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NATURE-BASED SOLUTIONS

FOR COMPREHENSIVE DISASTER AND CLIMATE RISK MANAGEMENT

Toolkit for Integrated Planning and Implementation
of Disaster Risk Reduction and Climate Change Adaptation



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For more information on UNDRR's CRM approach, visit: <https://www.undrr.org/crm>

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ACRONYMS

| | |
|------------------|--|
| BfN | Bundesamt für Naturschutz |
| CBD | Convention on Biological Diversity of the United Nations |
| CCA | Climate Change Adaptation |
| CDEMA | Caribbean Disaster Emergency Management Agency |
| CDM | Comprehensive Disaster Management |
| CRM | Comprehensive Disaster and Climate Risk Management |
| CRM-NbS | Nature-based Solutions for CRM |
| DRM | Disaster Risk Management |
| DRR | Disaster Risk Reduction |
| EbA | Ecosystem-based Adaptation |
| EbM | Ecosystem-based Mitigation |
| Eco-DRR | Ecosystem-based Disaster Risk Reduction |
| EM-DAT | The International Disaster Database |
| FAO | Food and Agriculture Organization of the United Nations |
| FEBA | Friends of Ecosystem-based Adaptation |
| GEDI | Global Ecosystem Dynamics Investigation |
| GEF | Global Environment Facility |
| GFDRR | Global Facility for Disaster Reduction and Recovery |
| IPBES | Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services |
| IPCC | Intergovernmental Panel on Climate Change |
| IUCN | International Union for Conservation of Nature |
| IWM | Integrated Watershed Management |
| MEA | Millennium Ecosystem Assessment |
| MSP | Multi-Stakeholder Partnership |
| NAP | National Adaptation Plan |
| NbS | Nature-based Solutions |
| NOAA | National Oceanic and Atmospheric Administration |
| RiX | Risk Information Exchange |
| SDGs | Sustainable Development Goals |
| SEM | Stakeholder Engagement Mechanism |
| SLM | Sustainable Land Management |
| SMHI | Swedish Meteorological and Hydrological Institute |
| UNCCD | United Nations Convention to Combat Desertification |
| UNDRR | United Nations Office for Disaster Risk Reduction |
| UNEA | United Nations Environment Assembly |
| UNEP | United Nations Environment Programme |
| UNEP-WCMC | UNEP – World Conservation Monitoring Centre |
| USGS | United States Geological Survey |
| WOCAT | World Overview of Conservation Approaches and Technologies |

INTRODUCTION

The toolkit on nature-based solutions for comprehensive disaster and climate risk management (CRM-NbS Toolkit) aims to support countries in making nature-based solutions (NbS) an integral part of planning under the comprehensive disaster and climate risk management (CRM) approach considering both disaster risk reduction (DRR) and climate change adaptation (CCA) in an integrative manner. The tools and related information presented here build on the NbS-related technical resources developed for UNDRR's CRM approach.¹

The UNDRR approach to CRM (www.undrr.org/crm) is aligned with Target E of the Sendai Framework for Disaster Risk Reduction 2015–2030: to “substantially increase the number of countries with national and local disaster risk reduction strategies by 2020”. The approach facilitates this by supporting the integration of risk reduction into national adaptation plans and climate information and adaptation considerations into DRR plans – and, where appropriate and agreeable, into an integrated plan. Therefore, the CRM approach is key to shifting towards integrated plans and policies that are supported by a shared understanding of risk and coherent institutions, thereby supporting larger policy coherence.

This toolkit builds on the latest definition of NbS from the United Nations Environment Assembly (UNEA): “Nature-based solutions 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, resilience and biodiversity benefits” (UNEA, 2022).

As an umbrella concept, NbS includes a number of approaches. Most relevant in the context of CRM for CCA and DRR are: ecosystem-based adaptation (EbA) and ecosystem-based disaster risk reduction (Eco-DRR). These two

approaches are already well established and cover both climate-related and non-climate-related hazards. While reference is made frequently to EbA and Eco-DRR throughout the toolkit, other relevant approaches may also be mentioned.

The CRM-NbS Toolkit comprises five tools that build on one another to facilitate the strategic integration of NbS, each focusing on a particular component of the CRM approach (Figure 1).

TOOL 1 supports compiling data, information and knowledge of a country's environment, climate, natural hazards, exposed elements and vulnerability and the impacts of these elements to assess the specific national and subnational context and challenges. Special attention should be given to Indigenous peoples and local communities, and their traditional sources of knowledge. It is assumed that such information is already primarily collected in the context of CRM planning.

TOOL 2 provides a list of keywords that countries can use to assess the extent to which NbS-related concepts are addressed in the national policy and planning landscape to identify NbS conceptual entry points for developing new or revising existing policies, strategies and plans.

TOOL 3 guides the selection of NbS interventions by highlighting categories and options to integrate NbS into the national policy and planning landscape.

TOOL 4 supports identifying relevant actors and stakeholders to engage in NbS and CRM planning and provides guidance on inclusive governance for NbS integration into CRM.

TOOL 5 provides an overview of how NbS is already being integrated into the national policy and planning landscape in various countries to facilitate the formulation of goals and measures across the national policy and planning landscape. A checklist supporting the implementation of the tools by national actors is provided.

¹ Contact undrr-bonn@un.org to access these supplementary CRM technical resources

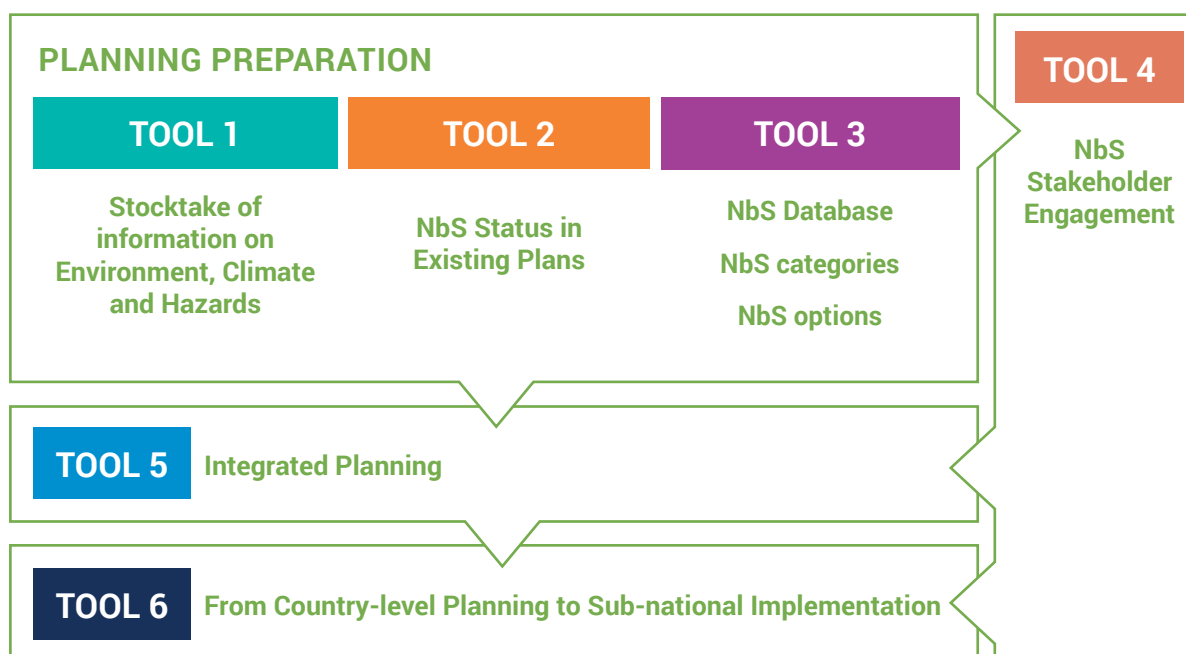


FIGURE 1. Overview of the CRM-NbS Toolkit

At the beginning of each tool, you will find a table with guiding questions summarising its purpose, how the tool is used and what results it can deliver.

TABLE 1. INTRODUCTORY TABLE THAT IS PRESENTED FOR EACH TOOL

| | |
|--|---|
| What can you do with this tool? | Summary of why this particular tool is relevant in integrating NbS into the CRM process and what can be achieved with it. |
| How do you use this tool? | Explanation of how to use the tool, whether it's a list of resources, a table providing an overview of how existing plans refer to NbS or a look-up table of NbS options for a particular environmental hazard. |
| What results do you get when using the tool? | The tool's results and what you can deliver with them are summarised. It also outlines how the tool complements other results from tools included in the CRM-NbS toolkit. |

In addition, at the end of each tool, you will find additional resources to explore and find more related examples. Case studies are presented as boxes to illustrate the tool.

TOOL 1

STOCKTAKE OF INFORMATION ON ENVIRONMENT, CLIMATE, HAZARDS, EXPOSURE, VULNERABILITY AND IMPACTS

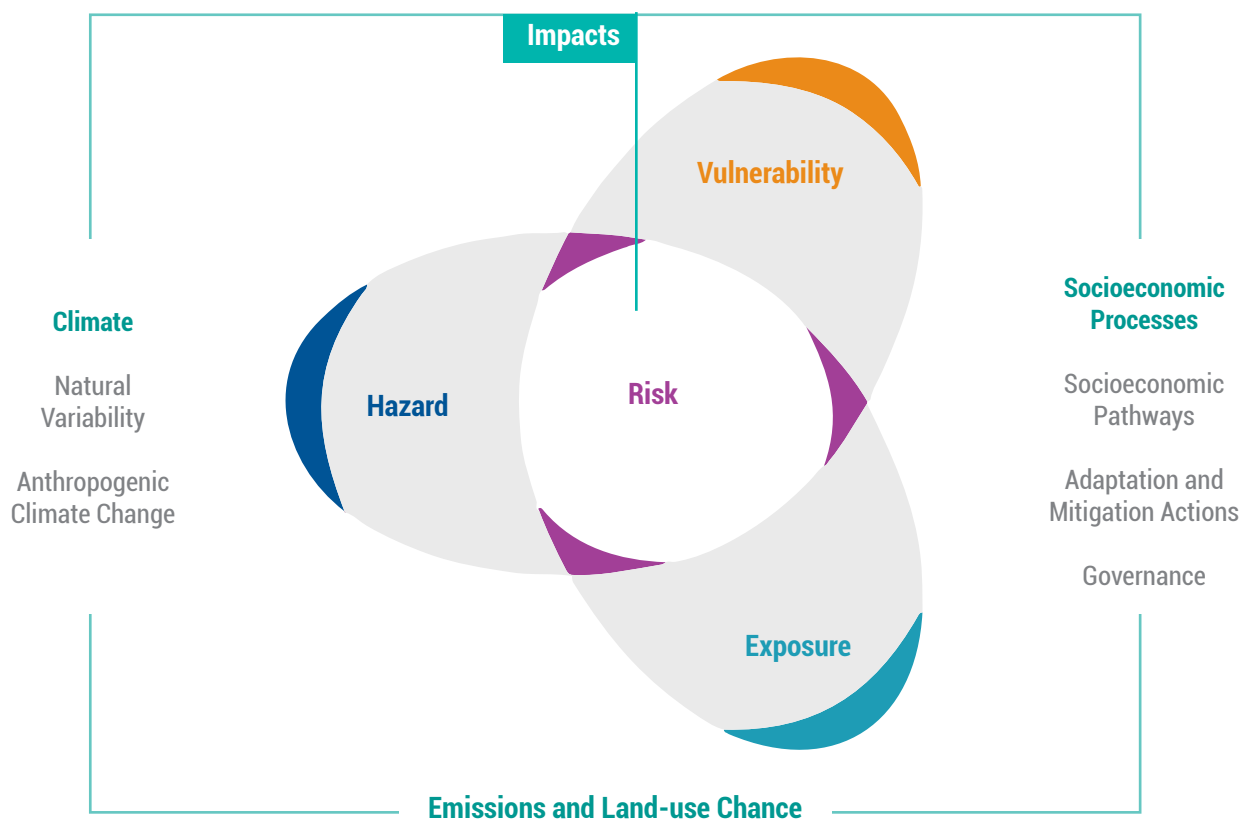
| | |
|---|---|
| What can you do with this tool? | With this tool, you can compile information to prepare an overview of a country's environmental and climate context as well as risks associated with natural hazards. Tool 1 is designed to inform the overall risk assessment in a country where NbS can be integrated. |
| How do you use this tool? | This tool consists of a list of main factors to ponder before considering NbS options: namely, the geographical context and the exposure and vulnerability to natural hazards. Many of these considerations might already be available in existing plans or national assessments. There are additional links to international data and information sources. |
| What results do you get when using the tool? | This tool supports the delivery of a comprehensive overview of a country context – in terms of main factors – as a precondition for considering NbS for CRM. |

This tool provides a list of main factors for consideration to better understand a country's environmental, climate and risk profile. The tool considers the disaster risk context by including climate-related hazards (e.g., tropical storms, floods, droughts and extreme heat) as well as non-climate-related hazards (e.g., volcanic activities, earthquakes and landslides). These profiles help to determine the role that NbS can play in the CRM process.

The tool consists of a series of tables (Tables 2–7) that list the main factors recommended when assessing entry points and compiling considerations for Eco-

DRR and EbA: environmental factors, climatic factors, hazard factors, and exposure and vulnerability factors.

The approach to stocktaking a country's environmental challenges, such as in Tool 1, is framed using the IPCC climate risk framework (Figure 2). While Tool 1 does not explicitly provide steps to conduct environment, climate and risk assessments (resources for this are provided below), the tool does highlight the main factors to consider in such assessments – the environmental and climate context and challenges, as well as hazards, drivers of exposure and vulnerability.



