Framework Convention on Climate Change

Standing Committee on Finance

Forum of the Standing Committee on Finance for Nature-based Solutions

Synthesis paper by the secretariat

Summary

This paper contains a synthesis of the submissions from Parties and observers provided on the Forum of the Standing Committee on Finance on Finance for Nature-based Solutions. It has been prepared to inform the discussions to be held in parts 1 and 2 of the Forum to be held in 2021 and 2022, respectively.

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Abbreviations and acronyms

AF	Adaptation Fund
AILAC	Independent Association for Latin America and the Caribbean
BIOFIN	Biodiversity Financing Initiative
CBD	Convention on Biological Diversity
CIFOR	Center for International Forestry Research
CO_2 eq	carbon dioxide equivalent
COP	Conference of the Parties
COVID-19	coronavirus disease 2019
EbA	ecosystem-based adaptation
EDF	Environmental Defense Fund
FAO	Food and Agriculture Organization of the United Nations
GCA	Global Commission on Adaptation
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gas
GIS	geographic information system
GIZ	German Agency for International Cooperation
GLEAM	Global Livestock Environmental Assessment Model
GLF	Global Landscapes Forum
IKI	International Climate Fund
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LDC	least developed country
LoCAL	Local Climate Adaptive Living Facility
NAP	national adaptation plan
NAP Global Network	National Adaptation Plan Global Network
NbS	nature-based solution(s)
NDC	nationally determined contribution
OECD	Organisation for Economic Co-operation and Development
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCF	Standing Committee on Finance
SEPAL	System for Earth observations, data access, processing and analysis for land monitoring
TAPE	Tool for Agroecology Performance Evaluation
TNC	The Nature Conservancy
UNCCD	United Nations Convention to Combat Desertification
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-REDD Programme	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
WBCSD	World Business Council for Sustainable Development

Executive Summary

1. **All submissions emphasize the important role of ecosystems in addressing climate risks through NbS**. Ecosystems provide a range of services to people and societies, yielding environmental, social, and economic benefits. The health of ecosystems is crucial for the Earth's carbon cycle, which is being threatened by anthropogenic climate change. NbS has an important role to play in carbon sequestration and avoiding GHG emissions, and it can help societies adapt and protect against the adverse impacts of climate change.

2. **Many international environmental agreements acknowledge the links between climate change, ecosystems and societal vulnerabilities, and the role nature can play in addressing environmental problems**. Agreements include the UNFCCC and the Paris agreement, the CBD, the UNCCD and the Sendai Framework for Disaster Risk Reduction 2015–2030. Furthermore, the UN Secretary General announced in 2020 the United Nations Decade on Ecosystem Restoration 2021–2030 aiming to prevent, halt and reverse the degradation of ecosystems worldwide.

3. **The conceptual framing of NbS has evolved throughout the years**. Many submissions commonly pointed to the key definitions developed by the IUCN, the European Commission, and the European Parliament. However, NbS continues to be a term defined and used differently by stakeholders. This has led to several limitations, such as the exclusion of the perspectives of local actors and a lack of operational specificity. In 2020, IUCN launched the "The Global Standard for Nature-based Solutions" to address these limitations. The standard aims to serve a framework that captures operational considerations associated with NbS and encompasses principles for a consistent approach in designing and implementing NbS.

4. **Climate hazards being faced by countries and regions with different ecosystems require different types of NbS**. For example, coastal hazards would benefit from mangrove protection and the management of coral reefs and coastal marshes, while areas experiencing intense precipitation would benefit more from the management and restoration of watershed vegetation and wetlands to store floodwater. Droughts would benefit from green belts to increase water availability and impacts of extreme temperature could be addressed from agroforestry practices that enhance canopy cover and promote urban green growth.

5. **Many successful NbS projects consider the role, knowledge, and traditional cultures of local and indigenous actors in implementing NbS**. There is a significant overlap between natural lands, conservation areas and lands managed by indigenous peoples. However, the local and indigenous actors are often overlooked during the design and implementation of NbS projects. A few submissions underscored the importance of using a rights-based approach, as evidence shows that lands managed by indigenous peoples with secured land rights have lower rates of deforestation, store more carbon, are more biodiverse, and benefit more people, including women, compared to lands managed by public or private entities.

6. **While NbS hold significant economic potential in addressing climate change, countries are faced with challenges in making the economic case for NbS due to their complex set of characteristics**. For example, nature and ecosystems are public goods, where the benefits of NbS are difficult to quantify. Furthermore, NbS are subject to various time and spatial scales and their benefits can fluctuate, given the dynamic and complex natural systems that influence the implementation of NbS.

7. **Countries and investors are faced with additional costs and risks, when considering investments in NbS projects**. Evidence suggests that NbS can be economical and more cost-effective than 'grey' alternatives. However, investors face high transaction costs, opportunity costs for the natural resource used and additional maintenance costs to realise long-term benefits. Furthermore, investors face a number of additional risks in NbS. To cite a few, some NbS to address climate change can be vulnerable to climate-related disasters and it can be time-consuming for ecosystem-based climate actions to demonstrate their benefits. Furthermore, investors also face the challenges of a lack of data on NbS, due to a lack of systemic monitoring and evaluation and an overall lack of technical capacity to account for and measure the value of NbS benefits.

8. **Many submissions recognise that NbS is insufficiently funded, although monitoring and tracking finance for NbS is at an early stage**. The State of Finance for Nature report by UNEP estimates that over USD 536 billion per year will be needed globally to meet future goals to address climate, biodiversity, and land degradation. However, approximately USD 133 billion per year including public and private sources is spent globally on NbS, which is not commensurate to the scale of financing needed globally. However, UNEP report notes that monitoring and tracking the financial flow for NbS remains at an early stage and there are varying methodologies being used by data collectors and governments to account for and report on finance for NbS.

9. **Public-sector funding remains the major source of finance for NbS**. Around 86 per cent of finance for NbS is estimated to come from the public sector, according to the 2020 UNEP report State of Finance for Nature. At the domestic level, finance for NbS is made mostly of direct assistance from governments, commonly in the form of grants or other similar financial outlays. Some countries established domestic financing mechanisms, such as national climate funds, which often feature multisectoral objectives and are useful for addressing both climate objectives and concurrently support NbS. Furthermore, some submissions highlighted that re-directing subsidies for industries that harm nature towards NbS can have a net effect of scaling-up financial resources for NbS. Despite ongoing efforts, several submissions highlighted that developing countries face technical difficulties and capacity gaps in designing and implementing policies that can scale-up the domestic financial resources for NbS and are seeking support from international institutions.

10. **Multilateral climate funds and other international finance institutions provide financial resources for nature-based climate actions in developing countries, notably in cross-cutting areas, such as forests and oceans**. Many submissions pointed to international climate finance mechanisms such as the GCF, the GEF, the Forest Carbon Partnership Facility and the AF that provide grant-based finance for nature-based climate actions in developing countries. Other bilateral and multilateral sources of climate finance, including development agencies and multilateral and regional development banks, provide both grant based and concessional finance for NbS for climate change. Programming direction of international climate funds and multilateral development banks have included different types of NbS across their climate mitigation and adaptation objectives. Furthermore, these institutions have policies on engaging with local and indigenous peoples in designing and implementing the projects, although the concept of NbS is captured in a heterogeneous manner across the institutions and target sectors.

11. **Currently relatively a small portion of NbS financing comes from the private sector and the potential remains to be tapped into**. UNEP report shows that **p**rivate finance flows into NbS amounts to USD 18 billion per year, which is 14 per cent of the total NbS financing. Many submissions acknowledge that the private sector has a very important role to scale up investments in NbS, mainstreaming nature into the commercial economy and ensuring the long-term sustainability of nature-based climate actions. Some examples of financing from the private sector include:

(a) **Carbon markets**: The mitigation potential of NbS can be used to generate carbon credits and secure financing from carbon markets.

(b) **Impact investments**: Impact funds can be used to catalyse financing for NbS by linking conservation outcomes and financial markets. This includes Impact Bonds where investors provide upfront capital and are repaid when certain environmental outcomes are achieved.

(c) **Insurance for nature**: Insurance contracts for NbS can help quantify risk, incentivize risk reduction, and create a formal pay-out structure. Though notably, certain conditions would need to be met before an insurance policy becomes a cost-effective option.

(d) **Supply chain finance**: Financial arrangements between different value chain actors can be used to support forest conservation initiatives, restoration, and production intensification.

12. **Innovative sources of finance and financial instruments can be developed and applied to scale-up the financing for nature.** For example, blended finance provides an opportunity to use development capital (public sector or philanthropic) to mobilize commercial capital (private sector) toward investments in sustainable development, such as NbS. It mitigates investment risk through credit guarantees, risk insurance, first loss and subordinate debt arrangements, and technical assistance. Other examples include debt-for-nature swaps which exchange one country's debt for environment-related action and payment of ecosystem services which pay owners of natural capital to protect natural assets and conserve biodiversity. Technical support and capacity building is prerequisite to utilizing innovative sources of finance and financial instruments for nature in developing countries.

