CLIMATE CHANGE
81/2025

Policy paper

Integrated Approaches to Addressing the Triple Planetary Crisis: Country Best Practices

Lessons learned from Brazil, Colombia, Japan, New Zealand, Panama, Rwanda and Sweden.

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publisher:
German Environment Agency

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Umwelt Bundesamt

CLIMATE CHANGE 81/2025

AA-Forschungsplan of the Federal Foreign Office

Project No. (FKZ) 3724 41 703 0
FB001911/ENG

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Imprint

Publisher
Umweltbundesamt
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Report performed by:
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Pfalzburger Straße 43/44
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Report completed in:
September 2025

Edited by:
Section V 1.1 International Climate Action
Tobias Herzfeld (Fachbegleitung)

DOI:
https://doi.org/10.60810/openumwelt-8106

ISSN 1862-4359

Dessau-Roßlau, December 2025

Abstract: Integrated Approaches to Addressing the Triple Planetary Crisis: Country Best Practices – Lessons learned from Brazil, Colombia, Japan, New Zealand, Panama, Rwanda and Sweden.

Humanity is already exceeding six of nine planetary boundaries, with climate change, biodiversity loss, and pollution driving a systemic triple planetary crisis or a polycrisis. Addressing these interconnected challenges requires integrated, cross-sectoral approaches. This paper analyses national strategies and governance mechanisms in seven diverse countries: (Brazil, Rwanda, Colombia, Sweden, Japan, New Zealand, and Panama) to understand if and how climate, biodiversity, and pollution policies are linked with each other. Using a DPSIR-based analytical framework, the analysis assesses policy integration, institutional coordination, and implementation dynamics across national submissions such as Nationally Determined Contributions (NDCs), National Biodiversity Strategies and Action Plans (NBSAPs), National Adaptation Plans (NAPs), and Biennial Transparency Reports (BTRs). The findings highlight that countries increasingly embed integrated concepts, such as nature-based solutions, circular economy, and ecosystem-based planning, within national strategies, resulting in measurable co-benefits for mitigation, adaptation, and socio-economic resilience. Successful examples include Brazil's coordinated update of its Climate Plan and NBSAP, Rwanda's community-driven restoration, Colombia's interministerial coordination bodies, Sweden's institutionalised cross-sectoral councils, Japan's ecosystem-based disaster risk reduction (Eco-DRR) efforts, New Zealand's Indigenous-led governance models, and Panama's integrated risk-based disaster-management. However, the actual implementation of integrated approaches often remains fragmented, constrained by limited finance, capacity, coordination and monitoring systems. The paper concludes with policy recommendations, highlighting the need to strengthen institutional coordination, close data gaps, expand inclusive governance, and align finance and monitoring mechanisms. Enhanced policy and institutional coherence across climate, biodiversity, and pollution agendas is essential to accelerate systemic transformation toward a more sustainable and resilient future.

Kurzbeschreibung:

Die Menschheit überschreitet sechs von neun planetarischen Grenzen, wobei Klimawandel, Verlust der biologischen Vielfalt und Umweltverschmutzung eine systemische Dreifach- bzw. Polykrise verursachen. Die Bewältigung dieser miteinander verknüpften Herausforderungen erfordert integrierte, sektorübergreifende Ansätze. Der vorliegende Bericht analysiert nationale Strategien und Governance-Mechanismen, welche Klima-, Biodiversitäts- und Umweltpolitik in sieben unterschiedlichen Ländern, inklusive Brasilien, Ruanda, Kolumbien, Schweden, Japan, Neuseeland und Panama, miteinander verknüpfen. Mithilfe eines auf dem DPSIR-Ansatz basierenden Analysemodells werden die politische Integration, institutionelle Koordination und Umsetzungsdynamik anhand nationaler Beiträge, wie den Nationally Determined Contributions (NDCs), den National Biodiversity Strategies and Action Plans (NBSAPs), den National Adaptation Plans (NAPs) und den Biennial Transparency Reports (BTRs) bewertet. Die Ergebnisse zeigen, dass Länder zunehmend integrierte Konzepte wie naturbasierte Lösungen, Kreislaufwirtschaft und ökosystembasiertes Planen in nationale Strategien einbetten, wodurch messbare Synergien für Klimaschutz, Anpassung und sozioökonomische Resilienz entstehen. Erfolgreiche Beispiele sind die koordinierte Aktualisierung des Klimaplans und des NBSAP in Brasilien, gemeinschaftliche Wiederherstellungsinitiativen in Ruanda, interministerielle Koordinierungsgremien in Kolumbien, institutionalisierte sektorübergreifende Räte in Schweden, ökosystembasierte Katastrophenvorsorge (Eco-DRR) in Japan, von Indigenen geführte Governance-Modelle in Neuseeland sowie ein integriertes risikobasiertes

Katastrophenmanagement in Panama. Dennoch bleibt die Umsetzung oft fragmentiert und wird durch begrenzte finanzielle Mittel, Kapazitäten, Koordinierung und Monitoring-Systeme eingeschränkt. Der Bericht schließt mit politischen Empfehlungen zur Stärkung der institutionellen Koordinierung, zur Schließung von Datenlücken, zum Ausbau einer inklusiven Governance und zur Angleichung von Finanzierungs- und Überwachungsmechanismen ab. Eine verstärkte politische und institutionelle Kohärenz zwischen Klima-, Biodiversitäts- und Umweltzielen ist entscheidend, um eine systemische Transformation hin zu einer nachhaltigeren und widerstandsfähigeren Zukunft zu beschleunigen.

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List of abbreviations

Abbreviation	Explanation
BTR	Biennial Transparency Report
CBD	Convention on Biological Diversity
CIM	Interministerial Commission on Climate Change (Brazil)
CO_2	Carbon dioxide
CONABIO	National Biodiversity Commission (Brazil)
COP	Conference of the Parties
DOC	Department of Conservation (New Zealand)
EbA	Ecosystem-based Adaptation
Eco-DRR	Ecosystem-based Disaster Risk Reduction
FONERWA	Rwanda Green Fund
GEF	Global Environment Facility
GBF	Global Biodiversity Framework
GHG	Greenhouse gas
IDEAM	Institute of Hydrology, Meteorology and Environmental Studies (Colombia)
IPCC	Intergovernmental Panel on Climate Change
JPO	Japan Biodiversity Outlook
LDN	Land Degradation Neutrality
LULUCF	Land Use, Land-Use Change, and Forestry
MADS	Ministry of Environment and Sustainable Development (Colombia)
MfE	Ministry for the Environment (New Zealand)
MiAmbiente	Ministry of Environment (Panama)
MMA	Ministry of Environment (Brazil)
MoE	Ministry of Environment (Rwanda)
MRV	Measuring, Reporting and Verification
NAP	National Adaptation Plan
NbS	Nature-based Solution
NBSAP	National Biodiversity Strategies and Action Plan
NDC	Nationally Determined Contribution
NECP	National Energy and Climate Plan
NIES	National Institute for Environmental Studies (Japan)
NGO	Non-Governmental Organization

Abbreviation	Explanation
OECD	Organisation for Economic Co-operation and Development
REMA	Rwanda Environment Management Authority
SDGs	Sustainable Development Goals
SISCLIMA	National Climate Change System (Colombia)
UN CBD	United Nations Convention on Biological Diversity
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

The concept of planetary boundaries by Rockström et al. (2009) defines nine critical limits of the Earth's system, of which six have already been crossed, meaning that we are operating outside the "safe operating space for humanity" (Richardson et al., 2023). Climate change, biodiversity loss, and pollution are all drivers exceeding these limits (Richardson et al., 2023). Due to the interconnected nature of the Earth's systems, surpassing one boundary influences others through complex feedback loops and interactions, potentially triggering cascading effects (Steffen et al., 2015). As a result, the cumulative effects of anthropogenic pressures, such as fossil fuel combustion, habitat destruction, and unsustainable land use are driving a systemic crisis that is unfolding, in the form of climate change, biodiversity loss, and pollution, among others. This *triple planetary crisis* or *polycrisis* not only undermines ecological resilience but also threatens the long-term sustainability of human development and well-being (IPBES, 2024; IPCC, 2023; UNEP-ISC, 2024).

Addressing these crises requires integrated approaches since underlying drivers and pressures are strongly interconnected (UNEP-ISC, 2024). Holistic approaches such as nature-based solutions (NbS)[1], circular economy principles, land restoration measures, and the One Health approach[2] are increasingly recognized for their capacity to deliver co-benefits across environmental domains (FAO & WOAH, 2022; IPCC, 2019). However, their implementation depends on enabling mechanisms including facilitating governance structures, effective stakeholder engagement, and coordinated financing and monitoring mechanisms.

The international community has already laid important groundwork for addressing the polycrisis through the adoption of the three Rio Conventions in 1992. Each of these agreements has driven the development of national strategies and action plans, including the Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) submitted to the UNFCCC; National Biodiversity Strategies and Action Plans (NBSAPs) submitted to the UNCBD; and Land Degradation Neutrality (LDN) targets submitted to the UNCCD. While these instruments reflect growing global commitment, they are still often implemented in silos through isolated sectoral responses. The same applies for the Sustainable Development Goals (SDGs), which are inherently interlinked but frequently pursued through fragmented policy processes (United Nations, 2023). Strengthening synergies in planning, implementation, reporting, and financing across these instruments is essential to leverage limited resources and avoid trade-offs (Mirzabaev & Akramkhanov, 2025).

This report analyses examples of best practices of integrated solutions, as well as cross-sectoral governance and policy mechanisms identified in national policies and strategies of seven country case studies from different regions in the world: Brazil, Rwanda, Colombia, Sweden, Japan, New Zealand, and Panama. These countries not only represent a diverse geographical scope but also encompass a range of socio-economic contexts. Brazil and Colombia are recognised as megadiverse countries, while others like Rwanda and New Zealand are notable for their rich endemic biodiversity. By demonstrating how countries are addressing the interconnected crises we are facing and how integrated approaches are already generating

[1] Nature-based solutions are defined as "actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits" (UNEA, 2022)

[2] One Health approach is defined as an "integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent" (WHO, 2023)

positive outcomes, these examples aim to inform and inspire the adaptation and replication of context-specific solutions to other national and regional settings.

The paper starts with introducing the analytical framework for the case study analysis in Chapter 2. In the following, Chapter 3 presents the seven country case studies showcasing best practices of integrated approaches. Subsequently, Chapter 4 synthesises the lessons learned from the case studies and points out prevailing gaps and limitations. Finally, the paper concludes with policy recommendations for enhancing synergies and scaling up integrated approaches.

2 Framework for case study analysis

The analytical framework developed to assess national approaches to the triple planetary crisis in the seven case study countries is structured to capture both policy integration and implementation dynamics across climate change, biodiversity loss, and pollution.

It builds conceptually on the OECD's 2025 draft Environmental Outlook (OECD, forthcoming) , which uses a DPSIR (Drivers–Pressures–State–Impact–Response) framework (see also Carnohan et al., 2023) to systematically trace the links between socio-economic systems and environmental outcomes.

For each of the countries analysed, we first looked at the socio-environmental context, recognising that geography, socio-economic characteristics, and the presence of Indigenous Peoples shape both vulnerabilities and responses.

We then assess the integration of the triple crisis across key policy documents; to ensure comparability we focused on the documents submitted to the various UN bodies: the latest NDCs and Biennial Transparency Reports (BTRs); NAPs and NBSAPs. For each of the documents, we used a DPSIR-style diagnostic to track whether interconnected drivers, cumulative impacts, and multi-targeted responses are explicitly recognised. Attention was paid to whether policy framing used integrated concepts like SDGs, One Health, circular economy, or NbS.

Additionally, for each country we mapped governance structures to examine coordination across ministries, institutions, and finance mechanisms. The case studies provide insights into implementation through examples of integrated interventions, while outcomes and impacts are evaluated based on available data, indicators, and intent to monitor, reflecting Carnohan et al.'s (2023) argument that even partial or emergent monitoring can indicate progress. Finally, the framework examines policy gaps, trade-offs and constraints, as well as lessons and innovations that may be transferable across contexts, with a view to informing international cooperation and support, including for Germany and the EU.