Source: Ara Begum et al., 2022

FIGURE 2. Risk within the toolkit is framed using IPCC's risk framework, wherein risk is the result of complex interactions among the determinants of risk (hazard, vulnerability and exposure) Figure adapted from IPCC (2014)

ENVIRONMENTAL FACTORS

TABLE 2. LAND COVER/LAND USE AND TOPOGRAPHY

| LAND COVER/LAND USE AND TOPOGRAPHY | |
|---|--|
| <p>CONTEXT: Having an overview of a country's land cover and topography is important to understanding how environmental challenges differ by location and where there are entry points for planning specific types of NbS.</p> | |
| WHAT TO CONSIDER? | CATEGORIES/FEATURES |
| Land cover and land use classes | <ul style="list-style-type: none"> • Cropland • Forest • Pastures • Wetlands • Settlements • Infrastructure • Water bodies • Watersheds |
| Topographical features | <ul style="list-style-type: none"> • Elevation • Slope |
| Other geographic elements | <ul style="list-style-type: none"> • Total land area • Protected areas • Other relevant features, such as coastline <p>Note: Further context-specific elements might be relevant for a particular country context.</p> |
| <p>Some examples of open-source data and information:</p> <ul style="list-style-type: none"> • Copernicus Global Land Service provides bio-geophysical remote sensing-based information products of global land surfaces. • AQUASTAT is FAO's global information system on water and agriculture. • GIEWS is FAO's global information and early warning system on food and agriculture. • Topography and Digital Terrain Data at a global level is available from NOAA. • EarthExplorer from USGS is a tool to query and order satellite images, aerial photographs and maps. • The Humanitarian Data Exchange includes various classes of land cover data for many countries. • ESA WorldCover 2020 provides a new baseline global land cover product at 10m resolution. | |

TABLE 3. ECOSYSTEMS

| ECOSYSTEMS (MEA, 2005; UNDRR, 2021) | |
|--|---|
| <p>CONTEXT: An inventory of a country's ecosystems and protected areas as well as the indication of biodiversity are key to understanding not only how ecosystems may be impacted by natural hazards but also which NbS may be best suited to address climate-related hazards with the targeted protection, conservation, restoration, sustainable use and/or management of specific ecosystems. This table provides a list of selected ecosystems to be considered in this regard.</p> | |
| WHAT TO CONSIDER? | CATEGORIES/FEATURES |
| Coastal | <ul style="list-style-type: none"> • Cropland • Forest • Pastures • Wetlands • Settlements • Infrastructure • Water bodies • Watersheds |
| Cultivated | <ul style="list-style-type: none"> • Elevation • Slope |
| Dryland | <ul style="list-style-type: none"> • Hyperarid • Arid • Semiarid • Dry subhumid |
| Forest/woodland | <ul style="list-style-type: none"> • Tropical/subtropical • Temperate • Boreal |
| Inland water | <ul style="list-style-type: none"> • Lakes • Rivers • Streams |
| Island | <ul style="list-style-type: none"> • Island states |
| Marine | <ul style="list-style-type: none"> • Coral reefs • Seagrass forests/meadows |
| Mountain | <ul style="list-style-type: none"> • Foothill • Lower montane • Upper montane • Subalpine • Alpine |
| Polar | <ul style="list-style-type: none"> • Tundra |
| Urban | <ul style="list-style-type: none"> • Urban parks and forests • Urban gardens and agriculture • Green roofs/walls/sidewalks and other urban features • Urban water bodies • Sustainable drainage systems • Urban nature reserves |

ECOSYSTEMS (MEA, 2005; UNDRR, 2021)

Some examples of open-source data and information:

- [Global Ecosystem Typology](#) from IUCN is a comprehensive classification framework for Earth's ecosystems that integrates their functional and compositional features.
- [Red List of Ecosystems Database](#) from IUCN can help to identify vulnerable ecosystems.
- [Key Biodiversity Areas](#) database from the Key Biodiversity Area Partnership supports the identification, mapping, monitoring and conservation of these areas. Data can be viewed online and requested for download.
- [Tested National-Level Biodiversity Indicators](#) from the Convention on Biological Diversity (CBD) provide available and potential indicators reported by 52 parties and other governments between May 2001 and February 2003.
- [World Database on Protected Areas](#) from UNEP-WCMC and IUCN is a database of marine and terrestrial protected areas.
- [NASA's GEDI Ecosystem Lidar](#) produces the first high-resolution laser ranging observations of the 3D structure of the Earth, which can also be used for ecosystem modelling, forest and water resource management, carbon cycle science and weather prediction, among other applications.

CLIMATE FACTORS

TABLE 4. CLIMATE AND CLIMATE CHANGE FACTORS

CLIMATE AND CLIMATE CHANGE

CONTEXT: Climate change impacts both climate-related hazards and the functionality of ecosystems and NbS. Considering the current and future projections of a country's climate – as well as the uncertainty inherent within these projections – is fundamental for consideration of NbS in CRM.

| WHAT TO CONSIDER? | CATEGORIES/FEATURES |
|---------------------------|---|
| Climate variables | <ul style="list-style-type: none">• Atmospheric (land) temperature (mean)• Sea surface temperature (mean) (if applicable)• Rainfall |
| Climate trends and scales | <ul style="list-style-type: none">• Forecasts, outlooks and scenarios• Timescales (seasonal, interannual, decadal, etc.) |

Some examples of open-source data and information:

- [IPCC Interactive Atlas](#) is a tool that provides spatial and temporal analyses of much of the observed and projected climate change information contributed to the Sixth Assessment Report by Working Group I, including regional synthesis for Climatic Impact-Drivers (CIDs).
- The [Climate Information Platform](#) from the Swedish Meteorological and Hydrological Institute (SMHI) provides downloaded climate change overviews for any location worldwide, as well as pre-calculated climate indicators and interactive maps and graphs.
- The [Climdex](#) allows users to explore, download and analyse indices from the global observed climate extremes derived from daily temperature and precipitation data. Users can download data and plot maps as well as time series of gridded and station data from a range of sources.

HAZARDS

TABLE 5. HAZARD FACTORS

| HAZARDS | |
|---|---|
| <p>CONTEXT: Assessing the frequency and magnitude of climate-related hazards and their impacts on ecosystems is an important component for planning of NbS for CRM.</p> | |
| WHAT TO CONSIDER? | CATEGORIES/FEATURES |
| Climate-related hazards | <ul style="list-style-type: none"> • Flooding • Tropical storms • Storm surge • Marine hazard • Extreme heat • Wildfire • Drought • Erosion |
| Non-climate-related hazards | <ul style="list-style-type: none"> • Earthquake • Tsunami • Volcanic activities • Landslides |
| <p>Some examples of open-source data and information:</p> <ul style="list-style-type: none"> • Hazard Information Profiles provides a description of over 300 hazards, developed through a consultative process. • Asian Disaster Reduction Center's (ADRC) disaster information database provides an overview of natural hazards around the world as reference information for DRR activities. • The natural hazards database from NOAA's National Centers for Environmental Information provides an archive of various natural hazard data to support research, planning, response and mitigation. Long-term data, including photographs, can be used to establish the history of natural hazard occurrences and help mitigate against future events. • The Disasters program area of NASA's Earth Science Applied Sciences Program provides links to hazard monitoring-related resources, trainings, and projects, including their Disasters Mapping Portal. • DFO Flood Observatory provides space-based measurement, mapping, and modelling of surface water, including flood hazard maps. | |

EXPOSURE AND VULNERABILITY

TABLE 6. EXPOSURE AND VULNERABILITY FACTORS

| EXPOSURE AND VULNERABILITY | |
|--|---|
| <p>CONTEXT: Exposure and vulnerability are components of overall risk, so an overview of exposed population and assets as well as different vulnerability dimensions is key for planning NbS for CRM. However, it is important to note that definitions differ slightly between risk and climate communities and would have to be brought together for CRM (for an overview on sectoral understandings, see Sett et al., 2022).</p> | |
| WHAT TO CONSIDER? | CATEGORIES/FEATURES |
| Exposure | <ul style="list-style-type: none"> Population (groups) exposed to a certain hazard Environmental, economic and physical assets exposed to a certain hazard |
| Vulnerability | <ul style="list-style-type: none"> Environmental dimension: e.g., environmental quality and protection, agriculture and livestock, natural infrastructure Social dimension: e.g., demographic patterns, inequality and marginalization, migration and displacement, health and well-being, education Economic dimension: e.g., livelihoods, financial buffer capacities, (un)employment Institutional dimension: e.g., governance, institutional capacities |
| <p>Some examples of open-source data and information:</p> <ul style="list-style-type: none"> Risk Information Exchange (RiX) from UNDRR is a repository of open-source global and national risk data, including exposure and vulnerability data for a number of growing countries. The Humanitarian Data Exchange includes various data sets on dimensions of exposure and vulnerability. | |

Overviews on exposure and vulnerability might already be available, since their use would not be limited to NbS. This list is supposed to give a broader overview, while the specific exposure and vulnerability pattern would differ by country. The assessment of hazard, exposure, vulnerability and overall risk as well as climate-related dynamics of this goes beyond the consideration of NbS planning and is essential for the overall planning in the context of CRM.

IMPACT INFORMATION

TABLE 7. IMPACT ASSESSMENT

| IMPACT ASSESSMENT (EUROPEAN UNION ET AL., 2013) | |
|---|--|
| <p>CONTEXT: Considering the propensity of exposed elements to suffer harm when impacted by natural hazards – including that of ecosystems – is an important component for planning of NbS for CRM.</p> | |
| WHAT TO CONSIDER? | CATEGORIES/FEATURES |
| Losses and damages from hazardous events | <ul style="list-style-type: none"> • Different types of impacts, including on: <ul style="list-style-type: none"> • Tropical storms • Lives and livelihoods • Ecosystems and biodiversity • Infrastructure and physical assets • Production of goods and services and access to them • Disruption of basic services (health, education, etc.) • Economic losses and damages • Governance and decision-making processes • Increases in risks and vulnerabilities as a result of a hazard event |
| <p>Some examples of open-source data and information:</p> <ul style="list-style-type: none"> • EM-DAT contains data on the occurrence and effects of more than 22,000 mass disasters in the world from 1900 to the present day. • DesInventar from UNDRR provides detailed disaster loss data for 110 countries at local levels.² • System of Environmental-Economic Accounting (SEEA) is a framework that integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment and the benefits of environmental assets to humanity. | |

Such assessments might already be part of a NAP or DRR strategy – as, for example, in Malawi (see Box 1). If not, other national assessments might be available, either as a standard assessment or maybe for specific events, such as in the case of Post Disaster Needs Assessments (PDNAs).

² Also see <https://www.undrr.org/disaster-losses-and-damages-tracking-system> for details on the forthcoming tracking system for hazardous events and disaster losses and damages.

BOX 1:

MALAWI'S COMBINED RISK OF DROUGHT AND FLOOD

Malawi has included the results from a previous assessment that mapped the combined risk of drought and flood by district in its National Resilience Strategy (2018–2030). This map is used to provide greater insight into the country's disaster risk context. The map shows that “Southern rural populations are among the most exposed and vulnerable to climate-related risks and shocks in Malawi” (Government of Malawi, 2018, p. 2). Such inclusion of climate hazard, exposure and vulnerability information provides valuable information for NbS integrated planning.

For a map of Malawi's combined risk of drought and flood by district, please see Government of Malawi's National Resilience Strategy (2018–2030): Breaking the Cycle of Food Insecurity in Malawi. Department of Disaster Management Affairs (available [online](#)).

MORE INFORMATION

- Report that provides guidelines on how to conduct a post-disaster needs assessment: European Union, GFDRR, UNDP (2013), [Post-Disaster Needs Assessment, Volume A, Guidelines](#). Brussels, European Union.
- Guidelines on risk assessment as input to DRR plans: UNDRR (2017), [Words into Action guidelines: National disaster risk assessment](#). Geneva, UNDRR.
- In-depth guideline on how to conduct an ecosystem-based climate risk assessment: GIZ, EURAC & UNU-EHS (2018), [Climate Risk Assessment for Ecosystem-based Adaptation – A Guidebook for Planners and Practitioners](#). Bonn, GIZ.
- Guidance note that outlines several practical applications of how countries can use country risk profiles in the promotion of probabilistic risk information: CIMA Research Foundation, UNDRR (2020), [Guidance Note on Using the Probabilistic Country Risk Profiles for Disaster Risk Management](#). CIMA Research Foundation, Savona, Italy.
- Guidance on how to integrate NbS into national DRR plans: UNDRR (2021), [Words into Action on Nature-based Solutions for Disaster Risk Reduction](#). Geneva, UNDRR.
- UNDRR (2022), [Technical Guidance on Comprehensive Risk Assessment and Planning in the Context of Climate Change](#).
- Profile that aims to enable the financial sector to measure and address nature-related risk by providing scientifically robust and actionable sustainability analytics on nature impacts and dependencies: UNEP (2023), [Nature Risk Profile: A Methodology for Profiling Nature Related Dependencies and Impacts](#). Cambridge, U.K.
- Online database that provides global monitoring on the state of mangroves: Global Mangrove Alliance (2023), [Global Mangrove Watch](#).

TOOL 2

NBS STATUS IN NATIONAL POLICY AND PLANNING LANDSCAPE

| | |
|---|--|
| What can you do with this tool? | With this tool, you can assess whether NbS and/or NbS-related concepts are already integrated – explicitly or implicitly – in national and subnational plans for DRR and CCA. |
| How do you use this tool? | This tool provides a list of keywords related to NbS for searching whether NbS and NbS-related concepts are, to some extent, already included in the national and subnational policy and planning landscape. |
| What results do you get when using the tool? | When using the tool, you can get a summary of NbS and NbS-related statements in plans related to DRR and CCA that have been reviewed. |

This tool helps to identify whether and how NbS and NbS-related concepts may already be part of the national policy and planning landscape in relation to DRR and CCA, ensuring that any new efforts build on this knowledge. Compiling NbS in existing documents is an essential preparatory step for bringing NbS into integrated planning for DRR and CCA.