13. **Public and private financial flow for NbS can be accelerated by putting in place the required regulatory and institutional arrangements and investment environment.** Conducive strategies, plans and policies can promote the uptake of NbS by both public and private entities and subsequently drive up the demand for financing. Currently, many climate change strategies and plans, including the NDCs and NAPs, national sectoral policies and net-zero pledges reflect NbS as part of the climate solutions. Enhancing the regulatory environment by reducing regulatory barriers and safeguards, encouraging financial risk disclosure to increases the accountability of firms, and properly accounting for nature through national accounting policies, can similarly help encourage the use of NbS.

14. **Technical assistance is necessary to support countries tap into the potential of NbS for climate actions and help private investors make the business case for nature.** Submissions highlighted several areas, where enhanced technical and capacity-building support can unlock the potential of NbS, including:

(a) Enhancing and harmonizing methods to account for the economic and non-economic benefits generated by nature;

(b) Identifying NbS investment models that can be applied across countries with similar ecosystems;

(c) Facilitating enhanced access to data and information on climate and nature that is required to formulate project proposals;

(d) Developing harmonized and effective metrics for monitoring and evaluating the NbS projects to measure the climate impacts and benefits, in the context of national climate policies and strategies.

I. Background

1. The Forum of the SCF is an activity mandated by the COP that is aimed at enhancing the communication and exchange of information and promotion of linkages and coherence among climate finance actors globally. Since its inception, the SCF has convened seven Forums.[1]

2. Through the Forum, the SCF facilitates a technical discussion among practitioners on a selected topic related to climate finance, highlights best practices and lessons learned in the mobilization and delivery of climate finance, and reports to the COP key findings and possible actions that could address challenges faced by the practitioners. The Forum brings together a wide range of stakeholders from governments, international climate funds and financial institutions, civil society, think tanks and the private sector.

3. The SCF, at its 21st meeting, agreed to organize its next Forum on the topic of "Finance for Nature-based Solutions"[2]. This agreement was welcomed by the COP at its twenty-fifth session.

4. In May 2020, the SCF announced a call for inputs from Parties and observers to inform the design of the Forum. In response, 45 submissions were received. The information contained in the submissions, the additional sources of information contained within the submissions, as well as deliberations under relevant mandated events under the UNFCCC, has been synthesized in this paper (see section III). The paper aims to inform the discussions to be held by the participants of the Forum to be held in two parts in 2021 and 2022.

II. Synthesis of information

A. Nature-based solutions and climate change

5. **The important role of ecosystems in addressing climate risks through NbS was emphasized in all the submissions.** Ecosystems provide a range of services to people and societies, yielding environmental, social and economic benefits, including providing services such as food, water and materials; regulating services that affect the climate, the magnitude of climate hazards and the quality of natural resources; and supporting services such as soil formation, photosynthesis and nutrient cycling. In particular, the health of ecosystems is crucial for the Earth's carbon cycle, which is being threatened by anthropogenic climate change. NbS help improve and maintain the health of ecosystems and therefore its capacity to cope with existing climate risks.

6. **NbS to address climate change are aligned with commitments and pathways for mitigation and adaptation.** Many submissions emphasized this point and cautioned against viewing NbS in isolation. The benefits of NbS for ecosystems include increasing carbon capture and storage capabilities while reducing vulnerability to climate hazards. (Malhi, 2020). The multisectoral characteristics of ecosystems means NbS are therefore tailored to address the particular characteristics of both climate mitigation and adaptation action.

7. **In the context of climate mitigation, the submissions highlighted the role of nature in building the potential for carbon sequestration and avoided carbon emissions.** By capturing and storing carbon, ecosystems contribute to climate mitigation. Their loss and degradation increase GHG emissions, with deforestation and human induced soil degradation accounting for nearly 20 per cent of GHG emissions. Therefore, NbS that aim to restore and preserve these natural systems can help prevent GHG emissions.

[1] Information on previous SCF Fora is available at: https://unfccc.int/topics/climate-finance/meetings--events/scf-forum.

[2] The SCF's 21st meeting outcomes. See SCF document SCF/2019/21/11, paragraph 24.

8. Furthermore, several submissions outlined the importance of distinguishing between terrestrial and marine carbon (carbon sequestration) and fossil carbon (carbon emissions) in the carbon cycle:

(a) **Terrestrial and marine ecosystems play an important role in the carbon cycle.** When adequately preserved, they act as carbon sinks and stores. Protected areas host at least 15 per cent of global terrestrial carbon reserves and oceans are the largest carbon reservoirs;

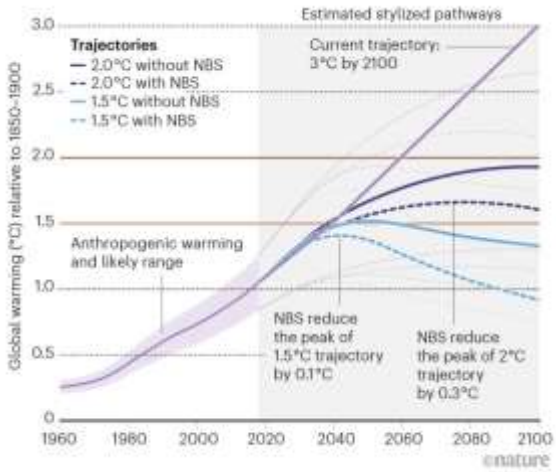
(b) **Fossil carbon results from the burning of fossil fuels that will never be reinserted into the earth.** This relates to the extracted carbon that was part of the formation of the Earth millions of years ago and has since been released into the atmosphere. Ecosystems across the world, such as forests, absorb about half of the carbon emissions (fossil carbon) generated by human activities each year.

9. **In the context of climate adaptation, the submissions highlighted how NbS help societies adapt to and protect against the adverse impacts of climate change.** Protecting and preserving ecosystems also protects and preserves their multitude of services that humans depend on, including the quantity and quality of food, water and land, and local livelihoods that are at risk from the impacts of climate change. NbS for climate adaptation directly address these risks and therefore strengthen the resilience and adaptive capacity of vulnerable ecosystems and communities. NbS can also help reduce the risks and impacts of extreme climate hazards, such as storms, landslides and floods, whose frequency and intensity will be exacerbated by climate change.

10. **NbS for climate enable long-term global benefits for both mitigation and adaptation.** The benefits can be experienced through large-scale carbon emission reductions and carbon sequestration that reduce the rate of global warming, and through the protection and preservation of ecosystems that reduce exposure to climate hazards and increase resilience to the impacts of climate change. Several submissions referred to the figure by Girardin, et al. (2021), which shows how NbS can reduce the global peak temperature and suppress global warming beyond 2100, if NbS are implemented over the long term (see figure 1). Under each climate scenario pathway illustrated in the figure (denoted by the dotted lines), NbS can significantly decrease the rate of global warming under the assumption that ambitious actions are taken immediately.

Figure 1

Modelling illustrating how nature-based solutions can reduce the global peak temperature and suppress global warming beyond 2100



Source: Girardin et al., 2021. Nature based solutions can help cool the planet – if we act now. *Nature*. Vol 593, 13 May 2021, pp. 191-194. Available at https://media.nature.com/original/magazine-assets/d41586-021-01241-2/d41586-021-01241-2.pdf

11. Many submissions emphasized the global benefit that will be realized by **providing financial and technical support to developing countries to scale-up the NbS to address climate change.** Developing countries are most impacted by climate change and the least

able to deal with its consequences. In turn, they are also the richest in terms of biological diversity and therefore possess most of the Earth's carbon sequestration capacity. Submissions further emphasized the importance of enhancing the support, considering the local communities who depend on the environment for their livelihoods and resources are under growing social and economic pressure caused by climate change.

1. International efforts to promote nature-based solutions as a means of addressing climate change

12. **International** agreements on climate and disaster risk reduction have acknowledged the interconnections between ecosystems and societal vulnerabilities and the role nature can play in managing increasing environmental risks. Several international legal and policy frameworks advocate for NbS to address climate change at varying scales. In particular, the submissions referred to the following international frameworks:

(a) **The Paris Agreement** calls on all Parties to acknowledge "the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity". Specifically, Article 5 encourages all Parties to conserve and enhance, sinks and reservoirs of greenhouse gases, as referred to in Article 4, paragraph 1(d)[3], of the Convention, and focuses on the implementation and support of the existing REDD+ framework under the UNFCCC[4] to reduce emissions from deforestation and forest degradation in developing countries and to further promote the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

(b) **The CBD.** At its fourteenth meeting, the Conference of Parties to the CBD decided to integrate climate change issues into national biodiversity strategies, bringing a focus to the important interdependencies[5];

(c) **The UNCCD** is a multilateral environmental agreement linking the environment and development to sustainable land management in arid, semi-arid and dry sub-humid areas, where some of the world's most vulnerable ecosystems and peoples are located. The UNCCD and the two other Rio Conventions (the CBD and the UNFCCC) aim to promote an integrated, coherent and multidisciplinary approach with enhanced coordination among the three Conventions, in view of the interconnection between land, climate and biodiversity;[6]

(d) **The Sendai Framework for Disaster Risk Reduction 2015–2030** recognizes the need to shift from primarily post-disaster planning and recovery to the proactive reduction of risks and in this context, the framework specifies that a range of ecosystem-based solutions should be considered in formulating and implementing disaster risk reduction strategies;

(e) **The United Nations Decade on Ecosystem Restoration 2021–2030** can serve as a framework to accelerate ongoing ecosystem protection and restoration efforts globally, targeting all major ecosystems, namely forests, grassland, cropland, wetlands, savannahs, inland water ecosystems, marine and coastal ecosystems, and urban environments.[7]

[3] In Article 4, paragraph 1(d), of the Convention, all Parties committed to pursuing actions that "promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases...including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems".

