serve as an important reference for actors and is strongly linked to accountability frameworks.

Interviewed experts believe that NBSAPs' monitoring, information disclosure, and participatory evaluation can have a significant contribution to accountability, however, this potential is not sufficiently harnessed. Assigning and assuming responsibilities for implementation

and inducing leadership to adjust sectoral policies in light of biodiversity targets are key challenges for mainstreaming that have also been identified by single case study analyses (Sarkki et al., 2015; Zimngrebe, 2018). While NBSAP processes have delegated certain responsibilities to relevant policy sectors, these are often not enacted or compete with perceived accountabilities to the sectors and interests they represent. This results in “responsibility gaps” and uncertainty in actors’ roles in governance settings, pointing to the need to assign and clarify responsibilities across sectors and levels to foster implementation (Sarkki et al., 2015). A review on accountability argues that information disclosure and monitoring can help to assign responsibilities, but cannot enact them without complementary institutional structures (Mason, 2020; Weidner and Jänicke, 2002). A comparison of different countries showed that assigning responsibilities beyond the environmental sector is helpful to challenge established institutional routines (Coffey et al., 2022). Xu et al. (2021) recommend establishing reviewing mechanisms even for voluntary commitments from different non-state actors, such that their contribution to biodiversity targets can be followed. This aligns with our observations that clear accountability frameworks beyond the environmental sector can help generate commitment for biodiversity.

4.3. Limitations and outlook

Our results are not intended to provide a representative sample to assess the level of mainstreaming in the eight countries. Instead, we apply an exploratory approach to reflect the perceived role of the Aichi Targets and NBSAPs in practice in different countries. The purpose of this study was to identify related challenges and leverage points. Our discussion of specific issues in a given country and its absence in another does not mean that this issue is necessarily absent from the latter; but

rather that it was not mentioned by the sample of experts interviewed. While our study offers a synthesis of available knowledge on national implementation that can be reflected in NBSAP processes, further research and reflection on country-specific implications is necessary to operationalize these levers and exploit the potential of NBSAPs.

5. Conclusion and policy recommendations

Our results reflect the views of experts from eight countries from the Global North and the Global South, who see both potential for and elementary barriers to the effective implementation of National Biodiversity Strategies and Action Plans (NBSAPs), the main instruments to mainstream biodiversity at the national level. Based on 179 interviews conducted between 2018 and 2021 in France, Germany, Honduras, Indonesia, Mexico, Peru, Rwanda, and South Africa, we identified four categories of the perceived contributions of global and national goals and strategies to national biodiversity governance in practice, and reported perceived potentials and challenges that align with findings in earlier studies and evaluations. Table 7 summarizes our findings and provides policy recommendations, which present powerful leverage points to strengthen mainstreaming through an effective implementation of NBSAPs to avoid another failure of meeting global biodiversity targets.

Overall, the 2011–2020 Strategic Plan for Biodiversity with its Aichi Targets was relevant for generating awareness and a political mandate for biodiversity at the national level, but lacked a high level of relevance for actors beyond the environmental sector, and particularly for actors at sub-national levels. The global Aichi Targets were mainly used by environmental ministries and advocacy groups to guide national targets and policies, legitimize activities related to biodiversity, mobilize resources, foster collaboration, and enhance monitoring. In light of the

Table 7

Overview of the perceived role of global and national targets for national biodiversity governance, identified potential of NBSAPs, and policy recommendations by the authors to strengthen their role in mainstreaming biodiversity.

