Good practices for increasing the application of Nature-based solutions and ecosystem-based approaches for disaster risk reduction
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## Acronyms and abbreviations

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<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>DRR</td>
<td>Disaster risk reduction</td>
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<tr>
<td>Eco-DRR</td>
<td>Ecosystem-based disaster risk reduction</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>G20</td>
<td>Group of 20</td>
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<td>GFMC</td>
<td>Global Fire Monitoring Center</td>
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<td>NbS</td>
<td>Nature-based solutions</td>
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<td>UN-Habitat</td>
<td>United Nations Human Settlements Programme</td>
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<td>UNOPS</td>
<td>United Nations Office for Project Services</td>
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I. Introduction

During the First Group of 20 (G20) Working Group on Disaster Risk Reduction held under Brazil’s presidency in February 2024, Brazil presented their Issue Note introducing several priorities. The Note builds upon the deliberations under India’s presidency in 2023. The importance of promoting a deeper understanding around Nature-based Solutions and Ecosystems-based Approaches for Disaster Risk Reduction was established as an ongoing priority for the G20 Working Group.

Cost-efficient, effective and scalable, ecosystem-based approaches can help Governments and communities address the growing and interconnected challenges of climate change, biodiversity loss, increased frequency of extreme weather and natural hazards, as well as other human-made environmental disasters. It was agreed that the Working Group will promote actions that enable G20 countries and support developing countries to scale up ecosystem-based approaches and nature-based solutions (NbS) for disaster risk reduction (DRR), with a focus on enhancing financing for investment.

This compendium of good practices complements the Working Paper: Increasing the Application of Ecosystem-based Approaches to Disaster Risk Reduction, which was prepared in 2023. The 16 cases presented hereafter have been collected through a call for good practice cases to G20 countries and knowledge partners. They demonstrate the diversity of applications of NbS, and provide insights into legal and policy dimensions, knowledge, data and capacity needs, implementation, and investment options. The cases cover various themes, including resilience-building, building back better, hydro-meteorological hazards, biodiversity loss, climate change, land degradation, desertification, food security, urban development, human health and water availability.

It should be noted that it was not possible to check the adherence of submitted cases against the available standards, criteria and guidance related to NbS. As much as possible, and based on information from good practice providers, the content of the cases was assessed against the internationally agreed definition of NbS that can be found in paragraph 1 of resolution 5 of the fifth session of the United Nations Environment Assembly (UNEP/EA.5/Res.5), adopted in March 2022:

“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”

Accordingly, only good practices that were deemed to advance actions that (1) protect, conserve, restore and/or sustainably use and manage natural or modified ecosystems, and (2) provide human well-being, ecosystem services, resilience and biodiversity benefits, were included.
II. Good practice cases

During the review of the cases, four overarching themes emerged that illustrate useful dimensions and perspectives in relation to NbS and their role in prevention, mitigation and preparedness for disaster risks, as follows.

1. Creating an enabling legal and policy environment

The cases included under this theme underscore the pivotal role of legal and policy frameworks in facilitating the successful implementation of NbS. They demonstrate that NbS interventions are more likely to thrive where comprehensive disaster risk governance lays the foundation for their implementation. By fostering cross-sectoral collaboration, ensuring regulatory clarity and emphasizing ecosystem protection, Governments can create an environment conducive to working with nature towards socioeconomic resilience and prosperity.

2. Increasing risk knowledge, data and capacity

Robust knowledge, data and capacity-building efforts are prerequisites for effective implementation of NbS. Cases included under this theme emphasize the importance of interdisciplinary research, long-term monitoring and data-sharing. Furthermore, they illustrate the role played by capacity-building initiatives to equip policymakers, practitioners and local communities with the knowledge, expertise and skills to design, implement and evaluate NbS projects. Collaborative knowledge platforms and partnerships can bridge gaps in understanding and enhance the overall effectiveness of NbS interventions.

3. Implementing nature-based solutions for disaster risk reduction

Effective implementation of NbS is critical to ensure that they produce the expected environmental, social and economic benefits, increase resilience, and adequately address the disaster risk in question. The cases included under this theme emphasize the need for ensuring collaborative efforts that involve local governments and communities, leveraging traditional knowledge, employing robust monitoring and evaluation mechanisms, and focusing on long-term sustainability. By embracing these perspectives, NbS can emerge as a formidable tool in addressing environmental challenges and advancing climate resilience.

4. Enhancing public and private investments

NbS require substantial financial support. The cases included under this theme demonstrate the pivotal role of both public and private investments. Governments can leverage public funds through innovative financing mechanisms to attract private sector participation. The cases also showcase successful public-private partnerships that blend philanthropic, concessional and market-based funding. These partnerships can unlock substantial resources for NbS interventions when designed with clear accountability and risk-sharing frameworks.

On the whole, the cases presented in this compendium underscore the transformative potential of NbS and offer a number of entry points that can be tailored to specific national contexts, as well as lessons learned. Each of the four overarching themes is preceded by key takeaway messages to facilitate learning and understanding. By leveraging the perspectives offered in this document, Governments, organizations and communities can harness the power of nature to address pressing environmental and socioeconomic challenges, building resilience and paving the way for a more sustainable and resilient future.
A. Creating an enabling legal and policy environment

Key takeaway messages

A conducive enabling environment promotes the implementation of NbS. This includes developing comprehensive disaster risk governance structures, supported by legal and regulatory frameworks, policies and plans at all levels, across sectors and for hazards of all kinds. NbS serve as one connector to ensure multiple benefits for environmental and socioeconomic resilience and sustainable development.

Developing a policy framework that incorporates risk considerations is essential for effective implementation. Such a framework can enhance existing legislation and policies to align with national, regional and local resilience goals.

Integrating ecosystem-based disaster risk reduction (Eco-DRR) across urban development plans can help reduce vulnerability to climate-related hazards, contribute to eco-friendly development and protect livelihoods. The development of specific adaptation strategies within the urban planning process can help identify and address climate-related risks effectively.