[4] Further elaborated in paragraph 23 and Box 2.

[5] Six of 20 Aichi biodiversity targets for 2020 established under the CBD have been partially met. Further information of Aichi targets at https://www.cbd.int/sp/targets/. Progress results of 2011-2020 Aichi targets available at CDB Outlook 5 report https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf

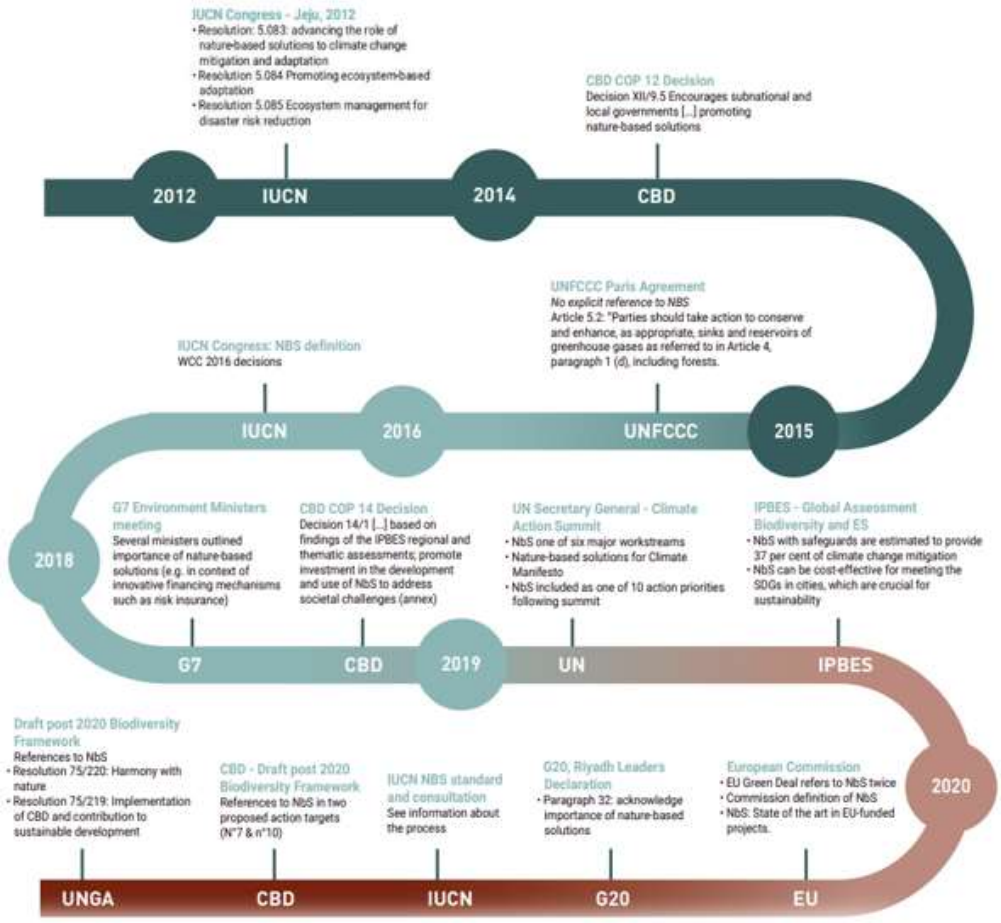
[6] See information on Joint Liaison Group: https://unfccc.int/resource/docs/publications/rio_20_adaptation_brochure.pdf.

[7] More information available at: https://www.decadeonrestoration.org/.

2. Conceptual framing of nature-based solutions

13. **The conceptualization of NbS is evolving. Figure 2 illustrates the NbS concept, reflected in various international resolutions, agreements and processes since 2012.** Key milestones include launch of the NbS Coalition at the UN Secretary General climate action summit in 2019, IUCN adopting NbS as one of the three areas of work within its programme for 2013–2016 in 2012, and the European Commission making NbS part of its Horizon 2020 research and innovation programme and investing in a series of projects to strengthen the evidence base for NbS.

Figure 2
Adoption by international bodies of the concept of nature-based solutions



Source: United Nations Environment Programme. 2021. *State of Finance for Nature 2021*. Nairobi.

14. **Submissions highlight broadly used definitions of NbS,** which capture the theoretical nexus between nature and humans and acknowledge the importance of both resilience and cost-effectiveness. Table 1 provides examples of NbS definitions and key considerations, as highlighted by the submissions.

Table 1
The three main international definitions of nature-based solutions and their key considerations

Organization	*Definition*	*Key considerations highlighted by the submissions*
IUCN	"Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges, effectively and adaptively, simultaneously providing human well-being and biodiversity benefits"[8]	The IUCN definition considers all types of ecosystems, with a focus on the protection and management of natural ecosystems and addresses societal challenges to meeting human well-being and biodiversity priorities. It accounts for all actions that provide a benefit to nature. Overall, it emphasizes the need for a well-managed or restored ecosystem to be at the heart of any NbS.
European Commission[a]	"Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions"[b]	Broader than the IUCN definition, it places a greater emphasis on applying solutions that not only use nature but are also inspired and supported by nature. It considers benefits beyond biodiversity and includes broader resilience considerations.
European Parliament	"Actions inspired by, supported by or copied from nature that aim to help societies address a variety of environmental, social and economic challenges in sustainable ways. Most nature-based solutions do not have a single objective, but aim to bring multiple co-benefits"[c]	The definition focuses on actions inspired and supported by or copied from nature.

[a] As stated in https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en
[b] See https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en
[c] See https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2017)608796

15. **However**, NbS continues to be a term defined and used differently by stakeholders and submissions indicated several limitations to the definitions:

(a) First, they do not account for the perspectives of local actors. The definitions have been developed by conservation entities, coalitions and regional government bodies which may not necessarily reflect the values and principles of other rights holders such as indigenous peoples and local communities;

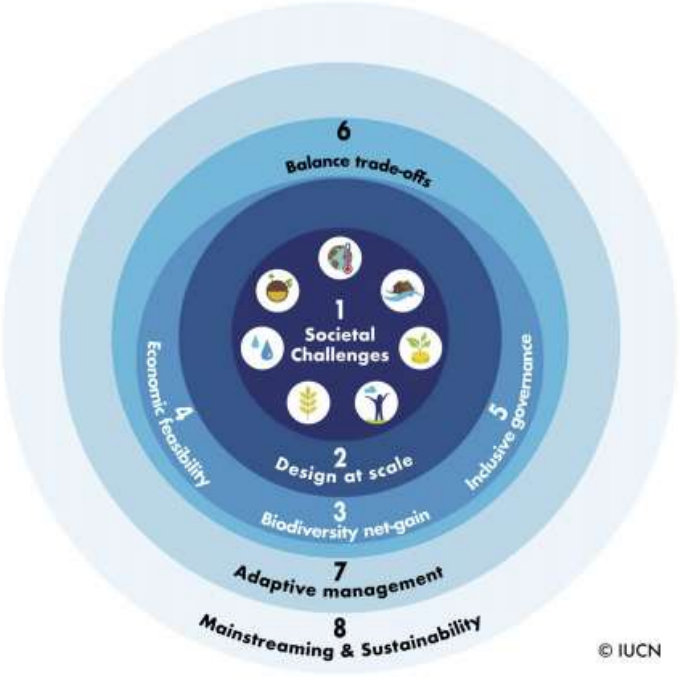
(b) Secondly, they lack operational specificity. Many submissions highlighted the need to understand which types of activities can be classified as NbS and which types cannot. NbS to address climate change under different ecosystems cover a multitude of sectors, each with a different focus. The submissions therefore emphasized the need to better understand the implementation of NbS at the ground level. This limitation was highlighted given the existing limited capacities among decision makers around the world, especially those with limited resources or expertise.

16. The Global Standard for Nature-based Solutions launched by IUCN in 2020 was established to address these limitations. It provides a framework to clarify operational considerations associated with and coordination of principles related to NbS. It follows eight standards to be applied in developing a consistent approach to designing, verifying and scaling up concrete solution-oriented outcomes (see figure 3). Results can be tracked and linked to global goals. Several submissions highlighted the importance of the Global

[8] See IUCN website (https://www.iucn.org/theme/ecosystem-management/our-work/iucn-global-standard-nature-based-solutions).

Standard to encourage an internationally agreed conceptual and operational definition of NbS.