3 Best practices: country case studies

3.1 Brazil

3.1.1 Country context

Brazil, the largest country in South America, is the most biologically diverse in the world, containing 70% of all catalogued species and a vast range of ecosystems, including the Amazon, wetlands, and the only reef ecosystem in the South Atlantic (CBD, n.d.). The country, has a population of around 213 million (Agência IBGE Notícias, 2024) and an economy that is heavily reliant on agriculture and natural resources, which leaves it vulnerable, particularly in rural areas. Brazil is also culturally diverse, with around 252 indigenous groups and approximately 180 different languages (MMA, 2017). Brazil is facing several challenges, including the loss of biodiversity, largely driven by habitat loss, overexploitation and pollution, which also threatens indigenous lands and traditional knowledge closely tied to these ecosystems (MMA, 2017). Moreover, Brazil is facing severe climate change impacts, such as rising temperatures, shifting rainfall patterns, droughts, floods, and sea level rise, all of which threaten infrastructure and ecosystems, particularly in coastal regions (Government of Brazil, 2024).

3.1.2 Integration of multiple crises in key policies

The updated NDC (2024), as well as Brazil's first NBSAP (2017), NAP (2016), and BTR (2024) do not explicitly mention the term *triple planetary crisis* or *polycrisis*, but they recognize the interconnectedness of climate change, biodiversity loss, and pollution. The NDC highlights the systemic and multi-dimensional nature of the climate crisis, advocating for integrated approaches that address socio-economic vulnerabilities and promote social justice. The NBSAP highlights the sustainable use of biodiversity for socio-economic resilience, while the updated plan that is set for release in late 2025, will incorporate new national biodiversity targets aligned with the Global Biodiversity Framework (GBF). The NAP integrates ecosystem-based approaches and NbS, emphasizing resilience and sustainable development through sector-specific strategies for agriculture, water, health, and urban planning, and promotes collaboration.

In its updated **NDC (2024)**, Brazil reaffirms a zero-deforestation target and considers forest restoration as a key strategy for the removal of greenhouse gas (GHG) emissions. The country recognises the climate crisis as interconnected with socio-economic vulnerabilities like inequality and poverty, and thus aims for achieving Climate Justice by 2035 through inclusive, unified action across society, government, and the economy (Government of Brazil, 2024). To implement its NDC, Brazil is developing its National Plan on Climate Change (*Plano Clima* or Climate Plan) and refining it through public consultations. The Climate Plan consists of multiple sectoral plans on mitigation, adaptation, and cross-cutting strategies, addressing key issues like deforestation, ecosystem restoration, sustainable livestock and agriculture, circular economy and just transition.

The **NBSAP (2017)** acknowledges that sustainable use of biodiversity provides benefits to people and fosters socio-economic resilience. Targets and actions include ecosystem restoration, pollution control, sustainable land and resource management, land tenure regularisation, as well as strengthening Indigenous Peoples and traditional communities. Brazil's updated NBSAP, which includes the targets of the GBF, is expected to be released in late 2025 (Sinimbú, 2025). It will incorporate the 23 national biodiversity targets for the period 2025 to 2030, established by the National Biodiversity Commission (CONABIO). The objectives range from reducing biodiversity loss by tackling pressures such as deforestation and native vegetation conversion.

Further goals also target restoring ecosystems, reducing pollution impacts, mitigating climate change, as well as sustainable business activities and bioeconomy (Government of Brazil, 2025a).

Brazil's **NAP (2016)**, aims to enhance resilience to climate change through sectoral strategies addressing climate risks in agriculture, water resources, health, and urban planning. The plan emphasises the integration of ecosystem-based approaches and NbS, such as ecosystem restoration, conservation, and sustainable land management, to reduce climate vulnerabilities and support biodiversity. It also incorporates a holistic approach to tackle the interconnected issues of climate change, pollution, and biodiversity loss by fostering collaboration among government, civil society, the private sector, and academia. Through tailored strategies and stakeholder involvement, the NAP focuses on promoting sustainable development and reducing vulnerabilities while strengthening the resilience of both ecosystems and communities (MMA, 2016).

In its first **BTR (2024)**, Brazil demonstrates that integrated approaches addressing both climate and biodiversity challenges are needed to achieve the NDC targets. The report highlights the use of NbS, such as restoration of wetlands and other ecosystems. In addition, sustainable and low-carbon agriculture initiatives such as agroforestry systems and integrated crop-livestock-forestry are mentioned. Pollution is addressed through innovative low-carbon circular economy solutions and bioeconomy, including a more efficient and sustainable production of charcoal. The report also includes non-GHG indicators, such as deforestation reduction rates and the expansion of protected areas. Furthermore, it recognizes the importance of Indigenous Peoples and Lands, to guarantee the protection and sustainable management of natural ecosystems while upholding rights, autonomy and traditional ecological knowledge (Ministry of Science, Technology and Innovation, 2024).

3.1.3 Governance and implementation mechanisms

In Brazil, environmental policies are coordinated primarily by the Ministry of Environment (MMA) which leads the development and implementation of national strategies such as the NDCs, NBSAPs, and NAPs. Climate policy is overseen by the Interministerial Commission on Climate Change (CIM), responsible for interministerial coordination, monitoring of the Climate Plan, and guiding the update of Brazil's NDCs through a broad participatory process (Government of Brazil, 2025b). The Climate Plan update is guided by scientific evidence and shaped through broad, inclusive dialogue involving all levels of government, the private sector, civil society, and the scientific community. Biodiversity policy is guided by the CONABIO, a multi-stakeholder body with civil society actors that directs the development of the NBSAPs and the National Biodiversity Policy (Conservação Internactional, 2024). Both CIM and CONABIO serve as cross-sectoral platforms to ensure horizontal integration with other federal policies, including in energy, agriculture, transport, and health. Scientific input is provided by a newly established Scientific Advisory Board which represents institutions like the Brazilian Research Network on Global Climate Change *Rede Clima*. In addition, climate data governance is being strengthened through the Brazilian National Transparency System *DataClima+*, expected to be completed in 2025. Policy implementation and financing are further strengthened through key financial instruments such as the Climate Fund and the Amazon Fund.

From 2023 to 2025, Brazil initiated an innovative approach to integrate its biodiversity and climate policies under the MMA. Instead of revising its NBSAP and Climate Plan separately, the country undertook a parallel, interconnected update that deliberately aligned national biodiversity and climate objectives with the GBF and the Paris Agreement, respectively. Hereby, Brazil intentionally integrated the institutional agendas through CIM and CONABIO and made extensive use of multi-stakeholder consultations and participatory workshops. By embedding biodiversity considerations into multisectoral climate strategies, Brazil ensured an alignment of

goals, avoided overlap and strengthened the connection between climate and biodiversity policies, resulting in a more integrated and holistic approach to addressing the interconnected crises of climate change and biodiversity loss. Furthermore, a strengthened governance structure through the involvement of CIM and CONABIO ensured coherence across agendas (Fey et al., 2025).

3.1.4 Highlights

Brazil has made significant progress in reducing deforestation in both the Amazon and Cerrado biome through targeted government initiatives. Between 2022 and 2024, Brazil reduced deforestation in the Amazon by 45.7%, driven by the PPCDAm action plan through strengthened inspection measures by the environmental authorities including the introduction of remote embargoes, resumed Amazon Fund financing, and stricter credit access rules. In the Cerrado, deforestation fell by 25.7% in 2024 following the launch of the PPCerrado, which combined targeted enforcement, remote monitoring, engagement with agribusiness, and improved data transparency to combat illegal land clearing (Government of Brazil, 2024).

Moreover, Brazil's integrated actions include large-scale mangrove and coral restoration through the *ProManguezal* and *ProCoral* initiative, which enhances coastal resilience, improves water quality, and protects biodiversity.

In agriculture, the national Plan for Adaptation to Climate Change and Low Carbon Emissions in Agriculture (ABC+ Plan) promotes regenerative practices such as crop-livestock-forest integration and degraded pasture recovery, delivering climate mitigation, biodiversity protection, and reduced agrochemical use. In the Cerrado biome, circular economy pilots, like sustainable agroforestry systems, restore degraded land while lowering emissions and minimising waste, illustrating regional efforts that combine ecological recovery with sustainable production (Government of Brazil, 2024).

3.1.5 Challenges and limitations

Despite notable progress in integrating climate and biodiversity agendas, Brazil's national strategies face important gaps and limitations. A key concern is the country's strong emphasis on sustainable biofuels in its NDC, which, while promoted as a climate solution, raises serious environmental trade-offs, particularly regarding land use, biodiversity loss, and deforestation. The expansion of biofuel crops, such as sugarcane and soy, can compete with native vegetation and food production, undermining the ecosystem services the country seeks to protect. Moreover, while Brazil has systems in place to monitor specific processes and outputs, such as the number and size of protected areas, it lacks a comprehensive instrument to track policy implementation, limiting the ability to evaluate the effectiveness of its biodiversity strategy (CBD, n.d.). Only a subset of national biodiversity targets is currently monitored. To address this, the Ministry of the Environment's Executive Secretariat has created a task force to develop environmental indicators, but full implementation remains pending.

3.1.6 Outcomes and impacts

Brazil has made tangible progress in addressing the interconnected crises of climate change, biodiversity loss, and pollution through integrated national strategies. Notably, between 2022 and 2024, deforestation in the Amazon decreased by 45.7%, and by 25.7% in the Cerrado, thanks to targeted government action plans and improved enforcement. Coastal ecosystems have benefited from large-scale restoration initiatives, enhancing resilience and biodiversity. In agriculture, the ABC+ Plan has promoted low-carbon and regenerative practices, leading to reduced emissions and agrochemical use while improving soil health. Circular economy pilots in

the Cerrado showcase how ecological restoration can be combined with sustainable production. This progress is largely attributed to strengthened governance and enforcement, including the reactivation of key institutions under the MMA, the coordination of interministerial efforts through the CIM, and enhanced satellite monitoring systems. Importantly, Indigenous Peoples are playing an increasingly important role in nature conservation, including through the new *Ywy Ipuranguete* ("beautiful land" in Tupi-Guarani) initiative, which was launched in early 2025 (Ministério dos Povos Indígenas, 2025). The initiative supports Indigenous-led management across 15 Indigenous Lands, covering about 6 million hectares in Amazon, Atlantic Forest, Cerrado, Caatinga, and Pantanal biomes, reinforcing territorial protection, food sovereignty, sustainable income generation, strengthening institutions, and preserving indigenous cultures and traditions.

3.2 Rwanda

3.2.1 Country context

Rwanda is a small, landlocked country in East Africa, covering approximately 26,338 km^2 (Republic of Rwanda, 2019). The country's natural environment includes montane forests, savannahs, wetlands, and a network of lakes. Rwanda has an estimated population of 14.6 million people in 2025, making it one of the most densely populated countries in Africa (World Population Review, 2025). It is classified as a low-income country, although it has experienced strong economic growth in recent years, driven by services, agriculture, and tourism. While being among the countries with the lowest emission per capita worldwide, Rwanda is highly vulnerable to climate change and is experiencing increased rainfall variability, floods, and prolonged droughts (Republic of Rwanda, 2020a). Moreover, land degradation, deforestation, biodiversity loss and (plastic) pollution are key vulnerabilities, posing risks to food security, infrastructure, water availability, economic activities and rural livelihoods.

3.2.2 Integration of multiple crises in key policies

Rwanda's updated NDC (2020a), as well as its first NBSAP (2016) and BTR (2024) do not explicitly refer to the *triple planetary crisis* or *polycrisis*, yet they recognise the interconnectedness between climate change, biodiversity loss, pollution, and socio-economic vulnerabilities. The NDC adopts an integrated approach, outlining mitigation and adaptation measures across sectors that generate co-benefits for livelihoods, health, and food security, and contribute to the SDGs. The 2016 NBSAP links ecosystem health to human well-being by highlights cross-sectoral actions such as pollution control and sustainable land use. Rwanda's ongoing NAP process prioritizes ecosystem-based adaptation (EbA) and climate-resilient development.