Effective collaboration and partnerships enable knowledge-sharing and learning, helping to build expertise and capacities. In addition, public outreach campaigns and awareness-raising improves the local population's knowledge and understanding.
Case 1: Integrative governance of development, the environment and disaster risk in the Republic of Korea

Location: Republic of Korea

Level: national

Hazard: all types of urban hazards

Solution/intervention type: ecosystem management, ecosystem protection

Issue(s) addressed: planning, implementation

Climate-related disasters and shocks have increased in frequency and severity, in particular affecting urban areas. In response, the Republic of Korea has adopted a number of policies and plans that promote ecosystem-based approaches, with the aim of reducing risks and increasing the resilience of cities to disasters and shocks. This is part of a risk governance approach that places increasing emphasis on managing development, the environment and disaster risk in an integrative manner.

The institutional and legal framework in the Republic of Korea makes provisions that require a set of impact assessments to be undertaken in the case of new urban developments. These include disaster, environmental, transportation and population impact assessments, with the aim of promoting eco-friendly DRR. Such a comprehensive approach contributes to the prevention of potential disasters and protects the environment, while producing co-benefits in terms of quality of life for residents and increased resilience of cities.

The new urban development of Sejong City, which started in 2012, is one concrete example of how this is being translated into practice. With a vision of creating a city where residents and visitors like to go for walks, where the environment comes to live, where ideas and jobs are created, and where the health and safety of residents is safeguarded, urban design has benefited from a comprehensive planning approach. The local government conducted the various impact assessments, which provided data and information on potential hazards and risks, including floods by river or inland waters, the stability of soil, slopes and ground, coastal erosion, and tsunamis, storms and earthquakes. Based on these assessments, disaster mitigation plans were prepared and a suite of hybrid approaches developed. These include the establishment of a nature conservation observation centre to support environmental monitoring and the protection of the nearby Hapgang wetland, a fine dust reduction and fog prediction service to detect risk to public health, and an innovative children’s playground that integrates urban farming services.

In addition to new developments, the Republic of Korea is investing in ecosystem-based resilience capacity-building in existing urban areas. This includes the expansion of urban green corridors that connect green spaces throughout cities, providing biodiversity benefits and improving the ecological balance. Other measures may include the creation of green pocket spaces, including green roads, parking lots and green buildings in urban areas, to increase water absorption capacity and facilitate water retention.
Concept of Sejong City

Source: from the case study submission of the Ministry of the Interior and Safety of the Republic of Korea

Resources and further information:

Case 2: Serving the science-policy-practitioners interface in landscape fire management and wildfire disaster risk reduction at global level

Location: Federal Republic of Germany

Level: global and national

Hazard: wildfires

Solution/intervention type: ecosystem restoration, ecosystem protection

Issue(s) addressed: planning, implementation, capacity-building

Climate variability, such as periodic extreme droughts caused by the El Niño-Southern Oscillation phenomenon, and land-use changes, exacerbate the risk of wildfires as well as their impacts if they occur. Demographic projections and climate change scenarios suggest that this situation will become more critical in the decades to come. The Global Fire Monitoring Center (GFMC), hosted by the Max Planck Institute for Chemistry in Germany, was established to address increased fire risks. It serves as the interface between science, policy, decision makers and the community of practitioners (the science-policy-practitioners interface). Since 2010, the GFMC has been decentralized and has established eight regional branches, providing advisory services for developing national fire management policies, advancing fire knowledge, and reducing the negative impacts of landscape fires on the environment, societies and people.

One key area of work relevant in the context of NbS for DRR relates to strengthening integrated landscape fire management through a comprehensive, cross-sectoral approach to fire governance. Policies and systems for integrated landscape fire management include four interconnected pillars: (i) fire prevention, (ii) the use of prescribed fire, (iii) fire suppression and (iv) post-fire restoration. The GFMC provides technical expertise and capacity-building that is based on sound scientific evidence and innovation, including on the role of nature in fire management. A comprehensive approach further involves a combination of top-down (national policy dialogues and inter-agency coordination) and bottom-up (learning from and capacitating local communities) approaches, connecting local, regional and national levels.

The GFMC leverages the capacity in advanced wildfire management by providing a global portal for wildfire documentation, information and monitoring. Also, working at the interface between the science community and the user community, the GFMC provides support for States and international organizations to develop long-term strategies or policies for wildfire management, including community-based fire management approaches and advanced wildfire management training for decision makers, especially in the prevention and preparedness of wildfire disasters.

Resources and further information:


- Global Fire Monitoring Center (n.d.). https://gfmc.online
Case 3

**Case 3: Building climate resiliency through urban plans and designs in the Philippines**

<table>
<thead>
<tr>
<th>Location:</th>
<th>Republic of the Philippines</th>
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<tbody>
<tr>
<td>Level:</td>
<td>national</td>
</tr>
<tr>
<td>Hazard:</td>
<td>all types of urban hazards</td>
</tr>
<tr>
<td>Solution/intervention type:</td>
<td>hybrid infrastructure</td>
</tr>
<tr>
<td>Issue(s) addressed:</td>
<td>planning</td>
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Tagum City in the Philippines is located between two rivers, the Hijo River and the Tagum-Libugan River. A booming city, more and more land has been converted for residential and commercial uses. As a result, only 10 per cent of the total land area is green and open spaces. In addition, Tagum City is faced with increasing rainfall, prolonged and extreme floods, urban heat stress, typhoons, and droughts. In the past, urban planning did not adequately account for natural features, including forests, waterways and mangroves. The damage to infrastructure, the agricultural sector, people and settlements, caused by Typhoon Pablo in 2012, Typhoon Zoraida in 2013 and Typhoon Tembin in 2017, illustrate the exposure and vulnerability of Tagum City to disaster risks. It is estimated that at least 10,000 businesses are exposed to hazards related to increased rainfall, which is further exacerbated by poor infrastructure.

To promote adaptation to climate change and make cities resilient, the United Nations Human Settlements Programme (UN-Habitat), in cooperation with the Department of Human Settlements and Urban Development of the Philippines, included Tagum City in the Building Climate Resiliency Through Urban Plans and Designs project. By participating in the project, Tagum City was able to enhance its urban and settlement planning guidelines through policy advisory and model implementation activities. It also served as an example on integrating ecosystem-based adaptation into urban planning approaches that could be considered for replication by other cities.

The approach to urban planning and design was based on the premise that consideration of climate change resilience at the onset would produce better results over the long term. As a first step, a capacity needs assessment was conducted, which provided insights into the skills and knowledge required to integrate methods for climate resilience in urban planning. This was followed by trainings on and updating of the Climate and Disaster Risk Assessment, the Local Climate Change Action Plan, and the Enhanced Comprehensive Land-Use Plan. This exercise helped increase understanding of the impacts of climate change on different ecosystems in the region, as well as the roles ecosystems play in addressing climate-related risks. It also ensured that blue-green networks found in the city would be prioritized and included in built infrastructure plans and developments. This includes, for instance, connecting waterways and conserving protected areas.