Figure 3
Global Standard for Nature-based Solutions launched by the International Union for Conservation of Nature in 2020



Source: IUCN. 2020. *Global Standard for Nature-based Solutions*. Available at https://www.iucn.org/theme/ecosystem-management/our-work/iucn-global-standard-nature-based-solutions

17. From conceptual definitions to practical interpretations, **multiple terms have been used to date to refer to NbS and ecosystem-based approaches.** The adapted representation of all terms by Cohen-Shacham et al. (2019) which was referred to in multiple submissions, categorizes NbS into five types of ecosystem-based approaches and highlights the commonly used terms for NbS (see figure 4):

(a) Restoration: ecological restoration, ecological engineering and forest landscape restoration;

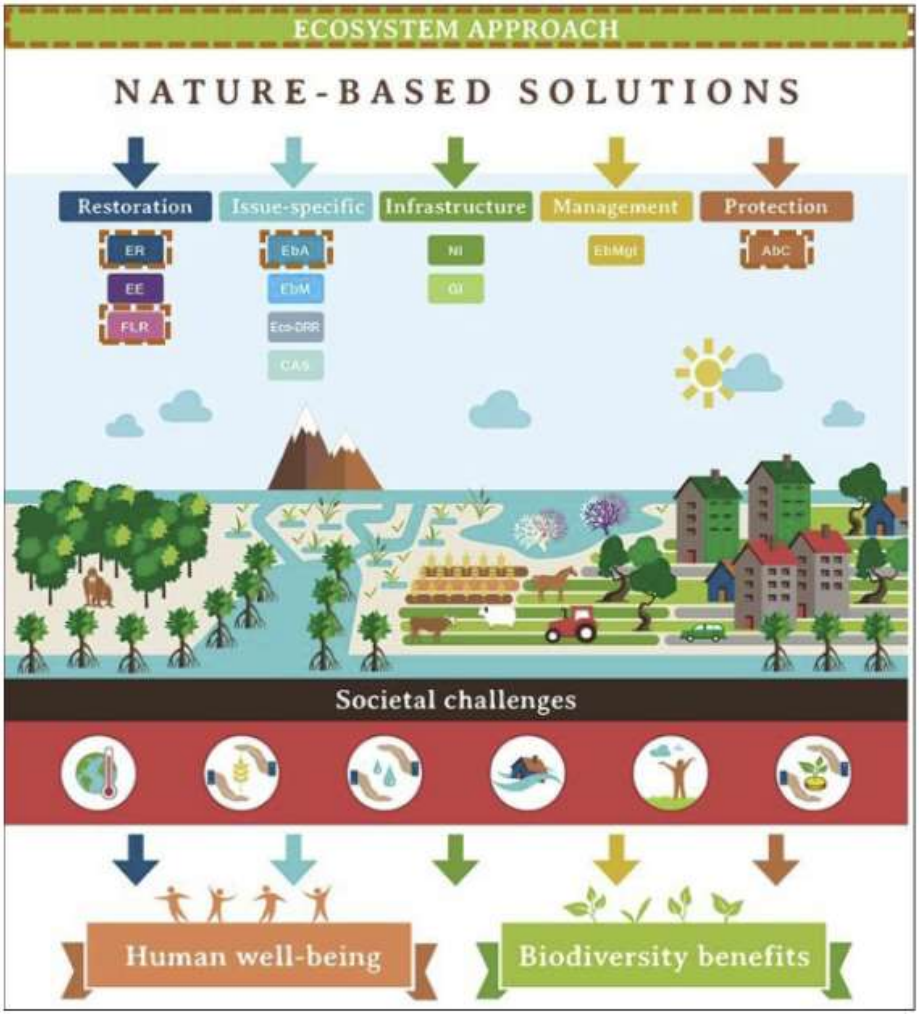
(b) Issue-specific: EbA, ecosystem-based mitigation (including natural climate solutions), ecosystem-based disaster risk reduction and climate adaptation services;

(c) Infrastructure: natural infrastructure and green infrastructure;

(d) Management: ecosystem-based management;

(e) Protection: area-based conservation, including protected area management and other effective area-based conservation measures.

Figure 4
Summary of the terms used for nature-based solutions under an ecosystem approach



Source: Cohen-Shacham et al. 2019. Core principles for successfully implementing and upscaling Nature-based Solutions. *Environmental Science & Policy*. Volume 98, August 2019, Pages 20-29. https://www.sciencedirect.com/science/article/pii/S1462901118306671

B. Approaches to implementing nature-based solutions

18. This chapter illustrates the different types of NbS available to countries to address different climate hazards, in the context of various ecosystems that underpin social and economic development. It also presents the main reasons guiding the choice of NbS (such as efficiency in achieving both mitigation and adaptation results, while restoring and conserving ecosystems) for different ecosystems.

19. Submissions highlighted various types of NbS developed and being used to address specific types of climate hazard. The UNEP *Adaptation Gap Report 2020* outlines types and examples of NbS tailored to the particular climate hazards faced by individual countries. In turn, respective additional benefits are outlined (see table 2).

Table 2
Examples of nature-based solutions and their application to reduce the impacts of major climate hazards

Climate hazards	*Examples of types of NbS*	*Potential additional benefits*	*Examples of application at the country level*
Coastal hazards • Sea level rise • Storm surge • Coastal erosion	• Mangrove protection and restoration to anchor sediments and dissipate wave energy • Management and restoration of coastal marshes and/or dunes to dissipate wave energy and/or complement engineered protection • Coral reef management and restoration to attenuate wave energy	• Improved fish stocks • Biodiversity conservation • Carbon sequestration and storage • Sediment accretion • Increased tourism and recreation and associated employment	• India: "Conservation and Management of Coastal Resources as a Potential Adaptation Strategy for Sea Level Rise" (AF submission) • Mauritius, Seychelles: "Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future" (AF submission) • Mexico: "Parametric insurance to protect and repair coral reefs and beaches along the Mexican Caribbean" (TNC submission)
Intense precipitation • Flood • Soil erosion • Landslide	• Management and restoration of watershed vegetation to enhance infiltration, reduce run-off and peak flows, and stabilize slopes • Agroforestry to enhance canopy interception of rainfall and rainwater infiltration and reduce soil exposure, thereby reducing run-off and erosion • Urban watercourse restoration and 're-naturing' to reduce assets at risk and secure riverbanks • Maintenance and restoration of urban green spaces to improve rainwater infiltration and reduce run-off • Management and restoration of wetlands to store floodwater or slow its release and filter sediment	• Increased availability of wild-sourced food and other products • Improved pollination services • Carbon sequestration and storage • Improved soil fertility • Biodiversity conservation • Improved water quality • Improved physical and mental health among urban populations	• Ghana: "Reforestation of reserve forest land that has degraded along the Akrum and Osubin Rivers and planting of trees along streams" (LoCAL submission) • Honduras: "Ecosystem-Based Adaptation at Communities of the Central Forest Corridor in Tegucigalpa" (AF submission) • Peru: GIZ project with Agrobanco to develop loan products for agroforestry systems (GIZ submission) • Uganda: GCF project on "Building Resilient Communities, Wetlands Ecosystems and Associated Catchments in Uganda" which will help the country restore critical wetlands (GCF submission)
Drought	• Management and restoration of watershed vegetation to enhance infiltration, recharge groundwater stores and maintain surface water flows • Establishment of 'green belts' to increase water availability, improve soil quality and provide shade and windbreaks	• Increased availability of wild-sourced food and other products • Increased pollination services • Carbon sequestration and storage • Improved soil fertility • Biodiversity conservation	• Kenya: "TWENDE: Towards Ending Drought Emergencies: Ecosystem Based Adaptation in Kenya's Arid and Semi-Arid Rangelands" (GCF submission) • Sri Lanka: "Promotion of drought-resilient crops and agronomic practices to protect against rainfall variability" (AF submission)

Climate hazards	*Examples of types of NbS*	*Potential additional benefits*	*Examples of application at the country level*
Rising temperatures • Heat stress • Urban heat islands • Wildfire	• Agroforestry to enhance canopy cover and provide shade • Rehabilitation and restoration of rangelands to repair ecological processes and enhance fire resistance • Creation of urban green spaces to increase vegetative canopies, which provide shade and evaporative cooling	• Carbon sequestration and storage • Improved soil fertility • Biodiversity conservation • Improved physical and mental health among urban populations	• European Union: "Nature Smart Cities across the 2 Seas" programme to develop green spaces, building solutions to protect against heat stress, drought and flooding (France submission) • Australia: "Traditional fire management (TFM) and monitoring systems to prevent wildfires" (Savannah Fire Management submission)

Note: The first three columns are examples provided by UNEP in the *Adaptation Gap Report 2020*. The examples of the application of NbS at the country level were compiled from the 45 submissions received from Parties and observers.