Rwanda submitted its **NDC (2020)** for the period up to 2030 (Republic of Rwanda, 2020a). The report recognises the linkages between climate change and environmental, economic, social and health impacts. In addition to sectoral adaptation and mitigation measures, their mutual co-benefits and their contribution to the SDGs are mentioned: measures include reducing dependency on biofuels, expanding renewable energy sources, sustainable land management practices and efficient irrigation, and restoring ecosystems, thus contributing to food security, improved livelihoods, human health, and poverty reduction.

As of July 2025, Rwanda has not yet submitted its updated NBSAP. The first **NBSAP (2016)** takes a holistic view of the interlinkages between ecosystem health and human well-being, recognising the role of biodiversity in reducing pollution, preventing disease, and safeguarding traditional medicine (Republic of Rwanda, 2016). It outlines actions such as mainstreaming ecosystem service valuation and expanding protected areas. In Rwanda's 6th National Country Report, conservation

efforts include an increase in forest cover, reducing biomass fuel, sustainable agriculture and agroforestry, pollution control, and waste management (Republic of Rwanda, 2020b).

Rwanda is in the process of updating its **NAP,** which has not been released as of mid-2025. Nevertheless, the ongoing NAP process aims to integrate adaptation into national and sectoral development planning. Key components include technical and institutional capacity building, promotion of climate-resilient technologies, and EbA interventions such as agroforestry and riverbank restoration. It also seeks to improve access to climate data, mobilise funding, and enhance knowledge sharing on adaptation efforts (Ministry of Environment, 2020; NAP Global Network, 2019).

Rwanda's first **BTR (2024),** recognises integrated approaches such as NbS and EbA, including agroforestry practices and reforestation. Pollution control is addressed through the introduction of a National Circular Economy Action Plan, sustainable waste management, resource efficient technologies, as well as measures to improve air quality. Non-GHG-related indicators such as the reduction of deforestation, the increase in forest cover and the protection and expansion of protected areas and wetlands are also used to assess progress (Republic of Rwanda, 2024).

3.2.3 Governance and implementation mechanisms

In Rwanda, the Ministry of Environment (MoE) oversees climate and environmental policies, including the NDCs, NBSAP, and NAP. The Rwanda Environment Management Authority (REMA) leads implementation, coordination, and technical support under MoE's supervision. Sectoral ministries, local authorities, and partners such as NGOs and academia support implementation. The Ministry of Finance, through the Rwanda Green Fund (FONERWA), manages climate finance, while the NAP process is supported by international partners like United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF) (Ministry of Environment, 2020; Republic of Rwanda, 2020a). Rwanda lacks a formal inter-ministerial climate body but coordinates climate action through a multi-level governance framework under the Green Growth and Climate Resilience Strategy, involving national forums, sectoral working groups, and local collaboration platforms to align and implement green growth objectives across all levels. Most remarkably, Rwanda has shown strong commitment in tackling plastic pollution for almost two decades, banning plastic bags in 2008 and expanding restrictions in 2019 to other single-use plastics (Knoblauch et al., 2018; UNEP, 2018). It continues to show leadership through international advocacy through its active role in the negotiations and by co-launching the High Ambition Coalition to End Plastic Pollution with Norway (Scheuchzer, 2024).

3.2.4 Highlights

Rwanda's monthly community work initiative *Umuganda* plays a key role in the country's environmental efforts by mobilising citizens for activities like tree planting, erosion control, and cleanups (Mtonga, 2022). In the early 2000s, it helped raise awareness about plastic pollution and build public support for the 2008 ban on single-use plastics. Today, *Umuganda* continues to support cleanups, land restoration, and waste management, while also strengthening civic engagement and community-government relations.

A flagship example of mainstreaming biodiversity into agriculture and rural development is Rwanda's Crop Intensification Programme, which was redesigned in 2025 to tackle biodiversity loss, chemical pollution, and soil degradation through more sustainable and equitable agricultural practices (REMA, 2025). The updated subsidy scheme promotes nutrient management, crop diversification, and erosion control while integrating equity principles to support both environmental and social goals.

The ecosystem-based restoration approach for the Nyungwe–Ruhango Corridor aims to restore ecosystems and strengthen climate resilience in Rwanda's Southern Province. Supported by the GEF, the project rehabilitates forests and wetlands and promotes sustainable land management across thousands of hectares. It combines agroforestry and non-timber forest product value chains to restore ecosystem services and create over 2,200 green jobs, addressing climate, biodiversity, and livelihood challenges in an integrated way (World Bank Group, 2025).

3.2.5 Challenges and limitations

Rwanda has made strong policy commitments on climate action, biodiversity conservation, and pollution control through international action such as through the HAC, but key interlinkages between these areas remain weakly addressed. Moreover, while in its NDC Rwanda places emphasis on stakeholder engagement across different sector levels, it lacks a justice-oriented approach to climate action, as the concept is absent from key policy documents and reporting, and no formal body or policy exists to guide it. This risks limiting the wider social benefits of climate measures and raises concerns about ensuring that no one is left behind (CAT, 2022b). In addition, Rwanda lacks a dedicated inter-ministerial body with a clear mandate to lead on climate action and ensure effective coordination across ministries and sub-national governments. Although the updated NDC assigns the MoE overall oversight and resource mobilization to the Ministry of Finance/FONERWA, it provides few details beyond reporting and transparency structures (ibid.). Lastly, although Rwanda is developing a comprehensive transparency framework embedded in its national planning processes to track NDC implementation, it lacks a dedicated climate review mechanism or formal ratchet-up process, i.e. a mechanism to regularly review and progressively strengthen its NDC targets, despite having submitted an updated NDC in 2020 (CAT, 2022b).

3.2.6 Outcomes and impacts

Rwanda has successfully reversed deforestation trends, increasing forest cover up to 30% and thus surpassing the 30x30 target ahead of schedule (Ministry of Lands and Forestry, 2018). Moreover, initiatives such as the Nyungwe–Ruhango Corridor restoration and the monthly Umuganda community work have contributed to environmental recovery and green job creation. The redesign of the Crop Intensification Programme further illustrates Rwanda's commitment to aligning agricultural development with biodiversity and climate goals. These efforts collectively enhance resilience, promote sustainable livelihoods, and advance progress towards the SDGs. Additionally, Rwanda has shown remarkable ambition in tackling plastic pollution both nationally and internationally.

3.3 Colombia

3.3.1 Country context

Colombia is located in the northwestern part of South America and is one of the world's 17 most megadiverse countries, encompassing many different ecosystems including the Amazon rainforest (forests cover about 53% of the national territory), Andean mountains, Pacific and Caribbean coasts, and extensive wetlands (Marca País, 2025). It has a population of over 52.6 million (DANE, 2024) and is one of the top economic performers in Latin America (World Bank, 2022). Colombia's economy relies on mining, manufacturing, agriculture, and tourism (Krok, 2023). However, Colombia faces significant environmental challenges such as high deforestation (particularly in the Amazon), pollution of water bodies, and climate change impacts exacerbated by land-use change and mining activities (USCIS, n.d.). Indigenous and Afro-Colombian

communities play an important role in natural resource management, with their traditional knowledge recognised in national policies (MADS, 2024).

3.3.2 Integration of multiple crises in key policies

The triple planetary crisis is not explicitly mentioned in the updated NDC (2020), the NBSAP (2024), the NAP (2021) or the BTR (2024), although the documents reflect a systemic understanding of interlinked environmental pressures. The NDC recognises the combined effects of deforestation, pollution and ecosystem degradation on climate vulnerability and human well-being. The NBSAP further emphasises how climate change, biodiversity loss and pollution are mutually reinforcing. The NAP acknowledges the interconnections between ecosystem degradation, climate risk and outcomes related to human well-being, livelihoods, and sustainable development. The documents reference integrated approaches, including the SDGs (NDC and NBSAP), NbS (NDC and NAP), circular economy and bioeconomy (NDC).

The **NDC (2020)** incorporates biodiversity objectives within climate mitigation and adaptation measures. Ecosystem protection and restoration, particularly of páramos[3], mangroves, forests and wetlands, are identified as essential for carbon sequestration, water regulation and disaster risk reduction. Adaptation and mitigation are addressed jointly, primarily through ecosystem-based approaches. Non-GHG targets include reducing deforestation, expanding protected areas, and improving water governance. Pollution control is addressed indirectly, e.g. through air quality co-benefits and the circular economy strategy, which links material and resource efficiency to both climate and biodiversity goals.

The **NBSAP (2024)** identifies climate risks to biodiversity, including altered species distributions and ecosystem stress. Biodiversity is framed as a key contributor to climate adaptation, particularly through the preservation of ecosystem functions and landscape connectivity. Pollution threats, such as pesticides, untreated wastewater and extractive activities, are recognised and linked to both biodiversity loss and increased climate vulnerability. Measures to reduce these pressures are included as part of a broader strategy for ecological restoration and resilience.

The **NAP (2021)** identifies ecosystems as both vulnerable to climate change and important for reducing climate risks. It recognises ecosystem degradation as a key factor that heightens exposure to climate-related risks and undermines adaptive capacity. EbA is a central pillar, with particular emphasis on hydrological regulation, agricultural productivity, and disaster risk reduction. Biodiversity is indirectly integrated through the recognition of ecosystem services and their role in territorial resilience and human well-being. While pollution is not addressed explicitly, declining water quality and ecosystem stress are noted, implicitly linking pollution to climate vulnerability. The plan promotes integrated approaches, including links between climate adaptation, territorial planning, disaster risk reduction, and sustainable development.

The **BTR (2024)** reflects an integrated approach to climate change, biodiversity loss and pollution. Initiatives such as ecosystem restoration and NbS contribute to both biodiversity conservation and resilience. NbS, particularly forest conservation and watershed protection, are highlighted as central to both mitigation and adaptation. REDD+ initiatives are framed with biodiversity co-benefits and improved forest governance. Deforestation and the degradation of natural forests are highlighted as the largest sources of net emissions in the land use, land-use change and forestry (LULUCF) sector. A central NDC target is the reduction of natural forest deforestation to zero hectares/year by 2030, supported by tools like the Forest and Carbon

[3] Alpine tundra ecosystems

Monitoring System (SMByC). The report stresses the strategic integration of climate and biodiversity objectives, mentioning the COP16 on Biodiversity held in Colombia in October 2024.

Pollution and environmental degradation threats are recognised and indirectly addressed through specific measures within the BTR. Pollution is addressed indirectly, for instance through the circular economy strategy, improved land-use planning, and sustainable agriculture, all of which link resource efficiency with emission reductions and biodiversity protection. Policies and measures in sectors like agriculture promote sustainable practices to reduce pollution, for instance, through efficient fertilizer use and agroecological models. The national inventory includes criteria pollutants and black carbon. Colombia has committed to a 40% reduction in black carbon[4] emissions by 2030 compared to 2014 levels, explicitly highlighting the benefits for air quality and climate mitigation from this measure. The negative effects of black carbon on ecosystems are not explored in detail. Measures in the waste sector focus on integrated solid waste management and domestic wastewater management, which contribute to improving public health and protecting water bodies. The report also notes that soils are affected by deforestation, mining, and oil exploitation, leading to erosion, contamination, and desertification.

3.3.3 Governance and implementation mechanisms

In Colombia, the Ministry of Environment and Sustainable Development (MADS) serves as the main authority for climate, biodiversity, and pollution, and is responsible for preparing and submitting the NDCs, NAPs, BTRs, and the NBSAP (CAT, 2023; NDC Partnership, 2024b). It receives input from specialised institutions such as the Alexander von Humboldt Biological Resources Research Institute which supports biodiversity policy, and the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) which provides climate and environmental data for pollution management (UNESCO, 2024). The Intersectoral Commission on Climate Change under the National Climate Change System (SISCLIMA) is the main inter-ministerial coordination body, engaging multiple ministries and the National Planning Department to oversee the implementation, monitoring, and financing of climate actions (Climate Policy Database, 2016; UNESCO, 2024). The National Council on Climate Change and technical committees offer platforms for aligned decision-making (CAT, 2023). Policy development processes for the NDCs, NAPs, and NBSAPs include consultations with Indigenous and Afro-descendant communities, local governments, farmers, private sector stakeholders, and civil society. These consultations are conducted within the framework of Colombia's legal provisions on environmental participation (NDC Partnership, 2024b; UNESCO, 2024). Sectoral mainstreaming occurs through mandates embedded in national development plans, environmental licensing, and mandatory subnational climate planning under SISCLIMA, although evaluations note variable uptake across sectors beyond energy (CAT, 2023; NDC Partnership, 2024b). Colombia has a National Biodiversity Finance Plan and participates in climate finance instruments, including sovereign green bonds, aligning biodiversity and climate funding (CAT, 2023; UNESCO, 2024). Monitoring remains partially siloed: IDEAM manages climate and pollution data; the Humboldt Institute and the Colombian Information System for Biodiversity oversee biodiversity data; and SISCLIMA provides a framework for integration (CAT, 2023; UNESCO, 2024). Recent improvements include the SIIVRA platform, which integrates biodiversity and climate vulnerability data to support adaptation planning and ecosystem-based responses (Fey et al., 2025).