The update of the Climate and Disaster Risk Assessment and the Local Climate Change Action Plan were considered instrumental in ensuring that the Enhanced Comprehensive Land-Use Plan would draw on climate change principles and risk information. In addition, the Local Climate Change Action Plan included concrete programmes, projects and activities, which resulted in budget allocations towards more open spaces in the city.

On a more strategic level, nature-based design solutions that absorb, retain, recycle and convey water within blue and green networks to curb flooding were
included in the city's Adaptation Strategy. The strategy considers the conservation and restoration of forests, the protection and restoration of coastal and marine ecosystems, climate-resilient crop production and fisheries, and NbS for managing hazards. Concrete measures proposed include increasing water permeability of built areas, improving drainage design to manage floods, redesigning river- and creek-side corridors, establishing adaptive parks for managing floods, and wet floodproofing of critical structures.

As a result of increased understanding of climate risks and evidence-based planning and action, Tagum City was able to develop the technical knowledge to develop climate-sensitive policies and projects that include NbS as an integral part of urban planning and design. Through enhanced policy and planning instruments, it was possible to address urban flooding and heat stress, while at the same time providing open spaces for social and economic activities.

Resources and further information:


Resilient urban design in Tagum City

Source: from the case study submission of the International Climate Initiative (IKI)
B. Increasing risk knowledge, data and capacity

Key takeaway messages

Comprehensive multi-hazard risk data helps in identifying and understanding the vulnerabilities of a region or community to specific hazards. It is critical to assess the specific risks faced by the community in the planning phase of an NbS intervention.

Geographic information systems provide valuable data that helps visualize and analyse disaster risks. Technology has an important role to play in disaster risk management, the planning of effective NbS and disaster preparedness.

Monitoring systems and cutting-edge numerical modelling help assess the effectiveness of NbS. Data and monitoring tools provide concrete evidence of the benefits that NbS provide, and support decision-making.

Tackling complex challenges, such as climate-related risks, requires multidisciplinary approaches and cross-sectoral cooperation to generate innovative solutions. Through co-creation, knowledge- and experience-sharing, as well as by tapping into relevant expertise, collaboration allows for a more comprehensive approach to problem-solving. This includes research collaboration across various sectors and fields.

The design, implementation and benefits of NbS should be documented, monitored and evaluated. The data and information collected will provide important insights into the effectiveness of the intervention and promote learning.

Training courses, public outreach campaigns, and improving the capacities of local authorities and scientists, are essential components of successful disaster prevention and conservation measures. The multifunctionality and benefits of NbS for DRR should be fully analysed and articulated to inform responsible actors and affected communities, and encourage their participation in NbS practice. These efforts not only enhance knowledge, but also empower communities to engage and take action.
Case 4: Supporting research to take stock of nature-based solutions in Canada

**Location:** Canada

**Level:** national

**Hazard:** meteorological, hydrological and environmental hazards

**Solution/intervention type:** hybrid infrastructure

**Issue(s) addressed:** knowledge-sharing and capacity-building

In Canada, a growing number of local governments are turning to NbS to provide municipal services more cost-effectively, such as water conveyance and stormwater management. However, the application of NbS remains siloed, resulting in a tendency to underestimate broader systems benefits and hindering large-scale utilization.

In collaboration with the Coalition for Disaster Resilient Infrastructure and Simon Fraser University, the Government of Canada supported the publication of a report to document Canadian case studies in five key hazard areas: urban heat island and urban flooding; coastal flooding and erosion; riverine flooding; water stress; and landslides and unstable slopes. These case studies aim to improve the awareness of decision and policymakers among all sectors.

For urban heat islands and flooding, Gibsons Town provides an excellent example by applying green infrastructure to deliver water and stormwater management solutions, saving an estimated CAD 3.5 million in capital costs and requiring 75 per cent less spending on operation and maintenance annually compared to the stormwater upgrade alternative. For instance, marsh restoration and dike relocation, which emphasize habitat creation and enhancement, are used to reduce coastal flooding impacts in Truro, providing a cost-effective alternative to raising dikes, creating berms and building tidal dams. NbS strategies such as providing landowner guidelines for maintaining vegetation in buffer zones, protection of trees on unstable slopes, and landscaping that follows natural contour lines to minimize landslide risks, are also crucial to the district of North Vancouver’s risk management.

The case study report demonstrates the transformative potential of NbS in Canada, not only in terms of cost savings and disaster resilience, but also in its broader positive impacts on the environment and policy development. It exemplifies how integrated NbS can simultaneously address multiple challenges, offering a more sustainable and resilient future for communities. The case studies demonstrate a number of good practices in NbS-related criteria and principles (e.g. inclusive governance, design at scale, economic feasibility) offering opportunities to advance and accelerate effective NbS in Canada. They further supported the identification of gaps, including the need for standardized NbS project planning processes, concrete and measurable goals, comprehensive analysis of interrelated factors, and multi-criteria assessment parameters.

**Resources and further information:**

**Case 5: Ecosystem-based disaster risk reduction practices for sustainable community development in Japan**

**Location:** Japan

**Level:** national

**Hazard:** meteorological and hydrological hazards

**Solution/intervention type:** ecosystem restoration, ecosystem protection

**Issue(s) addressed:** planning

In recent years, disasters caused by typhoons and heavy rain have become more frequent in Japan. To address this increased risk, Japan's Ministry of the Environment has published *A Guide to Eco-DRR Practices for Sustainable Community Development: Using Potential Map of Ecosystem Conservation/Restoration to Promote Eco-DRR*. The guide, published in March 2023, particularly focuses on water-related disasters.

The methods and information provided in the guide support the creation and use of "ecosystem conservation/restoration potential maps". These maps visualize areas with high potential for the implementation of ecosystem-based disaster risk reduction (Eco-DRR) measures, and facilitate a common understanding and joint decision-making among involved stakeholders. The potential map overlaps statistical analyses and geospatial information, using geographic information systems data. The potential map is created in three steps that produce an overlay of information tailored to the specific local characteristics and needs:

1. Understand the current status and future direction land-use and ecosystem distribution.
2. Evaluate the potential sites for Eco-DRR measures. This includes identifying sites for biodiversity and ecosystem conservation and restoration, such as wetlands.
3. Overlay the information generated under points 1 and 2 with land-use regulations, zoning and hazard maps to arrive at the "ecosystem conservation/restoration potential map".

