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UNLOCKING NATURE FOR DISASTER RESILIENCE

A POLICY GUIDE TO ENABLE NATURE-BASED SOLUTIONS

JAPANGOV
THE GOVERNMENT OF JAPAN

GLOBAL PROGRAM ON
NATURE-BASED SOLUTIONS
FOR CLIMATE RESILIENCE

GFDRR
Global Facility for Disaster Reduction and Recovery

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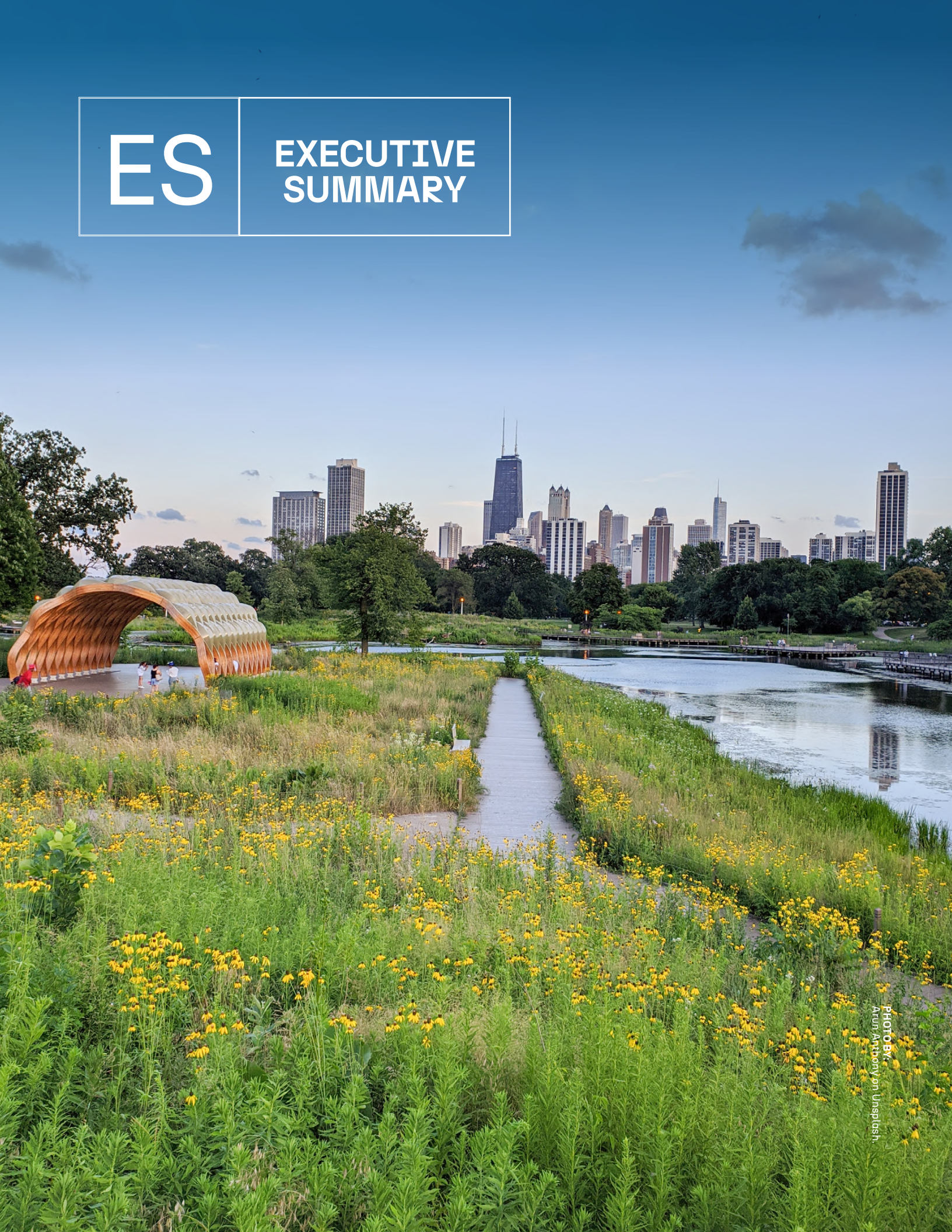
ES EXECUTIVE SUMMARY



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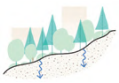
ENABLING NATURE-BASED SOLUTIONS FOR DISASTER AND CLIMATE RESILIENCE: A POLICY ROAD MAP

Nature-based solutions (NBS) are crucial for disaster risk reduction (DRR) and climate resilience, as they harness ecosystem services to mitigate natural hazards like floods, droughts, and erosion.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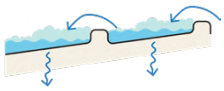
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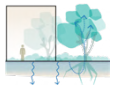
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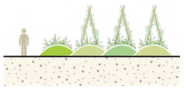
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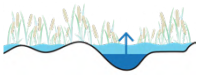
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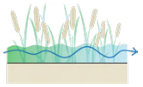
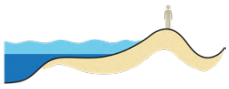

CONSTRUCTED INLAND WETLANDS


RIVER FLOODPLAINS


PONDS, LAKES, AND SMALL WATER BODIES


MANGROVE FORESTS


SALT MARSHES


SANDY SHORES

NBS deliver multiple socioeconomic and environmental benefits such as health, income generation, carbon sequestration, and enhanced biodiversity.


REEF ECOSYSTEMS


SUBMERGED AQUATIC VEGETATION


OTHER COASTAL WETLANDS

Global NBS investments are growing:

since 2012, the World Bank has financed 250+ projects, committing **US$12 billion, restoring 4.6 million hectares and improving 28 million lives** (World Bank 2025).

But funding remains far below climate targets: NBS finance must increase two-and-a-half-fold to reach US$571 billion by 2030. (UNEP 2026).

Policies are an accelerator: they unlock and scale public and private investment, moving NBS from pilots to transformative, climate-aligned action.

Some countries have started to integrate NBS into public policy, yet strategic uptake remains limited:

- → **Policy frameworks show gaps and barriers** for NBS implementation, scaling, and maintenance.
- → **NBS are not systematically integrated** into sector and subnational policies, leading to fragmented action.

KEY MESSAGE: POLICIES ENABLE SCALE.

A framework of enabling public policies is required that establishes the legal, financial, and operational mechanisms to allow, incentivize, and sometimes require the adoption of NBS for DRR and climate resilience.

CORE COMPONENTS OF AN ENABLING POLICY FRAMEWORK

Integration and alignment across levels: Policy reforms should follow a multilevel approach to be effective.

- **INTERNATIONAL AGREEMENTS** set the agenda and benchmarks.
- **NATIONAL POLICIES** establish the regulatory, financial, and strategic foundation.
- **SUBNATIONAL POLICIES** drive local implementation – each reinforcing the other to facilitate NBS uptake.

A mix of policy instruments: Strategically blending different policy instruments can help drive policy implementation by public and private actors and reduce trade-offs.

- **REGULATORY AND STRATEGIC:** Laws, standards, and strategies are crucial for sector and cross-sector NBS mainstreaming and rules of implementation.
- **ECONOMIC AND FINANCIAL:** Subsidies, tax incentives, and blended finance facilitate NBS financing for public and private investments.
- **INFORMATION:** Public advisory services, awareness-raising campaigns, and guidelines create knowledge for NBS implementation.
- **VOLUNTARY:** Public–private partnerships (PPPs), certification schemes, and management agreements (for example, with communities) support sustainable NBS.

Sector-wide mainstreaming:

Embedding NBS in DRR, climate, environmental, water, agriculture, building, land use, and urban planning policies is key to an aligned strategy. Further integration into economic sector policies increases NBS uptake and their impact on disaster and climate resilience.

Allow, incentivize, and require:

Policy reforms can follow a three-pronged approach, by allowing NBS (for example, removing barriers), providing incentives (for example, through simplified permits), and – where appropriate – requiring their adoption (for example, via compensation requirements).

SPOTLIGHT CASE

South Africa

South Africa has a mix of policies across multiple levels and sectors that enables NBS for DRR and climate resilience.

Regulatory policies that allow and incentivize NBS include the Disaster Management Amendment Act 2015, which encourages the integration of NBS in disaster preparedness and recovery, and the Revenue Laws Amendment Act 2008, which provides tax deductions for ecosystem conservation. These are supported by financial and voluntary policy instruments such as the Green Fund (which includes NBS financing) and the Kruger to Canyons Catchment Investment Programme (a PPP to protect watersheds, including through NBS). Further, sector policies allow for an aligned approach: the National Water Act 1998 requires the protection of water resources, and the Integrated Urban Development Framework 2016 promotes ecosystem restoration for urban resilience.

FOUNDATIONAL ALIGNMENT

- Establish a common statutory definition of NBS
- Embed nature as critical infrastructure

INSTITUTIONAL CAPACITY AND INCLUSIVE GOVERNANCE

- Involve environmental and DRR/resilience experts
- Integrate Indigenous peoples and local communities

10 GUIDING PRINCIPLES

POLICY INTEGRATION AND COHERENCE

- Integrate NBS into high-level development policies
- Design integrated sector policies
- Include NBS in ongoing policy-making processes

FINANCING, IMPLEMENTATION, AND ACCOUNTABILITY

- Assign finance ministries with a climate mandate and NBS budget
- Design adaptive policies based on robust monitoring frameworks
- Establish clear enforcement mechanisms for regulations

SECTOR POLICIES AS NBS ENABLERS

Disaster risk reduction (DRR)

- Integrate NBS into DRR laws, strategies, and plans.
- Align protection of high-risk areas with zoning and building regulations.
- Make the inclusion of NBS mandatory in climate risk assessment.

EXAMPLE

Mexico

Mexico's Quintana Roo funds reef and beach restoration through a Coastal Zone Trust, using hotel taxes and parametric insurance for rapid post-storm recovery.

Climate Change

- Include NBS targets in National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs).
- Use climate finance mechanisms to support NBS.
- Establish NBS criteria for climate resilience and justice.

EXAMPLE

Ethiopia

Ethiopia integrates NBS into high-level climate and economic strategies, strengthened by resilient agriculture, forestry, water, energy, transport, and health sector strategies.

Environment and biodiversity

- Integrate NBS into environmental laws, protected area (PA) regulations, and environmental and social impact assessment (ESIA) regulations.
- Create requirements on environmental data collection and sharing, including on NBS.
- Incentivize NBS investments through subsidies and accounting mechanisms.

EXAMPLE

Costa Rica

Costa Rica's Payments for Ecosystem Services Program, funded by a fossil fuel tax, pays landowners to conserve forests and restore degraded lands, increasing climate resilience.

Water

- Integrate NBS into water laws, regulations, and basin management plans as part of integrated water resource management (IWRM).
- Update official guidelines, engineering standards, and permitting for NBS.
- Simplify permitting and offer tax incentives and other benefits for private NBS investment.

EXAMPLE

Senegal

The transboundary Senegal River Basin Masterplan 2050, the development of which was supported by the World Bank, addresses flood and drought risk prevention, with action plans promoting NBS.

Agriculture and forestry

- Update agriculture regulations with ecological requirements for DRR, water security, and biodiversity, introducing NBS.
- Encourage Public-Private Partnerships for the adoption of agroecological practices.
- Promote sustainable forest management in national and subnational forest regulations.

EXAMPLE

India

India has advanced NBS through national and state policies such as the National Mission for Natural Farming, promoting NBS such as agroforestry to build resilience.

Building, land use, and urban planning

- Use zoning regulations and master plans to protect ecosystems in high-risk areas.
- Update (sub)national building codes with minimum green building requirements.
- Secure land tenure and involve communities to facilitate NBS uptake and sustainability.

EXAMPLE

The Philippines

The Philippines' Resilient and Green Human Settlements Framework, supported by a World Bank Catastrophe Deferred Drawdown Option (Cat DDO), integrates risk data and guidelines into local planning to enable NBS.

Other sectors: Transport, energy, tourism, extractives

- Include NBS in sector regulations and design codes across project phases.
- Require NBS in licensing and concession agreements for DRR and compensation.
- Establish financial incentives (for example, biodiversity credits) and accountability mechanisms.

EXAMPLE

Canada

In Canada, Québec's environmental policies and Hydro-Québec's Biodiversity Action Plan enable NBS and ensure that hydropower safeguards ecosystems, the rights of Indigenous peoples, and resilience.

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ABBREVIATIONS

BNG	Biodiversity Net Gain
Cat DDO	Catastrophe Deferred Drawdown Option
DPF	Development Policy Financing
DRM	Disaster risk management
DRR	Disaster risk reduction
ESIA	Environmental and social impact assessment
GFDRR	Global Facility for Disaster Reduction and Recovery
IPF	Investment Project Financing
IWRM	Integrated water resources management
NAP	National Adaptation Plan
NBS	Nature-based solutions
NDC	Nationally Determined Contribution
NGO	Nongovernmental organization
PA	Protected area
PES	Payments for ecosystem services
PPP	Public–private partnership
TNC	The Nature Conservancy
UNFCCC	United Nations Framework Convention on Climate Change

01 CONTEXT

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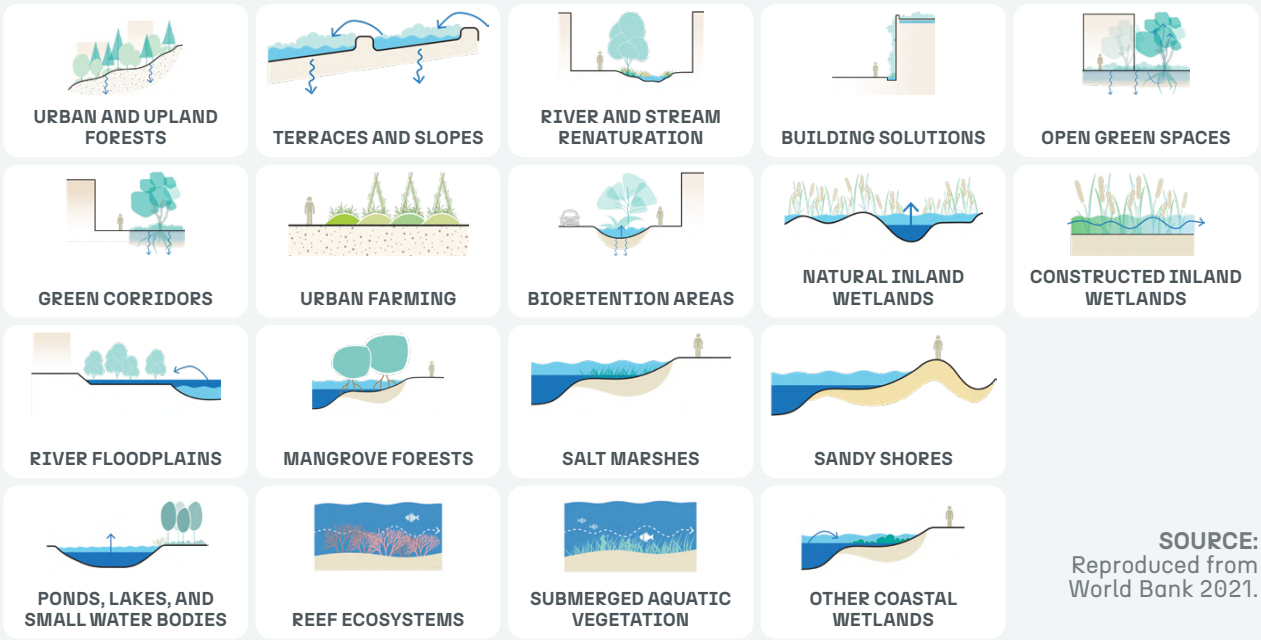
1.1. INTRODUCTION

Nature-based solutions (NBS) can help countries facing complex climate-related challenges to address disaster risks while providing important socioeconomic benefits. Increasing climate impacts, unplanned development, and ecosystem degradation are undermining the resilience of many countries to shocks and increasing their vulnerability to disasters. NBS offer integrated approaches that help manage disaster and climate risks, while providing multiple socioeconomic and environmental benefits.

NBS are "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 and resilience and biodiversity benefits" (UNEP 2022). These actions can involve conserving, rehabilitating, or establishing natural systems such as mangroves, urban green areas, river floodplains, coral reefs, and wetlands (figure 1.1).

This guide focuses on NBS for climate resilience and disaster risk reduction (DRR). As such, traditional conservation and restoration practices are also considered NBS if they aim for resilience or DRR while also caring for human well-being. For example, protecting an old-growth forest may qualify as an NBS when it helps manage flood and erosion risks. Moreover, an integral part of NBS is the participation of local communities, particularly vulnerable groups, to ensure social justice.[1]

FIGURE 1.1. NBS Interventions that Provide Benefits for Resilience



SOURCE: Reproduced from World Bank 2021.