4 Black Carbon: Black carbon is an air pollutant with effects on the climate, ecosystems, crops and human health. It is a component of fine particulate matter (PM2.5) and has a warming potential of up to 1500 times more than CO_2 per unit of mass. The main sources of black carbon are household energy, transport, industrial production, agricultural burning, waste burning and fossil fuels (Climate & Clean Air Coalition, n.d.).

3.3.4 Highlights

Colombia has implemented several actions that address climate, biodiversity, and pollution challenges. Examples include mangrove restoration in the Mallorquín Marsh, which enhances biodiversity, climate resilience, and water quality (Grupo Argos, 2023). Agroecological silvopastoral systems near Montería and in high Andean dairy regions support carbon sequestration and reduce agricultural pollution (Durana et al., 2023). In the La Mojana wetlands, a large-scale restoration initiative reduces flood risks and improves water quality and health outcomes (UNESCO, 2024). Meanwhile, Las Gaviotas demonstrates circular, regenerative development in Vichada, combining ecosystem restoration with renewable technologies (World Bank, 2022). A conservation initiative in the Middle Magdalena region has reconnected 600 ha of fragmented habitat through 15 ecological corridors for the endangered brown spider monkey (*Ateles hybridus*). The project, led by Fundación Proyecto Primates, combines reforestation, community engagement, and climate adaptation, and aims to expand to 2,000 ha (Mowbray, 2025). These interventions operate from local to national scale. Colombia's implementation of REDD+ initiatives supports forest conservation, climate mitigation, and biodiversity co-benefits, particularly in regions with high deforestation pressure. The SIIVRA and SIAC platforms enhance decision-making by integrating data on climate vulnerability, land cover, and ecosystem services. Colombia's circular economy roadmap promotes sustainable production and waste reduction, indirectly reducing pollution and emissions (Colombia, 2024).

3.3.5 Challenges and limitations

Despite strong frameworks, there are gaps in linking climate, biodiversity, and pollution (UNESCO, 2024). Although pressures from agriculture and infrastructure development are acknowledged, their systemic trade-offs with biodiversity and climate adaptation remain underexplored in key national strategies (Gobierno de Colombia, 2024). Implementation is often complicated by funding constraints, technical capacity gaps at subnational levels, and uneven monitoring across sectors (CAT, 2023; NDC Partnership, 2024b). While SISCLIMA provides an institutional base, comprehensive indicators to track co-benefits or cross-sectoral impacts remain limited (Climate Policy Database, 2016).

3.3.6 Outcomes and impacts

The updated NDC has targets to restore 300,000 ha of forest and mainstreaming biodiversity across planning instruments (Gobierno de Colombia, 2020). The NBSAP also prioritises mangrove protection and coastal wetland resilience (Gobierno de Colombia, 2024). NbS support sustainable rural livelihoods, as seen in silvopastoral transitions that increase productivity and reduce emissions in Andean dairy systems (Durana et al., 2023). Urban biodiversity planning delivers co-benefits for health, equity, and resilience to heat (Grupo Argos, 2023). Institutional coordination is strengthened through SISCLIMA, Colombia's cross-cutting climate governance system (Climate Policy Database, 2016). Although full evaluations are pending, synergies between environmental, social, and institutional objectives are becoming increasingly visible (World Bank, 2022).

3.4 Sweden

3.4.1 Country context

Sweden is a Northern European country covering approximately 450,000 km^2 with a population of about 10.5 million people (Statistics Sweden, 2024). It is a high-income country with an economy primarily based on services, advanced manufacturing, green energy, and technology

(OECD, 2025a). The country's natural environment includes forests covering nearly 63% of the land area, numerous freshwater lakes, and an extensive coastline along the Baltic Sea, Gulf of Bothnia, Skagerrak, and Kattegat (Eurostat, 2024; World Atlas, 2021). Despite high environmental standards, Sweden faces challenges such as the impacts of climate change on forests, eutrophication and pollution in the Baltic Sea, and biodiversity loss driven by habitat fragmentation and land-use pressures (OECD, 2025b). Sweden formally recognises the Sámi as Indigenous people with constitutionally protected rights. The Sámi Consultation Act obliges the national government, its agencies, municipalities, and regions to consult Sámi representatives on matters of particular concern to them. Sweden also engages with truth and reconciliation processes to address historical injustices and supports the Sámi's role in shaping sustainable development policies and implementing the 2030 Agenda (Sweden Abroad, 2025).

3.4.2 Integration of multiple crises in key policies

Sweden explicitly frames the triple planetary crisis of climate change, biodiversity loss, and pollution in its policy discourse. For example, Sweden's national statement at the Conference of the Parties (COP) 16 highlighted the interconnectedness of these crises, particularly stressing marine biodiversity and the need for a legally binding treaty on plastic pollution (Swedish Government, 2024). However, the term *triple planetary crisis* or *polycrisis* is not used explicitly in national strategies and policies. As a Member State of the EU, Sweden does not submit its own NDC but is part of the EU submission committing to at least 55% net GHG reductions by 2030 compared to 1990 levels (European Commission, 2020). Nor does it have its own NAP or NBSAP, although Sweden pledged at the last biodiversity COP that it would submit its updated NBSAP in 2025 (Swedish Government, 2024).

At a national level Sweden has several polices that address climate change, biodiversity loss and environmental pollution, sometimes addressing at least two of them jointly. The most comprehensive of these is the updated **National Energy and Climate Plan** (NECP) 2021–2030 (Government Offices of Sweden, 2024), which outlines emissions reduction pathways, LULUCF targets, and complementary measures in forestry, agriculture, water management, and biodiversity protection. The NECP explicitly integrates biodiversity co-benefits, noting that measures such as wetland and peatland restoration can simultaneously support carbon sequestration, reduce nutrient runoff, and enhance ecosystem resilience. The NECP explicitly addresses air pollution also linking it directly to emissions but also notices that the air pollution control policy needs further development in a manner integrated with both climate policy and energy policy. Other forms of pollution are not addressed.

The NECP is complemented by **Sweden's Climate Adaptation Strategy**, which, while not a formal NAP, functions similarly by promoting NbS to reduce climate vulnerability (Swedish Government, 2018). These include multifunctional green infrastructure, coastal zone protection, and sustainable forest and land management practices, often with overlapping biodiversity and pollution mitigation outcomes. It directly mentions biodiversity while only indirectly addressing pollution.

The **Swedish Strategy for Biodiversity and Ecosystem Services** provides the basis of addressing biodiversity loss in Sweden (Swedish Government, 2015). While it predates the post-2020 global biodiversity framework, it already recognised the systemic nature of environmental risks and the need to mainstream biodiversity across all sectors, including planning, agriculture, forestry, and the financial system, highlighting the dependence of human wellbeing and economic stability on functioning ecosystems. Building on this foundation, an updated NBSAP was proposed (but not yet adopted) in 2023 by the Swedish Environmental Protection Agency to better align with the UN Convention on Biological Diversity (CBD) and the EU Biodiversity

Strategy (Naturvårdsverket, 2024a). This updated approach introduces overarching targets, strategic themes, and specific measurable actions aimed at addressing diffuse pollution, ecosystem fragmentation, and climate impacts more comprehensively.

Sweden also has an **Environmental Objectives System**, which includes 16 nationally determined goals across environmental domains, such as "Reduced Climate Impact," "A Rich Diversity of Plant and Animal Life," and "A Non-Toxic Environment." These objectives are monitored by the Swedish Environmental Protection Agency and frame most sectoral strategies (Naturvårdsverket, 2023).

Sweden's 2021 Voluntary National Review reaffirms its commitment to the 2030 Agenda and highlights climate, biodiversity, and pollution as key sustainability challenges (Government Offices of Sweden, 2021). While national climate targets are ambitious, including net-zero emissions by 2045, Sweden's consumption-based emissions and global environmental footprint remain high. Biodiversity loss and pollution, particularly from chemicals and unsustainable resource use, persist despite national goals and protective measures. The report takes a systemic approach, stressing the need for integrated solutions that address environmental, social, and economic dimensions together.

Sweden's first **BTR (2024)** shows an integrated approach to climate change, biodiversity, and pollution, though it does not explicitly reference the "triple planetary crisis." Biodiversity is presented as a key contributor to climate adaptation, particularly through NbS such as river and wetland restoration for water retention and drought resistance. The protection and restoration of carbon-rich peatlands are also highlighted for their role in reducing GHG emissions and strengthening biodiversity. Pollution threats are addressed through measures like the ban on landfilling combustible and organic materials, which also regulates methane collection. Efforts also focus on reducing nutrient leaching in agriculture and fluorinated greenhouse gas emissions from industrial processes. These measures contribute to a broader strategy for ecological restoration and resilience, including sustainable forest management practices and the promotion of a circular economy to reduce material impact. The report also underscores Sweden's contributions to climate finance, transparency, and capacity-building, supporting integrated environmental goals globally. Monitoring frameworks continue to evolve, with growing integration of climate, biodiversity, and pollution indicators.

3.4.3 Governance and implementation mechanisms

Climate policy coordination is led by the Ministry of the Environment and Energy, while biodiversity policy falls under the Swedish Environmental Protection Agency. The Swedish Climate Policy Council and advisory bodies provide independent review and cross-sectoral advice integrating climate and environmental issues. Horizontal coordination is supported by the Environmental Objectives Council, which includes representatives from multiple ministries and agencies overseeing environmental goals linked to climate and biodiversity.

Multi-stakeholder platforms engage local governments, Sámi representatives, civil society, and private actors to support inclusive implementation. Funding for climate and biodiversity actions is mobilised from national budgets, EU funds, and international climate finance, though these funding streams remain somewhat fragmented. Monitoring systems are increasingly integrating data on climate, pollution, and biodiversity; however, frameworks often operate separately, limiting fully integrated assessments (Naturvårdsverket, 2023).

3.4.4 Highlights

Sweden has advanced integrated NbS that address climate adaptation, biodiversity, and pollution simultaneously. For example, wetland restoration in Västerbotten enhances flood control, improves water quality by filtering agricultural runoff, and supports biodiversity, operating mainly at local and regional levels (Naturvårdsverket, 2024b). Sustainable agricultural practices promoted under the Swedish Rural Development Programme reduce GHG emissions, pesticide use, and improve soil biodiversity, largely implemented at local and regional scales (European Commission, 2024b). Urban circular economy pilots in Swedish cities like Gothenburg target multiple environmental co-benefits: they reduce landfill waste and emissions from waste handling, recover nutrients and raw materials, and reinforce ecosystem health by optimising resource flows. These initiatives are coordinated by local authorities such as the City of Gothenburg's Circular Strategy Group and supported by research institutions like KTH – Royal Institute of Technology (European Commission, 2024a).

3.4.5 Challenges and limitations

Despite strong integration of climate and biodiversity policies, the links to pollution receive less focus. Trade-offs such as the impact of bioenergy expansion on forest biodiversity and soil carbon stocks are acknowledged but require further analysis (Angelstam et al., 2023). Implementation challenges include fragmented funding, institutional silos that limit scaling of integrated solutions, and capacity gaps at the municipal level for managing interconnected crises. Although monitoring is advancing, data systems still largely operate in sectoral silos, limiting fully integrated real-time policy use (Naturvårdsverket, 2023).