To make effective use of the potential map, users need to review local government plans and existing or planned ecosystem conservation and restoration activities. This review will provide insights into where existing ecosystem conservation and restoration initiatives could be adapted to contribute to DRR. It further provides guidance on future Eco-DRR interventions that can be supplemented through on-site surveys to determine the concrete measure to be implemented.

By providing a clear methodology for creating potential maps, the guide not only supports decision-making on where to implement Eco-DRR measures, but also contributes to the development of local government plans, and spatial and land-use planning, at various levels. In this way, the guide directly promotes community resilience, while increasing public awareness, understanding and acceptance of Eco-DRR solutions and their benefits.

**Resources and further information:**

  [https://www.env.go.jp/content/000124850.pdf](https://www.env.go.jp/content/000124850.pdf)
Case 6: Investment in scientific research and innovation on nature-based solutions: The Horizon Europe Programme

**Location:** European Union

**Level:** regional

**Hazard:** meteorological and hydrological hazards

**Solution/intervention type:** ecosystem management, ecosystem protection

**Issue(s) addressed:** investment, implementation, capacity-building

The increased frequency and severity of hydro-meteorological phenomena are significantly impacting European territories and are of global concern. However, the application of NbS in mitigating these hydro-meteorological disaster risks is still inadequate. This includes a lack of scientific evidence and knowledge around NbS policy, methods, applications and more. To address this challenge, the European Union is making increased investments in science, research and technology that promote NbS. Such research and innovation is primarily funded through the Horizon 2020 (2014–2020) and its successor Horizon Europe (2020–2027) programmes. These stimulate collaboration and actions to enhance the evidence base, societal acceptance and policy strengthening, while demonstrating advantages for market development of NbS.

The following projects illustrate how investments in science, research, technology and innovation support co-creation, collaboration and knowledge generation that advance the implementation of NbS: OPEN-air laboRAtories for Nature based solUtions to Manage hydro-meteorological risks (OPERANDUM), PHUSICOS, and Regenarating ECOsystems with Nature-based solutions for hydro-meteorological risk REducTion (RECONECT). All three projects contribute to science and policy, as well as provide good practices and case studies that support knowledge, data and capacity for the implementation of NbS.

OPERANDUM advanced the reduction of hydro-meteorological risks through co-designed, co-developed, deployed, tested and demonstrated innovative NbS, that combined green, blue and hybrid (a combination of natural and grey) infrastructure. Open-air laboratories, sites that cover a wide range of hazards, land use, socioeconomic conditions and levels of monitoring, served as demonstration sites. Scientific evidence was generated to address specific risks and their effectiveness, assessed through innovative monitoring systems and cutting-edge numerical modelling approaches. This approach helped to improve knowledge on how NbS contribute to the mitigation of climate change and provided insights into how to increase sustainable business opportunities.

PHUSICOS focused on risk reduction in rural mountain landscapes, proposing nature as a source of innovation and solutions to climate-related hazards. It addressed a knowledge gap in science and policy that had not considered such landscapes in detail. The project thus enriched the proof of concept of NbS, by implementing NbS in a number of case sites across Europe. This project demonstrated how NbS provide robust, sustainable and cost-effective measures for reducing the risk of extreme weather events in rural mountain landscapes.
Similar to the other two projects, RECONECT aims to enhance the evidence base on NbS, strengthening analysis and evaluation, with a particular focus on floods, storm surges, landslides, and droughts. It does this by connecting existing and co-creating a network of NbS cases, reflecting on the social and cultural acceptance of NbS, and promoting innovation in evaluation, selection, design, operation and maintenance of interventions. A “land-use planning” approach has been developed which links risk reduction with local and regional development objectives in a sustainable way through drawing upon the network of demonstrators and collaborators. A road map for NbS in Europe and beyond supports the replication and upscaling of NbS, proposing investment strategies and business models.

These projects are merely a few examples of investments by the European Union to fill knowledge gaps related to NbS and promote research and innovation. These investments strengthen collaboration across a diverse range of actors and help deliver data, tools and methods through an open platform and knowledge exchange. Moreover, they support innovation in governance approaches through strengthening policy frameworks and exploring financial instruments, with the aim of enhancing the effectiveness of the design and implementation of NbS.

Resources and further information:

C. Implementing nature-based solutions for disaster risk reduction

Key takeaway messages

A long-term strategic perspective allows for a comprehensive assessment of the value of NbS interventions under various conditions and time frames. This highlights the importance of considering the sustainability and resilience-building aspects of DRR practices beyond immediate economic gains.

It is critical to partner with local communities in designing and implementing NbS. Local ownership is crucial for the success and sustainability of initiatives. Empowering local communities to manage their natural resources can lead to innovation and increases the effectiveness of the solution. It also ensures that NbS are maintained and natural resources sustainably managed.

Traditional practices help develop unique solutions to address specific socioeconomic, disaster and environmental challenges. This showcases the importance of preserving and integrating traditional and Indigenous knowledge into modern DRR strategies.

Political leadership can drive NbS applications. NbS implementation that is supported by the Government, including through relevant incentives and subsidies, trainings and capacity-building, provide additional backing for local industries and livelihoods. Such support can help overcome barriers and encourage new entry points for NbS uptake and implementation.
Case 7: Improved water resources management through sawtooth oak forests and irrigation ponds in Japan

**Location:** Japan

**Level:** national

**Hazard:** meteorological, hydrological and environmental hazards, specifically flood, drought and water security

**Solution/intervention type:** ecosystem management, agroforestry

**Issue(s) addressed:** implementation, capacity-building

Communities in the Kunisaki-Usa region have faced difficulties securing water, especially for agricultural activities, due to a combination of mountainous landscapes, low rainfall and porous volcanic soils that cause rainwater run-off to the sea. In addition, floods may occur during the rainy and typhoon seasons.