1 For more clarity on NBS criteria, see the IUCN Global Standard for NBS: https://portals.iucn.org/library/node/49071.

NBS can complement or substitute gray infrastructure and provide multiple benefits, often at lower costs.[2] For instance, urban forests and green spaces across a city can collectively reduce stormwater runoff and mitigate flooding, making them a valuable component of a city's drainage system. At the same time, they can lower urban temperatures through shading and evapotranspiration, contributing to heat reduction strategies. Similarly, along coastlines, mangroves help dissipate wave energy and reduce storm surge height, which can decrease the need for costly embankments. They also stabilize sediments, helping to prevent erosion. Beyond these protective roles, both urban forests and mangroves provide additional benefits such as carbon sequestration, enhanced biodiversity, and recreational opportunities (van Zanten et al. 2023).

Investments in NBS can generate employment both during implementation and over the long term, particularly in ecosystem restoration, urban green infrastructure, coastal protection, and DRR activities. Recent estimates suggest that up to 63 million people could be engaged in NBS-related activities globally by 2030, across planning, construction, and operation and maintenance phases (Jongman, Lieuw-Kie-Song, and Portugal Del Pino 2025).

Despite their advantages, however, NBS continue to be overlooked by most public policy frameworks, which fail to address gaps and barriers that hinder NBS implementation (Pérez-Cirera, Cornelius, and Zapata 2021; OECD 2023). Prevailing regulations and technical standards instead focus on gray infrastructure to address sector challenges such as DRR and climate resilience (OECD 2020). Even countries that have integrated NBS into their policies struggle to move beyond siloed or one-off climate and environmental frameworks or translate national policies into subnational policy making and action. Further, many policies lack incentives or voluntary and mandatory provisions to encourage private investment in NBS, which contributes to the fact that private actors provide only about 12 percent of global NBS investments (UNEP 2026).

Successful implementation and scaling of NBS requires supportive policy frameworks that prioritize the environment and ecosystem-based approaches in multiple sectors. Aligning NBS efforts with broader development goals, such as climate action, DRR, sustainable development, food security, or infrastructure resilience, can facilitate the integration of natural solutions into national cross-sector agendas.

1.2. SCOPE OF THE DOCUMENT

This policy guide provides policy makers, technical specialists, and operational teams – including World Bank teams, governments, and development practitioners – with practical guidance on enabling NBS through public policies to enhance climate and disaster resilience.[3]

2 See van Zanten et al. (2023) for additional information on the benefits and costs of NBS.
3 The guide considers only climate-related disasters caused by hazards such as drought, flood, landslide, erosion, storm, heatwave, and wildfire.

International financing instruments offer governments a strategic opportunity not only to implement NBS but also to scale them up within their DRR, climate, and sector policies. Within the World Bank, policy-based lending instruments such as Development Policy Financing (DPF) have successfully advanced disaster risk management (DRM)-related policy reforms in many countries. This includes DPFs with a Catastrophe Deferred Drawdown Option (Cat DDO), which support the development and implementation of government-led policies aimed at strengthening DRM and climate resilience. While the World Bank's Investment Project Financing (IPF) instrument provides financial and operational support to specific projects, it sometimes involves policy components for project implementation, and operation and maintenance, such as regulatory requirements, institutional arrangements, or technical standards relevant to DRR and NBS investments. Accordingly, policy lending instruments, and partially also IPFs, provide a strategic opportunity to mainstream NBS within national disaster and climate resilience agendas.

The policy guide considers public policies[4] at international, national, and subnational levels, based on regulatory and nonregulatory policy instruments and an overarching set of guiding principles (chapter 2). It examines five key sectors for disaster and climate risk reduction: disaster risk reduction; climate change; environment and biodiversity; water; and land use and urban planning, with an overview of other relevant sectors (chapter 3). Each section highlights the role of NBS, identifies policy gaps, showcases opportunities and good practices, and provides a set of guiding questions. The proposed recommendations emphasize disaster and climate resilience while contributing to sector-specific goals.

Recognizing that there is no one-size-fits-all solution, this policy guide offers practical guidance featuring recommendations and good practices for enabling NBS through public policy. Policy adaptations should, however, be tailored to each country's unique context and development priorities, ensuring that NBS policies are both effective and locally relevant. Further, public policies are only one enabling factor for the implementation of NBS. Equally important aspects include political will, institutional arrangements, and technical capacity, among other factors (Martin et al. 2021).

The knowledge presented in this guide draws on previous DRR and NBS publications by the World Bank (for example, Browder et al. 2021 and World Bank 2021) and is based on a comprehensive literature and online review of scientific research and practice. The policy guide is situated within the current body of NBS knowledge, building synergies and linkages with recent publications. It draws on existing knowledge from research, international organizations, country reports, and policy frameworks.

4 By public policies, this document refers to a set of principles, guidelines, or rules established by government actors to guide decision-making and achieve specific objectives. They are shaped through political processes and reflect normative choices about public priorities. Policy framework, as used in this guide, is understood to mean the key policies (legally binding and nonbinding) across different levels and sectors that can enable or constrain the use of NBS for DRR.

02

INTEGRATING NATURE-BASED SOLUTIONS INTO POLICY REFORMS FOR DISASTER AND CLIMATE RESILIENCE

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2.1. WORKING AT DIFFERENT LEVELS OF THE POLICY FRAMEWORK

Policy reforms that aim to enable NBS for disaster and climate resilience should follow a multilevel approach. A single, isolated national policy is unlikely to change the status quo of how disaster and climate risks are managed at the local level – especially when it comes to using NBS instead of gray infrastructure. Instead, strategically linking international, national, and subnational policies provides a more effective framework that enables NBS implementation at scale.

While international agreements contribute to putting NBS on the political agenda and provide benchmarks, national policies are required to promote NBS across sectors and reduce legal barriers, and subnational policies are needed to guide local-level implementation. An analysis of the status quo of disaster risk management, climate, and sector policies at each level can help identify legal gaps and barriers, as well as existing enabling policies that may require strengthening (for example, through enforcement mechanisms or subnational policies).

In this context, policy coherence is essential as it ensures that priorities, standards, enforcement and financing across different policy levels and sectors are aligned and mutually supportive. This requires multilevel policy coordination to harmonize legal requirements, funding mechanisms, and operational guidelines for NBS, thereby maximizing synergies, efficient resource use, and impact while reducing conflicting priorities and other policy barriers. Opportunities to harmonize policies through cross-sector and multilevel coordination processes include the elaboration of national development plans, National Adaptation Plans (NAPs), or Nationally Determined Contributions (NDCs).[5]

The following sections provide an overview of the relevance of international, national, and subnational policies for enabling NBS, with more details provided in chapter 3.

2.1.1. INTERNATIONAL POLICIES

International agreements and global frameworks are critical to enable the widespread adoption and harmonization of NBS. They facilitate a common understanding, foster cooperation, establish legal guidance, enhance knowledge on NBS benefits and practices, and encourage countries to embed NBS into national strategies and sector policies. The following agreements are among the most relevant for disaster and climate resilience:

- **United Nations Framework Convention on Climate Change (UNFCCC),** particularly through the Paris Agreement (2015), can promote nature-based approaches, like natural reforestation, as part of climate mitigation and adaptation efforts integrated into countries' NDCs.
- **Kunming–Montreal Global Biodiversity Framework (2022)** positions NBS as crucial for enhancing climate resilience and reducing disaster risks.

5 See Browder et al. (2021) for more insights related to hydro-climatic risks.

- **Sendai Framework for Disaster Risk Reduction (2015-2030)** highlights NBS such as wetlands and mangroves as vital for reducing disaster risks. The United Nations Office for Disaster Risk Reduction guides NBS implementation under the Sendai Framework (UNDRR 2021).
- **United Nations Convention to Combat Desertification (1994)** advances land restoration and NBS practices such as reforestation to build resilience against drought, land degradation, and desertification risks.
- **Ramsar Convention on Wetlands (1971)** promotes the protection and restoration of wetlands and has helped countries worldwide establish wetland inventories. The 2022 Resolution XI.14 emphasizes the high relevance of NBS for DRR and climate resilience.

To be effective at the country level, however, international agreements need to be translated into national policy. This includes integrating the agreements into DRR strategies (chapter 3.2), national climate adaptation plans (chapter 3.3), and national biodiversity strategies and action plans (chapter 3.4).

Rwanda

Rwanda, following commitments to the Ramsar Convention, issued two ministerial orders in 2010 and 2017 on wetland inventories and management. Kigali demonstrated concrete policy action and became the fourth city in Africa to be awarded the Wetland City Accreditation in 2022.[6]

Indonesia

Indonesia's NDCs include specific targets on NBS for climate mitigation and adaptation – for example, restoring 2 million hectares of peatland – while establishing synergies with other international agreements.[7]

2.1.2 NATIONAL POLICIES

National policies help to scale up the adoption of NBS and embed them into national DRR, climate, and sector strategies. They can take various forms, including laws, regulations, strategies, and operational guidelines (chapter 2.2). At the core of this integration of NBS is a country's foundational legal framework, which ensures consistency and enforceability of actions across sectors.

Several countries have begun to integrate NBS into their national policies and development strategies. Instead of standalone NBS policies, countries often include NBS-related principles within sector legislation and guidance, including for DRR, climate, water, environment, and urban planning (see Dominica example, below, and sector policies under chapter 3). Embedding NBS into national development strategies can be highly effective, establishing NBS as a cross-sector planning theme, and often benefiting from allocated funds.

6 For more information on Kigali's award, see the city website at https://www.kigalicity.gov.rw/news-detail/city-of-kigali-awarded-wetland-city-accreditation-at-cop14.
7 For more information on Indonesia's NDCs, see the UNFCCC website at https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Indonesia/1/INDC_REPUBLIC%20OF%20INDONESIA.pdf.

Some countries have established standalone NBS policies. These are often strategies that specifically address the integration of NBS across sectors, including urban planning, water management, agriculture, forestry, and infrastructure. While such policies demonstrate high political priority, they may require additional sector and subnational policy updates to address policy barriers and effectively scale NBS.

Dominica

Dominica incorporated NBS in its Physical Planning and Building Code, with "planting of drought-resistant native species of vegetation" forming part of the identified slope stabilization techniques.[8]

The United States

The United States issued the Nature-Based Solutions Roadmap in 2022 as a national strategy to promote NBS in DRR, climate resilience, and sustainable infrastructure, supporting practices like green stormwater management and wetland restoration.[9]

2.1.3 SUBNATIONAL POLICIES

Although national policies set the overall policy framework, the actual implementation of NBS often depends on subnational policy making. State (or provincial) and municipal governments can create or update local laws, regulations, and zoning codes to promote NBS to address locally specific challenges. For example, they can create standards that require or encourage the incorporation of green infrastructure (like green roofs or permeable pavements) in new development projects. They can also offer tax incentives (for example, stormwater fees or reduced property tax) for NBS like rain gardens, sustainable farming, or green stormwater systems, helping reduce financial barriers to implementation. At the municipal level, NBS-related policies benefit from codesign and collaboration with communities and Indigenous populations – key stakeholders in managing natural resources.

The integration of NBS in urban master plans can be very effective in reducing local disaster and climate risks while achieving other sector-specific and overall development goals. An orientation on the use of specific policy instruments in urban plans for different NBS interventions is provided by Longato et al. (2024). Overall, the local level often shows the most trade-offs in NBS implementation, with local governments having to balance diverse interests and resources, for example, when protecting flood areas from urbanization.

8 For more information on Dominica's Physical Planning and Building Code, see the government website at https://dominica.gov.dm/laws/2022/Physical_Planning_Building_Regulations_2022_SRO_12_of_2022.pdf.

9 For more information on the Nature-Based Solutions Roadmap, see the Biden Administration archives at https://bidenwhitehouse.archives.gov/wp-content/uploads/2022/11/Nature-Based-Solutions-Roadmap.pdf.

British Columbia

In Canada, British Columbia's Climate Preparedness and Adaptation Strategy integrates NBS as one of the guiding principles, focusing on protecting watersheds, coastal ecosystems, and forests (provincial level).[10]

Belo Horizonte

The city of Belo Horizonte, Brazil, includes NBS in its Master Plan and New Urban Agenda, prioritizing resilient urban infrastructure and promoting the protection, conservation, and restoration of ecosystems, water resources, and natural habitats as essential for urban resilience (local level).[11]

2.2. USING A MIX OF POLICIES FOR NBS

Policy reforms should aim for a strategic mix of policy instruments to improve the uptake of NBS by public and private actors. Regulatory, economic, informational, and voluntary policy instruments (figure 2.1) can be combined at different levels and across sectors based on their suitability for achieving specific policy objectives related to NBS implementation:

REGULATORY INSTRUMENTS such as laws, regulations, and official guidelines set enforceable rules to mandate or guide NBS adoption – for example, land use regulations that integrate natural flood management. In a broader definition, this category also includes government strategies and planning documents (see Davis, Cuevas, and Gvein 2024).

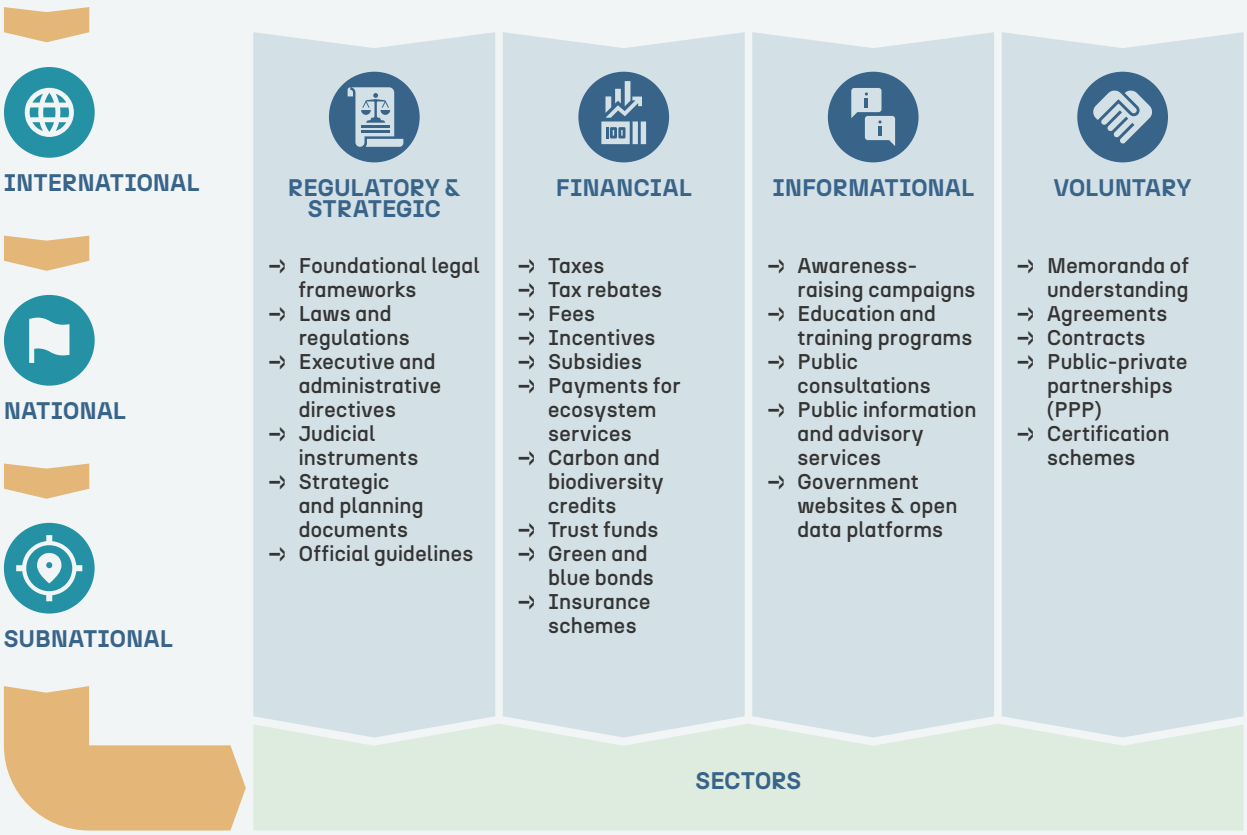
ECONOMIC INSTRUMENTS provide financial or market incentives like subsidies, tax deductions, or certification schemes to encourage NBS implementation – for instance, payments for ecosystem services (PES) programs that support reforestation to reduce erosion and flood risks.

INFORMATIONAL INSTRUMENTS focus on awareness-raising and capacity building – for example, DRR guidelines, training, and advisory services that enable stakeholders to adopt NBS.