1. Nature-based solutions for the agriculture sector

20. **Agricultural activities are critical for income generation in developed and developing countries and provide vital sources of food, energy, housing, jobs and livelihoods to rural and urban populations. However, the submissions outlined the importance of NbS for the agriculture sector given its high exposure to climate risks and its role as a large contributor to carbon emissions.** The sector absorbs 22 per cent of the impact caused by climate disasters and 25 per cent of the impact caused by climate-related disasters (FAO submission). At the same time, land-use changes, including as a result of agricultural activities, are one of the main drivers of biodiversity decline. According to FAO, the sector is the largest user of freshwater resources while grazing and food production systems account for 80 per cent of all agricultural land. In addition:

(a) The agriculture ecosystem emits carbon emissions. Agricultural activities continue to be a substantial source of carbon emissions. Globally, food production contributes to approximately 12.5 Gt CO_2 eq or 24 per cent of annual GHG emissions, of which 5.6 Gt CO_2 eq are mainly from livestock production and rotting food and 6.9 Gt CO_2 eq are from agriculture practices, fertilizer use, and land conversion and deforestation (FAO submission);

(b) NbS benefit the agriculture sector to reduce the negative impacts of climate change. The submissions indicated that using NbS for the agriculture sector to improve the resilience of food systems can simultaneously target the restoration, sustainable management and conservation of vital ecosystem services and biodiversity needed to buffer agricultural livelihoods against climatic and non-climatic risks and support the adaptation of livelihoods and communities dependent on food systems; ensure the longer-term efficient production of safe, nutritious and affordable food, while protecting the environment; restore carbon sinks (one third of the cost-effective climate mitigation needed between now and 2030); and reduce emissions (FAO submission).

Box 1
Examples of NbS in agriculture sector from submissions

Transboundary agro-ecosystem management project in Rwanda and Burundi.

Implemented by the FAO and funded by the GEF, this project has supported the adoption of an integrated ecosystems approach for the management of land resources in the Kagera Basin. This has restored degraded lands, sequestrated carbon, supported climate adaptation and mitigation objectives, protected international waters, conserved agro-biodiversity and contributed to sustainable use and improved agricultural production. Overall, this has contributed to food security and improved rural livelihoods.

Fundecooperación for Sustainable Development in Costa Rica

A joint project with the AF and Fundecooperación for Sustainable Development in Costa Rica focuses on improving farming productivity by promoting the use of climate-resilient agricultural and livestock practices, as well as the use of chemical-free fertilizers. It specifically targets local indigenous communities vulnerable to climate change and is expected to enhance food security with diversified production systems.

Mahaweli River Basin of Sri Lanka

In the Mahaweli River Basin of Sri Lanka, rain-dependent farmers are vulnerable to fluctuations in rainfall, which has been made more erratic by climate change. A joint project with the AF and the World Food Programme introduces and promotes drought-tolerant crop varieties and agronomic practices to protect farmers against rainfall variability. Some of these new crop varieties have been cultivated in the uplands. Forest nurseries have also been established.

2. Nature-based solutions for forest ecosystems

21. **Forest ecosystems form a significant part of economies and are a key factor in reducing carbon emissions.** Forests supply both goods and services. Goods include production inputs, food, fuel, environmental goods, building materials and raw materials for processing. In terms of services, forests store water, regulate water flows and protect water channels, among others (FAO and UNEP, 2020). They are a potential source of carbon reduction, as 80 per cent of the Earth's above-ground terrestrial carbon and 40 per cent of its below-ground terrestrial carbon is contained in forests.[9]

22. **Deforestation and forest degradation are the second leading cause of global warming**, responsible for about 15 per cent of global GHG emissions, which makes the loss and depletion of forests of major importance to addressing climate change. In some countries, such as Brazil and Indonesia, deforestation and forest degradation are the main sources of national GHG emissions. Many submissions pointed to wildfires as a major driver of forest degradation and desertification. Ecosystems such as tropical dry forests and savannahs cover around one sixth of the global land surface. Poor fire regimes constitute a major problem in such areas, resulting in the prevalence of large destructive fires that emit more GHGs than well-managed areas, and also resulting in negative socioeconomic impacts.

23. **NbS benefit forest ecosystems by reducing the negative impacts of climate change.** Stopping deforestation and forest degradation and supporting sustainable forest management result in numerous benefits, including: conservation of water resources and flood prevention, reduced run-off, controlled soil erosion, reduced river siltation, protection of fisheries and investments in hydropower facilities, preservation of biodiversity as well as traditional knowledge systems, local cultures and traditions. Submissions highlighted various examples of NbS related activities for enhancing forest ecosystems and halting deforestation and forest degradation and these can be grouped into three categories: REDD-plus activities; management of intact forests and; wildfire management.

24. Submissions show that many developing countries included forest activities, often under the REDD+ framework, in their NDCs. **The Warsaw Framework on REDD-plus,** recognized in Article 5.2 of the Paris Agreement, is a framework created at COP 16 in

[9] https://www.forestcarbonpartnership.org/what-redd

2010[a] to guide activities in the forest sector that reduce emissions from deforestation and forest degradation, as well as activities related to the sustainable management of forests and the conservation and enhancement of forest carbon stocks in developing countries. As at January 2020, 50 developing countries had submitted a REDD-plus forest reference emission level to the UNFCCC for technical assessment, covering more than 70 per cent of the total forest area of developing countries. Many developing countries have built their capacity to meet the requirements of the Warsaw Framework in preparation for receiving results-based payments. Conservation International notes that these preparations have improved the enabling environments for accessing climate finance at scale for NbS in the forest sector. However, it remains to be seen whether these same improvements will have spill-over benefits for non-forest NbS. Selected examples of REDD-plus projects contained in the submissions are shown in box 2.

Box 2
Selected examples of NbS under the REDD-plus framework

1. Forests in the Lao People's Democratic Republic have dramatically decreased from 70 per cent of land cover in the mid-1960s to around 46.7 per cent in 2015. GIZ, together with the Government of the Lao People's Democratic Republic, has implemented an emission reduction programme. At its core are performance-based payments to incentivize sustainable land-use practices that can help reduce emissions. Major outputs of the project include "an enabling environment for REDD-plus implementation, market solutions for agricultural drivers of deforestation, climate change mitigation action through forestry".

2. Non-adapted agriculture has resulted in deforestation and soil degradation in Central America. As a result, forest areas are unable to fulfil their role in maintaining water balance, soil conservation and biodiversity given the increasing fragmentation of the forest system. The GIZ project "Forest landscape restoration in Central America and the Dominican Republic and implementation of the Green Development Fund/REDD-plus Landscape" provides support to establish the necessary implementation and finance mechanisms to restore forest landscapes. The initiative involves introducing government policies and regulations, consulting indigenous groups and women, and mobilizing project funds for national financing mechanisms.

3. The GCF results-based payments pilot programme provides REDD-plus payments for reduced CO_2 emissions. Brazil, Ecuador, Paraguay and an FAO project in Chile had been beneficiaries of the programme as at May 2020. These funding opportunities allow tropical countries to focus on protecting forest systems.

25. **Submissions also highlighted the importance of 'intact forests', which are unaltered natural forest landscapes supposedly free from significant anthropogenic degradation, and the potential the forests have for NbS for climate change.** They hold value for both the climate and the biosphere as carbon stocks and sinks while supporting important co-benefits and social, economic and environmental outcomes. Specifically, the submissions highlighted that intact forests:

(a) Store about nine years' worth of human-induced emissions and sequester more than one quarter of the global carbon emissions produced each year (11 Gt CO_2 eq/year);

(b) Enhance climate resilience by sustaining regional rainfall and reducing ecological vulnerability to fire, drought, flood, etc.;

(c) Conserve the biological diversity essential to maintaining ecological functions, adaptation and resilience;

(d) Help secure the livelihoods and cultures of indigenous peoples and local communities while delivering cost-effective social benefits such as functioning watersheds, food security and reduced disease transmission.

26. **Intact forests have, however, experienced high rates of loss since the start of the twenty-first century, as a result of human actions that are driving their destruction** at twice the rate of deforestation (Potapov, 2017). If the losses continue at the current rate, half of the world's intact forests will be cleared or seriously degraded by 2100. Recent trends suggest that this rate is accelerating, as the global footprint of intensive human activity spreads. Degradation triggers a cascade of ongoing emissions from these forests and makes them less resilient to further degradation, including from climate change impacts (Watson, 2018). From 2000 to 2016, around 9 per cent of the world's most intact forests were lost, equating to 0.6 per cent per year between that period (Potapov, 2017). Also, underreporting of carbon accounting over the period means that the associated impacts are likely to be up to six times higher between 2000 and 2013 (Maxwell et al., 2019)

27. **Importantly, nearly half of intact forests (48 per cent in 2013) are tropical forests in developing countries that have limited access to financial support** (Potapov, 2017). These tropical forests support the highest rates of sequestration and biodiversity but have also experienced the highest rates of loss since 2000. The submissions indicated that countries that host intact forests have no clear means of support through existing climate finance mechanisms for the land sector, which focus mainly on near-term emission reductions (Mackey et al., 2015).