The key element of this tool is Table 8, which provides an extensive list of keywords directly or indirectly related to NbS. These keywords will allow users to identify NbS and NbS-related information and planned action in a review of existing documents such as NAPs or DRR strategies. As NbS is an umbrella term for multiple ecosystem-based approaches and used in different sectors, it may have diverse framings and labels. Therefore, this list should help the toolbox user to identify the numerous options under which NbS is considered. This would also include the growing consideration of NbS knowledge and measures from Indigenous peoples and local communities. Box 2 provides an example from Timor-Leste of what traditional knowledge within the national policy and planning landscape could look like. The list also

supports critical assessments of environmental and social safeguards, terms and/or concrete measures mentioned in the document and whether there is still the opportunity to fully exploit their potential.

It is recommended that users of this tool read through the keywords and apply them to guide an analysis of existing plans to help identify NbS uptake and entry points. The screening method selected could be determined by the number and length of documents. In carrying out the analysis, it is important to consider each keyword in the context of the intended goal of NbS: to address social, economic and environmental challenges, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.

The overlay between information on hazards, environment, climate, exposure, vulnerability and impacts (i.e., Tool 1) with an overview of NbS in existing plans (Tool 2), as well as any options from the NbS database (Tool 3), provides the knowledge basis for identifying the gaps and opportunities for integrating NbS into further planning.

TABLE 8. KEYWORDS TO HELP TO IDENTIFY NBS AND NBS-RELATED STATEMENTS/CONCEPTS IN EXISTING PLANS

| NBS APPROACHES AND CONCEPTS | | |
|--|---|--|
| ECOSYSTEM-RELATED | NATURE-RELATED | INFRASTRUCTURE-RELATED |
| <ul style="list-style-type: none"> • Ecosystem accounting • Ecosystem approach • Ecosystem-based Adaptation (EbA) • Ecosystem-based approaches • Ecosystem-based Disaster Risk Reduction (Eco-DRR) • Ecosystem-based management • Ecosystem-based Mitigation (EbM) • Ecosystem-based solutions • Ecosystem services | <ul style="list-style-type: none"> • Agroforestry • Biodiversity (conservation) • Bio(dynamic) farming • Building with nature • Climate-smart agriculture • Ecological pest management • Forest landscape restoration/rewilding • Indigenous (people's) knowledge • Integrated Watershed Management (IWM) • Integrated Water Resources Management (IWRM) • Landscape restoration • Natural capital (accounting) • Natural heritage (protection) • Nature-based solutions (NbS) • Regenerative farming • Sustainable grazing management • Sustainable Land Management (SLM) • Sustainable (natural) resource use • Traditional knowledge • Working with natural processes • Working with nature | <ul style="list-style-type: none"> • Blue infrastructure • Blue-green (hybrid) infrastructure • Ecological engineering • Engineering with nature • Green (hybrid) infrastructure • Natural infrastructure • Sponge cities |
| NBS MEASURES | | |
| <ul style="list-style-type: none"> • Afforestation • Agrobiodiversity • Bioshields • Bioswales • Community forests • Community gardens • Floodplain restoration • Grassland revegetation • Green dykes • Green facades • Green roofs • Living weirs • Mangrove, salt marsh, wetland restoration | <ul style="list-style-type: none"> • Permeable pavements • Rainwater harvesting • Reforestation • Removal of invasive species • River renaturation • River watershed management • Reef conservation/management/rehabilitation/restoration • River renaturation • Sand conservation/management/rehabilitation/restoration • Sustainable drainage systems | <ul style="list-style-type: none"> • Sustainable grazing management • Sustainable management of fisheries • Stormwater management • Urban wetlands • Urban agriculture • Urban farming • Urban greening • Urban nature reserves • Urban wetlands • Wetland restoration |

| ECOSYSTEM SERVICES | | | |
|---|---|---|---|
| PROVISIONING SERVICES | REGULATING SERVICES | HABITAT/SUPPORTING SERVICES | CULTURAL SERVICES |
| <ul style="list-style-type: none"> • Food • Fresh water • Medicinal resources • Raw materials | <ul style="list-style-type: none"> • Biological control • Carbon sequestration • Carbon storage • Erosion prevention • Maintenance of soil fertility • Local climate and air quality • Moderation of extreme events • Pollination • Wastewater treatment | <ul style="list-style-type: none"> • Habitat for species • Maintenance of genetic diversity | <ul style="list-style-type: none"> • Aesthetic appreciation • Inspiration for culture, art and design • Recreation • Mental health • Physical health • Spiritual experience • Sense of place |

Source: These keywords have been drawn from TEEB (2010), UNDRR (2021), Arce et al. (2019) and internal consultations with experts.

The keywords should help to identify the different forms of how NbS are mentioned in plans. Table 9 demonstrates this based on examples from the NAPs of Bangladesh and Timor-Leste, the DRR strategies of Colombia and India, and the integrated plans of Kiribati and Vanuatu.

TABLE 9. EXAMPLES OF NBS OR NBS-RELATED STATEMENTS IN NATIONAL PLANS

| COUNTRY | TYPE OF PLAN | NBS OR NBS-RELATED STATEMENT (REFERRING TO TERMS FROM TABLE 8) | EXAMPLE TEXT |
|------------------------|--------------|---|--|
| Bangladesh (2023–2050) | NAP | Infrastructure-related NbS approaches and concepts | “Promote green and blue infrastructure for urban environmental management and conservation” (p. 70). |
| Colombia (2015–2030) | DRR | Ecosystem-related NbS approaches and concepts | “Sixteen (16) ecosystem-based adaptation actions for disaster risk reduction” (p. 37). |
| India (2019) | DRR | NbS measures | To protect against cyclones and winds, “Support the preparation of detailed maps to delineate coastal wetlands, mangroves and shelterbelts and tracts for coastal bioshields using best tools, field studies and satellite data” (p. 103). |
| Kiribati (2019–2028) | Integrated | Ecosystem- and nature-related NbS approaches and concepts | As part of Strategy 4, “Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems”, communities are to “manage coastal fisheries taking into consideration sustainability of marine resources as well as climate change and disaster risks” (p. 70). |
| Timor-Leste (2021) | NAP | Ecosystem- and nature-related NbS approaches and concepts, ecosystem services | The NAP will identify planning “pathways that build the resilience of biodiversity and ecosystem resources and will adopt a systems approach to adaptation with respect to natural capital” (p. 3). The traditional practice of Tara Bandu is described in the NAP as an important entry point for promoting “ecosystem-based adaptation measures that provide co-benefits in terms of sustainability of harvests and the provision of ecosystem services” (p. 21). |
| Tonga (2018–2028) | Integrated | Nature-related NbS approaches and concepts | As an expected outcome of sub-goal “Safer and stronger coastal and marine infrastructures... integrated coastal and ecosystem-based adaptation” planning (p. 36). |
| Vanuatu (2016–2030) | Integrated | Ecosystem-related NbS approaches and concepts | “Support ecosystem adaptation and risk reduction services by: prioritising adaptation and risk reduction actions that build on, incorporate and protect taboos, conservation areas, heritage sites, locally managed areas and vulnerable habitats, and ecosystems and carbon sinks” (p. 20). |

BOX 2:

COMMUNITY EBA THROUGH TRADITIONAL KNOWLEDGE IN TIMOR-LESTE'S NAP

Timor-Leste's NAP (2019) integrates the traditional custom rule system of Tara Bandu as a means to strengthen community EbA approaches. Tara Bandu enforces peace and reconciliation at the local level through the power of public agreement and “generally involves some aspect of reducing or preventing community conflict, protecting the environment, managing natural resources and improving community welfare” (Government of Timor-Leste, 2019, p. 20).

Tara Bandu is part of Timor-Leste's Constitution and has been incorporated into various legal frameworks in relation to natural resource management and in the management of protected marine areas. For example, Timor-Leste's NAP (2019) states that within the country's Environmental Basic Law (Decree Law no. 26/2012), Article 8 declares that “Tara Bandu may be applied in accordance with the rituals instituted by local common law which are intended to conserve and promote the environment and the sustainable preservation and use of natural resources” (Government of Timor-Leste, 2019, p. 21). Timor-Leste's NAP further states that Tara Bandu has therefore been recognised by the national government as a “local customary law for protecting and conserving the environment and use of natural resources in a sustainable manner” (ibid.).

Communities use Tara Bandu to establish resource management regimes, including “forest conservation areas, fishery no-take zones, bans on certain types of destructive fishing methods and prohibitions on harvesting of certain species” (ibid.). The common practice of communities applying Tara Bandu to control the unsustainable use of ecosystems makes the custom “an important entry point for strengthening engagement with and involvement of local communities in resilience-building efforts” (ibid.), including “ecosystem-based adaptation measures that provide co-benefits in terms of sustainability of harvests and the provision of ecosystem services” (ibid.). With Tara Bandu, Timor-Leste's EbA planning aims to “bring people together, ensuring that all groups in targeted communities are included to maintain and further improve the existing efforts for improving social cohesion” and to promote long-term, climate-responsive peace and prosperity (Government of Timor-Leste, 2021, p. 3).



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FIGURE 3. *Tara Bandu* ceremony in Timor-Leste

MORE INFORMATION

- Report provides the global state of biodiversity and includes a list of ecosystem services: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2019), [Global Assessment Report on Biodiversity and Ecosystem Services](#), Bonn, Germany, IPBES Secretariat.
- Report provides a set of ecosystem services: Millennium Ecosystem Assessment (MEA) (2005), [Ecosystems and Human Well-Being Synthesis Report](#), Washington, DC, WRI.
- Report presents a regional comparative analysis of policy relevant CCA, DRR, biodiversity and NbS: Bisaro, A. and Meyer, K. (2022), [Integrating Nature-based Solutions into Policies for Climate Change Adaptation and Disaster Risk Reduction: A Regional Comparative Policy Analysis in the Western Balkans](#), Belgrade, Serbia, IUCN, Regional Office for Eastern Europe and Central Asia.
- UNDRR (2021), [Promoting Synergy and Alignment Between Climate Change Adaptation and Disaster Risk Reduction in the Context of National Adaptation Plans – A Supplement to the UNFCCC NAP Technical Guidelines](#).

TOOL 3

GUIDANCE FOR NBS SELECTION

| | |
|---|--|
| What can you do with this tool? | This tool provides a list of different types of NbS that can be customised and applied to the previously identified challenges (see Tool 1). |
| How do you use this tool? | This tool provides a database of NbS that can guide the identification of relevant measures and approaches for the planning process to address DRR and CCA in response to given climate-related hazard contexts and for ecosystems. |
| What results do you get when using the tool? | The result of using this tool should be the identification of one or more NbS options for integrated planning. In addition, it supports evidence-based assessments for NbS selection and facilitates research for prevention and adaptation. |

There are many NbS interventions to address DRR and CCA. Tool 3 supports identifying and integrating suitable NbS options into the planning process. The information on NbS options to address climate-related hazards while working with different ecosystems supports targeted and resource-efficient NbS planning.

In response to the stocktake in Tool 1, this tool can guide the selection of NbS in a targeted way. Moreover, it provides an overview of the benefits for both DRR and CCA and other co-benefits, which helps to customise strategies. The tool would also build on the previous analysis of NbS in existing documents from the national policy and planning landscape (i.e., Tool 2), which should help to complement and build on existing efforts.

An approach to using this tool includes the following:

1. Identify the climate-related hazard that needs to be addressed;

2. Determine the type of ecosystems in the region or country that can be tailored for planning NbS (e.g., a mountain area, a coastal region, etc.);
3. Consider the different types of general NbS categories (e.g., restoration, conservation, management, etc.);
4. Identify interventions that can be applied. Note that interventions documented in this toolbox include the following:
 - A definition
 - Worldwide examples

To facilitate a structured approach when selecting and planning NbS for CRM, Table 10 provides guidance for the example of inland and coastal flooding, while Table 11 can serve as a template for relevant information at the national level.

TABLE 10. SELECTED NBS MEASURES AND CRM BENEFITS TO ADDRESS DRR AND CCA IN THE CONTEXT OF SPECIFIC CLIMATE-RELATED HAZARDS, IN THIS CASE INLAND AND COASTAL FLOODING, ACCORDING TO SPECIFIC ECOSYSTEMS FOLLOWING THE MEA (2005) CLASSIFICATION.