Over many years, traditional knowledge and agricultural practices have been employed to overcome the water security and supply challenge, including the planting of sawtooth oak forests. These forests contribute to groundwater recharge and provide a source of food through the growth of shiitake mushrooms. In addition, an interlinked network of 1,200 small-scale water ponds, originally created to support irrigation, also benefit from the forest, stabilizing water supply and supporting agricultural production. The water storage function of the forest, in combination with the ponds, reduces the risk of floods and droughts, helps to balance the carbon cycle, supports adaptation to climate change, and provides benefits to biodiversity. However, the traditional practice of planting sawtooth oak forests was lost over time.

Efforts were made to reinvigorate the adoption of local solutions through education of children, the creation of jobs and the promotion of tourism. Although not an intentional outcome, the combination of solutions provides benefits as an NbS for DRR, climate change adaptation, and water and food security. As a result of this practice, there has been a gradual increase in the number of new and diverse farmers entering the Kunisaki-Usa region, as well as a growing number of local voluntary research groups and entrepreneurs. The local government also supports shiitake farmers through various initiatives, such as subsidies for efficient shiitake production, incentives for young farmers and entrepreneurs, and training courses for agricultural instructors.

**Resources and further information:**


Case 8: Using the Hani Rice Terrace system to reduce drought risk in China

Location: People’s Republic of China

Level: national

Hazard: drought

Solution/intervention type: ecosystem management, food production

Issue(s) addressed: implementation

The south-eastern part of Yunnan Province in China is susceptible to soil erosion and landslides due to high mountains with steep slopes and abundant rainfall. The absence of reservoirs in the area increases the risk of droughts and water shortages. The Hani Rice Terrace system has been developed based on these topographic conditions. It provides a number of benefits for nature and people, including food provision, water security and DRR.

Based on traditional practices, the Hani terrace system is an example of integrated water management comprised of forested areas, strategic positioning of settlements, terraces used for agriculture and the Hong River. This combination provides an abundance of water without the need for reservoirs, making rice farming sustainable and ecologically friendly.

The forest, drylands, village and terraces are distributed in steps to increase the water retention capacity. The forest in the upper part acts as a spring, collecting and storing water that drains into the ground and through the surface towards the village and the field crops, taking advantage of the topographic conditions. From the terraces, the water flow reaches the river valley. In addition, water run-off provides fertilizer for the paddy fields, as the flowing water carries nutrients from the forest litter as well as communal manure ponds.

The Hani Rice Terrace system works at a landscape scale, producing a number of benefits for biodiversity, livelihoods and DRR. For instance, 48 varieties of rice have been planted in Hani terraced fields. The landscape is composed of diverse habitats, including woodlands, grasslands, wetlands and farmlands, making it rich in biodiversity. The paddy fields, including the rice terrace on the slope, serve as artificial wetlands to store excess water and reduce risk of floods.

The spatial structure of the Hani Rice Terrace system, including the mixed forests and artificial wetlands created by the rice paddies, performs various ecological functions, including soil and water conservation, improvement of soil fertility and stability. Further, it supports the prevention and control of soil erosion and protects the village and local communities from hazards, including landslides, drought and flood.

Resources and further information:


China - Hani Rice Terraces
Source: © FAO/Min Qingwenon [Flickr]

Diagram of Hani Rice Terrace system
Source: Globally Important Agricultural Heritage Systems Secretariat
Case 9: Natural pond restoration as water reservoirs and sustainable drainage for flood protection in Sri Lanka

Location: Democratic Socialist Republic of Sri Lanka

Level: national

Hazard: floods

Solution/intervention type: hybrid infrastructure

Issue(s) addressed: financing, implementation

Seasonal flooding has been a significant problem for Mannar Island in Sri Lanka, negatively impacting people’s economic and social activities. Over 70 ponds used to provide natural drainage benefits. Ponds and water reservoirs are essential for water retention and groundwater recharge, especially in the north of Mannar, where surface waters are extremely rare and the population relies on groundwater for drinking and agriculture. However, over time, many of these were filled in to reclaim land for settlements and construction of buildings.

The unplanned nature of urban development destroyed the benefits for flood control derived from the pond systems. A lack of effective city planning also resulted in some roads being constructed with limited drainage and culverts to guide water off the road. The roads thus acted like dams, causing rising water levels during heavy monsoon rains. In the past, the increased flooding resulted in public service disruptions, the displacement of affected people, food shortages and waterborne diseases. Moreover, the municipal administration faced high costs for recovery and reconstruction of infrastructure.

To address the challenges faced by Mannar Island, the United Nations Office for Project Services (UNOPS) worked with the support of the European Union to raise awareness of the negative impacts of illegal encroachment of the pond area and the construction of unauthorized structures within the pond boundaries. In addition, existing natural ponds were restored as cost-free natural infrastructure, flooding and water storage solutions. A hydro-geographical map helped to identify key catchment areas and flood patterns, and demarcated pond boundaries. The map was also used to recommend actions to protect local communities from future flooding.

Effective coordination and cooperation with the local population was key for the success of this intervention and for protecting the livelihoods of the community. It was important to increase the population’s understanding of the benefits of pond rehabilitation for Mannar and overcome misconceptions that the activities would mean loss of land for individuals. To increase public awareness and develop capacity, trainings were carried out to educate the population about the importance of the ponds for local groundwater recharge and flood water retention, as well as to improve natural and hybrid infrastructure operation and maintenance. The rehabilitation work has increased the water retention capacity by 8,840m³, which will allow the ponds to capture more water run-off (reducing flooding risk) and help increase water infiltration (improve groundwater quantity and quality).

Resources and further information:

Case 10: Using the Kuttanad Wetland Agriculture System to reduce the impacts of floods in India

**Location:** Republic of India

**Level:** national

**Hazard:** floods

**Solution/intervention type:** ecosystem protection, food production

**Issue(s) addressed:** implementation

Kuttanad covers the Alappuzha, Kottayam and Pathanamthitta Districts in Kerala, India. Farming occurs below sea level due to the region's low altitude. These geographical conditions contribute to the region facing risks from floods and saltwater intrusion. The Kuttanad Wetland Agriculture System is one of the largest wetland use systems and existed for more than 150 years.

Made up of a complex mosaic of agricultural landscapes and ecosystems, including coastal backwaters, rivers, vast stretches of paddy fields, marshes, ponds, garden lands, edges, corridors and water ways, the wetland enables rice cultivation, coconut, tubers and food crop plantations, and fishing. The Kuttanad Wetland Agriculture System contributes approximately 25 per cent of Kerala's rice production, which makes it an important source of a staple food.