28. **Wildfires are a major driver of forest degradation and desertification**. Fire-dependent ecosystems, such as tropical dry forests and savannahs, cover around one sixth of the global land surface. Poor fire regimes constitute a major problem in such areas, resulting in the prevalence of large destructive fires that emit more GHGs than well-managed areas:

(a) Wildfires contribute to global carbon emissions and have become more frequent due to anthropogenic climate change. The net carbon emissions from wildfires between 1997 and 2014 due to destructive wildfires, deforestation, and fires in tropical peatlands (a measure of poor fire regimes) amounted to 2 Gt CO_2 eq y^{-1}. As many fire-dependent landscapes are closely linked with tropical rainforests, poor fire regimes in savannahs can also have a significant impact on these forests. The IPCC predicts that it is highly likely that global fire activity will increase as a result of climate change. The National Aeronautics and Space Administration predicts that wildfires could increase by as much as 35 per cent by 2100, mostly in fire-dependent landscapes. Wildfires burn a total land area of between 3.5 and 4.5 million km^2 per year, equivalent to the total land area of India and Pakistan together, and affect every region of the world;

(b) Wildfires result in negative socioeconomic impacts. Wildfire smoke alone is estimated to kill around 340,000 people annually (SFM submission). In 2017, insured losses from wildfires totalled USD 14 billion. The Economics of Ecosystems and Biodiversity has estimated that wildfires destroy ecosystem services amounting to around USD 146–191 billion per year.

29. **Some countries have been able to use NbS, through forest fire management, as a cost-effective means to manage wildfires** (see box 3 for example).

Box 3
Example of fire management

Wildfires can damage forest systems. Traditional fire management is a type of NbS that relies on local communities to apply established technologies to stop emissions from wildfires. To complement traditional fire management, monitoring systems assess the GHG emission reductions from improving fire management, which can be used to generate carbon credits. Traditional fire management was used in Australia for a number of years and the experience and knowledge gained through the practice proved to be universal and transferable. The International Savanna Fire Management Initiative is working to scale up the traditional fire management initiative. The programme is being tested in a pilot site in Brazil, with several developing countries also expressing an interest in piloting the programme.

3. Nature-based solutions for coastal and marine ecosystems

30. **Coastal and marine ecosystems are key carbon sinks and hubs for socioeconomic development for many countries but are threatened by anthropogenic climate change.** Coastal and marine ecosystems provide goods and services which add to gross national output, ensure food security and support coastal livelihoods. In addition, they provide large carbon sinks; for example, the soils in mangrove forests store approximately 6.4 billion tonnes of carbon globally. (Beasley, et.al., 2019). However, human activities are threatening the health of these ecosystems by exposing them to increasing climate risks and reducing the ability of nature to capture carbon. The ocean has absorbed about 90 per cent of the heat from rising GHG emissions trapped in the Earth's atmosphere and 30 per cent of carbon emissions. (UNFCCC, 2021). This has caused systemic changes, including ocean warming, acidification, deoxygenation, cryosphere melt and sea level rise, with devastating impacts on ocean and coastal life and the lives and livelihoods of coastal communities.

31. Submissions emphasized that **NbS play an important role in preserving and protecting coastal and marine ecosystems** and are therefore part of the climate solution. NbS for these ecosystems offer area-based protection and contain cross-cutting elements of biodiversity and climate mitigation and adaptation strategies (see box 4) for further information).

Box 4

Quantification of nature-based solutions for coastal and marine ecosystems

The Ocean as a Solution to Climate Change: Five Opportunities for Action report (2019)[a] has quantified, for the first time, the mitigation potential of various categories of coastal- and ocean-based activities (including NbS), including:

- Ocean-based renewable energy, including offshore wind and other energy sources, such as wave and tidal power;
- Ocean-based transport, including freight and passenger shipping;
- Coastal and marine ecosystems, including protection and restoration of mangroves, salt marches, seagrass beds and seaweeds;
- Fisheries, aquaculture and dietary shifts away from emission-intensive land-based protein sources towards low-carbon, ocean-based protein and other sources of nutrition;
- Carbon storage in the seabed.

The annual emission reduction potential of these five categories of ocean-based activities is 21 per cent of the total GHG emission reductions required to achieve the target of limiting global temperature increase to 1.5 °C by 2050 . Experts have deemed that actions related to the first four categories are worth pursuing immediately. However, they have cautioned that the fifth category, carbon storage in the seabed, warrants further research and development to better understand its environmental impacts and long-term efficacy (Ocean Dialogues, 2020).

[a] Hoegh-Guldberg O, et al. 2019. The Ocean as a Solution to Climate Change: Five Opportunities for Action. Washington, DC: World Resources Institute. Available at http://www.oceanpanel.org/climate.

[b] Presentation by Jane Lubchenco at the UNFCCC Ocean and Climate Change Dialogues. 2020.

32. **Furthermore, submissions point to the socio-benefit economics that NbS in oceans and marine ecosystem can result in**. Potential benefits of the NbS to the coastal communities include: improved water quality and fishery production for food security; improved livelihoods for small-scale fisheries in coastal communities through tourism and other coastal jobs; protection of coastlines from storm surges, floods and erosion; and carbon and nutrient sequestration (Narayan et al., 2016; Beasley et al., 2019). Various submissions emphasise that these benefits strengthen the link between biodiversity conservation, fisheries and climate change. The submissions also noted additional benefits from community-based approaches, where locally led NbS can provide economic dividends, as such approaches can lead to behaviour change, resulting in long-term solutions (Lomboy, 2019).

33. **Over recent years, the international community has acknowledged the importance of NbS for coastal and marine ecosystems as part of overall climate action.** Submissions included examples of climate change projects for coastal and marine ecosystems that are supported by bilateral and multilateral institutions. Selected examples are in box 5.

Box 5
Selected examples of Nbs projects for coastal and marine ecosystems

Both Benin and Costa Rica have large expanses of coastal wetlands that provide the perfect environment for mangroves and ecosystems rich in biodiversity. As climate change threatens these ecosystems, the French Facility for Global Environment has launched an initiative to restore the mangroves and build sustainable management capacity. The comprehensive ecological restoration programme (for 2017–2021) will cover 30 ha in Benin and 31 ha in Costa Rica. The programme includes the management of hydrological dynamics and the restoration of vegetation cover.

The joint FAO and GEF My-Coast project targets the improvement of coastal zone management in Myanmar's south coastal zone. Overexploitation, climate change and habitat degradation have put stress on some of Myanmar's coastal fisheries. To preserve the integrity of Myanmar's coastal zone, the project aims to strengthen national and local capacity by implementing a large-scale coastal zone conservation strategy and, in the process, deliver benefits from biodiversity conservation, sustainable fisheries management and climate change adaptation.

The work of the AF, UNDP and the Government of Mauritius on the Climate Change Adaptation Programme in the Coastal Zone of Mauritius included the implementation of several infrastructure and natural protection measures to combat beach erosion and flood risk along the coasts of Mon Choisy, Rivière des Galets and Quatre Soeurs. These measures included planting 20,000 mangroves along the Grand Sable coast to increase community resilience, installing 900 reef balls in the waters of Mon Choisy to minimize beach erosion and restore marine life, and developing a national coastal adaptation strategy for the coastal zone of Mauritius and Rodrigues to strengthen resilience measures.

34. **Submissions emphasized the need to scale-up financial and technical support to developing countries to formulate and implement climate projects in ocean and marine ecosystem.** In the case of marine ecosystems, there is momentum to promote the idea that "climate action equals ocean action", especially in low-lying coastal areas and small island developing States (UNFCCC, 2021). However, there is a need to break silos between process and practice; and current understanding of the ocean, climate change and biodiversity, and therefore to step up action through increased participation across institutions (UNFCCC, 2021). Despite the clear climate adaptation and mitigation benefits, activities to protect and restore ocean biodiversity receive global funding of less than USD 500 million per year (National Wildlife Federation submission).

C. Local communities and indigenous peoples for nature-based solutions

35. This chapter discusses the importance of local and indigenous actors in implementing NbS, as highlighted in several submissions. The role, knowledge and traditional cultures of local communities and indigenous peoples, as well as their overall participation in NbS, are crucial to addressing climate change. Many submissions emphasized that there is a significant overlap between natural lands, conservation areas and lands managed by indigenous peoples (Garnet, et. al., 2018) and highlight the importance of indigenous peoples' engagement and involvement in NbS projects:

(a) NbS projects, in which local communities and indigenous peoples participate, have been shown to result in lower rates of deforestation and higher carbon sequestration than those managed by other entities (RRI, 2019);

(b) Indigenous peoples' knowledge systems are nature-based and honour the complex interdependence of all life forms to effectively manage their resources, including waters, rivers, oceans, peatlands, forests, deserts, prairies and savannahs, developing effective solutions and practices for biodiversity conservation and climate change adaptation and mitigation.

36. **However, the submissions mentioned that these vulnerable groups are often overlooked during the development, design and implementation of NbS projects.** In particular, indigenous peoples' rights to land and territories are often overlooked. Indigenous peoples and local communities, together amounting to 2.5 billion people, manage over 50 per cent of the global land mass, including 80 per cent of the Earth's biodiversity resources. However, they legally own just 10 per cent of the land, rendering them and their lands vulnerable to the economic pressures that drive land use and land-cover changes worldwide. (Garnet, et. al., 2018). Insecure, contested and unjust land, ocean and forest tenure undermines efforts to protect, sustainably manage and restore ecosystems.