VOLUNTARY INSTRUMENTS promote collaboration via nonbinding agreements – for instance, public–private partnerships (PPPs) that finance NBS or establish community-led green space management to achieve sustainable urban flood and heat resilience.

10 For more information on the Climate Preparedness and Adaptation Strategy, see the government website at https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/cpas.pdf.
11 For more information on Belo Horizonte's Master Plan, see the website on Brazilian municipal laws at https://leismunicipais.com.br/plano-diretor-belo-horizonte-mg.

FIGURE 2.1. Four Types of Policy Instruments



SOURCE: Based on Davis, Cuevas, and Gvein 2024

Regulatory and strategic instruments are often a preferred policy solution owing to their binding and guiding nature and their ability to enable large-scale (that is, country- and sector-wide) implementation of NBS. Nonregulatory instruments are, however, highly relevant to stakeholder engagement (for example, private investors), capacity building, and the creation of incentives, which contribute to ensuring that regulations and strategies are effectively implemented.

To develop a suitable mix, policies can be introduced following a flexible three-pronged approach to allow, incentivize, and require the adoption of NBS:

ALLOW NBS

by creating a policy environment that authorizes NBS. This helps remove barriers, demonstrate feasibility, and gain stakeholder trust through policies and activities for NBS implementation. This effort can include revising regulations that mandate gray infrastructure, for example, to allow NBS options alongside or in place of a traditional seawall for coastal flooding.

INCENTIVIZE NBS

by promoting good practices and introducing market and nonmarket mechanisms, thereby enhancing the visibility of NBS among professionals while increasing the attractiveness and financial viability of such solutions. This effort can include laws, strategies, or technical guidelines that clearly mention NBS as preferred options; improved access to public funds; or simplified permits for private NBS investments.

REQUIRE NBS

by establishing regulations, standards, and enforcement mechanisms to ensure the systematic adoption or consideration of NBS in disaster and climate resilience laws and strategies, official guidelines, and public and private investment projects. This could include, for example, establishing regulations that require landowners to protect a percentage of forest land, or building codes with a quota for NBS investment in new developments.

Depending on the policy-making context, different policy mixes may be appropriate for achieving the desired objectives. The existing policy and governance framework and stakeholders involved must be considered when determining the optimal combination of policies. Governments often encounter trade-offs and conflicts when introducing and implementing NBS.[12] A well-designed combination of policies can help manage these challenges.

For example, regulations on floodplain protection and restoration – which may involve land use conflicts and resettlement issues – can be complemented by economic instruments such as compensation schemes and livelihood programs; voluntary instruments like community management agreements; and informational instruments such as early consultation and advisory services. Although they cannot eliminate all conflicts, a combination of policies can strengthen governance processes, balance diverse interests, and promote social justice.

12 For more information on NBS benefits and trade-offs, see The Nature Conservancy (TNC) publication at https://resilientwatershedstoolbox.org/nature-based-solutions-benefits-and-trade-offs.

CASE STUDY

PHOTO BY: Kylefromthenorth on Unsplash.

South Africa

South Africa demonstrates that a mix of policy instruments across sectors and governance levels that considers NBS for DRR and climate resilience can create an enabling environment for NBS without the need for standalone NBS policies. Some of the existing policies are summarized below.

ECONOMIC INSTRUMENTS:

The Green Fund[13] channels public and private investment into green projects, including those using NBS for climate resilience and DRR.

INFORMATIONAL INSTRUMENTS:

The Cape Town Green Infrastructure Programme[14] provides information for decision-makers, including the Guideline on Watercourses, which covers nature-based flood risk management.

VOLUNTARY INSTRUMENTS:

The Kruger to Canyons Catchment Investment Programme,[15] a PPP to secure funds and public and private engagement for the protection of the watershed and improvement of water security, promotes the use of NBS.

REGULATORY INSTRUMENTS:

The Disaster Management Amendment Act (South Africa 2015) incorporates ecosystem-based risk reduction measures across sectors and encourages the integration of NBS in disaster preparedness and recovery efforts. The National Climate Change Response White Paper (South Africa 2011) explicitly includes ecosystem restoration and sustainable land management as adaptation strategies to enhance resilience against climate hazards such as flood and drought. The National Water Act (South Africa 1998) promotes the integrated management of catchments, protection and restoration of wetlands, and natural water flow regimes. The Revenue Laws Amendment Act (South Africa 2008) provides tax deductions for ecosystem conservation based on Biodiversity Management Agreements, with potential impacts for high-risk areas such as floodplains. The Integrated Urban Development Framework (South Africa 2016) mandates the incorporation of green infrastructure and adaptive measures to enhance urban resilience.

2.3. KEY PRINCIPLES TO GUIDE POLICY MAKING FOR NBS

To be effective, policies for enabling NBS for disaster and climate resilience should be grounded in guiding principles that ensure consistency, inclusiveness, and scalability in the design and implementation of NBS.

13 For more information, see the Green Fund web page at https://www.dffe.gov.za/GreenFund.
14 For more information, see the Green Infrastructure Programme web page at https://www.capetown.gov.za/departments-city-initiatives/environmental-resource-management/green-infrastructure-programme.
15 For more information, see the Kruger to Canyons Catchment Investment Programme website at https://kruger2canyons.org/wp-content/uploads/2025/05/K2C-Project-Profile-Catchment-Investment-Programme.pdf.

The following 10 key principles provide an overarching framework to guide policy making for NBS. They are mutually reinforcing and nonhierarchical, reflecting the fact that effective NBS policy reforms typically evolve iteratively and in parallel across sectors and governance levels. Rather than representing a sequence or prioritization, these principles describe a set of enabling conditions that can be adapted to different institutional, sector, and country contexts. Together, they inform the sector-specific analysis and recommendations presented in chapter 3.

FOUNDATIONAL ALIGNMENT

- **Establish a common statutory definition of NBS at national level** to ensure coherence in policymaking, implementation, and investment decisions across sectors and governance levels.
- **Embed nature as critical infrastructure,** integrating the value of ecosystems into all levels of policy making to strengthen national and urban climate resilience (for example, through natural capital accounting).[16]

INSTITUTIONAL CAPACITY AND INCLUSIVE GOVERNANCE

- **Involve environmental and DRR/resilience experts** in the design of sector policies to identify NBS opportunities and avoid unintended negative impacts or policy barriers.
- **Integrate Indigenous peoples and local communities** in relevant policy design and decision-making processes, recognizing their land rights, governance roles, and ecosystem knowledge.

POLICY INTEGRATION AND COHERENCE

- **Integrate NBS into high-level development policies** to address the standard hierarchy of laws, whereby environmental, climate, and disaster risk reduction (DRR) policies often receive lower priority than economic or sector policies. High-level agenda setting is essential to engage key sectors.
- **Design integrated sector policies** that incorporate targets and actions related to disaster and climate resilience, ensuring that NBS contribute to sector objectives and are not undermined by conflicting policy measures.
- **Include NBS in ongoing policy-making processes** rather than creating standalone policies, using current and upcoming policy revisions as windows of opportunity for effective sector-wide mainstreaming of NBS and resilience.

FINANCING, IMPLEMENTATION, AND ACCOUNTABILITY

- **Assign to finance ministries DRR[17] and climate mandates and budgets for NBS,** to enable public investment in NBS and financial incentives to attract private sector investment.
- **Design adaptive policies based on robust monitoring frameworks** that include indicators and guidelines and ensure their continuous refinement in response to changing conditions.
- **Establish clear enforcement mechanisms for regulations,** with public and civic oversight to safeguard NBS investments by monitoring compliance and implementing sanctions.

16 For more information on natural capital, see the World Bank website at https://www.worldbank.org/en/topic/natural-capital.
17 Mandates can include financial analysis of climate risks and instruments to track climate finance. For more information, see https://www.imf.org/-/media/files/publications/howtonotes/2022/english/htnea2022006.pdf.

03 SECTOR POLICIES TO ENABLE NATURE-BASED SOLUTIONS

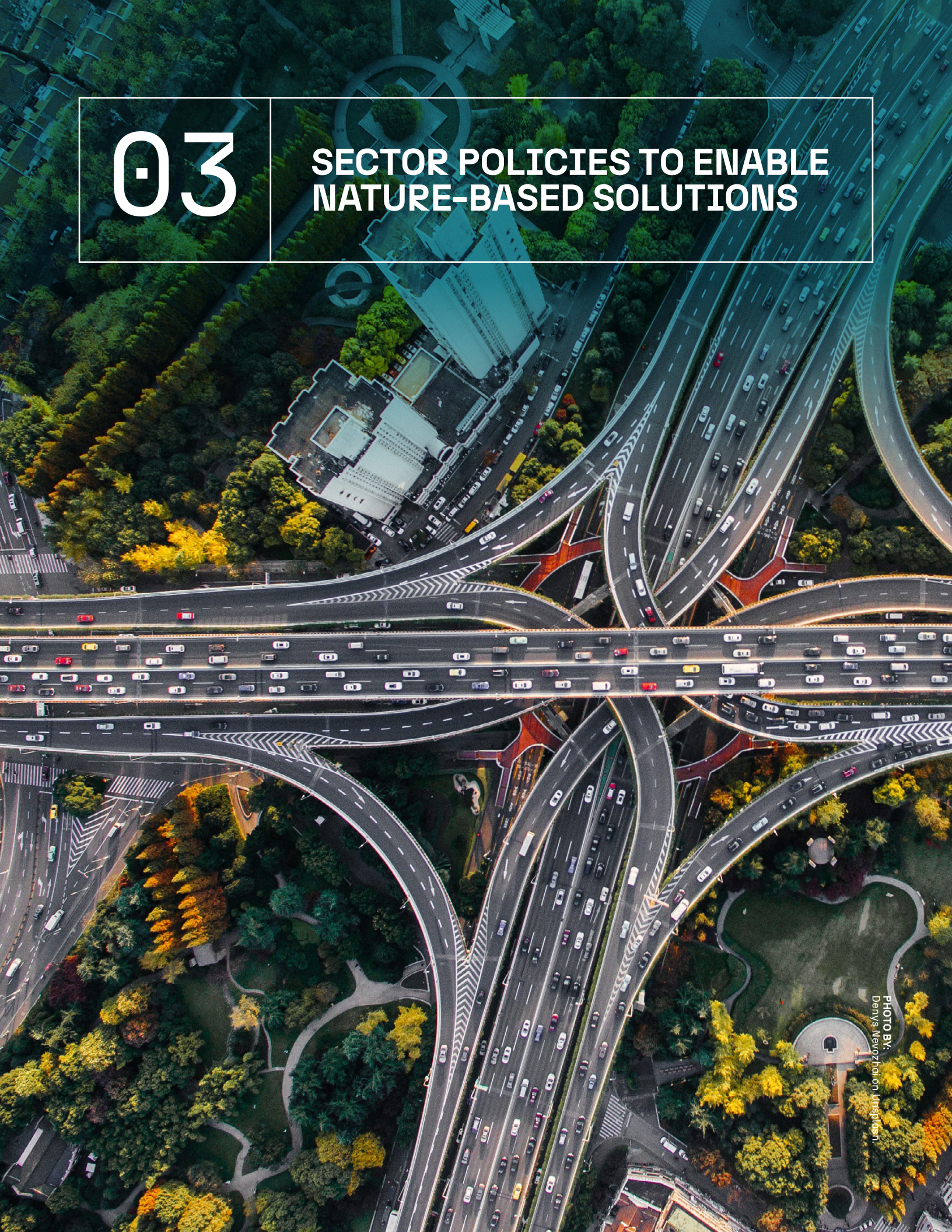


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PHOTO BY:
Mark Harpur on Unsplash.

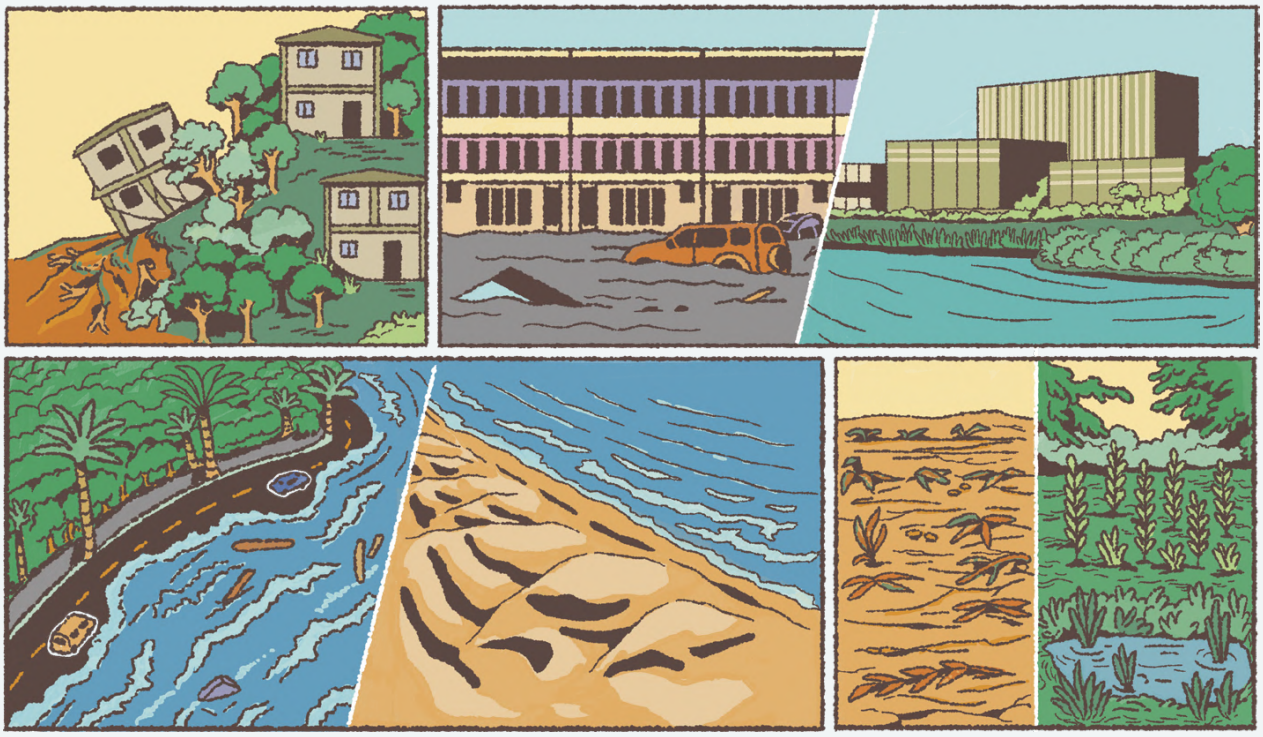
3.1. ROLE OF SECTOR POLICIES IN ENABLING NATURE-BASED SOLUTIONS AND DISASTER RISK REDUCTION

Sector policies are both an entry point and play a critical role in creating an enabling environment for NBS by integrating nature into decision-making across various sectors. Policies specifically addressing DRR and climate change, as well as environment, water, agriculture, forestry, land use, and urban planning, serve as primary enablers of NBS. Other sectors, however, including transport, energy, tourism, and industry, can also contribute significantly to the widespread adoption of NBS, allowing for more resilient infrastructure investments and economies.

When working with sector policies, cross-sector collaboration is essential. Where possible, policy-making processes should involve interministerial working groups or other collaboration formats, to ensure alignment, coherence, and harmonization of policies.

This section examines the role of sector policies in enabling NBS for disaster and climate resilience, highlighting relevant sector policies, policy gaps, opportunities for NBS implementation, and good practice examples. It also provides guiding questions to assess the extent to which NBS is integrated and coherent within sector policies.

3.2. DISASTER RISK REDUCTION POLICIES



WHY DO DRR POLICIES MATTER FOR ENABLING NBS?

Ecosystem degradation intensifies disaster risks by eroding natural services such as flood control, slope stabilization and soil moisture conservation. This heightens vulnerability, weakens adaptive capacity and drives greater socioeconomic losses. Disasters in turn damage ecosystems, creating feedback loops that worsen future risks and undermine recovery. Ecosystems are increasingly threatened by climate change, compromising their ability to provide essential economic, health, and environmental services (UNDRR 2020). To effectively reduce these risks, DRR policies must address their root causes, which calls for the integration of NBS into planning and implementation. Strengthening the resilience of ecosystems must be a shared priority of both DRR and environmental policies.

Relevant disaster risk reduction policies for NBS:[18]

National and state DRR laws, strategies, and plans can set the framework for integrating NBS such as floodplain restoration into countrywide efforts. Municipal DRR and urban resilience plans can integrate specific NBS measures and budgets for local risk reduction (for examples, see UNDRR GETI 2025).[19]

18 Note: This and the following sector policy overviews are not an exhaustive list of all relevant policies. They can be used as a starting point for policy analysis.
19 Refer to Browder et al. (2021) on enabling DRR policy frameworks for hydro-climatic risks.