Policy recommendations to strengthen mainstreaming and address challenges in implementation				
	Perceived role of the Aichi Targets	Perceived role of NBSAPs	Potential of NBSAPs	Policy recommendations by the authors
Raising awareness	Political mandate for biodiversity conservation	National vision for biodiversity conservation	Inclusion of groups and sectors with conflicting interests Increase visibility and usefulness for key groups and sectors	<i>Improve communication of the strategy and targeting</i> <i>Integrate international agenda to facilitate mainstreaming at national and sub-national levels</i>
	Reference document for statements, activities and education	Reference document for statements, activities and education	Reference document for activities beyond the environmental sector	<i>Institutionalize relevance of NBSAP in policy making and implementation processes</i>
Mobilizing initiatives for biodiversity	Guidance for national targets, environmental policies and activities within the environmental and private sector	Guidance for national policies, conservation activities and activities within the private sector and information for processes beyond the environmental sector	Prioritize biodiversity	<i>Securing high-level political ownership and legal commitment across sectors</i> <i>Ensure prioritization of biodiversity through legal framework</i>
			Link targets to concrete measures and address sub-national levels	<i>Integrated agenda with realistic long-term goals, linked to concrete implementation measures and defined responsibilities</i>
			Address incoherence of policies (e.g. harmful subsidies)	<i>Establish inter-ministerial coordination and collaboration mechanisms to ensure policy coherence</i>
Mobilizing support	Mobilization of resources, collaboration and legitimacy for activities and projects	Mobilization of resources, legitimacy for activities and projects	Initiate process to identify and reform public subsidies harmful to biodiversity Capacity building, staff and coordination mechanisms	<i>Redirect public funds through tax incentives and the reform of harmful subsidies</i> <i>Building and harnessing structures for coordination and collaboration across sectors and with sub-national levels</i>
Fostering accountability	Enhance assessment of progress in implementation	Provide framework for evaluation assessment and accountability	Consistent collection and availability of data, accountability structures	<i>Foster accountability structures through assigning and enacting responsibilities</i> <i>Provision of data and continuous participatory reflections of evaluations to enable learning processes</i>

low visibility of the CBD agenda among national implementation bodies, it is important to ensure their involvement in national NBSAP processes to enable an effective national response to global targets. A more integrated international political agenda around the topics of biodiversity, sustainable development, climate change, and other related issues would help countries to mainstream biodiversity without diluting efforts into fragmented silos. National institutions reflect this issue fragmentation at the international level, and struggle with integrating biodiversity implementation processes coherently.

NBSAPs will be central for implementing the new targets under the Kunming-Montreal Global Biodiversity Framework (GBF) (CBD, 2022a). The mechanism of planning, monitoring, reporting, and review is closely designed around the NBSAPs and will support the process of designing and improving national implementation (CBD, 2022b). Existing NBSAPs have been critical for establishing national visions for biodiversity conservation, guiding national biodiversity policies and conservation activities by NGOs and the private sector, mobilizing resources and legitimacy for projects, and providing frameworks for evaluation and accountability.

Lever for harnessing the role of future NBSAPs to strengthen mainstreaming and to achieve the goals and targets of the Kunming-Montreal GBF are: improving inclusive communication; translating targets into concrete measures; defining clear responsibilities; fostering cross-sectoral commitment; strengthening NBSAPs' legal status and/or enshrining specific targets into national laws; ensuring adequate public funding for NBSAP implementation; reforming and redirecting subsidies harmful to biodiversity; ensuring coordination among sectors and levels of governance; and strengthening accountability frameworks. Monitoring biodiversity outcomes and progress on implementation, as well as establishing accountability structures is key to establishing context-specific transformation pathways for achieving global and national targets.

Effective implementation will require a series of coordinated policy processes, high-level political commitment across sectors, and the inclusion of groups and sectors with conflicting interests. NBSAPs can help continue to raise awareness for biodiversity among a variety of stakeholders at different levels if they are complemented by an adequate communication strategy. Their relevance beyond the conservation sector can be increased by linking targets to relevant policies, addressing synergies and trade-offs with economic activities, and by stipulating them as an official reference for all related policy processes. Beyond strengthened awareness, however, biodiversity governance will require engaging with trade-offs between different policy goals and involving sectors in long-term planning procedures to ensure shared commitment and accountability to adopted biodiversity policies.

Our findings synthesize, structure, and expand available knowledge on national implementation. The guidelines for NBSAPs of the Kunming-Montreal GBF (CBD, 2022b, Annex b) emphasize the need for mainstreaming and strengthening NBSAPs in national biodiversity policies. Integrating knowledge on national implementation is key to designing operational targets, guidelines, and evaluation processes. It is now crucial for countries to learn from national experiences, as provided by this and other studies. The documented advances and remaining bottlenecks point to powerful levers to enable transformative biodiversity governance at all levels. Building on knowledge from past experiences will be central to ensuring that last decade's failure to meet global biodiversity targets is not repeated.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.esg.2023.100177>.

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