37. **Submissions point out that enhanced engagement with local communities and indigenous peoples in NbS projects can realize a wide range of benefits relating to climate change and socio-economic development**. They include:

(a) Reduction in carbon emissions and increase in carbon capture and storage. The reduction in carbon emissions resulting from increased land rights can range from 100 t C/ha to 625 t C/ha;

(b) Increased climate resilience by restoring and protecting ecosystems through NbS designed using the knowledge systems of indigenous peoples that value the inherent worth of ecosystem functions beyond human use and related benefits;

(c) Increased social impact by ensuring equity and human rights for all peoples;

(d) Application of solutions beyond market-based concerns to include social, cultural and health indicators;

(e) Replication of holistic solutions that address cross-cutting issues for the full realization of the Sustainable Development Goals;

(f) Promotion of comprehensive just transition, where solutions led by indigenous peoples expand on common definitions of "just transition" to restore a balanced, respectful and reciprocal relationship with the Earth;

(g) Contribution to food security. Such efforts provide replicable models of restorative and climate-resilient agricultural practices that can be scaled up to promote food security in even the most climate-stressed regions;

(h) Enhanced integrated land and water management, rooted in indigenous peoples' languages, culture and knowledge systems, that promote and protect human rights, as well as vulnerable plant and animal species through habitat restoration and preservation (RRI, 2019).

38. **To harness these benefits, many submissions point out that local actors should be more engaged in designing and implementing NBS projects to ensure the long-term success of investments in NbS.** The submissions highlighted various ways to enhance the engagements:

(a) Understanding of 'eco-resurgence' should be promoted and enhanced. Eco-resurgence is a bottom-up environmental governance mechanism, through which indigenous societies and their cultural richness and traditional philosophies are mainstreamed into sustainable development and climate action (Janardhanan. 2020). Eco-resurgence can be considered for different levels: (1) at the local level, improving understanding of self-reliance on ecosystems for livelihoods; (2) at the national level, prioritizing the philosophies of indigenous peoples to mainstream sustainable development goals; and (3) at the regional level, promoting common objectives while establishing shared pathways to foster collective responsibility towards sustainable development;

(b) Existing UNFCCC processes should be used to facilitate and guide the inclusion of local actors in climate-relevant projects. The UNFCCC secretariat has put in place the Local Communities and Indigenous Peoples Platform, and the GCF has established the Indigenous Peoples Policy, which includes standards on free, prior and informed consent processes related to GCF projects and programmes (CIFOR submission);

(c) NbS projects should include capacity-building for the local actors. Local actors often lack the capacity to understand and articulate not only climate risks but associated opportunities, such as through NbS. Capacity-building can strengthen the voices of local

actors and help build the relationship and trust with other stakeholders in the NbS project, as a result of the greater understanding of the associated risks and opportunities by the local actors;

(d) NbS projects should be co-designed and co-implemented with local actors. NbS projects designed and implemented with indigenous peoples and local communities should ensure that local knowledge and needs are captured and enhances uptake and ownership of such solutions;

39. **A number of submissions underscored the importance of using a rights-based approach.** Lands managed by indigenous peoples with secured rights experience lower rates of deforestation, store more carbon, are more biodiverse, and benefit more people, including women, compared to lands managed by either public or private entities. Securing the rights of indigenous peoples to their lands, territories and resources can conserve and restore the most vulnerable ecosystems, increase the storage of carbon, scale up agroecosystems for sustainable food production and restore harmony with nature and all life forms.

40. For example, the Indigenous Peoples' Forum on Climate Change reported that the increased recognition of community-based forest land rights in Africa, Asia and Latin America enhanced the positive benefits of of NbS projects by 40 per cent between 2002 and 2017. Furthermore, it estimated that by implementing existing legislation on land rights in forests in Colombia, the Democratic Republic of the Congo, India and Indonesia, the positive benefits of NbS projects could be doubled worldwide over the next 15 years and benefit at least 200 million people.[10]

D. Economic considerations for nature-based solutions

41. **This** chapter illustrates the economic aspects that countries consider in selecting NbS to address climate change.

42. **Submissions highlighted there is large-scale economic value of NbS for climate change at the global level.** TNC estimates that implementing NbS for climate mitigation at the global level could contribute between USD 25 and 90 billion in annual value added by 2030, without factoring in a carbon price. The Global Commission on Adaptation estimates that investing USD 1.8 trillion globally in five key adaptation approaches (early warning systems, climate-resilient infrastructure, improved dryland agriculture, global mangrove protection, and investments in making water resources more resilient) from 2020 to 2030 could generate USD 7.1 trillion in total net benefits.

43. **In this context, many countries consider selecting NbS because their economic activity is dependent on nature.** The World Economic Forum estimates that in terms of economic value, USD 44 trillion, amounting to half of the world's gross domestic product, is moderately to highly dependent on nature and its services. This includes the production and consumption of economic activity, assurance of the quality and quantity of resources for inhabitants and the local environment, and the protection of resources from global threats, including climate change.

However, countries are faced with challenges in making the economic case NbS, due to the unique characteristics of NbS. Many submissions indicated that the unique characteristics of NbS make it difficult to make the economic case, affecting the ability to determine the cost-effectiveness of investments in NbS (Dasgupta, 2021; Kousky and Light, 2019; UNEP, 2020; UNEP, 2021; Shiao et al., 2020; Cohen-Shacham, 2099). There are multiple reasons: NbS are often public goods, the benefits are difficult to quantify, they are subject to various time and spatial scales, and their performance is unreliable given the dynamic and complex natural systems that govern implementation of NbS (see table 3).

[10] Policy paper on indigenous peoples and nature-based solutions submitted by the Indigenous Peoples Major Group during the Climate Action Summit in 2019. Available at https://wedocs.unep.org/bitstream/handle/20.500.11822/28890/Securing_rights.pdf?sequence=1&isAllowed=y.

Table 3
Characteristics of nature-based solutions

Characteristic	*Description*
Public good	"It is not possible to exclude anyone from enjoying their benefits as they are provided for all, and one person enjoying them does not diminish their value for others." This relates in particular to ecosystem services[a]
Quantification of benefits	Many co-benefits are difficult to quantify, especially positive externalities such as human health and livelihoods, food and energy security, and biodiversity
Time scale	There are long time-horizons over which the benefits of NbS materialize
Spatial scale	The appropriate spatial scale is unique to each NbS. They are often implemented on a large scale to be effective, crossing jurisdictional boundaries
Dynamic	NbS need to be dynamic by complementing non-static ecosystems that are made of living components that change over time
Performance reliability	The performance of NbS can be unreliable owing to the complex natural systems involved

[a] See https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=3996&context=dlj

44. **In this regard, several submissions alluded to the additionality of risk and cost that a country or an investor is bound to, when considering investments in NbS.** Costs and risks contained in the submissions include:

(a) NbS have high transaction costs. Given the higher number of stakeholders involved in NbS, there is a need for more rigorous participative processes for the planning and management of such solutions, and a need for more stringent enforcement to maintain benefits in the long term. The magnitude of these additional transaction costs for the associated activities depends on the features of NbS and are often under accounted for;

(b) NbS have high opportunity costs. It is important to identify the trade-offs of NbS, as the space dedicated to them often implies that the land cannot be used for another productive use (UNEP, 2020) (OECD submission). For example, while some NbS actively aim to improve biodiversity in order to enhance the ecosystem service provided, such as the restoration of diverse oyster reefs for flood protection benefits, others may prioritize a different ecosystem function over biodiversity, such as the planting of non-native monocultures that enhance carbon sequestration but harm local biodiversity (Sedon, 2019). Moreover, the land itself cannot be used for other economic purposes, and the burden of this opportunity cost is borne by more vulnerable groups. For example, while forests can be used to sequester carbon and benefit people all over the world, keeping a forest intact will entail an opportunity cost for timber harvesting or other land uses such as food production or residential use. This cost is then shouldered by a smaller group of people (UNEP, 2020).

(c) NbS have additional maintenance costs. Throughout the lifetime of investments in NbS, additional maintenance costs are typically needed to ensure the realization of long-term benefits. This additional layer of funding, which is often indirect, is usually incurred by local populations (who may not always be the primary recipients of the related adaptation benefits) and frequently requires imaginative and carefully considered approaches that take special account of the diversity of those bearing the cost of NbS and their different financing needs, and the strong equity principles that must be factored into funding, benefit-sharing and cost recovery (UNEP, 2020). However, this does not necessarily mean that NbS are more costly. Evidence suggests that NbS are often cheaper and more cost-effective than 'grey' alternatives (Sedon, 2020).

45. **Submissions further elaborated on the technical constraints (inherent in NbS) that countries and investors face.** The constraints included in the submissions are:

(a) NbS to address climate change are in themselves climate sensitive. Ecosystems that protect people from climate-related disasters such as storms and wildfires are vulnerable to these very same events. This reduces the types of NbS that can be provided (UNEP, 2020). Moreover, NbS for adaptation tend to be highly context specific. This might make them less effective under changing climate conditions, particularly those involving a high magnitude

of climate-related hazards (Kapos, 2019). In its submission, Conservation International stated that, in the light of communities and natural ecosystems facing increasing risks from weather and climate-related hazards, scientific evidence from model-based assessments and empirical sources suggests that NbS can be equally or more effective than conventional structural approaches for hazard mitigation. They are also often more cost-effective (Glick, 2020).. However, as climate risks threaten the long-term viability of NbS, ecosystem management must move beyond traditional conservation and restoration approaches to acknowledge and actively manage these risks (Conservation International submission).