Trust funds (for example, based on taxes) and innovative instruments such as green bonds and parametric insurance can finance NBS (see Mexico's example below).[20] Risk insurance schemes can incentivize NBS, such as by offering lower rates for practices such as agroforestry.

Voluntary agreements (for example, with local DRR committees) can facilitate NBS implementation and maintenance (for example, mangrove reforestation).

Community/stakeholder training and information services (for example, drought bulletins) by local authorities or partners can support uptake of NBS for targeted risk reduction.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH DRR POLICIES?

Ecosystem degradation is a critical but frequently neglected risk factor that is overlooked in DRR policies and strategies.

Include in DRR policies and strategies provisions for the protection and restoration of critical ecosystems and their services (for example, natural buffer zones such as floodplains or mangroves).

Establish monitoring frameworks to track ecosystem losses, as well as the benefits of NBS for DRR – for example, using indicators such as hectares of ecosystem with climate resilience benefits restored (also refer to Dumitru et al. 2021).

Zoning regulations for hazardous areas do not exist or are not enforced. As a result, floodplains and other high-risk areas are increasingly occupied through settlement and economic activity.

Align DRR with zoning, land use, and environmental laws and regulations to designate no-build zones and natural buffers in areas that deliver essential ecosystem services for DRR (for example, floodplains, coastal wetlands, or upstream forests). Enforce restrictions on infrastructure expansion and land use conversion in these areas, while promoting their use for sustainable livelihoods-such as agroforestry or ecotourism – to align DRR with local development goals.

Establish compliance mechanisms with clear sanctions for unauthorized development in protected areas (PAs). Develop independent oversight bodies, use satellite monitoring to track illegal developments, and involve local communities and nongovernmental organizations (NGOs) to monitor noncompliant developments.

Align building permits with zoning regulations, ensuring local implementation. Provide open zoning data (including hazardous and no-build zones) and digitize building permits to enhance transparency.

20 For more information on the Trust Fund, see TNC's website at https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_Mexico_CoastalManagementTrust_Factsheet.pdf.

DRR plans and frameworks often prioritize gray infrastructure solutions (for example, sea walls, levees) over NBS owing to a lack of awareness, lack of capacities, or misperceptions of higher reliability or cost-effectiveness. Further, opportunities to complement and integrate NBS with gray infrastructure are often missed because of siloed planning.

Explicitly integrate NBS into DRR laws, strategies, plans, and operational guidance as viable tools for reducing disaster risks, alongside gray infrastructure.

Integrate NBS into infrastructure standards and planning frameworks, ensuring that natural and hybrid options are systematically considered in project appraisals.

Make the inclusion of NBS mandatory in climate risk assessment and planning processes. Risk assessments should include existing NBS and demonstrate the potential for risk reduction of new NBS. DRR planning should consistently evaluate the feasibility and appropriateness of NBS, with engagement from environmental specialists.

Facilitate the development of insurance schemes for NBS. Like gray infrastructure, NBS assets can benefit from insurance to ensure rapid recovery after disasters. Supportive policies can include risk assessment standards and incentives that allow insurers to design suitable products (see Mexico example, below). Without policy support to foster these markets, stakeholders may continue to favor gray infrastructure with established risk transfer solutions.

GUIDING QUESTIONS FOR ANALYZING EXISTING DRR POLICIES

Do the DRR law, national, state and municipal DRR strategies, plans and official guidelines:

- Restrict or prohibit developments in floodplains, natural coastlines, wetlands, and native forests or other key natural buffers?
- Integrate NBS or related concepts and measures such as green infrastructure, natural flood management, and ecosystem restoration, alongside gray infrastructure for DRR investments?

Check further policies for cross-sector coherence by asking:

- Do environmental policies on protected areas (PAs) exist that include critical ecosystems for DRR?
- Do national and subnational land use laws and building codes align in terms of building restrictions?
- Do national and subnational building codes and technical standards prioritize gray (DRR) infrastructure investments?

PHOTO BY: Etienne Lehuédé on Unsplash.

France

A Policy Framework for Coastal Risk Management

To reduce risks from coastal erosion and flooding while preserving natural ecosystems, France has integrated NBS into coastal and flood risk management laws. The 1986 Coastal Law[21] restricts construction within 100 meters of the shoreline, mandates strategic retreat from erosion-prone areas, and strengthens natural coastal defenses by preserving dunes, wetlands, and mangroves. The Coastal Law is enforced through the 1995 Barbier Law[22], which requires municipalities to elaborate a coastal risk prevention plan to be integrated into their local urban plans. At the same time, the Coastal Law formalized wetland compensation by introducing the 'avoid, reduce, compensate' hierarchy, which emphasizes first avoiding environmental damage, then minimizing impacts that cannot be avoided, and finally providing compensation as a last resort.

With the 2010 Grenelle 2 Law,[23] France introduced a maritime governance system with one national and four local coastal councils. The law established an "ecological democracy" model, bringing together state, local authorities, employers, employees, and environmental nongovernmental organizations (NGOs) to collaborate on environmental policy formulation and implementation. France's coastal policy framework also integrates enforcement mechanisms, such as local building permit controls, judicial actions,[24] and fines, as well as control through public and NGO oversight (Prieur 2020).

PHOTO BY: Pixabay

Vanuatu

A Disaster Risk Management Framework that Integrates NBS

Vanuatu's Climate Change and Disaster Risk Reduction Policy (2016–2030)[25] provides an overarching policy for national DRR. It promotes NBS such as mangrove restoration, watershed protection, and forest conservation to reduce cyclone, flood, and coastal erosion risks. The policy emphasizes the integration of traditional knowledge with scientific practices and community participation, supported by local disaster and climate change committees. DRR is embedded in the National Sustainable Development Plan (People's Plan), which prioritizes sustainable agriculture, forest and catchment protection, and prevention of coastal degradation. Complementary sector policies, including the National Environment Policy and Implementation Plan (2016–2030) and the Sustainable Tourism Strategy (2020-2030), reinforce NBS through biodiversity conservation, ecosystem restoration, and incentives for eco-friendly investments.

To strengthen implementation and provide contingent financing for disasters, the World Bank supported Vanuatu through a Cat DDO. Through the National Land Subdivision Policy (2019), the Cat DDO advanced risk-based land use planning and introduced guidelines for subdivision design requiring ecosystem-based adaptation and risk mitigation measures that work with natural systems.[26]

21 For more information on the Coastal Law, see the government website at https://www.ecologie.gouv.fr/politiques-publiques/loi-relative-lamenagement-protection-mise-valeur-du-littoral.

22 For more information on the Barbier Law, see the government website at https://www.legifrance.gouv.fr/loda/id/JORFTEXT000000551804.

23 For more information on the Grenelle 2 Law, see the government website at https://www.legifrance.gouv.fr/loda/id/JORFTEXT000022470434.

24 For example, after a deadly storm in 2010, mayors were held accountable for encouraging real estate development in high-risk areas and obstructing Flood Risk Prevention Plans. See France 24 website at https://www.france24.com/en/20140915-french-councillors-manslaughter-charges-over-lethal-2010-storm.

25 For more information on the Climate Change and Disaster Risk Reduction Policy, see the PreventionWeb link at https://www.preventionweb.net/files/46449_vanuatuccdrrpolicy2015.pdf?startDownload=true.

26 For more information on the Cat DDO, see the program document at https://documents1.worldbank.org/curated/en/859991578711682663/pdf/Vanuatu-Disaster-Risk-Management-Development-Policy-Grant-with-a-Catastrophe-Deferred-Drawdown-Option-Project.pdf.

PHOTO BY: Leo Escala on Unsplash.

Mexico

Coastal Zone Management with an Insurance Scheme

DRR in Mexico's coastal areas is guided by a multisector and multilevel policy framework that integrates nature-based approaches, including through DRR, marine, environmental, and land use policies, as outlined in the 2018 National Policy for Seas and Coasts of Mexico.[27]

At the state level, authorities have introduced innovative financing instruments through a trust fund and an insurance scheme. The state of Quintana Roo has become a pioneer for nature-based coastal protection – the Quintana Roo Coastal Zone Management Trust,[28] created with The Nature Conservancy and local hotel owners, funds reef and beach restoration with support from hotel taxes and donations. Through an innovative parametric insurance, the trust ensures rapid ecosystem recovery after storms, thus operationalizing national policy goals of risk reduction and sustainable development for coastal communities.

3.3. CLIMATE CHANGE POLICIES

27 For more information on the National Policy for Seas and Coasts of Mexico, see the government website at https://www.dof.gob.mx/nota_detalle.php?codigo=5545511&fecha=30/11/2018#gsc.tab=0.

28 For more information on the Trust Fund, see TNC's website at https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_Mexico_CoastalManagementTrust_Factsheet.pdf.

WHY DO CLIMATE CHANGE POLICIES MATTER FOR ENABLING NBS?

Climate change poses a significant risk to ecosystems by increasing the frequency and intensity of hazards like drought, flood, and wildfire, and by changing the composition, functioning, and location of ecosystems. Emissions reduction policies can be a long-term investment in healthy ecosystems and the sustainability of NBS. At the same time, climate policies can strengthen ecosystem resilience by promoting the adoption of NBS, which provide both adaptation and mitigation benefits for climate change and contribute to multiple additional benefits, including biodiversity, and broader development goals (Pörtner et al. 2022). To scale and sustain NBS, supportive climate policies are essential, as they establish the frameworks, financing, and incentives needed for effective implementation.

Relevant climate policies for NBS:

National and state climate laws, NDCs and adaptation strategies and plans can harness the value of NBS for both carbon sequestration and adaptation (Seddon et al. 2019). Urban resilience plans can integrate NBS such as street trees, urban parks, green roofs, and green district developments.

Climate action funds, green bonds,[29] and targeted subsidies (for example, green roof programs) can finance nongovernmental NBS action. City climate budgets can boost cross-sector NBS investments.[30] Carbon credits with strict environmental and social criteria can support financing.[31]

City climate networks (for example, C40 Cities) and partnerships can support shared resources for NBS implementation, while climate and green certification schemes help encourage NBS uptake by the private sector. Neighborhood and/or community maintenance agreements support NBS management, for example, of urban green spaces.

Cities can have an impact on NBS implementation through information campaigns (for example, the Cities Refresh initiative),[32] reference guidelines (for example, for climate-resilient gardens), and advisory services (for example, hotline for funding information). Climate maps, tree inventories, and other open data can support informed NBS investment decisions.

29 For example, the City of Gothenburg, Sweden, pioneered the introduction of a Green Bond Programme for climate mitigation and adaptation investments, supported by the World Bank. See the official document at https://mycovenant.eumayors.eu/docs/benchmarks/docs/114420_1415957090.pdf.

30 For more information see the C40 Knowledge Hub online policy brief on climate budgets at https://www.c40knowledgehub.org/s/article/Climate-budgets-why-your-city-needs-one?language=en_US.

31 For more information on carbon credits for NBS, see the World Resources Institute website at https://www.wri.org/insights/corporate-financing-nature-based-solutions-what-next.

32 For more information on Cities Refresh, see the European Commission website at https://eu-mayors.ec.europa.eu/en/Cities-Refresh.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH CLIMATE POLICIES?

Climate plans and strategies may lack concrete NBS measures with clear and measurable targets and dedicated funding.

Ensure that climate plans or strategies (such as NDCs or NAPs) explicitly include commitments to ecosystem conservation and restoration, with quantifiable NBS targets for both mitigation and adaptation. Adaptation targets must tackle identified climate vulnerabilities, whereas mitigation targets should be grounded in reliable carbon-sequestration data and accounting methods (Seddon et al. 2019).

Use climate finance mechanisms to support NBS. Ensure that the legal framework includes provisions for NBS funding, for example, by mandating that a share of climate finance is allocated to NBS, or by creating incentives for private sector investment. A balanced allocation of resources between adaptation and mitigation can further stimulate NBS to reach multiple national objectives. Likewise, balancing biodiversity and climate funding creates powerful incentives for NBS (for example, financing natural forests with high biodiversity instead of monocultures).

There is often a tendency to prioritize NBS within forest ecosystems, which can inadvertently overshadow other ecosystems vital for both climate change mitigation and adaptation, such as wetlands, coastal zones, and grasslands.

Align climate change laws and regulations with sector laws to reinforce ecosystem protection and embed NBS within sector climate adaptation plans. Strengthen cross-sector coordination to mainstream NBS into agriculture (for example, agroforestry), water management (for example, wetland restoration), and urban planning (for example, natural stormwater management).

The absence of clear standards and robust accountability mechanisms can enable greenwashing practices, undermining the integrity and sustainability of NBS.

Establishing and enforcing clear criteria for what qualifies as NBS for climate change mitigation and adaptation is essential to differentiate genuine interventions from greenwashing. This could mean, for example, using the definition of NBS set by the United Nations General Assembly in 2022 (UNEP 2022), as quoted in section 1.1 of this policy guide. Independent third-party verification, combined with meaningful engagement of local communities, is critical to assess and validate the environmental and social outcomes of NBS.

GUIDING QUESTIONS FOR ANALYZING EXISTING CLIMATE POLICIES

Do the climate laws, NAP, NDCs, and other state and municipal climate (adaptation) strategies and action plans:

- Refer to NBS or the role of ecosystems for climate resilience and DRR, for example, to address international commitments?
- Include specific NBS measures for climate resilience/DRR with clear targets (for example, share of rehabilitated wetlands) and budgets?

Check further policies for coherence by asking:

- Do national and subnational development strategies/plans, DRR policies, and environmental policies follow the same approach to NBS to strengthen national/local resilience?
- Do technical guidelines exist in the DRR, water, or building sectors that allow and specify the NBS measures suggested in climate policies?

EXAMPLES OF GOOD PRACTICE

PHOTO BY: Kaleab on Unsplash.

Ethiopia

High-level Integration of Climate Resilience and NBS

Ethiopia has established a comprehensive framework for climate adaptation, integrating NBS and climate resilience into high-level development policies and across various sectors. Central to this effort is the Climate-Resilient Green Economy Strategy (2011),[33] which aims to harmonize economic growth with environmental sustainability. It promotes nature-based approaches such as reforestation and climate-smart agriculture. Directly linked to this policy, climate-resilient sector strategies were adopted for the agriculture, forestry, water, energy, transport, and health sectors. For example, the Climate Resilient Transport Sector Strategy (2015)[34] promotes adaptive infrastructure, including green corridors and sustainable drainage.

Ethiopia's Long-Term Low Emission and Climate Resilient Development Strategy (2020–2050)[35] continues this emphasis on NBS across forestry, energy, agriculture, and urban planning. The National Blue Economy Strategy (2023-2027)[36] supports sustainable use of water resources, eco-friendly fisheries, water-based tourism, and conservation of aquatic ecosystems. Regulatory policies are complemented by voluntary initiatives like the Green Legacy Initiative, which planted over 30 billion trees in six years, and government capacity-building programs, for example, on sustainable agriculture practices.

33 For more information on the Climate-Resilient Green Economy Strategy, see the government website at https://www.epa.gov.et/images/Polices/CRGE_Strategy_Final.pdf.
34 For more information on the Climate Resilient Transport Sector Strategy, see the government website at https://www.mofed.gov.et/media/filer_public/15/31/153174c3-b472-4339-b3bb-fb2c48cad629/transport_cr.pdf.
35 For more information on the Long-Term Low Emission and Climate Resilient Development Strategy, see the government website at https://climate-laws.org/document/ethiopia-s-long-term-low-emission-and-climate-resilient-development-strategy-2020-2050_899b.
36 For more information on the National Blue Economy Strategy, see the government website at https://climate-laws.org/document/national-blue-economy-strategy-of-ethiopia-2023-2027_7fc7.

PHOTO BY: Aarom Ore on Unsplash.

Peru

Vanguard for NBS in Adaptation and Mitigation

Peru's climate policy framework positions the country as a vanguard for NBS. Peru's National Framework Law on Climate Change (2018), its updated NDC of 2025, and the National Climate Change Strategy towards 2050[37] embed ecosystem-based measures as core strategies for resilience and mitigation, while 35 percent of actions in its National Adaptation Plan (2021) are classified as NBS. These climate policies are complemented by sector strategies that reinforce NBS: the National Strategy for the Restoration of Ecosystems and Degraded Forest Lands (2021-2030) promotes sustainable forestry and landscape restoration; the National Agrarian Policy (2021-2030) integrates climate-smart agriculture practices such as agroforestry and soil regeneration; and the National Water Resources Policy and Strategy (2015) prioritizes watershed protection and green infrastructure for drought and flood management. Based on the Law on Mechanisms of Remuneration for Ecosystem Services (2014), municipalities must also show concrete policy action, prompting the cities of Lima and Moyobamba to adopt a water tariff model that charges residents a small fee to fund watershed conservation and rainforest restoration.