3.4.6 Outcomes and impacts

Success is measured through integrated environmental monitoring programmes such as the Swedish National Environmental Monitoring Programme, which combines climate, pollution, and biodiversity data to capture synergies and co-benefits (Naturvårdsverket, 2023). Outcomes include reduced deforestation nationally (Angelstam et al., 2023), improved urban air quality with lower nitrogen oxide emissions, and Sweden's active participation in international and EU commitments to expand marine protected areas aiming for 30% coverage by 2030. Social and economic impacts include job growth in the circular economy and sustainable forestry sectors, contributing to rural livelihoods through regional development initiatives and investments in green industries (OECD, 2023). Institutional impacts feature improved policy coherence through cross-sectoral bodies like the Climate Policy Council, enhancing collaboration between environment, health, and agriculture sectors (Swedish Climate Policy Council, 2023).

3.5 Japan

3.5.1 Country context

The population of Japan is approx. 126 million and declining, predicted to reach around 101-108 million in 2050. In 2022, Japan's GDP per capita was approximately 4.49 million yen (ca. 26,000 EUR). The country's economy is dominated by services and high-value manufacturing alongside a small but strategic agricultural sector. Japan's land area equals 378,000 km^2, spread over 6,800 islands. The geographic characteristics include a long coastline and major low-lying megacities; with various climate zones ranging from subarctic to subtropical and wide variations in precipitation patterns and temperatures across the islands. Japan is one of the most forested countries in the world (25 million hectares, or two-thirds of the country's total land area). Of this, 10 million hectares are planted forests. More than half of the forests are over 50 years old,

and the amount of CO_2 removals is declining because of the forests' age (Ministry of the Environment, Government of Japan, 2024). Rising mean temperatures and more frequent heavy rainfall in recent years cause deterioration in the quality of agricultural products, more frequent natural disasters, especially heavy-rain, and record heatwaves increasing risk of heat impact on health. These hazards, combined with sea-level rise along Japan's extensive coastline, heighten risks of floods, landslides and coastal erosion for densely populated coastal areas and ageing rural areas (Ministry of the Environment, Government of Japan, 2021). Japan's biodiversity has continued to decline over the past 50 years, with ecosystem extent, quality, and species populations deteriorating across all major ecosystem types despite a slight slowdown in loss rates for some areas (Ministry of the Environment, Government of Japan, 2023). The number of threatened species (Red List) totals 3,772 (Ministry of the Environment, Government of Japan, 2023). Indigenous contexts receive little explicit coverage in the four national climate- and biodiversity-related documents reviewed.

3.5.2 Integration of multiple crises in key policies

Japan's **NDC (2025)** is structured around economy-wide GHG mitigation and does not reference the *triple planetary crisis* or frame climate change as part of a *polycrisis*. The document does not contain targets or actions relating to biodiversity or pollution. Land use and forestry are addressed only in relation to their role as carbon sinks (e.g. urban green spaces, coastal wetlands), but co-benefits for biodiversity or water management are not mentioned. Adaptation and mitigation are treated separately: Japan marks adaptation–mitigation co-benefits as "not applicable". The only partial reference to integration is in the alignment with the broader **Green Transformation (GX) strategy**, which aims to combine economic "stable energy supplies, economic growth, and decarbonization" (p. 14). Material, water, and pollution considerations are not covered.

Japan's **BTR (2024)** reflects a more integrated framing than the NDC. First of all, it puts forward "integrated improvement of the environment, economy and society" (p. 66) as a basic concept for promoting climate change countermeasures, indicating that Japan wants to promote policies that will help improve the environment, economy and society in an integrated basis, including elements such as circular economy, recycling and proper waste processing and long-term demonstration of ecosystem services consisting of carbon removals and storage by natural ecosystems as well as focusing on social and labor issues. As per the document, Japan aims to enhance the carbon-absorbing capacity and climate resilience of ecosystems by conserving and restoring forests, wetlands, soils, and coastal areas, while managing wildlife impacts and reducing non-climate stressors such as pollution and land use. NbS including EbA, green infrastructure, and landscape management are promoted for their multiple benefits: climate mitigation, disaster risk reduction, biodiversity conservation, and socio-economic revitalisation. These approaches are integrated with protected area planning to maximise ecological and community outcomes. Urban greening is described not only as a carbon sink, but also as a contributor to erosion control and ecological restoration. Pollution is not deeply integrated into the climate framework.

Japan's **NAP (2021)** recognises the links between climate impacts and ecosystem degradation and explicitly emphasises the importance of pursuing mitigation/adaptation and biodiversity conservation in an integrated manner. It does not use "triple crisis", but names the "climate crisis", links it to the health crisis (COVID-19 pandemic) and stresses the importance of preparing for compound and cascading risks. The plan stresses the importance of integrating adaptation measures into agriculture/forestry/fisheries and biodiversity conservation. One of four guiding principles of the plan is to harness NbS, through measures such as forest and

satoyama[5] (Ministry of the Environment, Government of Japan, 2021) restoration, blue carbon ecosystems and green infrastructure. EbA and Ecosystem-based Disaster Risk Reduction (Eco-DRR), as part of NbS are promoted for their multiple benefits including reducing disaster risk, mitigating urban heat, and improving water quality while supporting biodiversity conservation. To enhance local resilience, the government encourages disaster-aware land use planning, relocation from high-risk zones, and the strategic use of natural ecosystems to minimise trade-offs and maximise synergies. While air pollution is recognised as amplifier of climate change impacts, concrete pollution-climate integration is limited. The plan does not include quantified biodiversity or pollution targets. Indigenous peoples are not referenced in the NAP.

Japan's **NBSAP (2023)** offers the most explicit integration of the three environmental crises, aiming to achieve a nature-positive future, net-zero GHG emissions, and a circular economy as pillars of sustainable "novel" growth (p. 30). It identifies four main drivers of biodiversity loss: land-use change, abandonment of traditional land management, pollution/invasive species, and climate change, all rooted in broader socio-economic trends. A key underlying issue is the insufficient mainstreaming of biodiversity, reflected in low public awareness, reduced contact with nature, and limited business engagement. The strategy emphasises addressing both ecological pressures and the societal values that sustain them.

The report also highlights the links between biodiversity loss, climate change, food systems, and emerging diseases, referencing the OneHealth concept. Interactions between biodiversity, climate, and pollution are central throughout, with actions focused on minimising climate impacts on ecosystems, reducing pollution, and promoting integrated, ecosystem-based solutions tailored to local conditions. These include expanding blue and green carbon sinks, improving resource use (e.g. biomass, sewage), and scaling up urban green and coastal infrastructure. It also stresses avoiding trade-offs, such as harmful renewable energy installations.

Japan supports a legally binding treaty on plastic pollution and aims for zero additional marine plastic litter by 2050 under the Osaka Blue Ocean Vision. Its 2050 vision for a "Society in Harmony with Nature" calls for aligning human activities with natural cycles, conserving ecosystems, mainstreaming biodiversity, and fostering shared responsibility across all sectors. Measures include integrating biodiversity into climate and resource policies, advancing a Circular and Ecological Economy platform, and promoting biodiversity-friendly, low-carbon, and circular goods and services. Traditional knowledge and cultural relationships with nature are also recognised.

3.5.3 Governance and implementation mechanisms

The climate change mitigation measures in Japan are being promoted by various ministries and agencies under the Global Warming Prevention Headquarters established in the Cabinet. It is headed by the Prime Minister with the Chief Cabinet Secretary, the Minister of the Environment, and the Minister of Economy, Trade and Industry as vice chairmen and all other ministers as members (Ministry of the Environment, Government of Japan, 2024). The Minister of the Environment is responsible for preparing the proposal for the National Adaptation Plan (Ministry of the Environment, Government of Japan, 2021), formally called the Climate Change Adaptation Plan. After preparation, the Minister must seek a Cabinet decision on the proposal. Ministry of the Environment leads the preparation of the NBSAP which is also adopted by the cabinet. The Ministry of the Environment is also the primary government office in Japan

[5] A Japanese term referring to a landscape where humans and nature coexist, particularly the area between mountains and cultivated land.

responsible for pollution and chemicals management. Cross-governmental coordination is ensured through the aforementioned Global Warming Prevention Headquarters and the Climate Change Adaptation Promotion Council comprising key ministries (Ministry of the Environment, Government of Japan, 2021). Scientific input is provided by the National Institute for Environmental Studies (NIES), which supports integrated data platforms and advises local governments (Ministry of the Environment, Government of Japan, 2021). Participatory mechanisms include stakeholder consultations and regional councils.

3.5.4 Highlights

Japan promotes climate action by conserving and restoring ecosystems such as forests, wetlands, and coastal areas to enhance carbon sinks, protect biodiversity, and support local economies through sustainable forestry and biomass use. NbS are central to this approach, integrating ecosystem restoration with green infrastructure for climate mitigation, disaster risk reduction, and community resilience (Ministry of the Environment, Government of Japan, 2023, 2024). The government actively advances Eco-DRR, using natural infrastructure like mangroves, coral reefs, and retarding basins to reduce hazards and strengthen regional resilience. Adaptive restoration is explored in post-disaster recovery to integrate ecological functions into land use planning. Blue carbon initiatives, including the restoration of seaweed beds and tidal flats, are also being scaled up alongside research into GHG accounting and marine-based industries like algae-derived plastics.

Green infrastructure plays a key role in securing rainwater infiltration, reducing the urban heat island effect, and creating ecological networks. These measures support both adaptation and biodiversity (Ministry of the Environment, Government of Japan, 2021, 2023).

Japan's broader policy framework links climate, biodiversity, and circular economy goals. The "Circular and Ecological Economy" platform promotes regional revitalisation through stakeholder engagement and integrated environmental-socioeconomic planning (Ministry of the Environment, Government of Japan, 2023). The Green Transformation (GX) policy furthers decarbonisation and circular economy objectives, while the DECOKATSU initiative envisions sustainable lifestyles in areas like food, housing, and transport. The MIDORI Strategy for Sustainable Food Systems supports sustainable agriculture, forestry, and fisheries by reducing pesticide and fertiliser use and expanding organic farming. These efforts aim to restore ecosystems such as *satoyama*, enhance rural resilience, and promote local circularity planning (Ministry of the Environment, Government of Japan, 2023)

3.5.5 Challenges and limitations

Interlinkages between climate change and health, and between biodiversity loss and pollution are addressed only in a limited manner across key strategy documents. For example, the NAP acknowledges the COVID-19 pandemic and compound risks, but there is no comprehensive strategy linking ecosystem degradation to public health. Air pollution is referenced only to a limed extent despite its role in climate impacts (Ministry of the Environment, Government of Japan, 2021). Similarly, while the NBSAP promotes sustainable agriculture and circularity, it gives limited attention to the pollution-related risks posed by agrochemicals and bioenergy expansion, which could undermine biodiversity goals. Although the NBSAP warns of trade-offs between biodiversity and climate actions (e.g., from poorly sited renewable energy or large-scale afforestation), these are not systematically assessed in the NDC or BTR, suggesting lack of integration between the climate-biodiversity policy streams. Implementation remains a challenge due to low public awareness (Ministry of the Environment, Government of Japan, 2021) and insufficient mainstreaming of biodiversity (Ministry of the Environment, Government

of Japan, 2023), and gaps in local adaptation capacity (Ministry of the Environment, Government of Japan, 2021). Finally, monitoring is fragmented: Japan lacks integrated indicators to simultaneously track progress on climate, biodiversity, and pollution goals, with many documents focused on action planning rather than reporting measurable, cross-cutting outcomes.