Working in harmony with the land, and effective water resource management, contributes to the conservation of biodiversity and ecosystem services, and helps manage the hydrological cycle of the region. Moreover, it provides DRR benefits by controlling floods during the monsoon season and droughts during the summer.

In the context of global food insecurity and salt intrusion in coastal agricultural lands, further aggravated by climate change, the Kuttanad Wetland Agriculture System is an example of an intertidal mosaic of agricultural landscapes and ecosystems that not only supports food security and local livelihoods, but also helps protect biodiversity and reduce coastal disaster risks. However, a number of challenges in coastal agricultural remain, including the need to consider pollution and financial gaps.

**Resources and further information:**

Case 11: Diversification of forage sources and strengthening of existing tree-based forage systems to reduce the impacts of recurrent droughts in the Plurinational State of Bolivia

**Location:** Plurinational State of Bolivia

**Level:** national

**Hazard:** drought

**Solution/intervention type:** ecosystem management, food production

**Issue(s) addressed:** implementation, capacity-building

Located in the south-eastern part of the Plurinational State of Bolivia, the Chaco Ecoregion consists of a large expanse of arid flatland. The Chaco is characterized by an irregular climate, marked by high thermal and rainfall variations. Average annual rainfall varies between 450mm and 700mm, and is concentrated between December and March; hence, the area usually sees a dry period between May and October. Given these specific climatic conditions, the availability of pastoral resources is generally scarce, especially during the dry season.

Prior to the intervention, cattle were raised without the benefit of silvopastoral approaches, and were fed using only trees and creeping herbaceous species. During drought periods, animals tended to suffer for several months, resulting in weakened body conditions which make them more susceptible to diseases and heightened mortality.

To build resilience to drought disasters, the Food and Agriculture Organization of the United Nations (FAO) supported the adoption of alternative agroecosystems. As a DRR innovation, the grass species Tangola and Camerún panameño were intercropped to diversify forage sources and strengthen existing tree-based forage systems, thereby enhancing the resilience of cattle to recurrent drought. In this agroecosystem, trees present the foundation of pasture productivity and provide a natural shelter for animals, helping them cope with recurrent dry spells or drought. As an additional co-benefit, leaves and tree litter can be used as forage during the dry season. Leaves add organic matter to the soil, contributing to the improvement of soil quality that supports the growth of forage grass during summer season. Through the introduction of Tangola and Camerún panameño species, forage resources are diversified, and forage availability (and quality) is increased during the dry season, leading to greater animal productivity and health.

To assess the effectiveness of the DRR innovation, data was collected from good practice plots and compared with data collected from control plots on the same farms, or from neighbouring farms where the good practice had not yet been implemented. The number of cattle on the monitored farms. Results showed that when prolonged drought occurs, the cumulative net benefits of the good practice are about 109 per cent higher than the benefits of practices previously used.

Shifting to cattle-raising in silvopastoral systems in the Bolivian Chaco led to a reduction of the impacts of drought, yielding important benefits. The benefit-cost ratio of the introduced good practice was 3.78, versus 1.74 for the previously applied practice. The higher performance of the good practice is mainly attributable to a significant reduction of mortality rates, combined with an increase in average animal weight, leading to an increase in production and a decrease in restocking costs.
Resources and further information:

D. Enhancing public and private investments

Key takeaway messages

Innovative financial instruments in DRR, such as resilience bonds, green bonds, impact investment and dedicated trust funds can play a crucial role in promoting NbS and resilience.

NbS for DRR should be financed through diverse sources, including state budgets, international grants, private sector investments and community grants. Diversifying funding streams reduces dependence on a single source and enhances financial resilience.

The establishment of a dedicated fund for the implementation of NbS for DRR helps increase awareness and uptake of natural infrastructure solutions. This approach supports the implementation of projects.

Financing should be accessible by local communities and those affected by disasters. Engaging communities helps create a sense of ownership and ensures the sustainability of NbS interventions over the long term. Financial mechanisms should be flexible, adaptive, and support such community-led processes and implementation.
**Case 12: Building urban resilience through investments in community-led nature-based solutions**

**Location:** People’s Republic of Bangladesh, Islamic Republic of Pakistan, Republic of the Philippines

**Level:** regional

**Hazard:** all types of urban hazards

**Solution/intervention type:** hybrid infrastructure

**Issue(s) addressed:** investment, implementation

The cities of Faridpur in Bangladesh, Sialkot in Pakistan and Aklan in the Philippines share common characteristics. They are susceptible to climate-related hazards such as floods and erosion. They face challenges related to poor drainage, inadequate solid waste management systems, unplanned development, and climate change, which increase risks to community health, well-being and local livelihoods. To address climate-related risks, including in the above urban areas, funding was made available through the multi-donor Urban Climate Change Resilience Trust Fund that is administered by the Asian Development Bank. The fund was created to support cities in Asia to reduce disaster risks and improve infrastructure resilience. In 2017, the three cities in Bangladesh, Pakistan and the Philippines were selected for the implementation of community-led projects that incorporated NbS in climate change adaptation measures. The projects emphasized community ownership by drawing on community-level climate risk and vulnerability assessments, and traditional knowledge, as well as by co-designing measures that would be operated and maintained by the respective communities.

The measures implemented in Faridpur and Sialkot included green parks and spaces, water retention ponds for water retention and reduction of run-off, and green rooftop schemes. These measures help to mitigate urban floods, while serving as recreational spaces for communities. The park in Sialkot responds to the local conditions and needs, and features ornamental trees and plants, jogging/walking paths, benches, playgrounds, washrooms, solar-powered lights, automated water sprinklers, kiosks reserved for small livelihood enterprises, and drainage and rainwater collection systems. In Aklan, bioengineering measures were implemented to reduce flood risks and landslides. In addition, a multipurpose evacuation centre promotes disaster preparedness, providing capacity-building on climate change, livelihoods training and marketing. It also supports the raising of native trees, gardening and bioengineering measures.