The World Bank bolsters these efforts through a DPF-Cat DDO that enhances Peru's PPP framework to channel private funds for climate investments and supports policies for reforestation on degraded lands and promotion of climate-smart agriculture.[38]

PHOTO BY: Tyler Lastovich on Pexels.

New Zealand

Emissions Trading System Integrating Forestry

The New Zealand Emissions Trading Scheme, introduced by the Climate Change Response Act 2002,[39] is one of the more mature carbon pricing mechanisms in operation. One of its distinguishing features is the incentives it provides for forest investments. The scheme allows authorities to account for the sequestration of carbon in forests, meaning that activities such as afforestation, reforestation, and improved forest management can generate carbon credits to sell or trade in the market. This provides financial incentives for forestry projects and the revenue from these transactions can support further investments in forestry and land use projects involving NBS that reduce risks related to flood, drought, wildfire, and erosion.

A recent Amendment Bill[40] to the scheme aims to limit the conversion of farms to exotic forests (often monoculture plantations), which may help to restore more natural forest ecosystems in the future. This increases the potential to implement NBS for DRR, as native forests have a positive impact on the water balance and soil quality, while monoculture plantations can even increase disaster risks (Wang et al. 2023).

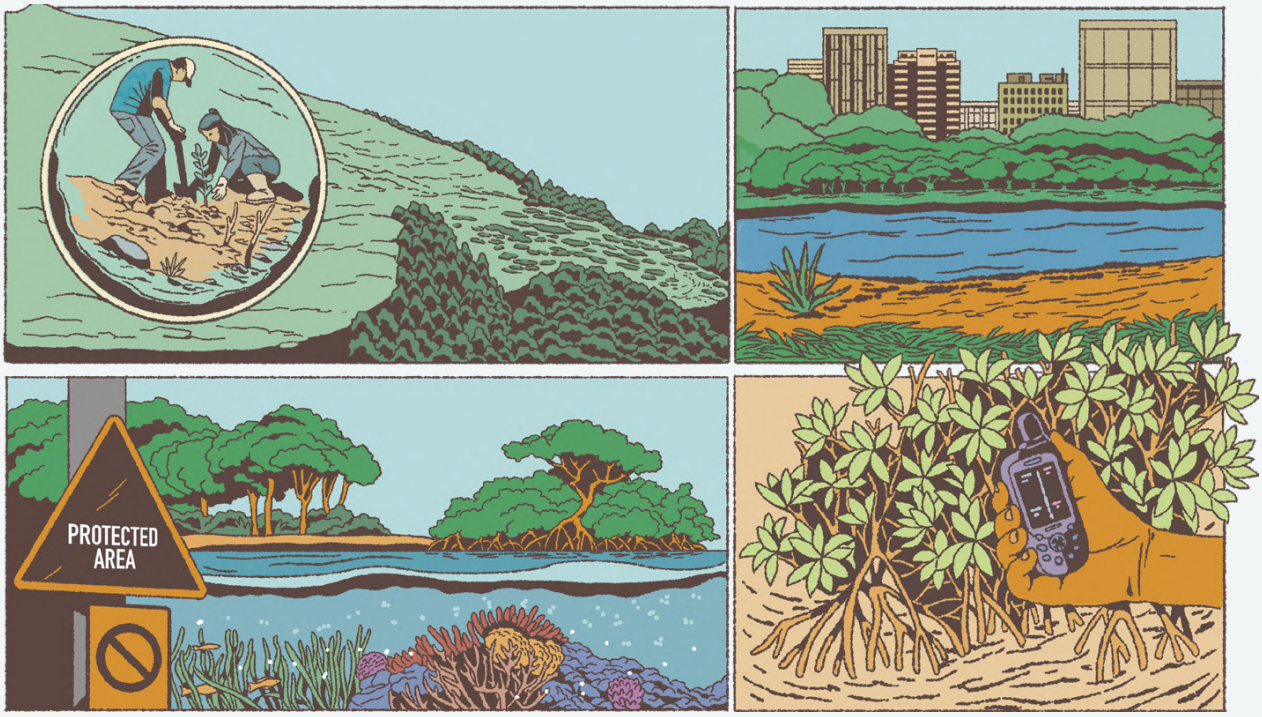
37 For more information on the National Climate Change Strategy, see the government website at https://cdn.www.gob.pe/uploads/document/file/7767750/6562767-politica-nacional-estrategia-nacional-ante-cambio-climatico-al-2050.pdf?v=1741880813.

38 For more information on the Development Policy Loan, see the Programme Document at https://documents1.worldbank.org/curated/en/099605011222241842/pdf/BOSIB07565830e0740965e04e82bcfa35fd.pdf.

39 For more information on the Climate Change Response Act, see the government website at https://www.legislation.govt.nz/act/public/2002/0040/latest/DLM158590.html.

40 For more information on the Amendment Bill, see the government website at https://www.legislation.govt.nz/bill/government/2025/0174/latest/whole.html.

3.4. ENVIRONMENTAL AND BIODIVERSITY POLICIES



WHY DO ENVIRONMENTAL AND BIODIVERSITY POLICIES MATTER FOR ENABLING NBS?

Environmental and biodiversity policies are crucial for NBS effectiveness because they ensure that the environment is healthy enough to harness nature's potential to address challenges like climate change, disaster risk, and food security. Policies focused on environmental and biodiversity conservation can enable NBS for disaster and climate risk reduction, as they prevent habitat destruction, pollution, and degradation; support ecosystem services such as flood and erosion control; promote restoration of degraded ecosystems in high-risk areas; and regulate the sustainable use of natural resources to avoid overexploitation (which can lead to, for example, drought).

Relevant environmental and biodiversity policies for NBS:

Environmental laws and regulations can require or incentivize NBS, for example, as part of compensation schemes (box 3.1). Biodiversity action plans often support NBS with concrete measures. Laws and regulations on PAs that include hazard-prone areas, such as floodplains, strengthen NBS for DRR (for examples, see Dudley et al. 2022). Environmental permitting enforces PA and compensation schemes. Municipalities can include NBS in their own environmental plans and strategies (see Lao People's Democratic Republic example).

Environmental trust funds for PA management, small-scale funds and campaigns for city engagement, blue/green bonds, payments for ecosystem services (PES), and environmental and biodiversity accounting can fund NBS for DRR efforts.

National, state, or city interinstitutional cooperation improves capacity and uptake of NBS.[41] City networks can strengthen NBS for regional environmental action.[42] Voluntary environmental programs led by citizens, schools, NGOs, and the private sector can include NBS action such as tree planting campaigns.

Educational campaigns (for example, with schools), environmental information centers, environmental communication strategies, and trainings can provide concrete knowledge about local NBS.

BOX 3.1.

ENVIRONMENTAL COMPENSATION POLICIES AS ENABLERS OF NATURE-BASED SOLUTIONS

Policies that regulate environmental compensation, including ESIA laws and regulations, biodiversity offset regulations (see United Kingdom example, below), and environmental licensing frameworks can enable NBS as compensation measures.

For this purpose, compensation requirements may explicitly include NBS or require measures that meet key criteria of no net loss (or net gain) of ecosystems and biodiversity; community participation; social justice; and/or climate resilience. These conditions align with NBS definitions (section 1.1) and ensure that compensation restores ecosystem functions, benefits communities, and strengthens local resilience.

Example: Uganda's National Guidelines for Biodiversity and Social Offsets (2022),[43] based on the National Environmental and Social Assessment Regulations (2020), inform developers on ecological compensation that meets rigorous ecological standards, ensures community engagement, and supports projects like wetland restoration and watershed protection, thereby integrating NBS into compensation measures.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH ENVIRONMENTAL AND BIODIVERSITY POLICIES?

Laws allowing construction or extractive permits in protected or ecologically sensitive areas can hinder NBS effectiveness and increase disaster risks.

Include natural ecosystems in high-risk areas in PA regulations and restrict land use and construction accordingly to safeguard ecosystems and their ecosystem services. Clear regulations help prohibit harmful activities (for example, deforestation, pollution) and establish enforcement mechanisms (that is, enforcement agencies and penalties). Adequate budgetary allocation and skilled personnel are critical to strengthen enforcement capacities.

For large developments, conditional permits can be provided, requiring restoration of ecosystems not only for compensation but also for DRR. For example, hydropower permits can be subject to the requirement for large-scale upstream reforestation and nuclear plant permits subject to the requirement to create green buffer zones.

41 For example, the United States Environmental Protection Agency started the Green Infrastructure Federal Collaborative, with members from more than 16 national institutions. See the Green Infrastructure Federal Collaborative web page at https://www.epa.gov/green-infrastructure/green-infrastructure-federal-collaborative.

42 For example, the Brazilian Metropolitan Region of Campinas connects 20 municipalities through the RECONECTA program to restore natural habitats and create ecological corridors. See the RECONECTA web page at https://semil.sp.gov.br/2020/07/campinas-apresenta-programa-reconecta-rmc/.

43 For more information on the National Guidelines for Biodiversity and Social Offsets, see the government website at https://www.nema.go.ug/sites/default/files/Final%20National%20Biodiversity%20and%20Social%20Offset%20Guidelines%20-%20Approved%20by%20NEMA%20Board%20March%202022.pdf.

Lack of environmental incentives leads to reduced or ineffective NBS investments in key economic sectors (industrial, mining, transport, and energy sectors).

Introduce sustainable resource management and the "polluter pays" principle into key environmental and sector policies to promote good practice and hold those who pollute responsible for covering the costs of the cleanup. This incentivizes economic actors to invest in sustainable approaches and NBS, with potential benefits for disaster and climate resilience (for example, healthy mangroves that protect coastlines).

Update environmental and social impact assessment (ESIA) regulations and guidelines to explicitly integrate NBS. For example, require during project planning and appraisal processes the assessment of NBS (such as reforestation, riparian buffer zones, and vegetative barriers for erosion control) as potential alternatives or additions to gray infrastructure. Additionally, regulations should establish clear performance metrics for ecosystem restoration, linking compliance with periodic license reviews and renewals.

Provide targeted incentives such as grants, subsidies, and environmental accounting mechanisms for NBS investments through environmental policies to encourage public and private investors to integrate NBS into project design (see examples below).

Limited availability, access, and sharing of environmental data can hinder evidence-based policy making and the ability to assess policy effectiveness.

Ensure that environmental, DRR, and sector policies include requirements for data collection and interinstitutional sharing, with mechanisms for their implementation. This can enable integrated risk and ecosystem mapping to guide and monitor the enforcement and impact of policies that regulate economic activities in high-value ecosystems.

GUIDING QUESTIONS FOR ANALYZING EXISTING ENVIRONMENTAL AND BIODIVERSITY POLICIES

Do the national and subnational environmental and biodiversity laws, regulations, strategies and programs:

- Consider the relevance of ecosystems and NBS for DRR and climate resilience?
- Include hazard-prone areas in PA regulations?
- Contain safeguards that require restoration of ecosystems to at least the same state as before development, and refer to NBS practices such as natural buffer zones?

Check further policies for coherence by asking:

- Do national and subnational sector laws (particularly for land use, water, agriculture, transport, energy, and extractive industries) align with PA regulations and environmental safeguards?

PHOTO BY: Michael Dziekonski on Pixabay.

Costa Rica

Payments for Ecosystem Services Program

Costa Rica's Payments for Ecosystem Services Program, established under the 1996 Forestry Law,[44] provides financial incentives for landowners who engage in conservation, reforestation, and sustainable land use practices. It directly supports NBS by encouraging forest regeneration and ecosystem conservation to combat land degradation, reducing disaster risks such as erosion, drought, and flood. Managed by the National Forestry Financing Fund,[45] the program is financed through a fossil fuel tax. The program compensates landowners for maintaining forest cover and restoring degraded ecosystems, recognizing the critical ecosystem services that forests provide, including water regulation, erosion prevention, carbon sequestration, and biodiversity.

The World Bank supported the expansion of Costa Rica's Payments for Ecosystem Services Program to marine ecosystems through an executive decree. The program is piloting payments for the conservation of mangroves in the Gulf of Nicoya, further extending its impact for coastal DRR and community resilience.[46]

PHOTO BY: Jack Anstey on Unsplash.

United Kingdom

Biodiversity Net Gain

The United Kingdom's Biodiversity Net Gain (BNG) initiative,[47] mandated by the Environment Act 2021,[48] requires investors in real estate and other infrastructure to deliver a measurable 10 percent increase in biodiversity following development and maintain it for 30 years. BNG plans are approved by local planning authorities before development begins. Developers must use the statutory biodiversity metric to quantify habitat gains through on-site restoration, off-site habitat creation, or, as a last resort, the purchase of statutory biodiversity credits – a financial instrument enabling developers to invest in ecological improvements elsewhere. Funding is supported through habitat banks and biodiversity unit markets, where providers manage habitat creation and long-term stewardship.

Extensive guidance frameworks include developer and land manager guides, as well as planning authority support, equipping stakeholders with the resources necessary to meet BNG requirements. By combining regulatory and financial instruments with clear guidance, BNG requires and incentivizes the integration of NBS into development, delivering biodiversity gains while enhancing climate resilience and DRR.

44 For more information on the Forestry Law, see the government website at https://www.sica.int/busqueda/busqueda_archivo.aspx?Archivo=leys_6991_1_27032006.pdf.
45 For more information on the program, see the Payment of Environmental Services web page at https://www.fonafifo.go.cr/en/servicios/pago-de-servicios-ambientales/.
46 For more information on the World Bank support, see https://www.worldbank.org/en/news/feature/2025/06/05/costa-rica-banco-mundial-pioneros-uso-pagos-servicios-ambientales-marinos-proteger-manglares.
47 For more information on BNG, see the government website at https://www.gov.uk/guidance/understanding-biodiversity-net-gain.
48 For more information on the Environment Act, see the government website at https://www.legislation.gov.uk/ukpga/2021/30/contents.

PHOTO BY: Teodor Kuduschiev on Unsplash.

Lao People's Democratic Republic

Vientiane's Green City Action Plan

The national environmental policy framework of Lao People's Democratic Republic is anchored in key public policies such as the Environmental Protection Law (2013), the National Strategy on Climate Change (2021),[49] and the enhanced NDC 2021. The Investment Law (2016)[50] incentivizes environmental protection, forestry, and biodiversity investments with tax exemptions, including waivers on import duties and value added tax, for up to 10 years. These policies collectively emphasize forest conservation, sustainable land use, climate change adaptation, and emissions reduction, with a goal of increasing forest cover to 70 percent of the land mass by 2035 and achieving net-zero emissions by 2050.

Under this framework, the Green City Action Plan for Vientiane Capital 2023–2030[51] serves as a vital instrument to advance environmental policy at the city level. Supported by the Global Green Growth Institute, the Green City Action Plan addresses Vientiane's urbanization challenges by prioritizing greenhouse gas reduction, improved waste and wastewater management, and the expansion of green infrastructure and biodiversity conservation. It aligns closely with national climate goals and reinforces climate resilience in urban planning, infrastructure development, and socioeconomic growth.

3.5. WATER POLICIES

49 For more information on the National Strategy on Climate Change, see the LaoFAB website at https://laofab.org/document/download/4942.

50 For more information on the Investment Law, see Lao's Land Information Working Group website at https://laolandinfo.org/wp-content/uploads/2019/07/Law-on-Investment-Promotion-2016_ENG.pdf.

51 For more information on the Green City Action Plan, see the Global Green Growth Institute website at https://gggi.org/report/green-city-action-plan-vientiane-capital-2023-2030-english-version/.

WHY DO WATER POLICIES MATTER FOR ENABLING NBS?

Ecosystems both depend on and influence the water balance and availability of clean water. Considering the importance of water for disaster and climate resilience in terms of flood and drought management, water policies that integrate NBS can have a significant impact. These policies establish the regulatory framework for the sustainable management of watersheds and the protection of water resources and critical ecosystems that contribute to flood control, water purification, and drought mitigation, such as wetlands, mangroves, and forests.[52]

Relevant water policies for NBS:

Water laws and regulations can require NBS for risk reduction (for example, natural buffers). These may be complemented by detailed measures and budgets in basin management plans, as well as drought and flood management plans. Official guidelines are a strong instrument to strengthen NBS, for example, for coastal protection and stormwater management. Municipal codes can support NBS, for example, by allowing, incentivizing, or requiring sustainable drainage systems (see Berlin example, below).