3.5.6 Outcomes and impacts

The reviewed documents primarily focus on action-planning and contain limited record of outcomes and impacts. Japan's review of its 2012–2020 National Biodiversity Strategy concluded that although progress was made across several areas, none of the national targets were fully achieved, and deeper societal and economic changes are needed to halt biodiversity loss planning (Ministry of the Environment, Government of Japan, 2023). While actions such as scientific-policy integration and international cooperation saw success, mainstreaming biodiversity, restoring human–nature relationships, and linking ecosystems remain incomplete. The Japan Biodiversity Outlook 3 (JBO3) confirms that although the pace of biodiversity loss has slowed, recovery has not occurred, and more transformative and comprehensive efforts are urgently required planning (Ministry of the Environment, Government of Japan, 2023). Quantifiable carbon sink achievements are reported: in 2020, forests in Japan absorbed 40.5 million tons of CO_2 through forest sink measures. Additionally, 2.7 million tons were absorbed via agricultural soil carbon sink measures, and 1.3 million tons through urban greening efforts planning (Ministry of the Environment, Government of Japan, 2023). Overall, the net removals (including CO_2, CH_4 and N_2O emissions) from the LULUCF sector in 2022 were 53.2 Mt CO_2 eq (Ministry of the Environment, Government of Japan, 2024).

3.6 New Zealand

3.6.1 Country context

New Zealand is an island nation in the South Pacific with a land area of ca. 270,000 km^2 and an exceptionally large marine Exclusive Economic Zone (4.4 million km^2) with diverse ecosystems from alpine zones to temperate forests and 15,000 km of coastline. The population is about 5.3 million (March 2024) and highly urbanised (Ministry for the Environment, 2024b).
GDP per capita is ~US$48,000 placing the country in the OECD high-income group (World Bank, 2024b, 2024c). Services provide two-thirds of GDP. However, the primary industries including agriculture play a fundamental role in the export sector and employment, with agriculture driving 53% of the country's emissions as of 2022. The overall emissions intensity of the country's economy has declined by 35% between 2010 and 2024, with renewables providing 88% of electricity in 2023 (Ministry for the Environment, 2024b). The NZ climate warmed +1.1°C in the past 100 years; sea-level rise averages 3.7mm/year (Ministry for the Environment, 2022). Communities are exposed to floods, drought and coastal erosion; the 2020 National Climate Change Risk Assessment lists 43 priority climate risks (Ministry for the Environment, 2022). New Zealand's endemic biota face "a biodiversity crisis" with ca. 4,000 species threatened or at risk. Key drivers include invasive species, climate change, land use change, harvesting of organisms and pollution, including plastic pollution and run-off from agricultural and urban activities (Department of Conservation, New Zealand Government, 2020). Māori comprise 17% of the population. Many Māori communities are located in rural and remote locations, and are particularly vulnerable to the effects of climate change on their homes, infrastructure and sites of cultural significance (Ministry for the Environment, 2022). Under the Treaty of Waitangi, Māori are partners in governance which is reflected in environmental policies (Ministry for the Environment, 2022, 2024b)

3.6.2 Integration of multiple crises in key policies

New Zealand's Second NDC for 2031-35 (2025) is framed almost exclusively around GHG mitigation; it does not use "triple planetary crisis" or polycrisis language. Biodiversity or pollution objectives are not directly referenced. Although agriculture is the single largest source of emissions, the document does not discuss other environmental pressures from this sector. The responses include investments in forestry and investment in agricultural mitigation, but the potential links to biodiversity co-benefits are not made explicit. The document acknowledges that "appropriate incentives will be required to balance encouraging afforestation for increased sequestration with other land uses". This document does not include biodiversity or pollution targets or integration of water or material-resource efficiency.

When describing the impact of climate change on Māori communities, the **BTR** (2024) acknowledges that climate change affects these communities also via loss and degradation of lands and waters, loss of species and biodiversity and exacerbating inequities due to unequal impact of climate change, acknowledging the interconnections between the various environmental crises. The report refers to *NZ Climate Change Strategy*: one of the five pillars of the strategy focuses on NbS to address climate change or specifically "restoring biodiversity while investigating new ways of harnessing nature to remove emissions from the atmosphere" (p. 89). It also refers to *the NZ's Sovereign Green Bonds Programme* that raises money to mitigate and adapt to climate change and protect New Zealand's biodiversity (although not necessarily through integrated projects). The document recognizes that "forests can act as significant carbon sinks, by absorbing CO_2, as well as helping to achieve other positive environmental outcomes (such as reducing erosion)" (p. 104) but does not elaborate further by e.g. linking to biodiversity goals.

The **NAP** (2022) explicitly links biodiversity and the climate crisis, refers to the 2020 Biodiversity Strategy and recognises that climate change amplifies ecosystem and invasive-species pressures. The plan highlights the fact that ecosystem degradation undermines resilience and community wellbeing. One of the pillars of the NAP is "working with nature": policies, planning and regulation should protect, enhance and restore nature and any impacts on nature should be mitigated as much as possible. Another pillar stresses maximising co-benefits: choosing adaptation actions that achieve complementary goals. The adaptation actions under the "Natural environment" domain of the plan aim to support ecosystems which are healthy and connected and where biodiversity is thriving. The plan recognises that NbS solutions buffer against climate impacts, while also fostering wellbeing, sequestering carbon and increasing biodiversity. NbS are proposed as adaptation action across various pillars of the plan. NZ has a dedicated Adaptation Action Plan developed by the Department of Conservation, which applies to public conservation land, threatened native species and systems. The government also plans to develop an integrated work programme to deliver climate, biodiversity and wider environmental outcomes. The links to environmental pollution are not explicitly made.

The NZ government develops adaptation responses in partnership with Māori. The plan includes an *indigenous worldview of the national adaptation plan* represented by the *Rauora* framework. The framework recognises that the land, people and associated life forces are interconnected. In this way, a well land is a well people, and so too are the life forces of these components of the world health, recognising land, people, life forces and practices as a single, integrated system. That is why Maori, like other indigenous groups, while generally supporting the underlying intentions of *working with nature*, raise a significant critique of the term NbS when it is not truly Indigenous-led or adapted to reflect holistic, Māori worldviews and values, as without critical contextualisation and genuine self-determination, NbS can unintentionally reinforce patterns of colonialism and marginalisation.

The **NBSAP** (2020) identifiesboth climate change and pollution as key pressures on biodiversity. It recognises both that the effects of climate change on biodiversity are likely to be significant and also that actions to respond to and mitigate effects of climate change may also have impact on biodiversity. At the same time, it emphasises that resilience to climate change depends on healthy ecosystems. The document recognises liquid and solid wastes, light and noise pollution, plastic pollution and run-off from urban and agricultural activities as pressures on biodiversity. The NBSAP acknowledges cascading climate effects on species and ecosystems and commits to adaptive management to build resilience. Among responses, the plan proposes stimulation of nature-based jobs to support ecosystem restoration (also as a powerful tool for mitigating and avoiding catastrophic impacts of climate change). One of the 13 objectives of the plan focuses on providing NbS to climate change and biodiversity being resilient to its effects, emphasising the *reciprocal connection between the two crises.* The plan outlines nine concrete actions linked to this objective.

3.6.3 Governance and implementation mechanisms

Climate policy is led by the Minister of Climate Change and the Ministry for the Environment (MfE), which also hosts the Climate Change Chief Executives Board (CCEB) with representation of 25 heads of key agencies, that tracks delivery of the emissions-reduction plan (ERP) and the NAP and reports quarterly to ministers (Ministry for the Environment, 2024b). Biodiversity policy is led by the Department of Conservation (DOC), which drafted and now implements the NBSAP (Department of Conservation, New Zealand Government, 2020). Responsibilities for pollution, hazardous substances and chemicals sit with MfE under the Resource Management Act and the Environmental Protection Authority (Ministry for the Environment, 2024b). Preparation and submission of key international reports reflect this division of labour: MfE prepares and submits the NDCs and the BTR to the UNFCCC (Ministry for the Environment, 2024b) the Minister of Climate Change publishes the statutory NAP (Ministry for the Environment, 2022) and DoC transmits the NBSAP to the CBD Secretariat (Department of Conservation, New Zealand Government, 2020). Horizontal integration is provided by the CCEB and the Climate Priorities Ministerial Group, chaired by the Minister of Climate Change (Ministry for the Environment, 2024b) at the highest level, the Climate Change Response Ministers Group chaired by the Prime Minister oversees both the ERP and NAP, supported by a new inter-departmental executive board (Ministry for the Environment, 2022). Independent advice and scrutiny come from the Climate Change Commission, which provides mitigation budgets, six-yearly national climate-risk assessments and biennial reviews of NAP implementation (Ministry for the Environment, 2022, 2024b). The NAP itself dedicates a chapter to integrating climate resilience "in all government strategies and policies," listing critical actions that simultaneously address climate, biodiversity and freshwater goals (Ministry for the Environment, 2022). NAP, NDC and NBSAP explicitly recognise the rights and stewardship role of Māori as Treaty partners. The NAP proposes development of *Mātauranga Māori indicators* to enable monitoring and evaluation of impacts on biodiversity, mahinga kai, flora, fauna and human health and create data baselines that centralise indigenous knowledge and values, and can be used in environmental assessment (Ministry for the Environment, 2022).

3.6.4 Highlights

New Zealand's government has adopted an integrated work programme (2022–26) to deliver climate, biodiversity, and broader environmental outcomes (Ministry for the Environment, 2022). It focuses on overcoming barriers to native ecosystem restoration by reducing the cost of native plants, supporting long-term afforestation, and funding research into carbon sequestration and

land management impacts. Carbon offset funding, including through the Carbon Neutral Government Programme, is leveraged to deliver joint climate and biodiversity benefits.

Māori knowledge and co-governance play a central role. Concepts like *rauora* (interconnected wellbeing) and *mauri* (life-force) guide policy toward integrated outcomes: reducing emissions, restoring ecosystems, and improving human health. Māori rights, knowledge systems, and guardianship are embedded in climate and resource governance (Ministry for the Environment, 2022).

The One Billion Trees programme supports climate goals, biodiversity, and regional development by aligning tree planting with local environmental and cultural needs. As of late 2024, over 698 million trees have been planted, including more than 40 million directly funded through the programme. To further support sustainable land use, the Integrated Farm Planning Programme helps farmers incorporate biodiversity, climate resilience, and emissions planning into everyday practices (Ministry for the Environment, 2022). Circular economy policies include mandatory product stewardship schemes for tyres, farm plastics, and e-waste to reduce landfill methane, microplastics, and toxic leachate while promoting recycling (Ministry for the Environment, 2024b).

3.6.5 Challenges and limitations

While New Zealand's core strategies acknowledge important linkages between climate change and biodiversity, several key interconnections remain underdeveloped or unaddressed. Notably, climate-health links receive very little attention across the NDC, NAP, BTR or NBSAP, despite evidence of compounding health risks from air pollution, heatwaves, and vector-borne diseases. Similarly, interactions between pollution and biodiversity loss, such as microplastic impacts on marine ecosystems or pesticide runoff affecting native species, are recognised in the NBSAP , but not integrated into climate or adaptation frameworks. Trade-offs are also under-analysed: the NDC promotes afforestation and carbon removals (New Zealand Government, n.d.) and the BTR references "significant carbon sinks" and erosion control via forests (Ministry for the Environment, 2024b), yet neither addresses potential biodiversity or cultural conflicts from large-scale exotic tree planting. This suggests a need for stronger mechanisms to bring biodiversity–pollution–climate integration beyond pilot initiatives and into mainstream planning.

3.6.6 Outcomes and impacts

The government is developing "Mātauranga Māori indicators" to enable monitoring and evaluation of impacts of climate change on biodiversity, flora, fauna and human health. This will create data baselines that centralise indigenous knowledge and values, and can be used in environmental assessments (Ministry for the Environment, 2022). The Jobs for Nature programme was a NZ$1.2 billion COVID economic stimulus that funded ecosystem restoration projects nationwide, creating employment (close to 4,000 green jobs) while delivering biodiversity, climate mitigation and adaptation and water quality benefits (Ministry for the Environment, 2024a). The One Billion Trees programme has planted nearly 700,000,000 trees prioritising native species that store carbon, filter runoff and create habitat (Ministry for the Environment, 2022).