The interventions in the three cities were concluded in 2022. They demonstrate the need and effectiveness of investments in locally led actions that are adapted to the specific context. Such investments support communities to co-design, implement, operate and maintain NbS, building on local and traditional knowledge and promoting the long-term sustainability of climate adaptation and DRR measures. Moreover, the three cases provide evidence that NbS do not need to be expensive or require large investments.
Diagram showing aspects of developing and implementing nature-based solutions in communities

Source: from the case study submission of the Asian Development Bank
Case 13: Financing disaster risk reduction and reef conservation through the Mesoamerican Reef Insurance Programme

**Location:** Mexico

**Level:** national

**Hazard:** tropical storms

**Solution/intervention type:** ecosystem protection

**Issue(s) addressed:** financing, implementation

Quintana Roo, Mexico, faces high risks from hurricanes and tropical storms. The Mesoamerican Reef, the second largest barrier reef in the world, provides a buffer and helps mitigate disaster risks. At the same time, the coastal region around Quintana Roo largely depends on the tourism industry, worth USD 12 billion per year. Therefore, it is expedient to implement measures that help protect the reef, the beaches behind it, and people and property in adjacent areas.

In an effort to protect marine and coastal ecosystems and preserve their value as an ecosystem service to mitigate storm surge risks, the Nature Conservancy, the Mexican state government of Quintana Roo and other partners established the Mesoamerican Reef Insurance Programme. The scheme serves as the first pilot of its kind. It combines ecosystem-based adaptation measures with climate risk financing and insurance, and covers 167km of coastline, encompassing several municipalities and their towns, including Cancún, Puerto Morelos, Playa del Carmen, Tulum and Cozumel.

The Mesoamerican Reef Insurance Programme provides insurance against tropical cyclones, and covers damages to the coral reefs found in the Mesoamerican Reef, as well as the beaches along the coast. In this regard, it transfers the risk of damages from tropical storms and provides for the protection of vital ecosystems through coral reef protection, management and restoration, and the stabilization of beachfronts. The reef insurance is replenished through an existing fee levied from owners of beachfront properties and paid into a trust fund. The Coastal Zone Management Trust manages the funds, contracts services for reef restoration, maintenance and resilience needs, and purchases catastrophe insurance. The insurance is triggered by set parameters (e.g. wind speed), providing pay-outs for emergency restoration. As a result, local businesses such as hotels, the tourism industry and livelihoods benefit from greater protection and resilience.

For the design of the insurance scheme, robust scientific evidence, including from flood risk assessments and ecosystem-based adaptation benefit analyses, was a crucial prerequisite for the development of financial and environmental plans. This includes a monitoring framework that tracks reef health over time, and provides data on risk reduction benefits that helps anticipate risks. Moreover, the implementation of the initiative relied on the involvement of the insurance industry as well as the consistent and close cooperation between the private and public sectors, especially government agencies, hotel owners and civil society.

**Resources and further information:**

Case 14: The National Mangrove Rehabilitation Programme in Indonesia

| Location: | Republic of Indonesia |
| Level: | national |
| Hazard: | loss of mangroves |
| Solution/intervention type: | mangrove reforestation/rehabilitation |
| Issue(s) addressed: | financing, planning, implementation |

Indonesia has one of the world’s largest and most productive mangrove ecosystems, covering approximately 3.4 million hectares, representing approximately 22 per cent of the global mangrove area, or 54 per cent in Asia. Mangroves provide a wide range of ecological services that benefit nature and humans, acting as guardians of the coastal environment by mitigating climate change impacts (e.g. through increased carbon storage) and protecting coastal communities from disasters such as storm surges, coastal erosion and flooding. The dense root systems of mangroves help dissipate wave energy, stabilize sediments and reduce the force of incoming tides and currents.

Despite their recognized value, mangroves face numerous threats, such as deforestation, unsustainable practices, degradation and conversion into aquaculture ponds, which accounts for nearly 50 per cent of the overall loss. This not only harms mangrove ecosystems, it also jeopardizes the livelihoods of coastal communities, who depend on the ecosystem functions and services provided by mangroves.

In 2020, the Government of Indonesia launched the National Mangrove Rehabilitation Programme and established the National Peatland and Mangrove Restoration Agency to lead the implementation of the programme. The programme aims to direct investments towards the rehabilitation of 600,000 hectares of mangroves by 2024, with an estimated cost of 26 trillion rupiah (USD 1.8 billion). An initial investment of USD 100 million is targeted at the most degraded mangrove forests in nine provinces across Indonesia. In the first two years, over 39,000 hectares of mangroves were rehabilitated. However, due to the COVID-19 pandemic, the result achieved falls short of the target of 83,000 and 228,000 hectares for 2021 and 2022 respectively.

To further support efforts of mangrove restoration and help prioritize actions, guide decision-making and build long-term sustainability and resilience, the Government of Indonesia developed a *Road Map for National Mangrove Rehabilitation 2021–2030*. The National Mangrove Rehabilitation Programme was further included as a priority in the *National Medium-term Development Plan for 2020–2024* and supported by a Presidential Regulation adopted in 2021. In addition, five sources of funding were identified by the Government of Indonesia, including the state budget, international grants and loans, a mangrove business permit scheme, a compulsory mangrove rehabilitation scheme tied to lease permits along river basin areas, and a corporate social responsibility scheme.

The Indonesian National Mangrove Rehabilitation Programme demonstrates the importance of diversifying sources of funding, as well as the need for political support through dedicated policies and coordination mechanisms. Still, a number of challenges remain, and the complexity of the undertaking requires a phased approach. Identified challenges include the complexity of governance (e.g. the absence of regulation, leadership, commitment and integrity), the
need for stakeholder coordination (e.g. overcoming conflict of interest and collaboration between multiple stakeholders), technical hurdles and risk information needs (e.g. impact of natural phenomenon and human activities on mangrove ecosystem sustainability), logistical constraints (e.g. access and knowledge disparities), and community engagement (e.g. by empowering local communities to take ownership).

![The President of Indonesia Joko Widodo (centre) planting mangroves in Batam, Kepulauan Riau Province](https://media.istockphoto.com/photos/the-president-of-indonesia-joko-widodo-centre-planting-mangroves-in-batam-kepulauan-riau-province-picture-id1674761541?k=6&m=1674761541&s=612x612&w=0&h=5-SeSnUZcbEqs8ztxiHJSK1oRcPqJQ2tKm_F8nF1WG0=)

**Source:** Presidential Secretariat Press Bureau/Laily RE

**Resources and further information:**


Case 15: Dedicated funds in support of natural infrastructure solutions for disaster risk reduction in Canada

Location: Canada

Level: national

Hazard: meteorological, hydrological and environmental hazards

Solution/intervention type: dedicated investments in natural and hybrid infrastructure

Issue(s) addressed: financing

Canada is facing growing disaster risks and losses. In the last 50 years, the combined losses from extreme weather and related disasters in Canada have increased by more than 1,000 per cent. In particular, floods, wildfires and other climate-related disasters have been identified as threats to the country. As damage to infrastructure and disruptions of services is one of the largest contributors to economic losses from disasters, building infrastructure resilience has been identified as critical.