Water funds, river trust funds, blue and green bonds, and PES can enable NBS financing. Blue carbon (for example, for saltmarshes), biodiversity, and water storage credits[53] are further incentives for public and private NBS investment. Water fees (for example, on stormwater discharge) and property taxes (for example, relative to impervious surface) are municipal instruments that can be used to increase private adoption of NBS.

River basin cooperation agreements can drive NBS for flood and drought reduction (see the Caña a la caña project, Spain,[54] and the Senegal example, below). PPPs between governments, NGOs, and companies to implement water programs (for example, on water credits) can provide resources for NBS.

Reference guidelines and public advisory services on NBS (for example, on private, nature-based stormwater management), complemented by NBS training programs for basin committees, PPP members, and/or cooperatives will increase implementation capacity.

52 For a detailed analysis of enabling policies for water security, see TNC's publication "The Power of Policy" at https://www.nature.org/content/dam/tnc/nature/en/documents/0/9/092925_ThePowerofPolicy_FINAL.pdf.

53 See the UK's Replenish Toolbox as an example of water storage through a river trust fund: https://hive.greenfinanceinstitute.com/wp-content/uploads/2024/10/NEIRF-case-study-The-Rivers-Trust-Replenish.pdf

54 For more information on the project, see https://consorcidelaribera.com/canya-a-la-canya/?lang=en.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH WATER POLICIES?

Water laws with limited consideration of integrated water resource management (IWRM)[55] principles can hinder sustainable NBS and increase water-related risks owing to institutional fragmentation.

Embed IWRM principles in legislation governing the use of water resources, emphasizing ecosystem restoration for flood and drought management. While IWRM ensures sustainable and coordinated management of shared water resources at the watershed level, the link to NBS can support water management and DRR objectives.

Require an integrated water governance body to develop basin management plans, incorporating IWRM and NBS. Regulations should define multistakeholder decision-making, clearly establishing roles and responsibilities. Based on agreed actions and resources in the plans, the water governance body can strengthen NBS implementation at the watershed level to reduce water-related disasters and conflicts at the local level.

Water engineering guidelines and financing, which define the design and implementation of water infrastructure, often prioritize conventional gray infrastructure. At the same time, they lack provisions for NBS. This leads to an exclusion of NBS and to a default reliance on traditional gray infrastructure.

Explicitly incorporate NBS into official operational guidelines, standards, and permits related to flood management, water quality, water infrastructure, and other areas of water management. For infrastructure investments, require that NBS (including hybrid solutions) are consistently evaluated as viable alternatives to conventional gray infrastructure and prioritized when found to be technically and financially feasible.

Strengthen economic policy instruments for NBS with high DRR and other development potential. Clarify institutional responsibilities for NBS financing in the water sector and consider incentives via permits (for example, streamlined approval processes), tax regulations (for example, reduced water taxes), subsidies (for example, for private water retention), and PES (for example, for community-based mangrove reforestation) in national and subnational water policies.

National and municipal permits are not provided for NBS. The absence of references to NBS – and of highly specific technical standards – in permitting requirements may unintentionally restrict the adoption of NBS.

Allow the use of NBS and provide clear technical instructions, including quality criteria and examples, for the design, construction, and operation and maintenance of NBS.

55 IWRM refers to a coordinated approach to the management of water, land, and associated resources that seeks to balance economic and social benefits fairly without undermining ecosystem sustainability.

Water policies that lack effective enforcement and implementation mechanisms risk creating overallocated water systems, degraded watersheds, and poorly coordinated flood and drought management. This can undermine key ecosystem services and lead to increased water-related risks (including water shortages, floods, and droughts).

Set up clear monitoring and enforcement mechanisms in water laws and regulations for water allocation, watershed management, and flood/drought management, avoiding having regulatory bodies serve multiple interests (for example, irrigation/hydropower versus compliance).

Promote voluntary agreements and conduct training programs with landowners, farmers, and water users to implement NBS for aquifer recharge and water storage, to contribute to reductions in water abstraction and irrigation demand.

GUIDING QUESTIONS FOR ANALYZING EXISTING WATER POLICIES

Do the national and state water laws, regulations, and/or official guidelines, as well as municipal water bylaws and codes and river basin management plans:

- Integrate principles of IWRM and refer to NBS such as river restoration and urban nature-based stormwater management, promoting the watershed as the unit for planning water resources?
- Prevent encroachment of infrastructure into aquatic ecosystems, protecting floodplains and wetlands through natural buffer zones?
- Provide technical standards and guidance for NBS? If not, do they at least avoid actively prioritizing gray infrastructure?

Check further policies for coherence by asking:

- Do national and subnational land use and zoning laws and regulations, building codes, and urban master plans align with the protection of aquatic ecosystems and buffer zones?
- Do agriculture, energy (hydropower), and transport policies comply with IWRM principles and regulations on ecosystem protection?

PHOTO BY: Tyo on Unsplash.

Bangladesh

Delta Plan for Adaptive Coastal Management

The Bangladesh Delta Plan 2100[56] is a long-term, integrated national policy that guides water management and DRR by addressing flooding, river erosion, salinity intrusion, and urban drainage challenges across the Ganges-Brahmaputra-Meghna Delta region. A key focus is on combining gray infrastructure measures with NBS such as tidal river management, wetland restoration, and ecosystem conservation (of the Sundarbans mangrove forest, for example), which provide natural flood buffering, sediment control, and salinity regulation.

The plan requires coordinated actions among national government, local authorities, and water management bodies. The World Bank, through the Global Water Security and Sanitation Partnership, developed the Bangladesh Water Platform, which convenes stakeholders, enhances coordination, and provides analytics that inform government policies and projects. Local policies, such as the urban water and sanitation plans, work alongside the Bangladesh Delta Plan 2100 to ensure inclusive resilience building with community participation and adaptive governance.

PHOTO BY: Nikita Pishchugin on Unsplash.

Germany

Policies Enabling Nature-Based Urban Drainage

The Berlin Water Law (2019)[57] provides the framework for sustainable water management in Germany's capital city. On stormwater management, it prioritizes infiltration into the soil on private properties. Through a coalition agreement, the Berlin State Government set the target of reducing stormwater input into the centralized system by 1 percent per year. To enable implementation, the city issued a statute in 2021[58] that prohibits stormwater discharge into the mixed drainage system and defines the principles of decentralized stormwater management for new housing projects. The city's Stormwater Discharge Exemption Ordinance (2001)[59] already allows for permission-free discharge of nonhazardous stormwater on site, giving specifications for sustainable urban drainage systems such as bioswales. To enable private investment, the city established a funding scheme for green roofs and the Berlin Rainwater Agency as an advisory and training service for citizens, companies, and other interested parties.

56 For more information on the Bangladesh Delta Plan, see the government website at https://bdp2100kp.gov.bd/.
57 For more information on the Berlin Water Law, see the ECOLEX website at https://www.ecolex.org/details/legislation/berlin-water-law-lex-faoc073697/.
58 For more information on the statute, see the Berlin Water Agency's website (in German) at https://www.bwb.de/de/regenwassereinleitung.php.
59 For more information on the Stormwater Discharge Exemption Ordinance, see the German website on environmental law at https://www.umwelt-online.de/recht/wasser/laender/bln/nwfreiv.htm.

PHOTO BY: Curioso Photography on Unsplash.

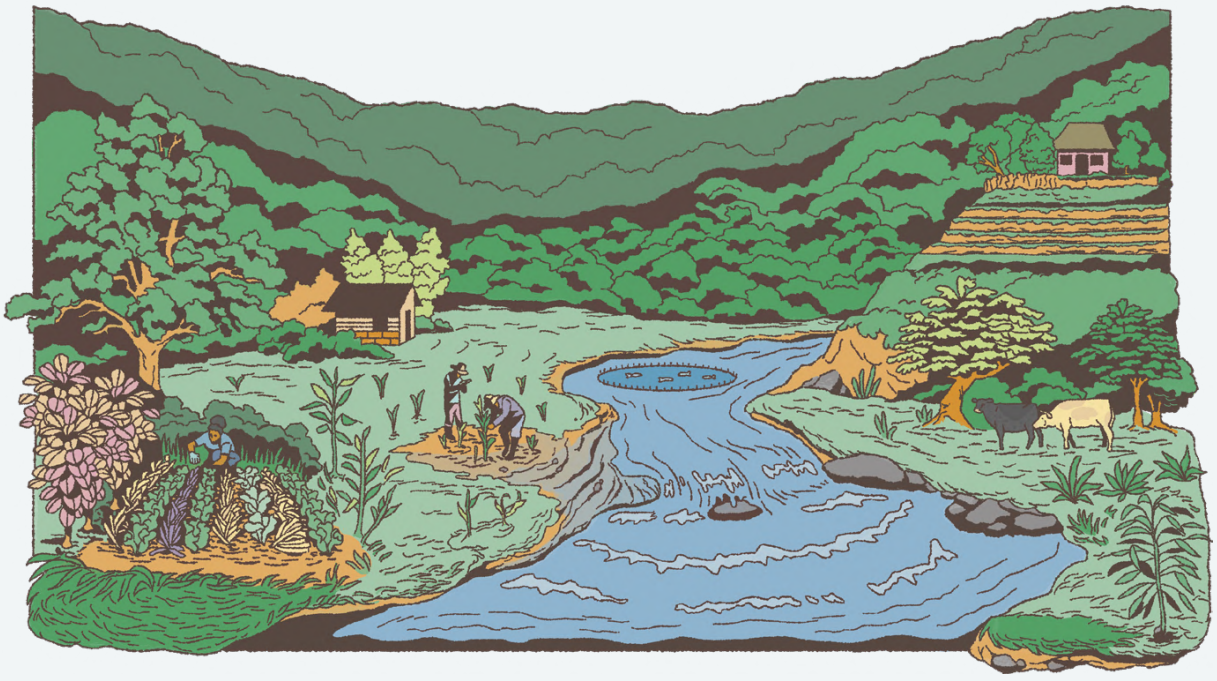
Senegal River Basin

Transboundary River Basin
Master Plan Supporting NBS

The Senegal River Basin Development Authority is a water governance body established in 1972 by four riparian countries – Guinea, Mali, Mauritania, and Senegal in response to severe droughts in the Senegal River Valley. The authority serves as a leading example of transboundary IWRM. The Senegal River Charter (2002)[60] promotes fair water distribution and safeguarding of water bodies, floodplains, and wetlands. It includes financial incentives, awareness campaigns, mandatory impact assessments, the "polluter pays" principle, and a dispute resolution mechanism.

The authority developed the Senegal River Basin Masterplan 2050[61] with support from the World Bank. This plan addresses flood and drought risk prevention, as well as biodiversity protection, and is complemented by targeted action plans that promote NBS such as reforestation and agroforestry (partly funded through the World Bank). To ensure implementation, the Climate Investment Plan sets priorities through 2030. Analytical tools like the Water Evaluation and Planning system underpin sustainable water management and guide informed investment decisions.

3.6. AGRICULTURE AND FORESTRY POLICIES



60 For more information on the Senegal River charter, see the WhatConvention.org website at https://whatconvention.org/en/convention/1668.

61 For project information on the Senegal River Master Plan, see the Senegal River Basin Development Authority's website at https://cda-omvs.org/wp-content/uploads/2025/01/15161-BRL-OMVS-Schema-Directeur-Amenagement-des-eau-du-fleuve-Snenegal-horizon-SDAGE-2050.pdf.

WHY DO AGRICULTURE AND FORESTRY POLICIES MATTER FOR ENABLING NBS?

Forestry and agriculture activities significantly affect land use and ecosystem health. About 50 percent of wetlands globally have been drained for agriculture (Hanson and Ranganathan 2023); agropollutants degrade soils and ecosystems; and 420 million hectares of forest have been lost to deforestation for agricultural and forestry purposes since 1990 (FAO 2020). At the same time, both sectors rely heavily on healthy ecosystems for consistent, long-term profitability, particularly in a changing climate with heightened disaster risks. In this context, policies that promote sustainable practices and NBS can help balance short-term production with long-term resilience.

Relevant agriculture and forestry policies for NBS:

National and state-level agriculture and forest laws, regulations, strategies, and action plans (for example, on agroforestry) can promote sector adoption. National and subnational cross-sector strategies (for example, on sustainable resource management) help to mainstream NBS. Municipal urban forest ordinances can define rules for NBS implementation, while local sector plans can identify concrete measures and budgets.

Ecological subsidies, tax breaks, PES, certification schemes, and (disaster) risk insurance schemes can incentivize private sector uptake of NBS.

PPP contracts with cooperatives and forest owners facilitate NBS uptake by sharing expertise, resources, and risks.

Information campaigns, consultation services, and trainings (for example, by extension services) increase awareness and capacitate farmers, shepherds, and forest owners in NBS implementation and maintenance.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH AGRICULTURE AND FORESTRY POLICIES?

Siloed agriculture policies that compete over land and resources hinder the application of integrated approaches such as NBS that offer multiple benefits.

Create a coordinated cross-sector strategy or plan on sustainable natural resource management[62] and include NBS. Establish a common vision, coordination mechanisms, and procedures from the start of the policy making process to avoid conflicting objectives and enable integrated resource management for NBS.

Update agriculture regulations with ecological requirements for DRR, water security, and biodiversity, introducing NBS such as vegetated strips.

62 An example is the Natural Resource Management Strategy of Sorell Council, a rural local government in Tasmania. See the government website at https://www.sorell.tas.gov.au/wp-content/uploads/2025/06/Sorell-Council-Natural-Resource-Management-Strategy-Reduced.pdf.

Subsidies and insurance schemes that favor intensive agriculture discourage long-term NBS investments by the private sector.	**Create incentives for agroecological practices and other NBS through disaster risk insurance** and other schemes (for example, ecological subsidies, tax breaks, PES) that are accessible to small-scale farmers.
	Encourage PPPs to share financial and human resources for the adoption of NBS, to reduce risks and barriers and allow the upscaling of successful measures.
Forestry regulations that allow destructive logging practices undermine the effectiveness of NBS.	**Promote sustainable forest management in national and subnational forest laws and regulations,** balancing wood and non-wood uses with regeneration. Establish national and regional governance frameworks for sustainable forest management through relevant regulations.
	Embed forest certification mechanisms[63] in forestry laws and regulations to drive private sector engagement (for example, as a compliance option to reduce illegal logging) and promote responsible supply chains.
Forestry and environmental laws that specify only basic compensation criteria for deforestation accelerate ecosystem degradation.	**Establish legally protected forest areas (for example, national parks), specify adequate safeguards,**[64] **and promote NBS** as part of conservation, compensation, and sustainable forest management. Ensure funding (for example, via trust funds), community involvement, and enforcement through monitoring systems, penalties, and independent control entities.
	Require the development of long-term forest management plans for public and private forests and promote the inclusion of NBS. Define sustainability criteria and indicators (for example, biodiversity metrics, soil health indices) that can be planned, monitored, and periodically revised, following climate resilience objectives (among others).

63 For example, Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC)

64 Adequate in this context means: (1) matching the type, quality, and function of the habitat lost (e.g., old-growth forests); (2) calculating non-market and long-term values to offset real losses; (3) requiring guarantees for long-term maintenance; (4) excluding monetary payments or carbon credits for compensation; and (5) applying special rules for PAs.

GUIDING QUESTIONS FOR ANALYZING EXISTING AGRICULTURE AND FORESTRY POLICIES

Do the national and state agriculture and forestry laws and regulations, and municipal-level sector strategies and plans:

- Integrate sustainability and climate resilience criteria (for example, soil health, water efficiency, biodiversity) into planning and practice?
- Promote NBS or related approaches, such as agroforestry or regenerative farming, to enhance ecosystem services and reduce disaster risks?
- Include incentives for sustainable practices (for example, ecological subsidies, carbon credits) and discourage harmful practices like monocultures or excessive chemical use?

Check further policies for coherence by asking:

- Do agriculture policies align with forestry, water, and land use policies in regard to sustainable resource use principles to avoid conflicting objectives (for example, irrigation versus conservation)?
- Do agricultural subsidies and insurance schemes align with climate and biodiversity goals?

EXAMPLES OF GOOD PRACTICE

PHOTO BY: BoyKat on Pixabay.

Bhutan

High-Ambition Policies for Forest Conservation and Organic Farming

Bhutan's constitution[65] mandates forest cover for at least 60 percent of its land mass, ensuring ecosystem services for climate resilience and carbon sequestration (the country's forest cover currently exceeds 70 percent of the land mass). Bhutan pledged under the Glasgow Declaration on Climate Action in Tourism to halt forest loss and land degradation by 2030 and implemented a National Reducing Emissions from Deforestation and Forest Degradation Strategy with an operational framework. The Climate Change Policy of the Kingdom of Bhutan (2020)[66] emphasizes climate resilience in the pursuit of gross national happiness and promotes the inclusion of traditional knowledge, as well as innovation, while focusing on forests and soils to maintain carbon neutrality. Bhutan also targets 100 percent organic agriculture by 2035, guided by the National Framework for Organic Farming (2006),[67] aiming to reduce chemical use and enhance soil health. These integrated policies create a strong enabling environment for scaling up NBS to enhance climate resilience.