3.7 Panama

3.7.1 Country context

Panama is located at the southern tip of Central America, bordering Costa Rica and Colombia, and covers approximately 75,000 km^2 (IMF, 2024; UNEP, 2018). It has a population of around 4.5 million people and is classified as an upper-middle-income country with a service-based economy focused on logistics, financial services, and trade, particularly around the Panama Canal (World Bank, 2024a). The country hosts diverse ecosystems, including tropical and highland cloud forests, which cover 65% of the national territory, as well as extensive coastal zones with mangroves and coral reefs. Its geographic location and varied topography make Panama a biodiversity hotspot, though this biodiversity is increasingly threatened. The country is highly vulnerable to climate change, facing rising sea levels that endanger low-lying coastal and island communities, along with more frequent and intense extreme weather events. Additionally, deforestation driven by agriculture, livestock, and urban expansion poses significant risks to biodiversity and ecosystem health (República de Panama, 2020).

3.7.2 Integration of multiple crises in key policies

Although the *triple planetary crisis* is not explicitly stated in the analysed documents, the strong interlinkages between climate, biodiversity, and pollution with socio-economic factors are highlighted. Panama's updated NDC (2024), its NBSAP (2018), the BTR (2024), and the upcoming NAP all take an integrated approach to tackling these interconnected crises. Together, they promote NbS, ecosystem restoration, and circular economy practices to address climate change, biodiversity loss, disaster risk, pollution, and social vulnerabilities, particularly those related to poverty, gender, and intergenerational equity. The One Health approach is not mentioned.

In May 2024, Panama became the first country to submit its third **NDC (2024)**, reaffirming its strong commitment to the Paris Agreement (NDC Partnership, 2024a). The NDC takes an integrated approach to mitigation and adaptation, emphasising NbS and green infrastructure to address climate, disaster risk, and food security while promoting social equity. It includes commitments to restore 50,000 ha of degraded land through agroforestry and silvopastoral systems and supports a circular economy to boost resource efficiency and employment, especially for women. The NDC also aligns with Panama's biodiversity strategy by expanding protected areas and addressing land degradation and pollution.

Panama's **NAP** is currently under development and aims to integrate climate change considerations across all sectors and disciplines (UNEP, 2023). It will include four sectoral plans, aligned with Panama's updated NDCs, focusing on water resources, agriculture and food security, infrastructure and health. Emphasis is being placed on integrated approaches, particularly through NbS and ecosystem-based adaptation, to simultaneously address climate resilience and biodiversity conservation.

Panama's **NBSAP (2018)** outlines five strategic priorities up to 2050, including conservation and restoration, sustainable use, education and improved mainstreaming and governance, to address key drivers of biodiversity loss (República de Panama, 2018). It promotes adaptation through the restoration of forests, mangroves, and wetlands, which serve as carbon sinks and natural buffers against extreme events. The plan also targets pollution control via better watershed management and sustainable consumption and production practices. Complemented by Panama's 30x30 commitment, the NBSAP takes a holistic approach to enhance climate resilience, biodiversity conservation, and ecosystem health.

The **BTR (2024)** integrates comprehensive approaches to address the climate and biodiversity crisis, including NbS as a strategic priority to increase resilience and reduce disaster risk. In addition, reforestation measures, such as the National Reforestation Program, are being promoted to absorb carbon and restore degraded land through agroforestry practices and silvopastoral systems. The circular economy is a priority sector of Panama's NDCs, which is being addressed through initiatives such as updating environmental regulations, promoting a National Center for Circular Economy and developing a National Climate Change Plan for the Circular Economy to reduce emissions and improve resource efficiency. In addition, non-GHG-related indicators such as the reduction of deforestation through the National REDD+ Strategy and the strengthening of protected areas are explicitly mentioned and pursued (Ministerio de Ambiente de la República de Panamá, 2024).

3.7.3 Governance and implementation mechanisms

Panama's NDC and NBSAP are both led by the Ministry of Environment (MiAmbiente) with strong interministerial coordination and broad stakeholder engagement. The NDC was developed through a whole-of-government and whole-of-society approach, involving civil society, Indigenous peoples, local authorities, youth, the private sector, and academia (NDC Partnership, 2024a). The Ministry of Economy and Finance (MEF) plays a key role in mobilising climate finance, while MiAmbiente coordinates planning, monitoring, and reporting processes. For the NAP, a Coordination Platform and Working Group were established to ensure participatory development through collaborative workshops and stakeholder input (MiAmbiente, 2023). Similarly, the NBSAP was drafted through multi-sectoral consultations, and its implementation relies on cross-ministerial coordination, policy integration, and decentralisation to local governance. Panama emphasises horizontal policy alignment and stakeholder inclusion as central to effective environmental governance. The country also demonstrates leadership in tackling plastic pollution through its active participation in the High Ambition Coalition to End Plastic Pollution (Scheuchzer, 2024). In June 2025, Panama launched its 2040 Plastic Pollution Roadmap, reaffirming its commitment to circularity and long-term sustainability (La Web de la Salud, 2025). Moreover, **Panama's Nature Pledge**, launched in May 2025, adopts an integrated approach that aligns climate action, biodiversity conservation, and land restoration under the three Rio Conventions, promoting ecological connectivity, sustainable development, and community engagement (CBD, 2021; Ministerio de Ambiente, 2025).

3.7.4 Highlights

Panama's 2040 **Plastic Pollution Roadmap**, launched in June 2025, outlines a national strategy to tackle the environmental and health risks of plastic pollution through an integrated approach. It focuses on reducing single-use plastics, improving waste management and recycling infrastructure, promoting biodegradable alternatives, and fostering public awareness. The roadmap also encourages collaboration across sectors and supports innovation to drive green entrepreneurship and create sustainable jobs (Global Plastic Action Partnership, 2025; La Web de la Salud, 2025).

In June 2021, Panama expanded the Cordillera de Coiba Marine Protected Area to over 67,908 km^2, achieving the global 30x30 target nearly a decade early. This MPA protects a key migratory corridor for endangered marine species and reflects Panama's leadership in the High Ambition Coalition for Nature and People. The initiative combines legal enforcement, scientific monitoring, and stakeholder involvement to ensure sustainable marine resource management (Mission Blue, 2021).

3.7.5 Challenges and limitations

Despite Panama's commendable efforts to integrate climate and biodiversity goals across its updated NDC and long-term NBSAP, several limitations remain. First, key interlinkages, such as those between climate change and public health, or between biodiversity and pollution, are insufficiently explored, with the One Health approach notably absent. Although pollution, particularly from agriculture and urban development, is recognized, it is not strongly linked to biodiversity or health outcomes, indicating gaps in holistic policy integration (República de Panama, 2020). Second, while measuring, reporting and verification (MRV) systems for climate exist and biodiversity indicators are defined, there is limited integration of data to track synergies and conflicts across multiple environmental goals (República de Panama, 2020). Third, Panama also faces structural barriers to effective policy implementation, including institutional challenges in clarifying cross-sectoral responsibilities and operationalizing coordination mechanisms, societal challenges in linking climate action to poverty reduction, gender equality and inclusive development, as well as technological and capacity gaps, and financial constraints that require scaled-up private investment and international support (República de Panama, 2020).

3.7.6 Outcomes and impacts

As a member of the **High Ambition Coalition for Nature and People**, Panama has made notable progress toward the global 30x30 target, expanding the Cordillera de Coiba Marine Protected Area in 2021 and reaching 30% marine protection well ahead of schedule. This effort helps conserve important ecosystems, mitigate climate change, and reduce pollution, while the 30x30 Implementation Programme supports enforcement, restoration, and stakeholder engagement in ocean governance (McKinsey & Company, 2023). Complementing these actions, Panama is developing an integrated MRV system aligned with its NDC, SDGs, and national plans to track both mitigation and adaptation progress. Its NBSAP 2018–2050 also includes a monitoring framework with clear targets and indicators, supported by a National Biodiversity Information System to guide adaptive management and interinstitutional coordination (República de Panama, 2018, 2020).

4 Concluding remarks, synthesis and recommendations

4.1 Lessons learned

Efforts to address the interconnected challenges of climate change, biodiversity loss, and pollution are generating a growing body of experience across countries. Lessons from national planning and implementation reveal promising innovations in governance, NbS, participatory approaches, green finance, agricultural transformation, and public engagement: many of which may offer inspiration for EU and Germany as well as their international cooperation efforts.

Integrated governance and institutional coordination One of the most important enablers of integration is institutional coordination. Successful examples combine interministerial structures with inclusive platforms. Panama has perhaps the most comprehensive model, using a whole-of-government and whole-of-society approach (NDC Partnership, 2024a) that engagesministries, civil-society, Indigenous authorities, youth, academia and the private sector, while the Ministry of Economy and Finance steers resource mobilisation. Brazil demonstrates that cross-ministry coordination bodies (CIM and CONABIO) can align sectoral policies and budgets; synchronising the updates of the Climate Plan and the NBSAP under one steering group helped reduce overlap and embed biodiversity in climate action. (Fey et al., 2025). Colombia's SISCLIMA framework provides another structured mechanism for cross-sectoral alignment, (CAT, 2023; Climate Policy Database, 2016; NDC Partnership, 2024b), while Sweden's Environmental Objectives Council and Climate Policy Council ensure horizontal coordination and independent oversight. (Naturvårdsverket, 2023; Swedish Climate Policy Council, 2023). New Zealand offers another model of high-level coordination through its Climate Change Chief Executives Board and a Prime Minister–led interministerial group (Ministry for the Environment, 2024b). Together, these cases demonstrate that lasting integration requires both formal mandates and broad, multi-stakeholder participation.

Nature-based Solutions and Ecosystem-Based Planning

NbS are gaining traction as effective approaches to deliver both integrated environmental benefits as well as socio-economic co-benefits. Brazil has mobilised political and financial support by framing zero-deforestation and coastal restoration as joint mitigation and adaptation strategies. Colombia has advanced NbS through silvopastoral transitions and urban biodiversity projects, while platforms like SIIVRA improve targeting by integrating biodiversity and climate vulnerability data. (Durana et al., 2023; Grupo Argos, 2023,) Federal Agency for Nature Conservation, 2025). Japan promotes Eco-DRR, blue carbon, and satoyama landscape restoration, showing how localised approaches can build resilience and socio-economic benefits. (Ministry of the Environment, Government of Japan, 2021, 2023). Panama uses NbS for disaster risk reduction by restoring mangroves and wetlands, while the Cordillera de Coiba MPA demonstrates the potential of marine NbS when science-based zoning is combined with co-management. Sweden's application of NbS in urban and rural areas, coupled with participatory processes involving Indigenous Sámi representatives, highlights how ecosystem restoration can be embedded in broader sustainability and equity goals (Swedish Climate Policy Council, 2023). The country has embedded wetland and peatland restoration into its national mitigation and adaptation strategies, linking NbS directly to net-zero pathways.(Government Offices of Sweden, 2024; Sweden, 2024; Swedish Government, 2018).

Across all countries, the lesson is that NbS gain traction when they are embedded into wider policy frameworks and linked to sectoral development priorities, rather than being treated as stand-alone conservation measures. At the same time, the cases illustrate that NbS can only

deliver their full potential if designed with strong governance, local participation, and long-term financing mechanisms

Inclusive and participatory approaches

Inclusive and participatory governance emerges as another key success factor. Brazil's joint climate and biodiversity policy revision stands out for embedding the voices of civil society, Indigenous peoples, and scientists. Recognising Indigenous territories and giving Indigenous people a voice through national consultations and multi-stakeholder dialogues platforms helped strengthen rights and climate justice while improving environmental outcomes. New Zealand's integration of Māori knowledge and values into national strategies also sets a valuable precedent. The *Rauora* framework, outlined in the NAP (p. 30), views ecosystems, land, and people as one interconnected system. New Zealand is also developing *Mātauranga Māori* indicators to ensure monitoring systems are grounded in Indigenous knowledge and values (Ministry for the Environment, 2022). These examples highlight how participatory processes and cultural worldviews can anchor climate and biodiversity strategies in social legitimacy and justice.