Links lead to more information regarding the examples provided in this table. Comparable information for other hazards can be found in references below and should be used to customize this overview for the country specific context.

| CLIMATE-RELATED HAZARD: FLOODS (INLAND) | | | | | |
|--|--|---|---|---|--|
| ECOSYSTEM | NBS MEASURE | | CRM BENEFITS | | |
| | NbS general category | NbS-specific intervention (examples) | DRR benefits | CCA benefits | Co-benefits |
| Urban Inland water (wetlands, floodplains) Mountains | Restoration of rivers/natural landscapes | Reconnecting rivers to floodplains (Europe project) Re-creating natural river forms (Germany, Belgium and Turkey initiative) Natural drainage path restoration (UK example) | Riverine flood mitigation Erosion reduction (reduced risk of landslides, mudflows, etc.) Water supply regulation | Resilience to extreme climate events (drought) Carbon storage and sequestration | Biodiversity Recreation Nutrient replenishment Livelihood opportunities |
| Urban Forest and woodland Inland water (wetlands, floodplains) | Restoration (and/or revegetation: replanting in barren or denudated soil) and conservation of vegetation | Riparian forest vegetation restoration and conservation (Bulgaria example, Australia example) Wetland restoration and conservation (US example) | Water purification Reduce water velocity and detain runoff (reduce flash floods and storm surge) Water temperature control | | |
| Forest and woodland Inland water | Protected areas management | Protected areas (expansion and management) (Ecuador example) | | | |
| Cultivated | Soil management | Soils and vegetated land (US example) Soil conservation measures: (cultivated terracing, Morocco example) | Increased drainage and water-holding capacity Reduced rainfall runoff | Resilience to extreme climate events Climate change mitigation | Increased crop production |
| Urban | Renaturation | Constructed wetlands (Italy example) Pond creation (UK example) Rainwater harvesting for urban gardens (China example) Green roofs and green walls (Ireland example) | Reduction of flood peak and lag time Stormwater management Groundwater recharge Improved water quality Reduce stormwater runoff | Cooling effects Resilience to extreme climate events Reduce urban heat island | Recreation Human health and well-being Improved habitats Urban gardening (livelihood opportunities) |

| | | | | | |
|------------------------------|--------------|--|--|--------------------------|--|
| Mountains (upper watersheds) | Revegetation | Upstream watershed restoration (Colombia, London, India, Ecuador and Indonesia examples) | Reduce runoff by increasing infiltration | Carbon sequestration | Forest provision, firewood, fodder, timber |
| Inland water (peatlands) | | Revegetation of hilltops (with or without crops/cultivation) (UK example) | Erosion reduction (reduced risk of landslides, mudflows, etc.) | Local climate regulation | Recreation and tourism |
| Cultivated | | | | | Biodiversity |
| Urban | | Terracing and erosion barriers (Czech Republic example) | | | |

CLIMATE-RELATED HAZARD: FLOODS (COASTAL)

| ECOSYSTEM | NBS MEASURE | | CRM BENEFITS | | |
|---|--|---|--|---|---|
| | NbS general category | NbS-specific intervention (examples) | DRR benefits | CCA benefits | Co-benefits |
| Coastal and marine vegetation (coral reefs, mangroves, salt marshes and other coastal wetlands and forest/ woodland coastal vegetation) | Restoration and conservation of coastal vegetation | <p>Coral reefs nurseries (US example)</p> <p>Coral reef transplant (Grenada/Caribbean example)</p> <p>Planting (afforestation) mangroves (Kerala/India example)</p> <p>Management, conservation and restoration of coastal vegetation (global examples)</p> | <p>Wave attenuation</p> <p>Break offshore waves</p> <p>Protection from coastal and tidal flooding</p> <p>Coastal erosion reduction</p> <p>Tsunami protection</p> | <p>Blue carbon storage</p> <p>Stabilization of local climate and air quality</p> <p>Resilience to extreme events</p> <p>Sea level rise protection</p> | <p>Biodiversity</p> <p>Recreation and tourism</p> <p>Livelihood opportunities</p> |
| | Protected areas management | Expansion of protected areas with coastal and marine vegetation (global examples) | | | |
| Coastal (beaches and sand dunes; estuary) | Sand management | Beach and shoreface nourishment (US example) | Protection from coastal and tidal flooding (storms and sea level rise) | Stabilization of local climate and air quality | Biodiversity |
| | Restoration of coastal vegetation | <p>Green nourishment: Shoreface nourishment and seagrass restoration (Western Indian Ocean example)</p> <p>Dune rehabilitation (Portugal example)</p> | Coastal erosion reduction | | Recreation and tourism |
| | Renaturation/ Restoration/ Created habitats | <p>Artificial dune construction (US example)</p> <p>Barrier islands/sandpits restoration (New Zealand example)</p> | Protection from coastal and tidal flooding (storms and sea level rise) | Resilience to extreme events | Livelihood opportunities |
| | Protected areas management | Protection of barrier islands and sand dunes (Pacific islands example) | Buffering against ocean surge and other types of inundation due to typhoons, hurricanes and tsunamis | Resilience to extreme events | Biodiversity |
| | | | | Sea level rise protection | Recreation and tourism |
| | | | | | Livelihood opportunities |
| | | | | | Socioeconomic resilience |

Using a table to plan targeted NbS interventions is recommended as a way to prepare for the respective country context and challenges. The structure of Table 11 could be used as the basis for planning, using the information from Tool 1 (climate-related challenges, ecosystems) and data from national assessments or information summarised at the end of Tool 2.

TABLE 11. TEMPLATE TABLE TO DERIVE RELEVANT NBS INFORMATION AT THE NATIONAL LEVEL

| NON-CLIMATE- OR CLIMATE-RELATED HAZARD | | | | | |
|--|----------------------|--------------------------------------|--------------|--------------|-------------|
| ECOSYSTEM | NBS MEASURE | | CRM BENEFITS | | |
| | NbS general category | NbS-specific intervention (examples) | DRR benefits | CCA benefits | Co-benefits |
| | | | | | |
| | | | | | |
| | | | | | |

As described in the previous tools, some countries already apply NbS to address climate-related hazards. Box 3 describes an example in Bangladesh, where a project has addressed climate-related hazards, vulnerability and the adaptation of selected coastal communities through NbS.

BOX 3: COMMUNITY-BASED ADAPTATION TO CLIMATE CHANGE THROUGH COASTAL AFFORESTATION (CBACC-CF) PROJECT – BANGLADESH

Communities from four coastal districts in Bangladesh were the key stakeholders engaged in the CBACC-CF project, which aimed to reduce climatic vulnerability of coastal communities to the impacts of climate-related hazards through enhancing resilience of coastal forests and adaptive capacity, in line with Bangladesh's NAP (see Tool 5). Coastal communities across Bangladesh are vulnerable to climate-related natural hazards, including cyclones, tornadoes and flooding. The CBACC-CF project, a joint implementation by the Government of Bangladesh, the Global Environment Facility (GEF) and UNDP, focused on restoring and replanting degraded mangrove and wetland areas for climate-risk adaptation, while also generating sustainable land-use livelihood alternatives for households.

This was achieved through an innovative community-based adaptation model known as Forest, Fish and Fruit (FFF), which restored fallow coastal lands with mangroves, fruit and forest trees and vegetables and by establishing aquaculture areas. These afforestation measures supported a reduction in flooding, salt intrusion and freshwater scarcity for the cultivation of crops and fish, thereby helping to generate income for community households and restore coastal ecosystems.

The project followed several good practices, including inclusive stakeholder empowerment through knowledge building, political ownership, collaboration and approval, and building local capacities. The FFF model generated knowledge-building activities by promoting proactive NbS planning

and the exchange of information to manage climate-related risks. Additionally, the FFF model established “an institutional interface to provide climate change information in an integrated manner, thereby providing guidance to government and the general public to support information-based adaptation planning” (C4Ecosolutions, 2015, p. 5). The project also focused on developing partnerships with subnational stakeholders – such as community organizations – to strengthen institutional capacity, and integrating NbS into Bangladesh’s national policy and planning landscape. Particular focus was directed to engaging and empowering traditionally marginalised groups, such as landless people and female-headed households, within the project. These groups were granted access to Government land providing the land was used within the framework of the FFF model, thereby increasing the livelihood security of these groups. Community and government stakeholders were provided with NbS planning capacity development, which was crucial to the later stages of project implementation.



FIGURE 4. Community-based afforestation practices to restore degraded mangrove and wetland areas

For more information about this case, see:

- UNFCCC (2023), *Community-based Adaptation to Climate Change Through Coastal Afforestation (CBACC-CF) Project – Bangladesh*
- UNDP (2011), *Community-based Adaptation to Climate Change Through Coastal Afforestation (CBACC-CF) Project – Bangladesh*
- C4Ecosolutions (2015), *Ecosystem-based Adaptation Through South-South Cooperation – Good Practice Case Study*
- Ahammad, R., Nandy, P. & Husnain, P. (2013). Unlocking ecosystem-based adaptation opportunities in coastal Bangladesh. *J. Coast Conserv.* 17, 833–840. <https://doi.org/10.1007/s11852-013-0284-x>

MORE INFORMATION

- Report provides a set of ecosystem services:
Millennium Ecosystem Assessment (MEA) (2005), [Ecosystems and Human Well-Being Synthesis Report](#), Washington, DC, WRI.
- Online database provides a centralised and integrated database of best practices from around the world where NbS have helped communities cope with a variety of societal challenges:
Asia-Pacific Climate Change Adaptation Information Platform, [Inspired by Nature-based Actions and Solutions](#) (2023), Onogawa, Asia-Pacific Climate Change Adaptation Information Platform.
- Online case study platform with examples of successful NbS stories visually organised in a world atlas:
NbS Initiative (2023), [NbS Case Study Platform](#), Oxford, University of Oxford.
- Guidelines contain several good examples and case studies of successful NbS examples around the world:
UNDRR (2021), [Word into Action on Nature-based Solutions for Disaster Risk Reduction](#), Geneva.
- Online database that has more than 1200 NbS examples grouped by region, type of ecosystem, theme and challenge. (Note, not all solutions presented are NbS.)
[PANORAMA](#) (2023), Blue Solutions Initiative.

Database on specific EbA examples:

- Online database that contains different types of information on EbA, including linkages to several relevant data sets of EbA measures:
WOCAT (2016), [WOCATpedia for Ecosystem-based Adaptation](#), World Overview of Conservation Approaches and Technologies (WOCAT).
- Online database of more than 200 tools and methods relevant to EbA that aims to help EbA practitioners, planners, decision-makers and researchers easily find and understand the tools and methods available to support their work:
FEBA (2023), [EbA Tool Navigator](#).
- Report provides examples of good EbA practices and approaches to adaptation and mitigation in Europe:
Doswald, N. & Osti, M. (2011), [Ecosystem-based approaches to adaptation and mitigation – good practice examples and lessons learned in Europe](#), BfN, Bonn, Germany.
- Online database provides an NbS evidence base of experiences, knowledge, tools and services online from 30-plus EU Horizon 2020 projects:
Network Nature (2023), [Case Studies Database](#), Gland, IUCN.

Database on specific Sustainable Land Management (SLM) practices:

- Online database that provides best practices to control land degradation enhancing productivity and/or other ecosystem services:
WOCAT (2023), [WOCATpedia on SLM technologies](#), WOCAT.

TOOL 4

STAKEHOLDER ENGAGEMENT AND INCLUSIVE GOVERNANCE FOR NBS

| | |
|---|--|
| What can you do with this tool? | With this tool, countries can identify relevant stakeholders for NbS at the national and subnational levels to effectively facilitate NbS planning within the CRM process and ultimately engaging with these stakeholders in inclusive governance processes. |
| How do you use this tool? | Review the guidance to confirm that all relevant stakeholders are identified and engaged meaningfully in the CRM process and related governance systems. The suggested resources can be used as concrete guidance for facilitating stakeholder engagement. |
| What results do you get when using the tool? | This tool enables the successful integration of relevant NbS actors and rights holders. It facilitates the identification and institutionalization of inclusive and transparent engagement processes. This helps to establish empowerment and leadership of relevant actors, setting up inclusive governance across sectors and scales, and moving from country-level planning to the subnational level. |

Effective government ownership and the meaningful engagement of relevant stakeholders and rights holders are central to the successful integration of NbS planning into CRM approaches and a preliminary step towards setting up an inclusive governance scheme. Throughout the planning, extensive stakeholder and rights holder identification and engagement activities should take place. This tool helps ensure that relevant rights holders and stakeholders (i.e., those with expertise on environmental challenges and NbS) are involved in integrated planning at the national and subsequently subnational planning levels. Along with DRR and CCA actors, particularly those familiar with Eco-DRR and EbA, stakeholders should include experts on NbS, rights holders and users of ecosystem services, and those with assigned or potential responsibilities for NbS planning. Such stakeholder engagement enabled by effective government leadership is an

appropriate step towards including all relevant stakeholders, increasing awareness of interested/affected parties and ensuring that any subsequent participatory process within the CRM planning feeds into inclusive governance.

This list is non-exhaustive and ultimately depends on the country context. Further research should be conducted on relevant stakeholders and rights holders who should be involved.

Stakeholder engagement and inclusive governance are essential parts of the overall CRM process. The “More Information” section contains additional resources that provide guidance to facilitate stakeholder engagement and build inclusive governance systems, including suggestions for specific activities.

IDENTIFY RELEVANT NBS STAKEHOLDERS AT NATIONAL LEVEL CRM PLANNING³

This list facilitates the identification of relevant stakeholders and rights holders at the national level:

- National ministries in charge of sectors or thematic areas relevant to NbS – such as environment, natural resources and biodiversity, climate, disaster risk management, spatial planning, infrastructure, finance, education and research – should be included;
- National public sector institutions should also be considered – for example, the water sector or the environmental agency, which are usually relevant for NbS. Consequently, this identification should include water regulators, environmental authorities, basin authorities and water utilities that may govern or manage watersheds and/or provide essential goods and services (*Note: Some of these might work on subnational scales, depending on country size*);
- National government departments and policymakers, such as government officials and elected representatives already engaged in the broader field of NbS or that have been identified as relevant but haven't been involved yet are potential stakeholders;
- National associations or representations of Indigenous peoples are key actors, rights and knowledge holders in relation to the deployment of NbS. Therefore, Indigenous peoples must be involved in planning and decision-making, and their free and informed consent needs to be guaranteed before proceeding;
- Finance institutions and donors in the form of public sector, international development cooperation or private philanthropy/foundations, (supra)national banks or insurance companies that can contribute to NbS in CRM should also be approached;
- Other relevant national institutions could include multilateral and bilateral development agencies, representatives of international actors – such as UNFCCC focal points, UN Convention to Combat Desertification (UNCCD) focal points, CBD focal points, Sendai focal points – or NGOs and civil society organisations engaged in environmental conservation or NbS on national scale.