Instead of focusing on measures that consider only grey infrastructure solutions, Canada created avenues for investments that would increase awareness and uptake of natural infrastructure projects. One opportunity to do so is the Disaster Mitigation and Adaptation Fund, worth CAD 3.86 billion. This national fund supports infrastructure projects that increase the resilience of communities at risk of being impacted by climate-related disasters. The Disaster Mitigation and Adaptation Fund has committed CAD 2.3 billion in 83 built and natural infrastructure solutions, to reduce community vulnerability to climate impacts and prevent infrastructure failure.

In addition to the existing fund, in June 2021 Canada established a dedicated fund to support natural and hybrid infrastructure projects. The CAD 200 million Natural Infrastructure Fund is the first of its kind in Canada that specifically increases investments in NbS for DRR. It focuses on environmental protection, community resilience and economic growth and job creation. The fund has already been used to conserve wetlands, build urban drainage systems, including rain gardens, and restore beaches and dunes.

Canada’s success in increasing awareness and uptake of natural infrastructure for building resilience relies on enhanced public investment and all-of-government and whole-of-society engagement. One key success factor of Canada’s approach to investments in natural infrastructure is the focus on inclusive approaches and leaving no one behind. Canada is also sharing lessons learned and experiences to further enhance its efforts on NbS (see also case 4 above).

Resources and further information:


Case 16: Jilin Yanji Low-Carbon Climate Resilient Healthy City Project

Location: People’s Republic of China
Level: national
Hazard: flood
Solution/intervention type: hybrid infrastructure
Issue(s) addressed: investment, planning, implementation

Yanji city in Jilin Province, China faces the challenges of poor urban liveability and traffic management, exposure to climate-related flood risk, and risks to water security and safety. This includes inefficient public transport, traffic congestion and poor parking management, urban and river flooding, and inefficient water supply and wastewater management. River flooding, flash floods and urban flooding endanger lives, property and livelihoods, and pose disturbances to traffic and public life.

Under its Operational Priority 3: Tackling Climate Change, Building Climate and Disaster Resilience, and Enhancing Environmental Sustainability, the Asian Development Bank is investing USD 130 million in strengthening the urban resilience of Yanji. Among other goals, the investment will be used towards the construction of climate-resilient flood risk management and sponge city green infrastructure and institutional capacity-building for low-carbon, climate-resilient, and healthy city planning and infrastructure management. It is expected that the experiences and lessons learned will promote replication in other parts of China.

An integrated urban climate and flood risk assessment, adaptation options assessment and a comprehensive water resources management strategy build the foundation of the project. Through the project, a new drainage pipe system along and across the first bus rapid transit corridor will be designed and constructed. This will guide stormwater more directly to the river and help reduce urban flood risk, as well as ease urban traffic. Floodplain and wetland preservation, and ecological riparian and embankment rehabilitation, have also been included to foster ecosystem-based flood risk management. With functional green spaces to retain and naturally filtrate stormwater, improved drainage pipe networks, and ecological river management, flood risks to the urban area will be significantly reduced. Meanwhile, sponge city green infrastructure will improve urban water supply, as a natural system for water cleansing and filtration.

This systemic green-grey integration was simulated through advanced hydraulic modelling, which showed that the project area would be virtually free of urban flooding. The first phase of the bus rapid transit corridor is already in operation, and the project will run until 2027. Multiple cross-benefits will come from an integrated solution provided to improve the urban liveability of a medium-sized city, which is timely and essential to lessen the migration to coastal mega-urban regions. Knowledge-sharing with other cities is expected to promote further investments in and uptake of hybrid infrastructure solutions that integrate ecosystem-based approaches.

Resources and further information:
III. Conclusions and way forward

NbS have emerged as an important high-impact solution to reducing disaster risk and building resilience with benefits for socioeconomic development, environmental sustainability and overall human well-being.

This compendium of good practice cases provides compelling documentation that NbS offer multifaceted benefits, including conservation of biodiversity, climate change mitigation and adaptation, enhanced disaster resilience, and socioeconomic development. The cases presented here provide valuable insights into the effectiveness and versatility of NbS, underscoring that working with nature is key to the successful implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 and related frameworks and agendas, including the 2030 Agenda and its Sustainable Development Goals, the Paris Agreement, and the Kunming-Montreal Global Biodiversity Framework. NbS also contribute to the achievement of the goals set out by the G20 Working Group on Disaster Risk Reduction.

However, it is worth noting that scaling up the application of NbS requires additional efforts at international, regional and, in particular, national and local levels. The cases highlight the need for long-term commitment and investment, as upfront capital costs may represent a barrier for stakeholders to adopt NbS, especially for least developed countries, landlocked developing countries and small island developing states. Thus, international investment and flexible financial mechanisms are necessary. Governments and institutions also need to create the enabling conditions for the effective implementation of NbS, including through conducive governance mechanisms and supportive policies. Collaboration among various actors and stakeholders is essential. This includes involving local communities in the planning and implementation of NbS to foster a sense of ownership, and ensure the long-term viability of these solutions. The cases show that risk knowledge, supported by data and information, is a cornerstone of designing appropriate NbS interventions that address disaster risks. Capacity-building, including trainings, dialogues and awareness-raising activities, are essential to enable decision makers to make risk-informed decisions and to increase ownership and buy-in from the public.

The G20 is well placed to promote, learn from and scale up the good practices included here, as well as collect, disseminate and share additional good practices on NbS for DRR, in support of:

i. Strengthened legal and policy frameworks and comprehensive disaster risk governance that provide the enabling environment for the implementation of NbS for DRR;

ii. Increased data collection, knowledge-sharing and capacity-building to support risk-informed decision-making and public understanding and awareness of the benefits of NbS for DRR;

iii. Increased uptake and implementation of NbS for DRR that is founded on collaboration and partnership, inclusion and participation; and

iv. Enhanced and innovative financing strategies that increase investments in NbS for DRR.