65 For more information, see the Bhutan 2008 constitution on the Constitute Project website at https://www.constituteproject.org/constitution/Bhutan_2008.
66 For more information on the Climate Change Policy, see the FAO website at https://faolex.fao.org/docs/pdf/bhu207787.pdf.
67 For more information on the National Framework for Organic Farming, see the FAO website at https://faolex.fao.org/docs/pdf/bhu167577.pdf.

PHOTO BY: Equalstock on Pexels.

India

Policy Framework for the Agroecology Transformation

In the past 15 years, India has integrated the concept of sustainability and agroecology into policies and funding schemes at the central and state levels. In 2008, the National Action Plan on Climate Change launched concrete sector missions for policy action. The National Mission for Sustainable Agriculture promotes organic farming, agroforestry, and soil health management via soil health cards. The National Water Mission improves irrigation efficiency and water conservation through microirrigation, farm ponds, and rainwater harvesting (Steglich et al. 2023). More recently, the National Mission on Natural Farming (2024)[68] advances agroecology through certification systems and the Zero Budget Natural Farming approach, encouraging chemical-free, biodiversity-friendly practices. State-level programs like Andhra Pradesh Community-Managed Natural Farming and Karnataka's Krishi Bhagya Scheme incentivize soil restoration and sustainable irrigation. These policies collectively enable NBS by fostering resilient agroecosystems, reducing climate risks, and improving resource efficiency.

PHOTO BY: Random Institute on Unsplash.

Colombia

NDC and Climate Law Promote NBS in Agriculture and Forestry

Colombia integrates NBS into climate and agriculture policy through its NDC 3.0 (2025),[69] prioritizing forest conservation and reforestation, PES and agroecological systems to cut emissions and enhance resilience. The National Policy on Climate Change (2017) promotes the use of agroforestry and silvopastoralism in Colombia, reinforced by the Climate Action Law (2021), which mandates deforestation reduction and sustainable land use. The Zero Deforestation Agreement (2019)[70], a PPP with beef producers, includes monitoring, incentives, and awareness campaigns to curb forest loss. These frameworks promote sustainable cattle ranching, forest restoration, and carbon sequestration, demonstrating how coherent climate and agriculture policies can scale NBS for climate mitigation and resilience.

68 For more information on the Natural Farming Mission, see the government website at https://www.pib.gov.in/PressNoteDetails.aspx?NoteId=155019&ModuleId=3&reg=3&lang=2.

69 For more information on Colombia's NDC 3.0, see the UNFCCC website at https://unfccc.int/sites/default/files/2025-12/NDC%203.0%20Transformaciones%20para%20la%20Vida%20%28Colombia%29.pdf.

70 For more information on the agreement, see the Ministry of Environment archives at https://archivo.minambiente.gov.co/images/BosquesBiodiversidadyServiciosEcosistemicos/pdf/Acuerdo_cero_deforestacion/Acuerdo_sector_Carne_Cero_Deforestacion.pdf?utm_source=copilot.com.

3.7. BUILDING, LAND USE, AND URBAN PLANNING POLICIES

WHY DO BUILDING, LAND USE, AND URBAN PLANNING POLICIES MATTER FOR ENABLING NBS?

Changing landscapes due to urbanization, the development of infrastructure, and economic activities are a major driver of climate-related disaster risks. Building, land use, and urban planning policies can promote NBS to reduce these risks in urban and rural contexts.

Building policies provide rules and orientation for the development of infrastructure, including criteria such as resilience and risk reduction. Land use policies help balance social, economic, and environmental needs amid land development (for example, establishing PAs for certain ecosystems in high-risk zones). Urban planning policies follow long-term development objectives that guide urban land use, while defining concrete local action to address challenges such as climate and disaster risks. Box 3.2 describes the World Bank's NBS Opportunity Scan tool, which can inform land use and urban policy design based on geospatial data.

PHOTO BY:
World Bank.

Relevant building, land use, and urban planning policies for NBS:

Zoning regulations are key enablers of NBS in hazard-prone areas such as floodplains and wetlands. Subnational land use and urban planning policies can directly promote NBS implementation (for example, integrating NBS into urban master plans to highlight priority actions and provide financing). Building codes, standards, and bylaws may allow and require NBS (for example, stipulate share of permeable surface, or requirement for green roofs), while municipal permits can provide fast-track procedures as incentives.

Green building certificates[71] and targeted subsidies – supported by property tax reductions and permitting fee waivers – can enable NBS in private building developments. National and subnational funds, green bonds, and preferential loans allow financing of large-scale public and private NBS.

Land stewardship agreements can include NBS for climate-resilient land management. PPPs may cofinance green district developments. City networks and agreements can support NBS in urban planning and implementation.

Data-driven spatial planning instruments and shared data platforms support coherent management of local land uses, protection of hazard-prone areas, and identification of potential NBS locations (Zhang et al. 2024).

71 For a checklist of green building codes with country-level analysis, see https://documents1.worldbank.org/curated/en/099091123125537701/pdf/P17606806e3fd10a60be520d5cfe7871577.pdf.

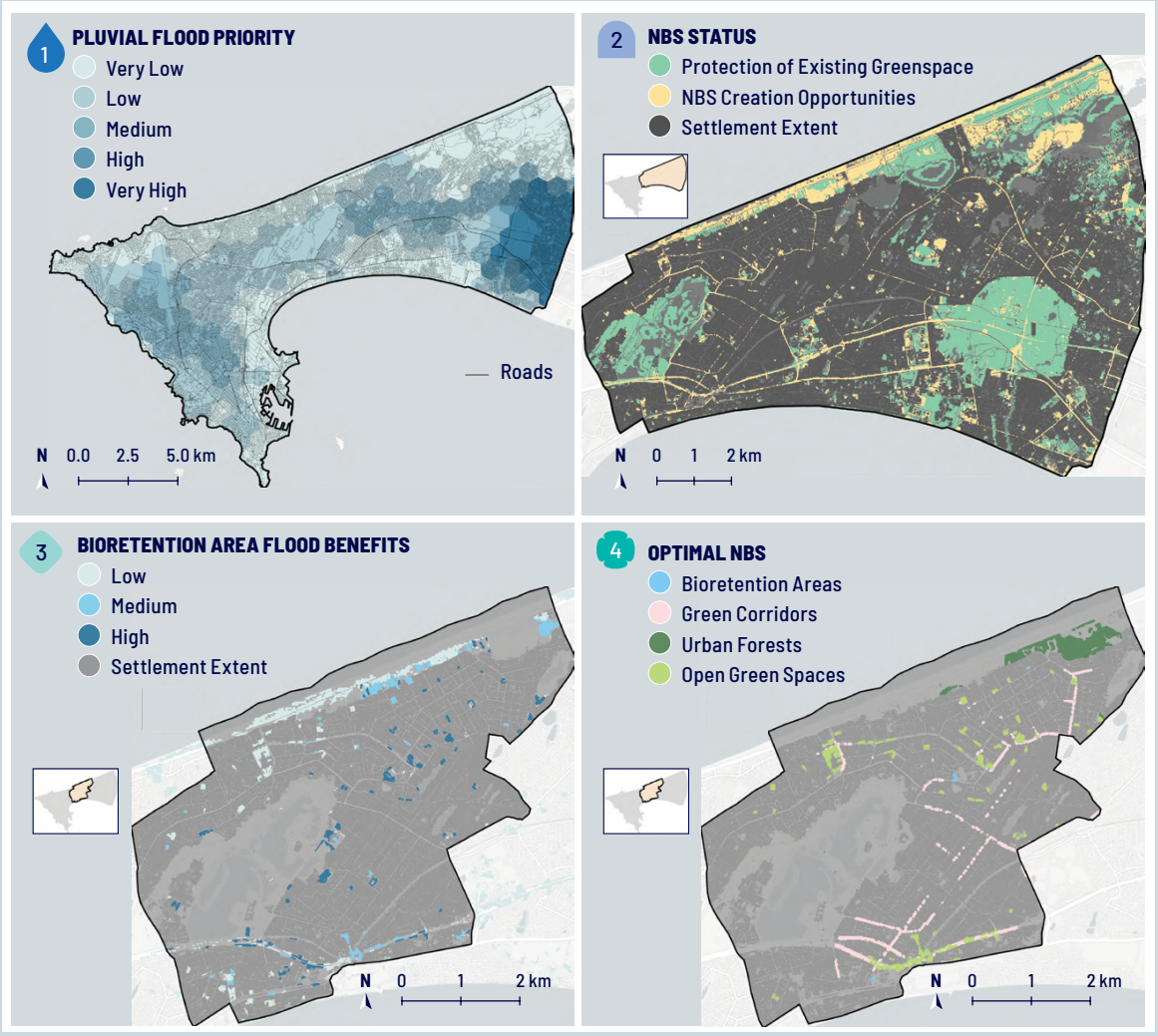
BOX 3.2.

THE WORLD BANK'S NATURE-BASED SOLUTIONS OPPORTUNITY SCAN FOR POLICY MAKING

The World Bank developed the NBS Opportunity Scan to assist governments and other stakeholders to identify optimal NBS during the early project planning stages of an Investment Project Financing operation. The NBS Opportunity Scan uses global geospatial data to map areas with high climate risks and pinpoint locations where NBS measures can offer significant risk reduction benefits. The tool identifies zones that should be prioritized for protection, restoration, or the implementation of new NBS interventions.

Beyond informing investment planning, the insights generated by the NBS Opportunity Scan are also valuable for shaping public policy. Ecosystem protection and restoration can be advanced through a combination of policy instruments. At the municipal level, zoning regulations can designate protected areas and restrict development (for example, green spaces; see image 2, figure B3.2.1). Similarly, new NBS can be mandated and incentivized by policies at different political levels. For example, green corridors (see pink lines in image 4, figure B.3.2.1 can be integrated into road design codes, urban planning, and transport strategies and public funding for transportation.

Figure B.3.2.1. Example of the NBS Opportunity Scan Imaging of Dakar, Senegal



SOURCE: World Bank 2024.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH BUILDING, LAND USE, AND URBAN PLANNING POLICIES?

Building, land use, and zoning regulations/ordinances that lack environmental criteria can undermine ecosystem services and increase disaster risks.

Integrate ecosystem services and DRR into zoning regulations and urban master plans – key instruments for guiding urban land use and development – to ensure that natural processes are considered in planning, opening pathways for the strategic implementation of NBS.

Update (sub)national building codes with minimum green building requirements (for example, greenspace ratio) and offer incentives such as subsidies and tax breaks for green building certification (see relevant policies above).

Land use regulations with fragmented and unclear land tenure hinder conservation and NBS practices for long-term resilience.

Ensure security of tenure in land laws for Indigenous and vulnerable communities as well as private landowners, particularly small-scale farmers. With formalized land rights, communities and landowners are better able to invest in sustainable NBS practices, such as reforestation and agroecology, to allow for resilient livelihoods in the long term, rather than pursue short-term, high-risk coping practices such as slash-and-burn agriculture.

Misalignment between national land use, DRR, and sector legislation and municipal regulations and practices can lead to land degradation, hindering DRM efforts and NBS effectiveness.

Align national development, DRR, climate, biodiversity, and agriculture strategies around sustainable land use priorities. Clearly define sustainable land use criteria in national strategies to guide coordinated action across government ministries and stakeholders. This promotes a sector-wide enabling environment that empowers the use of NBS to build climate and disaster resilience and contribute to wider development priorities.

Make sure that land use policies create opportunities for communities to participate in local land use decisions – securing their buy-in is essential for successful and sustainable NBS and DRR actions. When local stakeholders are involved, they are more likely to support and maintain NBS projects that align with community values and needs.

Traditional zoning laws often separate land uses (for example, residential, industrial, environmental), limiting opportunities to implement NBS like green corridors, mixed-use green spaces, or urban forests that require flexibility in land use guidelines.

Revise zoning laws to allow and encourage in urban planning policies the design of multifunctional spaces such as parks and wetlands that reduce urban flood and heat island risks. The multiple benefits of NBS make them ideal solutions for multifunctional urban spaces.

GUIDING QUESTIONS FOR ANALYZING EXISTING BUILDING, LAND USE, AND URBAN PLANNING POLICIES

Do the national and state building and land use laws and regulations, and urban building and zoning codes and master plans:

- Integrate a sustainable land use approach with specific criteria applicable to all sectors and relevant for DRR and/or climate resilience?
- Explicitly promote NBS by incorporating ecological zoning, blue-green infrastructure, or nature-based flood and drought management solutions to increase climate resilience?
- Secure private land tenure and require community involvement in land use decisions?

Check further policies for coherence by asking:

- Do national and subnational sector laws (including agriculture, forestry, and water) align with sustainable land use criteria?

EXAMPLES OF GOOD PRACTICE

PHOTO BY: PortCalls Asia on Unsplash.

Philippines

Human Settlement Policies Support NBS through Cat DDO

Based on a sound DRR and climate resilience policy framework, the Philippine government launched sector policy reforms in education, health, and human settlements, supported by a World Bank Cat DDO.[72] A key reform is the Resilient and Green Human Settlements Framework (2023),[73] which promotes risk-informed community development across six areas: population, land use and urban planning, sustainable development, climate governance, circular economy, and housing services.

The framework emphasizes the integration of risk assessment tools into local land use plans and local development plans. Recognizing that local governments often lack capacity for risk-informed planning, the Cat DDO supported a department order of the Department of Human Settlements and Urban Development introducing a shared risk data platform to improve zoning and identify suitable sites for sustainable urban growth. Additionally, the Cat DDO supported official guidelines and capacity building for resilient urban design, including the creation and maintenance of green and open spaces. These informational policy instruments directly enable NBS as means of implementing the national human settlements policies at the local level.

72 For more information on the Cat DDO, see the World Bank's program document at https://documents1.worldbank.org/curated/en/099102623091018813/pdf/BOSIB194828749145e3148061acd51af4ccb8a27c8.pdf.

73 For more information on the Resilient and Green Human Settlements Framework, see the UN-Habitat website at https://unhabitat.org/sites/default/files/2023/06/resilient-and-green-human-settlements-framework-2023.pdf.

PHOTO BY: Portraitor on Pixabay.

Rwanda

Kigali's Master Plan Strategically Integrates NBS

The Kigali Master Plan 2050 embeds NBS into its vision of a "city in the forest," prioritizing wetland rehabilitation, urban forests, and green corridors to reduce flood and landslide risks. The Kigali Master Plan includes Zoning Plans and Regulations, Urban Design Guidelines, and a Green City District Master Plan, among other aspects. Reflecting Rwanda's National Land Use and Development Master Plan 2020–2050, the Kigali Master Plan enforces risk-informed zoning and land use that protect wetlands and mandate green buffers.

Implementation is financed through national funds (for example, the Rwanda Green Fund) and international funds. The World Bank supports investments (for example, wetland restoration) and integrated urban planning instruments such as the Urban Wetland and Restoration Monitoring System.[74] Voluntary initiatives such as #IgitiCyanjye (#MyTree) mobilize citizens for tree planting and slope restoration. Together, these instruments mainstream NBS into efforts to strengthen Kigali's climate resilience.

PHOTO BY: Coleen Rivas on Unsplash.

Singapore

Green Building Standards with Requirements for NBS

Over the last two decades, Singapore has embedded NBS into urban development through a coherent suite of green building standards and land use policies. The Singapore Green Building Masterplan 2021[75] sets the target to 'green' 80 percent of buildings (by gross floor area) by 2030, positioning green buildings as a pillar of climate resilience under the Singapore Green Plan 2030. Building standards are certified via the Building and Construction Authority Green Mark Certification Scheme, which places an emphasis on design that integrates biophilic features, efficient water systems, and blue–green infrastructure.

The Landscaping for Urban Spaces and High-Rises Programme[76] has operationalized the Landscape Replacement Policy since 2007, requiring developments to replace lost on-site greenery through ground-level landscaping, sky terraces, vertical greenery, and green roofs, using a Green Plot Ratio requirement typically ranging from 3.0 to 4.0. Incentives such as cash grants for skyrise greenery and gross floor area exemptions for communal sky terraces lower the cost of integrating NBS features. Design guidelines and trainings build industry capacity and standardize submissions.

74 For more information on the Second Rwanda Urban Development Project, see the World Bank website at https://projects.worldbank.org/en/projects-operations/project-detail/P165017.