This identification process is the first, indispensable step to involve, engage and empower stakeholders for a more successful integration of NbS in CRM at national scale.

³ Adapted from Brill et al., 2022.

IDENTIFY RELEVANT NBS STAKEHOLDERS AT SUBNATIONAL LEVEL⁴

Possible subnational stakeholders and sectors to engage in NbS planning should be considered in the CRM process. This list can help to identify, involve, engage and empower stakeholders who are relevant at the subnational level for integrating NbS planning. Note that while these stakeholders influence and are engaged in subnational-level planning, they can also make valuable contributions for national planning:

- Local public sector institutions and parastatals, including local government, environmental authorities and water-related actors (regulators, basin authorities and water utilities may govern or manage watersheds and/or provide essential goods and services), should be included;
- Indigenous peoples and local communities are essential to the success of NbS and its social acceptance and should also be included. These groups are often key beneficiaries of NbS planning as well as custodians of ecosystems and biodiversity. Therefore, these parties must be involved in decision-making and their free and informed consent guaranteed. The identification, benefits and monitoring of NbS measures and specific local interventions should be undertaken in partnership with and co-led by Indigenous peoples and local communities. This ensures that rights are respected and that Indigenous, traditional and local knowledge feeds into planning processes.
- Private sector actors, including corporate and industrial actors that are usually direct investors

and beneficiaries, should be considered too. This group might also involve collective action initiatives to drive NbS projects at scale, or implementing NbS for providing protection to their assets.

- Non-governmental organizations, civil society and community-based organizations, such as women's groups, seeking economic, social or environmental development outcomes can be included as technical advisers for planning NbS projects.
- Additionally, other technical experts that can help inform the planning of NbS, private landowners who may have complementary or conflicting objectives, media and academia should also be included.

This identification process at the subnational scale thereby facilitates cross-sectoral and cross-scalar integration.

Both lists together help to identify the right actors for the planning and implementation of specific measures. Box 4 provides an example of a list of cross-sectoral stakeholders and ministries included in the National Disaster Risk Reduction Strategic Plan 2021–2030 developed by the Government of Seychelles (note that media and academia are generally identified as specific stakeholder groups, as in the list above, but in the case of Seychelles' national DRR plan, they have been identified as sectors).

⁴ Ibid.

BOX 4:

STAKEHOLDERS ENGAGED IN THE NATIONAL DISASTER RISK REDUCTION STRATEGIC PLAN 2021–2030 OF THE GOVERNMENT OF SEYCHELLES

The Seychelles' national DRR plan (Government of Seychelles, 2021) gives a detailed overview of stakeholder groups, sectors and specific stakeholders. In this case, the list is detailed and would, for example, not only identify responsible sectors but even concrete stakeholders within the sector.

| STAKEHOLDER GROUP | SECTOR | STAKEHOLDER/SUBSECTORS |
|-------------------|---|---|
| Government | President's Office | Department of Defence |
| | | Department of National Planning |
| | Vice President's Office | Department of National Security |
| | | Blue Economy |
| | Cabinet | Ministers |
| | National Assembly | Leader of Government Business, Leader of the Opposition and Members of Parliament |
| | Ministry of Internal Affairs | Disaster Risk Management |
| | | Police |
| | | Seychelles Coast Guard |
| | Ministry of Finance, Economic Planning and Trade | Finance |
| | | Economic Planning |
| | Ministry of Local Government and Community Affairs | Department of Local Government and Community Affairs |
| | Ministry of Agriculture, Climate Change and Environment | Agriculture |
| | | Climate Change |
| | | Energy |
| | | Environment |
| | | Public Utilities Corporation |
| | | Seychelles National Park Authority |
| | | Seychelles Meteorological Authority |
| | | National Biosecurity Agency |
| | | Land Waste Management Agency |
| | Ministry of Family Affairs | Family Affairs |
| | | Social Affairs |
| | | National Council for Children |
| | | National Council for the Elderly |
| | | National Council for the Disabled |
| | | Agency for Social Protection |
| | Ministry of Health | National AIDS Council |
| | | Health Care Agency |
| | | Hospital of Victoria |
| | | Public Health Authority |
| | Ministry of Education | Early Childhood, Primary and Secondary Education |
| | | Tertiary Education and Human Resource Development |
| | Academia* | University of Seychelles |
| | Media* | <i>Seychelles Nation</i> newspaper |
| | | Seychelles Broadcasting Corporation |
| | Ministry of Land Use and Housing | Housing |
| | | Lands |
| | | Infrastructure |
| | Ministry of Foreign Affairs and Tourism | Department of Foreign Affairs |
| | | Department of Tourism |
| | Ministry of Employment and Social Affairs | Employment |
| | | Social Affairs |

| STAKEHOLDER GROUP | SECTOR | STAKEHOLDER/SUBSECTORS |
|--|--|---|
| Parastatal | Ports | Seychelles Ports Authority |
| | Outer Islands | Island Development Company |
| | Fast Moving Consumer Goods (FMCG) | Seychelles Trading Company |
| | Airport | Seychelles Civil Aviation Authority |
| Private | Academia* | Private schools |
| | Businesses | Chamber of Commerce & Industry (SCCI) |
| | Media* | Today newspaper |
| | | Seychelles News Agency |
| | Insurance | H Savy Insurance |
| | Telecommunications | Cable & Wireless |
| | | Airtel |
| | | Intelvision |
| Civil society organizations | CSO management | Citizen Engagement Platform Seychelles |
| | Gender | Gender Secretariat |
| | Disaster Risk Management (DRM) | Red Cross Society of Seychelles |
| | Human | Human Rights Commission |
| | Animal welfare | Seychelles Society for the Protection Against Cruelty to Animals |
| | Eco-DRR | Seychelles Conservation and Climate Adaptation Trust |
| | | Nature Seychelles |
| | Religious/spiritual Groups | Seychelles Interfaith Council |
| Public/ community | Private | Volunteers |
| | | Children and youth |
| | | Older persons |
| | Vulnerable groups | Persons with disabilities |
| | | Prisoners |
| | | Women and girls |
| International partners | International and regional organizations | African Union |
| | | Common Market for Eastern and Southern Africa |
| | | International Federation of the Red Cross |
| | | Indian Ocean Commission |
| | | Plateforme d'Intervention Régionale de l'Océan Indien |
| | | Southern African Development Community |
| | | United Nations |
| | | World Bank Group |
| | | International Union for the Conservation of Nature |
| | | European Union CBRN Centres of Excellence |
| | | United Nations Integrated Crime and Justice Research Institute (UNICRI) |
| | | International Science and Technology Centre (ISTC) |
| | | International Atomic Energy Agency (IAEA) |
| | | Organisation for the Prohibition of Chemical Weapons (OPCW) |
| | | Indian Ocean Rim Association |
| | | International Monetary Fund (IMF) |
| Cross-cutting/ multi-stakeholder platforms | Committees/platforms | National Disaster (Risk Management) Committee |
| | | National Climate Change Committee |
| | | National Vulnerability Assessment and Analysis Committee |
| | | |
| International governments | Embassies and consulates | Chinese Embassy |
| | | British High Commission |
| | | French Embassy |
| | | Indian High Commission |
| | | Japanese Embassy |

INCLUSIVE GOVERNANCE

Integrating NbS into CRM requires recognizing, engaging and addressing the concerns of a wide range of stakeholders and rights holders. Inadequate governance arrangements for otherwise well-intentioned interventions can undermine long-term sustainability and the legitimacy of benefit and cost-sharing arrangements. At a minimum, NbS action must comply with applicable legal and regulatory requirements and be clear about where legal responsibilities and liabilities lie. Various countries have already established governance systems for addressing climate change and/or DRR. They can serve as inspiration for how to bring together different actors in an inclusive governance approach (see, for example, Figure 5).

Adequate and inclusive governance systems enable disaster risk reduction and climate action. While there are distinct definitions for disaster risk governance (UNDRR 2016) and governance in the context of climate action (IPCC 2022), both are governance as a system of policy and legal frameworks and procedures for guiding and managing action on different scales towards a common goal, bringing together formal and informal actors.

Often, risk and climate governance are hardly linked, not making use of potential synergies in action, including in NbS. However, in the field of natural resources and ecosystems particularly, basic compliance should be complemented by additional mechanisms that actively engage and empower local communities and other affected stakeholders. Freely or easily accessible courses should also be explored as a way to empower people with the knowledge needed to understand all the issues at play. The [Thought Leadership Course on Synergizing Disaster Risk Reduction and Climate Change Adaptation](#) is one example.

IUCN's Global Standard for Nature-based Solutions (2020), criterion 5 (Table 12), can provide useful guidance. It asserts that NbS should be based on inclusive, transparent and empowering governance processes. Meaningful and inclusive governance, according to the standard, includes that "NbS acknowledge, involve and respond to the concerns of a variety of stakeholders, especially rights holders" (ibid., p. 14).

TABLE 12. IUCN'S CRITERION 5: NBS ARE BASED ON INCLUSIVE, TRANSPARENT AND EMPOWERING GOVERNANCE PROCESSES (IUCN 2020)

| INDICATORS |
|---|
| <p>5.1 A defined and fully agreed-upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention is initiated.</p> <p>Guidance: Feedback and grievance resolution mechanisms can include formal, legal or informal non-legal complaint systems that operate according to a clear set of procedures, roles and rules for receiving complaints and providing a remedy. Effective grievance resolution mechanisms are characterised by their acceptance and legitimacy among affected stakeholders, transparency, accessibility and adherence to rights-based approaches. They should operate in a predictable and equitable manner and be based on engagement and dialogue.</p> |
| <p>5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous peoples to Free, Prior and Informed Consent (FPIC).</p> <p>Guidance: In order that governance arrangements function effectively, all affected stakeholders need to be equipped with the right information at the right time and the inputs they provide need to be meaningfully addressed. In doing so, a conscious effort is required to ensure that traditionally excluded groups are actively brought into the process in a manner that upholds their dignity and encourages their participation. This is particularly the case when an NbS intervention operates or impacts on the lands and territories of Indigenous peoples, where their right to self-determine interventions and outcomes should follow established FPIC protocols.</p> |
| <p>5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention.</p> <p>Guidance: Stakeholder mapping and analysis identifies those who may be directly and indirectly, positively or negatively, affected by the NbS. This allows the intervention to afford opportunities to affected stakeholders to engage with and participate in the design and implementation, advocate clearly to uphold their own rights and interests, and where necessary, prevent further marginalisation.</p> |
| <p>5.1 A defined and fully agreed-upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention is initiated.</p> <p>Guidance: It is important that transparent and accessible documentation records key steps in NbS decision-making procedures. This helps enhance accountability and provides a strong basis for recourse in the case of any disputes or disagreements. Specific attention should be paid to noting which stakeholders were involved in decision-making and the role they played. This is particularly important where extreme inequity persists, so that processes can be adapted to encourage meaningful and effective participation.</p> |
| <p>5.1 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision-making of the stakeholders in the affected jurisdictions.</p> <p>Guidance: Ecosystems do not follow political and administrative borders. Where appropriate, transboundary cooperation agreements between relevant authorities underpin NbS planning and implementation across frontiers to help ensure coherency and consistency of approach and desired outcomes.</p> |

Different countries have already included setting up inclusive risk and climate governance in their planning to ensure that all relevant actors are considered in an overarching planning and decision-making framework. The detailed setup will, among other factors, depend on the number and type of actors to be involved, which will differ depending on country sizes, the form of

government, responsible ministries, administrative scales and relevant non-governmental actors.

Box 5 provides a case study of how Kiribati has taken up these principles of inclusive governance to help shape its integrated CCA and DRR plan and its subsequent integrated NbS planning.

BOX 5: CASE STUDY – INCLUSIVE GOVERNANCE IN KIRIBATI'S JOINT IMPLEMENTATION PLAN FOR CLIMATE CHANGE AND DISASTER RISK REDUCTION** 2019–2028 (KJIP)

Kiribati's KJIP 2019–2028 (KJIP, 2012, 2019) makes concerted efforts to utilise inclusive governance to shape its goals and strategies. The institutional arrangement of the newly established KJIP Secretariat (Figure 5) included the Kiribati National Expert Group on Climate Change and Disaster Risk Management (KNEG), a multisectoral coordination mechanism for climate change and disaster risk management. The KNEG was composed of various government ministries, NGOs, the private sector, FBOs and development partners, and it was instrumental in enhancing alignment of the KJIP with “global good practice around three priorities: the integration of gender considerations in climate adaptation planning; the creation of intentional and strategic linkages between climate adaptation planning processes at the national and island level; and the integration of climate adaptation in sectoral planning processes” (ibid., p. 64).