Fiscal innovation and green finance

Several countries are demonstrating how fiscal and financial strategies can support integrated environmental action. Brazil's Amazon Fund and Climate Fund, along with subsidised rural credit for low-carbon agriculture, demonstrate how fiscal instruments can incentivise compliance and innovation. (Government of Brazil, 2024). Rwanda's FONERWA mobilises and coordinates climate finance while aligning it with community needs. New Zealand's *Jobs for Nature* programme, launched as a post-COVID stimulus, illustrates how public funding can create employment while delivering environmental restoration outcomes. Colombia has a National Biodiversity Finance Plan and participates in climate finance instruments, including sovereign green bonds, aligning biodiversity and climate funding (CAT, 2023; UNESCO, 2024). Panama's Ministry of Economy and Finance ensures environmental goals are mainstreamed into national budgeting, with the planned National Centre for Circular Economy set to drive green entrepreneurship.(Global Plastic Action Partnership, 2025; La Web de la Salud, 2025). These examples show how both public funds and blended finance instruments can strengthen cross-cutting outcomes when transparency and accountability are built in.

Policy innovation in agriculture and food systems

Countries are also innovating in aligning agricultural and food systems with climate and biodiversity goals, underlining that food systems reform is essential for delivering both environmental and socio-economic resilience. Brazil's low-carbon agriculture (ABC+) plan helps to mainstream sustainable agricultural practices by tying them to measurable emission-reduction targets. Combining technical assistance with performance-based incentives encouraged producers to adopt low-carbon, biodiversity-friendly systems while boosting productivity in the Cerrado and Amazon biomes. Japan's MIDORI Sustainable Food Systems Strategy sets regulatory targets for pesticide and fertilizer reductions, supports organic farming, and promotes rural revitalisation (Ministry of the Environment, Government of Japan, 2023). New Zealand's Integrated Farm Planning framework enables farmers to manage greenhouse gas emissions, biodiversity, and risk within a single system (Ministry for the Environment, 2024b), offering a potential model for the EU CAP reforms.

Public engagement and behaviour change

Finally, countries are investing in public engagement and behavioural change as key levers of transformation and indispensable complements to technical solutions. Rwanda's monthly community work initiative *Umuganda* exemplifies strengthened civic engagement and fosters

community-government relations. Japan's GX policy and the DECOKATSU movement use communication, lifestyle branding, and incentives to promote a shift toward low-carbon, nature-positive living. Sweden, too, has supported participatory policymaking, education, and urban circular economy initiatives that build public ownership of environmental objectives. Moreover, Brazil's approach of engaging agribusiness associations in the action plans to prevent and control deforestation in the Amazon and Cerrado biomes (PPCerrado and PPCDAm), shifted norms toward zero-deforestation supply chains and accelerated voluntary compliance.

Transparent integration of biodiversity and climate action

Finally, transparency frameworks can drive integration. Colombia links biodiversity and climate goals under the Enhanced Transparency Framework. By embedding biodiversity-related co-benefits into climate mitigation and adaptation measures, the country demonstrates how international reporting tools can promote policy coherence. The inclusion of platforms like SIIVRA and SIAC, which integrate biodiversity, land use, and climate vulnerability data, further supports evidence-based planning. The National Biodiversity Finance Plan, linked with climate finance instruments like green bonds, illustrates how integrated financing mechanisms can support action across the triple crisis (Colombia, 2024).Sweden demonstrates how transparency frameworks can serve as levers for policy integration. It links biodiversity co-benefits to core mitigation measures, notably through LULUCF, sustainable forestry, and ecosystem restoration. There are monitoring improvements, including efforts to combine emissions data with biodiversity and pollution indicators through the Swedish National Environmental Monitoring Programme, advancing integrated MRV systems (Naturvårdsverket, 2023; Sweden, 2024). Both cases illustrate how reporting requirements under the Paris Agreement and the CBD can be used proactively to align policies and track co-benefits.

4.2 Gaps and limitations

Siloed approaches and institutional fragmentation

The seven analysed countries increasingly acknowledge the need for integrated approaches to climate, biodiversity, and pollution, but implementation often remains fragmented. For example, in Rwanda inter-ministerial coordination remains informal and thus, lacks a clear mechanism to assure continuous political alignment across sectors (CAT, 2022a). In contrast, while Sweden has coordinating bodies, funding streams and legal mandates for climate and biodiversity are not always harmonised, leading to implementation challenges at subnational levels (Sweden, 2024). In Colombia, there are subnational implementation gaps, with limited technical capacity and financing undermining the full operationalisation of national plans. Pollution often remains only indirectly addressed.

Although health-related aspects are flagged across the countries' strategies, the practical integration is often missing. For example, Panama's NDC and NBSAP aim for alignment but do not fully address links between pollution, biodiversity, and public health. Similarly, Japan and New Zealand highlight certain interactions, such as microplastic and pesticide impacts on ecosystems yet fail to reflect these connections in broader adaptation or health strategies. Japan's NAP refers to compound risks like COVID-19 (pp. 13–14), but lacks a cohesive vision linking public health, pollution, and ecosystem degradation. New Zealand's policy documents omit climate–health linkages, despite rising risks from air pollution and heatwaves.

Trade-offs

Trade-offs across sectors are increasingly recognised but not systematically addressed. Brazil's leading role and promotion of biofuel production as part of its energy transition in their NDCs has detrimental impacts on land and water use, GHG emissions, as well as biodiversity (De Area

Leão Pereira et al., 2024). Sweden notes potential impacts from bioenergy on forests and soil carbon, though these concerns are still under-assessed (Angelstam et al., 2023). While bioenergy plays a significant role in decarbonising heating and electricity, the BTR notes uncertainties regarding long-term forest carbon sinks and the impact of harvesting on ecosystem integrity and soil carbon (Sweden, 2024). New Zealand encourages large-scale afforestation as part of its climate mitigation strategy (Ministry for the Environment, 2024b; New Zealand Government, n.d.) but does not consider biodiversity or cultural implications of exotic tree planting. Japan's NBSAP mentions risks from poorly sited renewables and agrochemical use but does not fully integrate these considerations into climate policies. In Colombia, key trade-offs related to agriculture and infrastructure remain unexplored in national strategies (Gobierno de Colombia, 2024; UNESCO, 2024).

Monitoring limitations

Monitoring systems often remain fragmented and sector-specific, limiting countries' ability to assess progress across environmental goals (see also Carnohan et al., 2023), despite first efforts at developing integrated monitoring frameworks and data systems. For example, Brazil has systems in place to monitor specific processes and outputs, such as the number and size of protected areas, but lacks a comprehensive instrument to track policy implementation, thus limiting the ability to evaluate the effectiveness of its biodiversity strategy (CBD, n.d.). Colombia's platforms such as SISCLIMA, SIIVRA and SIAC offer potential for integration, yet capacity and funding gaps limit subnational monitoring. Additionally, data remains partially siloed across climate, biodiversity, and pollution domains, limiting cross-sectoral learning (CAT, 2023; Climate Policy Database, 2016; NDC Partnership, 2024b). In Sweden, data systems also remain siloed and often operate under separate legal and institutional mandates (Naturvårdsverket, 2023; Sweden, 2024), while Rwanda and Panama lack integrated frameworks to track cross-cutting progress. Japan focuses on action planning without unified indicators to measure outcomes across the polycrisis.

Funding constraints

Financial and resource limitations are a shared barrier to effective implementation of integrated strategies. In Colombia, subnational implementation is particularly hampered by limited funding and technical capacity (CAT, 2023; NDC Partnership, 2024b). Sweden also struggles with fragmented funding streams and siloed institutions, which constrain the scaling of holistic solutions. While national and EU resources are mobilised for climate and biodiversity, funding silos and lack of integrated planning at the local level complicate cross-cutting action. Municipalities, tasked with delivering many NbS and adaptation measures, often lack sustained financial support for interlinked efforts (Sweden, 2024). Rwanda similarly experiences funding shortfalls, compounded by institutional fragmentation and weak coordination, which slow progress on aligning climate, biodiversity, and pollution agendas.

Lack of capacity

Finally, capacity limitations are another persistent challenge. In Rwanda, local governments often lack the institutional strength and technical expertise needed to implement national ambitions effectively. Japan, while more advanced in planning, faces challenges due to low public awareness (Ministry of the Environment, Government of Japan, 2021), insufficient biodiversity mainstreaming (Ministry of the Environment, Government of Japan, 2023), and uneven local adaptation capacity: only 52% of designated cities had adaptation centers in 2021 (Ministry of the Environment, Government of Japan, 2021).

4.3 Policy recommendations and outlook

Addressing the polycrisis requires integrated approaches. The country case studies in this report demonstrate that policy coherence and environmental synergies are possible when supported by enabling governance frameworks, inclusive institutions, and innovative finance.

1. Strengthen integrated policy frameworks

Countries should continue aligning their climate (NDC, NAP), biodiversity (NBSAP), and pollution strategies with each other and with national development plans. Integrated planning frameworks and cross-referencing of targets, as emerging e.g. in Brazil, Sweden, Japan and Panama, can reduce trade-offs and enhance co-benefits. Aligning the timing of major national strategy updates can enhance coherence.

2. Improve institutional coordination

Effective interministerial coordination bodies, such as Colombia's SISCLIMA, Japan's Global Warming Prevention Headquarters or New Zealand's Climate Change Chief Executives Board, could be replicated or strengthened. Clear mandates, shared indicators, and sustained political support are necessary for long-term coherence.

Sweden's Climate Policy Council and Environmental Objectives Council offer a particularly interesting example of institutionalised cross-sectoral advisory bodies that enhance coherence between climate, biodiversity, and pollution agendas. These models highlight the benefits of both interministerial coordination and independent oversight for long-term policy alignment.

3. Continued integration of NbS across sectors

NbS and EbA offer cost-effective means of addressing climate risks, biodiversity goals, and pollution reduction simultaneously. Their integration into sectoral plans such as for agriculture, water, health and disaster risk reduction, should be upscaled and supported by monitoring and knowledge-sharing platforms like SIIVRA in Colombia. Nature-based approaches such as watershed restoration, and silvopastoral systems in Colombia show how NbS can generate mitigation, biodiversity, and water quality co-benefits. Community-led and place-based restoration efforts like those in Rwanda's Nyungwe–Ruhango Corridor and Japan's *satoyama* landscapes, ensure ecological, cultural, and livelihood co-benefits. These approaches should be embedded more systematically in territorial and development planning, with pollution reduction goals more clearly articulated, and adhering to internationally agreed NbS standards (e.g. IUCN (2020), UNEA (2022).

4. Close data and monitoring gaps

Countries should invest in shared, open-access platforms that link climate, biodiversity, and pollution data to improve decision-making such as Colombia's SIIVRA platform. SIIVRA demonstrates the potential of integrated platforms to bridge data gaps.

Integrated information systems, such as Sweden's Environmental Monitoring Programme and Brazil's DataClima+, are important for tracking progress across crises. They demonstrate how governments can integrate biodiversity, climate, and pollution data streams into unified reporting frameworks. The evolution of Sweden's monitoring programme is illustrative of how MRV systems can support the Enhanced Transparency Framework under the Paris Agreement. New Zealand's Mātauranga Māori indicators track climate and biodiversity impacts through Indigenous knowledge systems.

5. Mobilise cross-cutting finance

Public and private finance streams should support joint outcomes. Instruments such as sovereign green bonds (e.g. Colombia, New Zealand) or climate funds aligned with biodiversity strategies (e.g. Brazil, Rwanda) offer replicable models. Expanding access to these instruments at subnational levels could address implementation gaps and unlock private-sector partnerships. Transparent MRV systems are needed to demonstrate impact (also for co-benefits) and unlock blended finance.

6. Enhance inclusive and participatory governance

Indigenous and local communities must be central actors in policy design and implementation. Good practices to build on include: regular and meaningful consultation with civil society, youth, academia, and private actors through formal platforms, as practiced in Panama and Colombia; legal frameworks that recognise environmental rights, Indigenous self-determination, and biodiversity protection; and mechanisms for free, prior, and informed consent, and co-governance (e.g. New Zealand). Building on local government capacity to plan and deliver integrated actions, including through technical assistance, participatory planning, and sustained financing can strengthen implementation at subnational levels.

Outlook

The integration of responses to the *triple/poly crisis* is gaining momentum but remains uneven. Continued international cooperation, knowledge exchange, and support, especially to developing and climate-vulnerable countries, will be necessary for scaling transformative practices. Building on the lessons of these countries, efforts should focus on supporting systemic integration at scale, aligning environmental objectives with social equity and sustainable development.

5 List of references

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