75 For more information on Green Building Masterplans, see the Building and Construction Authority website at https://www1.bca.gov.sg/buildsg/sustainability/green-building-masterplans.

76 For more information on the landscaping program, see the Urban Redevelopment Authority website at https://www.ura.gov.sg/Corporate/Guidelines/Circulars/dc17-06.

3.8. OTHER SECTOR POLICIES: TRANSPORT, ENERGY, TOURISM, AND EXTRACTIVE INDUSTRIES

Embedding NBS in economic sector policies can have high impacts in terms of reducing disaster risks and increasing the resilience of these sectors – and, ultimately, the national economy. This section provides an overview of potential policy reforms in the transport, energy, tourism, and extractive industries sectors. While this overview is less exhaustive than those dedicated to the preceding key sectors, the policy guide nevertheless seeks to highlight relevant policies and recommendations to inform policy analysis and policy making in these sectors.

Transport, energy, tourism, and extractive industries policies can place significant pressure on ecosystems, particularly where development prioritizes conventional gray infrastructure or resource-intensive practices. Such approaches may degrade ecosystem services, increasing the exposure of infrastructure assets, tourism destinations, and surrounding communities to climate- and disaster-related risks. When ecosystem impacts are insufficiently addressed, development can inadvertently heighten vulnerability rather than resilience. Integrating NBS into infrastructure planning and sector development can help maintain and restore ecosystem services, ensuring that investments contribute to and benefit from climate and disaster resilience.

Despite their potential, NBS are frequently overlooked in transport, energy, tourism, and extractive industries policies owing to siloed planning, outdated technical standards, complex permitting processes, weak or inconsistent regulations, and legal uncertainties. Revising sector laws, codes, and design standards to explicitly integrate NBS across all project phases – planning, construction, operation and maintenance, and decommissioning – can help align infrastructure development with environmental goals and reduce climate and disaster risks. Emphasizing the integration of green and gray infrastructure and strengthening environmental safeguards will help prevent maladaptation (that is, adaptation that reduces local risks while degrading ecosystems and transferring risks elsewhere). This approach can support climate-proofing and generate multiple co-benefits for resilience and sustainability.

Relevant transport, energy, tourism, and extractive industries policies for NBS:

Transport and infrastructure codes requiring NBS (for example, green corridors, permeable surfaces); renewable energy siting regulations obliging habitat restoration; permitting conditions that require NBS in the design and decommissioning of transport, energy, tourism, and extractives projects; and (sub)national sustainable tourism strategies, design regulations, and standards for accommodation can promote and require NBS (for example, requirements around construction density and green space).

Green bonds and infrastructure funds can be used to promote sustainable transport, energy, and tourism projects, as can biodiversity credits for solar/wind projects. PES for watershed protection and ecosystem restoration, and eco-certification and tax breaks for resort designs in which NBS are central are appropriate policies in tourist locations.

PPPs and blended finance can support NBS in transport, energy, tourism, and extractives investments. Industry charters and corporate social responsibility programs can promote biodiversity-friendly energy and extractives development. Destination stewardship agreements can integrate NBS for sustainable tourism.

Reference guidelines and public advisory services support the integration of NBS in transport, tourism, energy, and extractives investments. Awareness campaigns, for example, for tourism operators and tourists, and training for artisanal miners support local NBS knowledge.

WHAT ARE THE POLICY GAPS AND OPPORTUNITIES TO ENABLE NBS THROUGH TRANSPORT, ENERGY, TOURISM, AND EXTRACTIVE INDUSTRIES POLICIES?

TRANSPORT INFRASTRUCTURE. The expansion of transport infrastructure such as roads, railways, and transport hubs (including seaports[77] and airports), if not strategically planned and managed, can exacerbate disaster risks through factors such as deforestation, impaired watershed connectivity, and damaged coastal/terrestrial ecosystems. Embedding in transport policies NBS such as green corridors, permeable pavements, bioswales, and reforestation not only strengthens disaster resilience – by stabilizing terrain, absorbing stormwater, and reducing urban heat – but also supports carbon offsetting and enhances biodiversity, thereby increasing alignment with regulatory requirements.

Design green transport policies that not only focus on carbon neutrality but also integrate climate resilience and environmental protection. This approach further contributes to the overall sustainability of transport infrastructure, while delivering multiple social, environmental, and economic benefits.

Harmonize transport infrastructure standards to require the integration of NBS in design and operation to enhance DRR. This includes aligning water and environmental standards for roads, airports, harbors, and rail infrastructure to ensure the systematic use of NBS such as green drainage systems, flood-retaining landscapes, and heat-mitigating green spaces to manage stormwater, reduce flood risk, and limit heat stress.

Include specific environmental safeguards for all life-cycle stages. These should comprise requirements for infrastructure planning (for example, using NBS and limiting habitat fragmentation), design (for example, climate-proofing), construction (for example, erosion control), and decommissioning (for example, restoration of sites).

PHOTO BY: Esau Fuentes Gonzalez on Unsplash.

El Salvador

DPL for Resilient Road Infrastructure

The World Bank's Development Policy Loan (DPL) supports El Salvador in adopting regulatory reforms that integrate climate resilience and environmental safeguards into transport planning and investment. Through measures such as mandatory inclusion of slope stabilization, vegetative buffers, and improved drainage in road design standards, the DPL helps institutionalize NBS within the guidelines of the Ministry of Public Works and Transport. These actions strengthen the climate resilience of the transport sector, in line with national climate adaptation goals.[78]

77 For more information on NBS for ports, see the World Bank (2025) publication http://hdl.handle.net/10986/43420.
78 For more information on the Development Policy Loan, see the Project Appraisal Document at https://documents1.worldbank.org/curated/en/099101123145539105/pdf/BOSIB02a20001c0810a4df0d66e54d38e61.pdf.

ENERGY INFRASTRUCTURE. The expansion of energy systems, including solar, wind, hydropower, nuclear, and biomass projects, is essential for the green energy transition but can damage ecosystems and increase disaster risks through land conversion, habitat disruption, and pollution if not carefully managed. NBS such as wetland restoration, riparian buffers, and slope reforestation can not only help protect energy infrastructure from hazards but also create safe, inaccessible zones around critical facilities (for example, hydropower plants, nuclear sites), increase the longevity and cost-effectiveness of infrastructure (for example, by reducing sedimentation in dams), and foster local community engagement (for example, through solar grazing).

Integrate NBS in national energy laws, safety regulations, design standards, and guidelines. Establish requirements for NBS in the planning, operation and maintenance, and after-use of power stations, energy networks, solar farms, and wind turbines.

Embed in energy regulations and permits specific requirements for sustainable water and land use, such as restricting construction in critical ecosystems and instead emphasizing NBS, for example, for stormwater management and landscape restoration.

Introduce incentives in permitting processes.[79] Permit exclusions can be provided for nature-positive projects with low adverse environmental impacts or with significant climate and biodiversity benefits. Simplify permits for NBS project components and compensation measures.

PHOTO BY: Robert Macleod on Unsplash.

Québec

Policies for NBS in Hydropower

The environmental framework of Québec, Canada, which includes the Policy on Ecological Instream Flows and the Protection Policy for Lakeshores, Riverbanks, Littoral Zones, and Floodplains, ensures that hydropower development safeguards ecosystems and the rights of Indigenous peoples, creating strong entry points for NBS. Hydro-Québec complements these regulations with its Biodiversity Action Plan, environmental funding programs, and adherence to the global Hydropower Sustainability Standard, achieving gold certification in 2023. These measures enable the use of NBS such as wetland restoration and fish habitat creation to compensate for altered water flows, reducing ecological impacts while enhancing resilience and biodiversity.[80]

79 For more guidance, see TNC's "Improving the Environmental Permitting Process for Clean Energy Infrastructure" at https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_PermittingReformWhitePaper.pdf?utm_source=chatgpt.com.

80 For more information, see the Québec Hydropower Generation and the Environment online report on the Issuu website at https://issuu.com/hydroquebec/docs/wsp_generic_english_final_dec_2020_low-res.

EXTRACTIVE INDUSTRIES. Extractive industries such as mining, oil, and gas often cause significant environmental damage such as deforestation and land, water, and soil degradation, which may increase disaster risks locally. NBS such as reforestation, wetland restoration, and vegetative buffers can help mitigate some local impacts and compensate for other, global impacts.

Implement stronger restoration and rehabilitation obligations. Enforce clear requirements for postextraction land rehabilitation, including nature-based approaches like reforestation, wetland restoration, and soil regeneration.

Establish financial incentives and accountability mechanisms. Develop financial instruments such as biodiversity credits, restoration bonds, and tax breaks to encourage companies to invest in NBS. At the same time, enforce penalties for noncompliance and require performance-based guarantees (for example, environmental bonds).

Reform licensing and concession agreements to require the integration of NBS for risk reduction and compensation as a condition for project approval and renewal. These agreements should mandate for the project design the inclusion of NBS such as reforestation for erosion control, wetland restoration for water filtration, and habitat corridors to minimize biodiversity loss.

PHOTO BY: Justice Hubane on Unsplash.

Botswana

Policies for Sustainable Mining and Environmental Restoration

Botswana's Mines and Minerals Act, enforced through the Amendment Act 2024,[81] requires ESIAs and environmental management plans for all mining operations, including mine closure and rehabilitation obligations, creating a legal basis for NBS such as reforestation and wetland recovery. International commitments, like the Gaborone Declaration for Sustainability in Africa, and ISO 14001 certification of major mines (for example, Jwaneng diamond mine) reinforce ecosystem protection and promote integration of NBS in planning. These measures, supported by financial guarantees for mine rehabilitation, enable the use of NBS to reduce land degradation, restore habitats, and align extractive activities with long-term resilience goals.

81 For more information, see the Republic of Botswana Government Gazette at https://www.minchinkelly.bw/wp-content/uploads/2024/11/Mines-and-Minerals-Amendment-Act-2024-Act-No.-14-of-2024.pdf.

TOURISM. Tourism development, if not strategically planned and managed, can increase disaster risks and environmental degradation through factors such as coastal erosion, deforestation, and water stress. In coastal destinations in particular, sandy beaches and associated ecosystems are critical economic assets, while also contributing to DRR.[82] Embedding in tourism policies NBS such as dune restoration, mangrove conservation, green roofs, and vegetative buffers not only strengthens disaster and climate resilience but also enhances biodiversity and scenic value, which are central to tourism attractiveness. This approach aligns with cross-sector sustainability standards and growing consumer demand for eco-friendly destinations.[83]

Integrate NBS explicitly into a national strategy for sustainable tourism with long-term objectives and targets, considering climate resilience, DRR, biodiversity, and social justice goals. Provide NBS guidelines for public and private tourism investments.

Include NBS obligations in tourism facility permits and incentivize certification. For example, mandate mangrove restoration and dune stabilization in coastal resort development plans. Provide tax breaks or fast-track permits for businesses with certifications from national or internationally recognized schemes (for example, Global Sustainable Tourism Council, Green Globe).

Scale up information, education, and communication campaigns to influence community and tourist behavior toward nature-positive practices, contributing to NBS sustainability.

PHOTO BY: Random Institute on Unsplash.

Colombia

Strengthening NBS for Tourism with a Cat DDO:

Colombia's Decree 646 (2021), its Tourism Sector Plan 2022–2026, and the National Development Plan's Tourism in Harmony with Life Policy prioritize sustainable tourism and ecosystem protection, including NBS and DRM plans for tourist destinations. Colombia's Fourth Cat DDO supports this reform process, providing funds and risk finance instruments, such as parametric insurance, to facilitate the implementation of national policies for the tourism sector that increase resilience and carbon sequestration.[84]

82 For more information on NBS for beaches, see the World Bank (2025) publication http://hdl.handle.net/10986/43686.
83 For more information on how NBS offers opportunities for the tourism sector, see the World Bank (2025) publication under footnote 82.
84 For more information on the Cat DDO, see the Program Document at https://documents1.worldbank.org/curated/en/099011525180029297/pdf/BOSIB-97e85b55-ee93-468b-914b-0c73c474076f.pdf.

04 CONCLUSIONS

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PHOTO BY:
James Park on Unsplash.

Embedding NBS into DRM and climate-related policy reforms, as well as into sector and subnational policies, presents a critical opportunity to enhance disaster and climate resilience while delivering co-benefits for ecosystems, communities, and economies.

Unlike conventional gray infrastructure, NBS and hybrid options offer flexible, adaptive, and cost-effective solutions that can evolve over time to meet the challenges of a changing climate. Despite their advantages, NBS remain underrepresented in many policy frameworks, which instead tend to prioritize gray infrastructure owing to long-standing regulatory, institutional, and technical biases. Overcoming these barriers requires deliberate efforts to align regulatory and other policy instruments with nature-based approaches.

This policy guide presents multiple opportunities to integrate NBS into national, subnational, and sector policy reforms, strengthening disaster and climate risk reduction. These opportunities serve as possible entry points to guide practitioners from the World Bank, government, and nongovernmental organizations to strengthen NBS through individual policies and policy reforms, including those supported by international financing instruments, such as the World Bank's Development Policy Financing, including with Cat DDO, and Investment Project Financing.

A tailor-made approach based on each country's context, development objectives, and existing policy and governance framework is required to enable NBS in the policy-making process. This requires policy analysis and stakeholder involvement, for which this document can serve as inspiration. In particular, the guiding principles (section 2.3) and sector-specific guiding questions (chapter 3) are potential starting points for the analysis of existing policy gaps and opportunities for enabling NBS for disaster and climate resilience.

The following are the main considerations for enabling policy frameworks for NBS, focusing on disaster and climate resilience:

Embed NBS directly into national socioeconomic development, DRM, and climate plans and strategies.

In updating these policies, explicitly include NBS measures such as natural nonbuildable buffer zones, river and floodplain restoration, green corridors, and natural reforestation. While high-level strategies and development plans can facilitate sector-wide integration and budgeting, DRM and climate-specific policies can provide detailed guidance on NBS implementation.

Adopt a gradual, multilevel policy approach.

Although national policies provide an overarching framework, much of the implementation of NBS takes place at the subnational level. Local governments can play a key role by developing or updating urban master plans, zoning codes, building codes, and official guidelines to promote NBS in response to local needs. Additionally, financial incentives can be offered at different policy levels; these may include tax deductions and public funds for NBS initiatives like natural stormwater systems or agroecological practices. Policies can be developed at different levels, following a top-down or bottom-up approach, depending on the context and needs of each country.

Contribute to sector policies that are relevant for disaster and climate resilience to create favorable conditions for scaling NBS.

For example, environmental and biodiversity policies can target ecosystem conservation for DRR and climate resilience. Water and agriculture policies that promote IWRM and a sustainable use of natural resources can integrate NBS like upper catchment reforestation and agroforestry. Transport, energy, tourism, and building policies can strengthen infrastructure resilience through the adoption of NBS such as natural drainage and slope stabilization, biosolar green roofs, reforestation, and nature-positive design, operation, and decommissioning.

Use a mix of policies that allow, incentivize, and/or require NBS.

Strategically combining policy instruments (for example, regulatory with financial) can enable NBS implementation by public and private actors at different levels and across different sectors. This can be done gradually by removing policy barriers, incentivizing NBS adoption through financial and nonfinancial tools, or requiring NBS integration (for example, via updated environmental regulations).

It should be stressed that enabling policies do not always need to use the specific term "nature-based solutions." Policies that adopt related approaches such as sustainable land and water use practices, ecosystem health, and nature-positivity can also strengthen NBS and reduce disaster and climate risks. At the same time, removing policy barriers related to environmental degradation and, more specifically, to the prioritization of gray infrastructure can be equally important to achieve and sustain NBS implementation.

Implementing and scaling NBS often involves trade-offs and conflicts. An enabling policy mix should tackle these challenges by incorporating context-appropriate instruments that balance competing interests while ensuring social justice.

With many countries on the verge of upscaling NBS from early pilot stages to country- and sector-wide implementation, shaping enabling policy frameworks has become a critical priority. As such, support has grown for policy reforms that enable NBS. On the operational side, project developers considering key investments in NBS and hybrid solutions should analyze the need and potential for supportive policies that could increase an investment's sustainability and allow successful upscaling approaches.

Together with public policies, other key enablers should be addressed for successful NBS implementation at scale. These include, for example, governance structures, leadership, institutional capacity, and financing. Given the significance of the topic, the literature is constantly evolving, producing practical insights that enrich and extend the knowledge offered here.

This policy guide complements the evolving knowledge landscape on NBS by providing policy makers and operational teams with actionable entry points, guiding principles, and sector-specific understanding to advance policy making that enables NBS. It is designed to support tailored reforms, foster cross-sector collaboration, and build governance capacity, thereby laying the foundation for the systemic adoption of NBS.

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