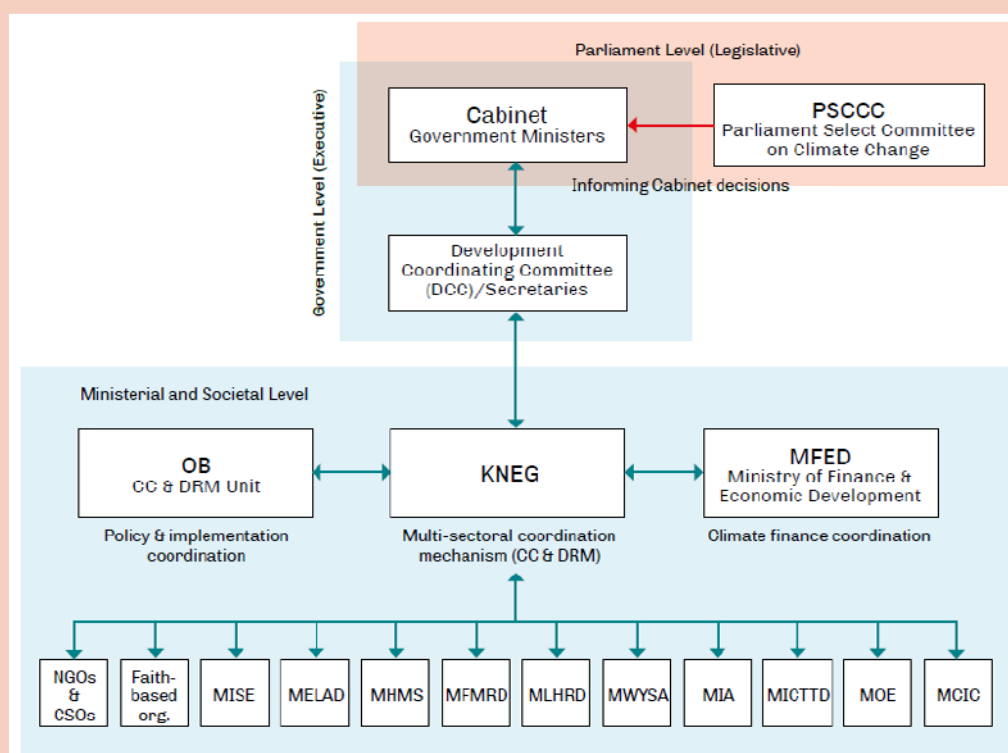


FIGURE 5. Institutional setup and governance structure for climate change in Kiribati

Source: Figure source: KJIP (2012, 2019, p. 77

The KNEG was involved in several rounds of national consultations about the preparation of the KJIP, including the “convening of local gender experts to inform specific enhancements to the KJIP and ongoing implementation governance structures” (ibid.). It also consulted about the involvement of representatives from the Women’s Development Division of the Ministry of Women, Youth, Sport and Social Affairs (MWYSSA) to “co-facilitate workshop sessions with the KNEG on gender and climate change planning in line with emerging policy directions of that division” (ibid.).

According to the KJIP, gender equality is one of the key guiding principles of the development of the plan, which responds to established regional and international gender equity policies, such as: the Framework for Resilient Development in the Pacific 2017–2030 (FRDP) through the promotion of the equal participation of women and men in climate change and disaster risk management initiatives and governance; the adoption of UNFCCC’s Gender Action Plan (2017) under the Paris Agreement (2015); and SDG 5, gender equality, through the inclusion of institutional mechanisms for gender equality and the integration of gender inclusion targets. One such target is KJIP’s Strategy 1, Action 3, which aims to “establish and enhance formal mechanisms for gender equality in CCA & DRM governance and planning” (ibid., p. 104). This planned action also includes a focus on the economic empowerment of women.

In addition to gender, the KJIP includes mechanisms to enhance community resilience by establishing and nurturing “strategic partnerships for community participation engagement, ownership and inclusion of vulnerable groups” (ibid., p. 76). The inclusive governance focus on communities is taken up by some of the KJIP’s strategies and actions that focus on NbS for climate change and DRR. For example, Strategy 4, Action 1, outlines the plan for developing a national community-based integrated vulnerability assessment framework, establishing community-based CCA and DRM committees with members including people of different genders and persons with a disability, while drawing on traditional knowledge and innovative engineering solutions when developing a local adaptation and DRM plan. This action is then fed into Action 2, which focuses on developing community-based protected areas and protected species at outer island level, in part achieved through the plan of “strengthening community involvement in mangrove replanting and reporting on mangrove and its species health” (ibid., p. 122) and protecting local ecosystems’ endemic biodiversity by controlling invasive alien species on outer islands. Lastly, Action 3 plans for Community-based Fisheries Management (CBFM) and the inclusion of targets for women’s involvement in CBFM governance and operation, while strengthening technical capacity and skills for coastal ecosystems management and fisheries processing.

**** Kiribati’s plan, while called a “joint implementation” plan, has both integrated planning and implementation components.**

MORE INFORMATION

Guidelines that offer technical guidelines for the NAP process based on the initial guidelines for the formulation of NAPs, and to arrange a review of these technical guidelines:

UNFCCC (2012), [National Adaptation Plans: Technical Guidelines for the National Adaptation Plan Process](#), Bonn, Germany.

Mechanism that offers representational space for all “non-state” Sendai stakeholders as set out in paragraphs 36 and 48 of the Sendai Framework. The UNDRR Stakeholder Engagement Mechanism (UNDRR-SEM) aims to leverage the voice and action of stakeholders in support of planning activities to advance the Sendai Framework and integration of disaster risk reduction into the broader 2030 Agenda:

UNDRR (2018), [UNDRR Stakeholder Engagement Mechanism \(SEM\)](#), Geneva.

Report offers joint principles for adaptation to assess progress in participation and transparency in NAP processes: Southern Voices (2018), [NAP Process in Participation and Transparency](#).

Report aims to offer guidance to governments and their partners on how to engage the private sector in the NAP process:

Crawford, A. & Church, C. (2019), [Engaging the Private Sector in National Adaptation Planning Processes](#). Winnipeg, International Institute for Sustainable Development.

Guide offers practical steps on the “who, when, where and why” of stakeholder engagement to those looking to invest in NBS projects. This guide will support investors and practitioners in making NBS projects more inclusive, more culturally appropriate and more likely to be sustainable in the long run, given the buy-in and support garnered from diverse stakeholders from the start of a project:

Brill et al. (2022), [Stakeholder Engagement Guide for Nature-based Solutions](#), Oakland, United Nations, CEOWater Mandate and Pacific Institute.

The guide provides a practical framework for the design and facilitation of collaborative processes that work across the boundaries of business, government, civil society and science. The guide links the underlying rationale for multi-stakeholder partnerships, with a clear four phase process model, a set of seven core principles, key ideas for facilitation and 60 participatory tools for analysis, planning and decision-making:

Brouwer et al. (2016), [The MSP Guide: How to Design and Facilitate Multi-Stakeholder Partnerships](#), Wageningen, Wageningen University and Research, WCDI and Rugby, UK: Practical Action Publishing.

Guide updates and expands the content of an e-learning course by the same name: UN DESA and UNITAR (2020), [Stakeholder Engagement and the 2030 Agenda: A Practical Guide](#), United Nations, New York.

Guide aims to build and enable systematic engagement and action between governments and stakeholders to reduce existing risks and prevent the creation of new risks for resilient socioeconomic development at the global, national and local levels:

UNDRR (2019), [Partnership and Stakeholder Engagement Strategy](#), Geneva, UNDRR.

Report presents a qualitative review of inclusive approaches to DRM – a part of the first stocktaking exercise that the GFDRR conducts to assess lessons learned and generate knowledge to help mainstream inclusive approaches and strategies across GFDRR activities:

World Bank (2022), [Inclusive Approaches to Disaster Risk Management – A Qualitative Review \(English\)](#). Washington, D.C., World Bank Group.

Report examines the myths, stereotypes and underlying drivers of gendered outcomes in DRR. It recognises that there are multiple vectors of vulnerability and exclusion and calls for more contextualised and nuanced analyses: Erman et al. (2021), [Gender dimensions of disaster risk and resilience: Existing evidence](#). Washington, DC, World Bank.

Guide is for practitioners responsible for the planning of NbS, which is considered a collaborative effort in which scientists, experts, policymakers, practitioners, citizens and other stakeholders work together:

Nature 4 Cities (2017), [Step-by-Step Guide for Coproduction and Cocreation of Nature-based Solutions](#), Eindhoven, DuneWorks.

Strategy draws out implications for how international development actors can support inclusion more effectively through more politically aware ways of thinking and working:

OECD (2020), [What Does “Inclusive Governance” Mean? Clarifying Theory and Practice](#). Paris, OECD Publishing.

TOOL 5

NBS INTEGRATED PLANNING

| | |
|---|---|
| What can you do with this tool? | This tool provides an overview of how NbS is already integrated in existing NAPs, DRR strategies and integrated plans, including the applicable planning landscape and governance scales. New plans can be formulated on the basis of this overview or existing ones reviewed. |
| How do you use this tool? | This tool provides an overview table showing the scales of governance and planning for NbS that are included in different types of plans around the world. Detailed tables on each country/region show how NbS is being considered by these pioneers and how they introduced it into their plans. Explanations and text modules can be used and adapted to the user's own planning processes. |
| What results do you get when using the tool? | The examples from these early-adopter countries illustrate entry points and opportunities for bringing NbS into an integrated plan and how to establish NbS entry points for various planning scales and elements. |

NbS can be integrated into policy and planning across different planning scales (Figure 6) and elements (Figure 7). Therefore, this tool aims to provide insights on how NbS can be integrated within a CRM process, based on the assessment of front-runner documents (11 countries and one region). While the examples do not provide a complete list of all national documents

that consider NbS or related concepts, the selection showcases the different forms of NbS integration after a thorough assessment. This approach should support countries as they try to optimise placement of their respective NbS needs and solutions within their integrated plans, informed by the outcomes from tools 1–4.

FIGURE 6. NbS integration across integrated planning scales

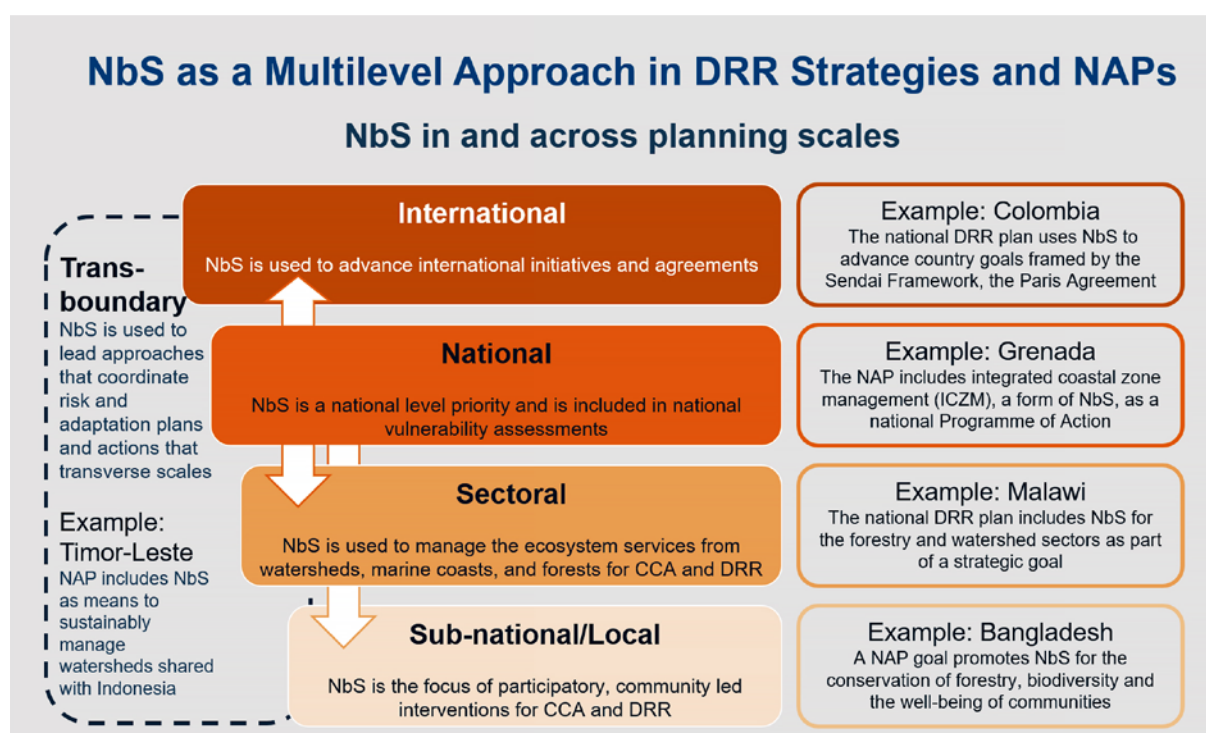
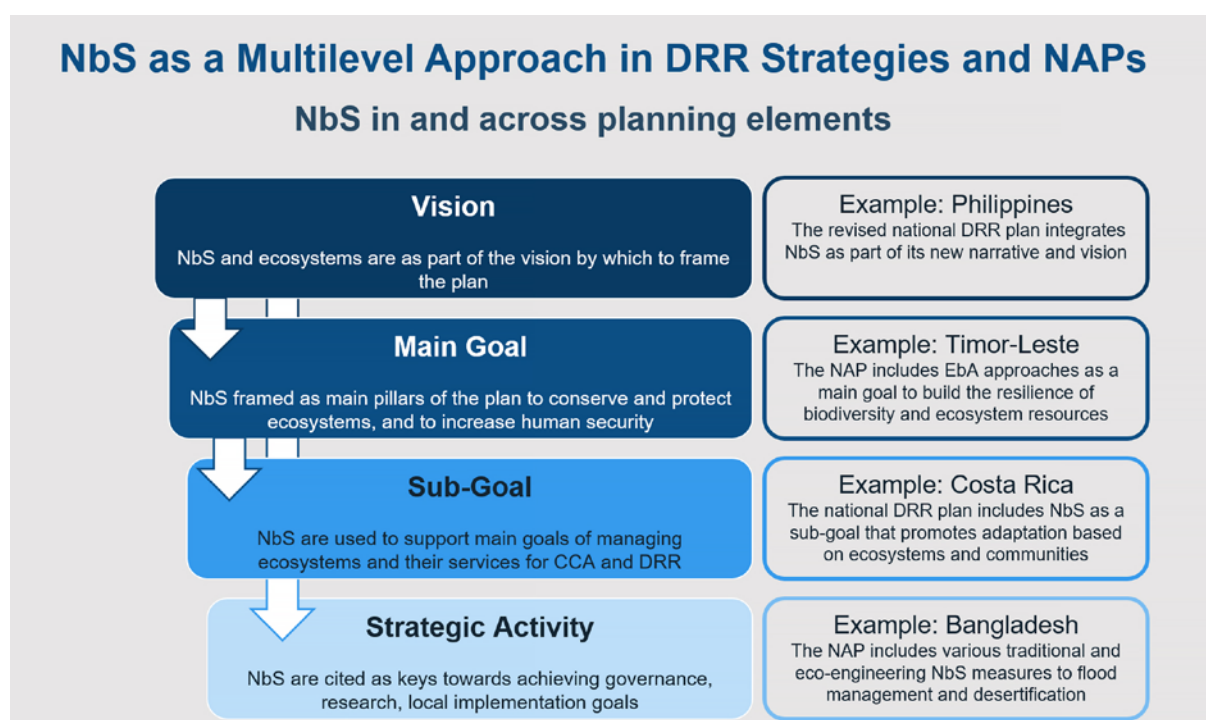


FIGURE 7. NbS integration across integrated planning elements



NbS is integrated into planning at different scales and in different elements across the 12 (supra)national policy and planning landscape documents reviewed (see Table 13), indicating that there is no standard approach, but a need to adjust to national contexts. The examples provided showcase DRR Strategies, NAPs and Integrated Plans referenced in figures 7 and 8.

TABLE 13. SUMMARY OF NBS WITHIN DRR STRATEGIES, NAPS AND INTEGRATED PLANS FROM EXAMPLE COUNTRIES (ORDERED ALPHABETICALLY)

| COUNTRY | PLAN | NBS PLANNING SCALE | | | | | NBS PLANNING ELEMENT | | | |
|-------------------------|------------|--------------------|----------|----------|-------------------|----------------|----------------------|-----------|----------|----------------------|
| | | INTER-NATIONAL | NATIONAL | SECTORAL | SUBNATIONAL/LOCAL | TRANS-BOUNDARY | VISION | MAIN GOAL | SUB-GOAL | STRATEGIC ACTIVITIES |
| Bangladesh (2023–2050) | NAP | | X | X | X | | X | X | X | X |
| Caribbean (2014–2024) | Integrated | | X | X | | | X | X | | |
| Chad (2021–2026) | NAP | X | | X | | X | | | X | X |
| Colombia (2015–2030) | DRR | X | | | X | | | | | X |
| Costa Rica (2022–2026) | NAP | | | | X | | | X | X | X |
| India (2019) | DRR | | X | X | X | | | X | | X |
| Kiribati (2019–2028) | Integrated | | | X | X | | | X | | X |
| Malawi (2018–2030) | DRR | | | X | X | X | | | | X |
| Philippines (2020–2030) | DRR | | | | X | | X | | | X |
| Timor-Leste (2021) | NAP | | X | X | X | X | | X | | X |
| Tonga (2018–2028) | Integrated | | X | X | X | | | | | X |
| Vanuatu (2016–2030) | Integrated | | | X | X | | | | X | X |

Tables 14–25 provide greater detail of how NbS integration across the different integrated planning scales and elements is formulated in the plans mentioned in Table 13. These examples help in the formulation of NbS integrated plans. (Note: referenced page numbers refer to the NAP or national DRR strategy.)

TABLE 14. NBS INTEGRATION WITHIN BANGLADESH'S NAP (2023–2050)

| BANGLADESH (NAP, 2023–2050) | |
|---|--|
| NBS INTEGRATED PLANNING SCALES | |
| National | By making NbS a main goal of its NAP, Bangladesh has incorporated NbS at the national level (p. 9). This sets the framework for NbS across planning scales. |
| Sectoral | NbS are planned across various sectors, including agriculture, coastal management, landscape management, urban development and research (p. 72). |
| Subnational/local | Many NbS strategic activities are oriented at the local level, including rainwater harvesting and community-based afforestation and restoration (p. 70). In addition, NbS local planning focuses on capacity development, livelihood diversification and locally led adaptation (p. 78). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Vision | Elements of NbS are included within the NAP's vision of "Building a climate-resilient nation through effective adaptation strategies to foster a robust society and ecosystems and stimulate sustainable economic growth" (p. 8). |
| Main goal | Bangladesh's NAP has made promoting NbS one of the primary goals: "Goal 4: Promote nature-based solutions for conservation of forestry, biodiversity and well-being of communities" (p. 9). The goal highlights the multidimensional benefits of NbS "to protect, sustainably manage and restore natural or modified ecosystems, and to address societal challenges effectively and adaptively" (p. 65). |
| Sub-goal | NbS are also integrated within various sub-goals, including the promotion of: climate-smart agriculture, urban green and blue infrastructure, the scaling up of ecosystem-based adaptation for wetlands conservation and afforestation/reforestation, and advancing research on climate change impacts on ecosystems and application of ecosystem-based adaptation (p. 70). |
| Strategic activities | Various NbS are included as strategic activities. Some examples are community-based rainwater harvesting using Indigenous methods in water-stressed areas (p. 72); eco-engineering solutions for flood and drainage management (ibid.); the extension of climate-smart technologies for increasing irrigation water use efficiency (p. 74); the expansion of ecosystem-based adaptation for the restoration of mangroves, hill areas and wetlands to tackle the adverse impacts of climate change (p. 76) and combat desertification through planting regenerative indigenous species (ibid.) and many others. |

TABLE 15. NBS INTEGRATION WITHIN CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY'S (CDEMA) DRR STRATEGY (2014–2024)

| CARIBBEAN (DRR STRATEGY, 2014–2024) | |
|--|---|
| NBS INTEGRATED PLANNING SCALES | |
| National | NbS is integrated at the national level by the CDM acknowledging that ecosystem services are the foundation of national economies and livelihoods that are centred on tourism, fisheries and agriculture (p. 59). |
| Sectoral | One of the CDM's main goals is to further the integration of CDM at sectoral levels, including NbS through improved land use planning to enhance ecosystem services (p. 53). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Vision | NbS is included as part of the strategy's environmental sustainability cross-cutting theme, influencing the overall vision of the plan (p. 59). Ecosystem services are acknowledged to be the foundation of all national economies and sustainable livelihoods that rely on tourism, fisheries and agriculture (ibid.). The contribution of ecosystem services to DRR is also highlighted as part of the cross-cutting theme (ibid.). |
| Main goal | The conservation and maximization of ecosystem services through improved land use planning – for example, Integrated Coastal Zone and Watershed Management – is promoted (p. 53) as part of the main goal of improving the integration of NbS planning at sectoral levels (Priority Area 3). |

TABLE 16. NBS INTEGRATION WITHIN CHAD'S NAP (2021–2026)

| CHAD (NAP, 2021–2026) | |
|---|--|
| NBS INTEGRATED PLANNING SCALES | |
| International | Chad's NAP considers NbS to enhance synergies between the Rio Conventions and the SDGs, with the aim of contributing to the goal of land degradation neutrality and promoting the conservation, management and restoration of ecosystems, as well as interventions that call for protecting and conserving biodiversity and restoring ecosystems and their services (p. 64). |
| Sectoral | The NAP ensures that climate planning priorities are aligned with regional projects that incorporate NbS, such as the Great Green Wall Initiative, which will in part help countries adopt climate-resilient agricultural development paths (p. 65). |
| Transboundary | Chad's participation within the Great Green Wall Initiative illustrates that the country's NbS projects encompass various integrated planning scales (p. 65). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Sub-goal | NbS planning is to be prioritised, as the ecosystem services and associated benefits can be leveraged both for adaptation and mitigation, "thereby maximizing the impact of climate change investments in Chad through better synergy between the NAP and the NDC" (p. 64). |
| Strategic activities | Chad has prioritised NbS measures within its NAP to help build climate resilience and increase mitigation efforts to improve agricultural production, livelihoods, food security, nutrition, livestock management and sustainable grazing and feeding practices, reforestation and sustainable forest management, water, sanitation, hygiene and renewable energy (p. 64). |

TABLE 17. NBS INTEGRATION WITHIN COLOMBIA'S DRR STRATEGY (2015–2030)

| COLOMBIA (DRR STRATEGY, 2015–2030) | |
|---|---|
| NBS INTEGRATED PLANNING SCALES | |
| International | Colombia designed its plan with global goals that contribute to increased resilience, such as those included in the CBD, the 2030 Agenda for Sustainable Development, the UNCCD, and the Sendai Framework for Disaster Risk Reduction 2015–2030, as well as various other strategic guidelines, including adaptation based on socio-ecosystems (p. 19). |
| Subnational/ local | Communities are the focus of NbS for DRR, with ecosystem-based actions to be further defined outside of the national plan (p. 37). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Strategic activities | NbS are formulated as strategic activities for DRR (p. 37), including the identification of strategic ecosystems for better understanding of how Eco-DRR measures address hydrometeorological hazards (p. 51); impacts to ecosystem services in the Amazon from climate change and anthropogenic activities as the target of risk assessments (p. 60); articulation of ecosystem services in DRR and CC policies (ibid.); the promotion of Eco-DRR as best practices to environmental and territorial authorities (p. 67) and EbA actions to address coastal erosion (p. 71). |

TABLE 18. NBS INTEGRATION WITHIN COSTA RICA'S NAP (2022–2026)

| COSTA RICA (NAP, 2022–2026) | |
|---|--|
| NBS INTEGRATED PLANNING SCALES | |
| Subnational/ local | The NAP promotes ecosystem- and community-based approaches in both rural and urban settings (p. 61). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Main goal | Within Costa Rica's NAP, NbS is linked to a main country goal of securing the well-being of people and ecosystems (p. 54). NbS is also recognised for its ability to address vulnerabilities of various population groups and strategic ecosystems to climate change in a transversal manner (p. 61). |
| Sub-goal | Costa Rica has included NbS as a sub-goal within its NAP. "Promotion of adaptation based on ecosystems and communities outside the state's natural heritage" (p. 54, translated by authors). |
| Strategic activities | NbS are planned to increase protected areas' buffer zones, within urban areas outside the country's main metropolitan zone and in responsible fishing communities (p. 54). NbS are also planned as strategic activities for research, local planning and management, adaptive and eco-competitive agricultural production systems, and financial planning within several of its main planning goals. |

TABLE 19. NBS INTEGRATION WITHIN INDIA'S DRR STRATEGY (2019)

| INDIA (DRR STRATEGY, 2019) | |
|--|--|
| NBS INTEGRATED PLANNING SCALES | |
| National, sectoral and subnational/ local | Planning NbS strategic sectoral actions is designated as the responsibility of central, state and local administrative bodies (p. 101). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Main goal | NbS is included as one of the plan's 30 main planning objectives for "ecosystem-based approaches regarding shared resources, such as within river basins, mountainous regions and coastlines" (p. 11). |
| Strategic activities | NbS are included as measures against specific hazards with varying degrees of specificity, including the promotion of medium- and long-term green and blue infrastructure actions to address various hazards, including cyclones and winds (p. 101), floods (p. 127), urban flooding (p. 139), landslides and snow avalanches (p. 169) and drought (p. 183). Two specific examples are: addressing tsunamis by developing coastal forests (green belts) and bioshields (mangrove plantations) for communities residing along estuaries (p. 152) and improving the forest coverage and green areas to reduce the impact of heat (p. 213). |

TABLE 20. NBS INTEGRATION WITHIN KIRIBATI'S INTEGRATED PLAN (2019–2028)

| KIRIBATI (INTEGRATED PLAN, 2019–2028) | |
|--|---|
| NBS INTEGRATED PLANNING SCALES | |
| Sectoral | This strategy promotes healthy and resilient ecosystems to increase water and food security through integrated NbS sector-specific approaches (p. 11). |
| Subnational/ local | A community-based approach complements NbS for effective conservation and sustainable use of natural resources – such as coastal fisheries – to protect ecosystems and enhance the resilience of vulnerable groups of people (p. 70). It also facilitates the strengthening of capacities of communities to plan NbS for food and nutrition security (pp. 70–71). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Main goal | Ecosystems are included in one of the key strategies for climate change and disaster risk management (p. 11). |
| Strategic activities | It also facilitates the strengthening of capacities of communities to plan NbS for food and nutrition security (pp. 70–71) is a strategic output anticipated. |

TABLE 21. NBS INTEGRATION WITHIN MALAWI'S DRR STRATEGY (2018–2030)

| MALAWI (DRR STRATEGY, 2018–2030) | |
|---|--|
| NBS INTEGRATED PLANNING SCALES | |
| Sectoral | Malawi's NbS planning occurs at the sectoral level, and specifically at the watershed and landscape level, where it is specified that "project plans and results reflect multisectoral coordination" (p. 98). Civil society organizations and groups are also target audiences for training in engaging and advocating for NbS (ibid.). |
| Subnational/ local | In additions to NbS planning at the watershed and landscape level (see above row, "Sectoral"), communities and schools are being considered in planning for tree planting and caring incentives as specific NbS measures (p. 70). |
| Transboundary | IWM and SLM approaches are applied across territories, encompassing sectoral and local areas (p. 69). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Sub-goal | <p>NbS are integrated into a number of sub-goals supporting main planning pillars of catchment protection and management:</p> <ul style="list-style-type: none"> • Planning for a harmonised IWM approach, assessments, learning agenda and road map (p. 69); • SLM via healthy forests and landscapes for sustainable food systems enhance nutrition, employment and income needed to support sustainable livelihoods and resilience to shocks (ibid.); • Payments for ecosystem services are planned as a means of generating finance and investment for further NbS planning in support of catchment protection and management (p. 70); and • Using forest ecosystem services to drive forest-based enterprises (p. 72). |
| Strategic activities | <p>The promotion of climate-smart agriculture practices for improved food security, nutrition and climate resilience are included as strategic activities (p. 48) to achieve the sub-goal of drought mitigation for resilient agricultural growth.</p> <p>Agroforestry's provisional ecosystem services are planned to enhance agricultural diversification in support of resilient agricultural growth and forest-based enterprises, specifically beekeeping (p. 72).</p> <p>SLM, restoration and conservation practices, such as afforestation to enhance forest ecosystem services, and provisioning services, are planned as strategic activities to support SLM (pp. 73, 99, 100).</p> <p>Activities for this purpose include consolidating existing and new assessments of land restoration and opportunities for ecosystem services. This can be done using multicriteria mapping, climate-smart agriculture (p. 99), planning stream/riverbank and wetland restoration measures using bamboo and indigenous tree species to reduce soil erosion, for improved food security and livelihoods as well as hillside protection (pp. 70, 99), and scaling up financing and investment for ecosystem services through reforestation and carbon sequestration (p. 100).</p> |

TABLE 22. NBS INTEGRATION WITHIN THE PHILIPPINES' DRR STRATEGY (2020–2030)

| THE PHILIPPINES (DRR STRATEGY, 2020–2030) | |
|--|--|
| NBS INTEGRATED PLANNING SCALES | |
| Subnational/ local | At the local level, NbS is the focus of studies that determine the role of ecosystems in reducing disaster impacts and contributing to climate change mitigation within cities, municipalities and surrounding regions (p. 45). NbS is also to be integrated into local development planning, including the role of ecosystem services (p. 53). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Vision | The Philippines has integrated NbS as part of the new narrative of its revised plan (p. 49). This is based upon lessons learned that linking environmental management to risk reduction and resilience-building by harnessing ecosystem services, using blue-green infrastructure and promoting locally led NbS processes is key for DRR plans (pp. 39, 44, 45). |
| Strategic activities | NbS are framed as a key output of various strategic activities in support of DRR goals and sub-goals (p. 68). This includes conducting ecosystem stocktaking, ecosystem carrying-capacity studies, mainstreaming ecosystem services into national and local development planning, habitat conservation and restoration, improving urban greening, promoting sustainable integrated area development, creating participatory environmental governance, promoting sustainable community resource-based enterprises/livelihood programs, and formulating an Integrated River Basin Management and Development Plan (ibid.). |

TABLE 23. NBS INTEGRATION WITHIN TIMOR-LESTE'S NAP (2021)

| TIMOR-LESTE (NAP, 2021) | |
|---|--|
| NBS INTEGRATED PLANNING SCALES | |
| National | At the national level, a key consideration to enhance the NAP process is building capacities and knowledge for embracing NbS to maximise synergies between environmental conservation and rehabilitation efforts (p.15). This consideration would therefore include all other planning levels. Additionally, the NAP makes clear that the country's adaptation response should include NbS whenever possible (p. 19). |
| Sectoral | NbS are included at the sectoral level, specifically including capacity-building for individuals and institutions for climate-smart agriculture and aqua/mariculture, and resilient land management (pp. 45–46), among others (p. 45). |
| Subnational/ local | The traditional customary rule of Tara Bandu (see Box 2 in this toolkit) is placed at the centre of the NAP's local engagement and planning strategy, which includes NbS that provide co-benefits in terms of sustainability of harvests and the provision of ecosystem services (p. 19). |
| Transboundary | Timor-Leste's NAP explicitly addresses transboundary climate change issues in transboundary catchment sites with NbS, specifically by building upon NbS measures (such as integrated water resource management and whole-basin approaches) with Indonesia to explore innovative approaches to coordinate adaptation plans and actions in these areas (p. 31). |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Main goal | <p>NbS is included as one of the 14 guiding principles in Timor-Leste's NAP, with EbA helping to identify planning "pathways that build the resilience of biodiversity and ecosystem resources"; they will adopt "a systems approach to adaptation with respect to natural capital" (p. 3).</p> <p>Additionally, the guiding principle for planning community-based adaptation approaches specifically mentions the inclusion of traditional approaches, such as Tara Bandu. Timor-Leste's NAP describes Tara Bandu as an important entry point for promoting "ecosystem-based adaptation measures that provide co-benefits in terms of sustainability of harvests and the provision of ecosystem services" (p. 21).</p> |
| Strategic activities | Various NbS strategic activities are outlined in the NAP, including but not limited to planning Eco-DRR approaches in coastal areas and coral reefs. The plans include maintaining mangrove plantations and promoting awareness to protect coastal ecosystems from impacts of sea level rise, introducing green infrastructure to prevent landslides and restoring riverbanks vulnerable to climate change, adopting integrated agroforestry and watershed management, promoting sustainable land management under climate change, and integrating water conservation, water use management and climate risk reduction approaches into Tara Bandu (pp. 47–49). |

TABLE 24. NBS INTEGRATION WITHIN TONGA'S INTEGRATED PLAN (2018–2028)

| TONGA (INTEGRATED PLANNING, 2018–2028) | |
|---|---|
| NBS INTEGRATED PLANNING SCALES | |
| National, sectoral and subnational/local | NbS sectoral planning is included in the plan to support resilience-building actions across national, island and community levels. This includes blue-green infrastructure for coastal and marine ecosystems (p. 3), unspecified NbS for flood management (p. 9) and planning activities that lead to integrated coastal and EbA approaches. |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Strategic activities | <p>While no strategic activity explicitly mentions NbS, the expected outcome of sub-goal 4.1 specifies two NbS approaches, as well as integrated coastal management and EbA approaches (p. 36). Therefore, the strategic activities planned for this sub-goal – such as coastal infrastructures, agricultural and water management approaches in the context of climate change and disaster risks, and “environmentally sensitive flood management responses” (p. 36) – could be planned to include NbS to achieve integrated coastal management and EbA approaches.</p> <p>NbS are part of a set of integrated climate change adaptation and disaster risk reduction resilience targets for development and conservation of biodiversity, and cultural and historical sites (p. 42).</p> |

TABLE 25. NBS INTEGRATION WITHIN VANUATU'S INTEGRATED PLAN (2016–2030)

| VANUATU (INTEGRATED PLANNING 2016–2030) | |
|---|---|
| NBS INTEGRATED PLANNING SCALES | |
| National, sectoral and subnational/local | NbS sectoral planning is included in the plan to support resilience-building actions across national, island and community levels. This includes blue-green infrastructure for coastal and marine ecosystems (p. 3), unspecified NbS for flood management (p. 9) and planning activities that lead to integrated coastal and EbA approaches. |
| NBS INTEGRATED PLANNING ELEMENTS | |
| Strategic activities | <p>While no strategic activity explicitly mentions NbS, the expected outcome of sub-goal 4.1 specifies two NbS approaches, as well as integrated coastal management and EbA approaches (p. 36). Therefore, the strategic activities planned for this sub-goal – such as coastal infrastructures, agricultural and water management approaches in the context of climate change and disaster risks, and “environmentally sensitive flood management responses” (p. 36) – could be planned to include NbS to achieve integrated coastal management and EbA approaches.</p> <p>NbS are part of a set of integrated climate change adaptation and disaster risk reduction resilience targets for development and conservation of biodiversity, and cultural and historical sites (p. 42).</p> |

BOX 6:

INTEGRATED PLANNING OF NBS WITHIN VANUATU'S CLIMATE CHANGE AND DISASTER RISK REDUCTION POLICY 2016–2030

Vanuatu's Climate Change and Disaster Risk Reduction Policy 2016–2030 is a national climate change and DRR planning document that integrates NbS as an important part of its resilience-building goals. Vanuatu's integrated plan can be broken down into the steps indicated in the integrated NbS planning toolbox and checklist.

Stocktake of information on environment, climate and hazards, exposure, vulnerability, impacts (Tool 1):

- Vanuatu's integrated climate change and DRR policy includes a subchapter (Chapter 5.2) on the national environmental risk context. The policy refers to a developed national profile of risks due to climate change and geohazards, which is available to guide planning and decision-making. To create this risk profile, a stocktake of the local environmental context, including hazards, exposure and vulnerability must have been taken into consideration. Examples of these hazards include "volcanic eruptions, earthquakes, tsunamis, cyclones, climate variability, storm surge, landslides, droughts and flooding" (Vanuatu, 2015, p. 6). The subchapter also states that "extreme weather events, including cyclones and storms, will increase in intensity but not necessarily in frequency; dry periods will last longer; and extreme rainfall will be more frequent and intense" (ibid.).
- Potential impacts on different sectors and their consequences are also considered within the risk context, such as: the reduced availability of fresh water; coral reef deterioration; loss of coastal land; and damage to infrastructure, to name a few.

NbS status in national policy and planning landscape (Tool 2):

- Chapter 7.4.5 points out that NbS for climate change and DRR should complement and strengthen other "ecosystem-related development policy documents (e.g., Land Use Planning Policy, Foreshore Development Act, Physical Planning Act)" (Vanuatu, 2015, p. 20). This implies that the developers of this integrated policy would have surveyed other documents within the national policy and planning landscape to better understand which ones had NbS-related planning elements.
- Chapter 7.3.2 acknowledges and integrates traditional knowledge for climate change and DRR. The policy states the "people in Vanuatu have long-held traditional practices to deal with temperature and rainfall variability, cyclones and geological hazards" (Vanuatu, 2015, p. 14), including traditional early warning and coping mechanisms. This information is being systematically documented and incorporated into planning processes.

Guidance for NbS selection (Tool 3):

- While Vanuatu's integrated policy does not include an NbS database, the integration of a subchapter on ecosystem-based approaches within the policy (see example of Tool 5 below) indicates that the planning of specific NbS measures for an integrated CRM approach will have already occurred or will occur.

NbS inclusive governance and stakeholder engagement for NbS (Tool 4):

- Various strategic priorities and subsequent strategies of Vanuatu's policy focus on fostering inclusive governance. Chapter 7.1 focuses on the topic of governance and specifically acknowledges that different groups of people have different vulnerabilities. Vanuatu has described in the chapter that these people's participation in climate change and DRR planning through transparent processes is one of the elements of good governance. The engagement of various institutional stakeholder agencies – including sectoral agencies and subnational governments, NGOs, communities and traditional governance systems – is to be strengthened through various means, including but not limited to: establishing and institutionalizing

coordination mechanisms for stakeholders; supporting climate change and DRR capacity-building for stakeholders; and “facilitating the equal and active participation of vulnerable groups in decision-making bodies at all governance levels via all partners and stakeholders” (Vanuatu, 2015, p. 9).

NbS integrated planning (Tool 5):

- Chapter 7.4.5 focuses on ecosystem-based approaches and states that Vanuatu’s “diverse ecosystems are being threatened by climate change, as are the livelihoods and well-being of the ni-Vanuatu people who rely on them for income and food. Ecosystems provide cost-effective adaptation services, and effective natural resource management can minimise the risks of climate change and disasters while enhancing livelihoods and resilience” (Vanuatu, 2015, p. 20). As such, the policy has included ecosystem-based approaches as a strategy to advance climate change and DRR goals, complementing the integrated CRM, community-based adaptation and the loss and damage approaches also outlined within the policy. The ecosystem approaches include:
 - “prioritising actions that incorporate threats and solutions from the ‘ridge to the reef’ of island communities;
 - identifying and minimising negative impacts on the environment from proposed adaptation and risk reduction activities;
 - prioritising adaptation and risk reduction actions that build on, incorporate and protect taboos, conservation areas, heritage sites, locally managed areas and vulnerable habitats and ecosystems and carbon sinks;
 - quantifying the value and benefit of ecosystem services and building this into adaptation and risk reduction planning and budgeting;
 - prioritising ‘soft’ ecosystem-based adaptation over ‘hard’ engineered infrastructure for ecosystem function maintenance (e.g., coastal revegetation versus sea walls);
 - developing advocacy and educational programmes around the value of ecosystem-based adaptation; and
 - utilising sound land-use planning approaches and implementing and enforcing ecosystem-related development policy documents (e.g., Land Use Planning Policy, Foreshore Development Act, Physical Planning Act)” (ibid.).

MORE INFORMATION

- Guidelines provide input on how to develop a national DRR plan:
UNDRR (2017), [Words into Action Guidelines: National Disaster Risk Assessment](#), Geneva.
- Guidelines for integrating EbA into NAPs:
UNEP (2021), [Guidelines for Integrating Ecosystem-based Adaptation into National Adaptation Plans: Supplement to the UNFCCC NAP Technical Guidelines](#), Nairobi.
- Guidelines on how countries may include blue carbon in their NDCs:
The Blue Carbon Initiative (2023), [Guidelines for Blue Carbon and Nationally Determined Contributions](#), Arlington, Conservation International.
- Online database that provides global monitoring on the state of mangroves:
Global Mangrove Alliance (2023), [Global Mangrove Watch](#).

SUMMARY CHECKLIST FOR TOOLBOX IMPLEMENTATION

As a summary, this toolkit proposes a checklist (Figure 8) for checking progress along the sequence of tools proposed in this toolbox, thereby helping to “take the steps” for planning NbS as a coherent order of actions for CRM. It also informs on the integration of national and subnational agendas for cooperation and coordination among various governance levels and multiple sectors.



FIGURE 8. Checklist to support the toolkit use

Different countries have already introduced integrated planning and step-wise approaches, as highlighted in the examples given throughout the toolbox. Box 6 demonstrates how Vanuatu’s integrated plan satisfies both the approach and the checklist.

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