(b) Ecosystem-based climate actions will take time to demonstrate their benefits. Some NbS, especially those involving the restoration of badly degraded ecosystems, can be slow to develop their adaptation benefits or fully deliver potential co-benefits. While conventional infrastructure provides the planned protective benefit immediately upon finalization of construction, the growth rate of ecosystem, such as forests, takes much longer to fully reap their full protective benefit (Kabish, 2016). However, it must be noted that the value and adaptability of the enhanced ecosystem will appreciate over time, in contrast to the high depreciation associated with conventional infrastructure;

(c) There is no systemic tracking of records and data relating to implementation and results of NbS projects. Projects tend to be implemented on an ad hoc basis, which in turn contributes to a low track record for NbS, with sparse and case-specific performance data. A critical challenge persists for NbS in terms of the availability and accessibility of the necessary performance data, which may not be collected at all, or may be collected inconsistently or incompletely, or across different spatial scales (Bush and Boyo, 2019), (OECD, 2021). Authorities charged with managing risks to communities will likely default to better known and tested solutions in the absence of robust performance data for NbS (Dadson, 2017);

(d) Ecosystems are highly dependent on wider enabling environment processes (Calliari, 2019). For example, the alteration of upstream sediment loads may influence downstream coastline stability, which in turn determines the success and feasibility of downstream or coastal interventions (OECD submission). Frequently, NbS cannot be sustained by managing individual sites in isolation, as the delivery of associated ecosystem services might depend on multi-faceted processes taking place on a larger scale (World Bank, 2917). In some cases, a certain size of ecosystem may be needed for it to be resilient to various pressures and therefore to continue to provide services in future;

(e) There is a lack of technical capacity to value the benefits of NbS. The existing methods for assessing, valuing and monitoring the co-benefits of NbS are often underdeveloped or challenging to apply (Tremolet, 2019) (OECD submission).

E. Finance for nature-based solutions

46. This chapter summarizes the different types of finance and finance mechanisms that exist for NbS, as identified in the submissions.

1. Overview of the financial flows of nature-based solutions

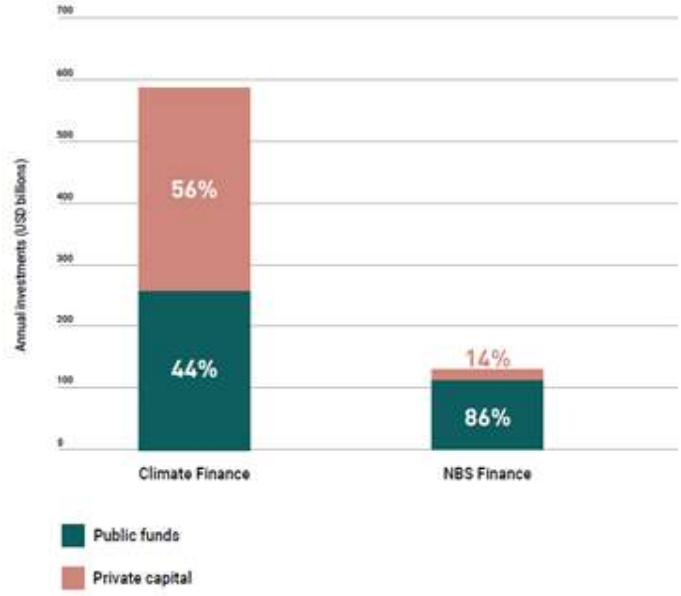
47. **Many submissions emphasized the need to better value NbS to leverage finance**. The difficulties involved in valuing the benefits of NbS to address climate change make the identification of finance needs across all scales hard to ascertain owing to the unique economic characteristics of NbS (as explained in Section II, chapter D above). Determining actual finance flows toward NbS is complex given their multisectoral scope, especially their application in different ecosystems. However, given current and future trends in anthropogenic impacts of climate change on nature, the submissions emphasized that insufficient finance is being allocated to climate action as a whole, and in turn for NbS.

48. **Existing international and country climate policies and strategies, including COVID-19 green recovery plans, contain key commitments that need to be met, where finance plays a key role.** All submissions endorse the Paris Agreement and its main goal, which highlights the importance of increasing Parties' ambition to reduce carbon emissions

and build climate resilience, specifically through their NDCs. To an extent, this includes using NbS to help meet commitments (see section F below for further information). Overall, the submissions were in favour not only of increasing finance for NbS, but also of increasing the ambition of policies in their use of NbS to meet the goal of the Paris Agreement. In addition, a study conducted by UNCCD revealed that of the USD 14.6 trillion of finance for COVID-19 recovery packages announced by 50 of the world's largest economies, just USD 368 billion (2.5 per cent) is being directed toward green initiatives (UNEP, 2021).

49. According to the *State of Finance for Nature* report (UNEP, 2021), **approximately USD 133 billion per year (public and private) is currently spent globally on NbS[11] (in developed and developing countries), which is less than the amount provided in climate finance.** A total of USD 115 billion per year is spent by the public sector (including public sector official development assistance) and USD 18 billion per year is spent by the private sector to finance NbS. NbS are therefore relatively underfunded. UNEP (2021)[12] noted that the amount of finance for nature is considerably smaller than the amount spent on climate finance, which is estimated to total around USD 579 billion annually according to the 2019 *Global Landscape of Climate Finance* report by Climate Policy Initiative (Buchner, 2019) (see figure 5).

Figure 5
Global climate finance relative to finance for nature-based solutions



Source: United Nations Environment Programme (2021). State of Finance for Nature 2021. Nairobi.

50. **The share of funding support from developed countries for NbS initiatives in developing countries remains small within total finance for climate adaptation.** According to the *Adaptation Gap Report* (UNEP, 2020), an analysis of adaptation finance provided by international climate funds, including the GEF, the GCF, the AF and IKI, shows that NbS account for around 13 per cent of finance (see table 4). These international climate funds have the following particular aims and roles:

(a) The GCF, one of the two operating entities of the Financial Mechanism, supports the implementation of the Convention and the Paris Agreement in developing

[11] NbS finance for protection of biodiversity and landscape (USD 53 billion), Agro, forestry and fishing (USD 23 billion), water resources, conservation and land management, pollution control and other natural resources budget (USD 17 billion), Pollution abatement, wastewater mitigation and environmental protection (USD 11 billion), environmental policy and other (USD 8 billion), sustainable supply chains (USD 7 billion), biodiversity offsets (USD 5 billion), impact investments (USD 3 billion), conservation NGOs (USD 1.8 billion), public Official Development Assistance (ODA) (USD 2.4 billion), and other.

[12] The UNEP *State of Finance for Nature* report has used the updated climate finance data from CPI (updated in December 2020)

countries. It ensures that all climate mitigation and adaptation projects are aligned with developing countries' climate policies and strategies[13];

(b) The Medium-Term Strategy 2018–2022[14] of the AF includes the aim of reducing climate change vulnerability to ecosystems in developing countries. This is reflected in the projects funded by the AF, which include projects on ecosystem-based adaptation;

(c) The GEF 2020 Strategy explains[15] the importance of ecosystems in tackling the threat of climate change. Different types of NbS are used across the portfolio of GEF projects;

(d) IKI is an instrument of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety for the international financing of climate change mitigation and biodiversity action in developing countries. It operates within the framework of the UNFCCC and the CBD.

Table 4
Distribution of funding for projects that include nature-based solutions

Funding source	*GEF (1991–2020)*	*GCF (2015–2020)*	*AF (2010–2020)*	*IKI (2008–2020)*	*Total*
Climate funding with co-financing (USD billion)	66.77	23.1	0.742	3.556	94.17
NbS funding (USD billion)	8.61	2.02	0.504	0.92	12.05
NbS funding (% of total)	13	9	68	26	13

Source: United Nations Environment Programme (2021). Adaptation Gap Report 2020. Nairobi. Available at https://www.unep.org/resources/adaptation-gap-report-2020

51. **Finance provided for activities that harm nature likely exceeds what is spent on activities to protect nature by at least sixfold.** Based on the annual average for 2015–2017, finance for global biodiversity activities amounted to USD 78–91 billion per year. Of that amount, USD 67.8 billion per year was from domestic public expenditure, USD 3.9–9.3 billion per year was from international public expenditure and USD 6.6–13.6 billion per year was from private expenditure (OECD, 2019), as referred to in the GIZ submission). In contrast, governments spent approximately USD 500 billion per year (reported in 2019, and USD 800 billion per year reported in 2021 (OECD, 2021) on activities that harm biodiversity (e.g., subsidies for fossil fuel and support for harmful agricultural practices). This does not account for private sector expenditure, which, if included, would likely result in higher financial flows toward activities that harm biodiversity (GIZ submission).

52. **The submissions also emphasized that assessing how much finance is directed toward NbS is challenging.** Finance for NbS is difficult to track because it falls between what is classified as "climate finance" and "conservation finance". Finance for NbS is sometimes not distinguished as a separate category, and/or it is viewed as part of general capital planning. The fact that NbS are integrated into other solutions can lead to underreporting. On the other hand, even disaggregated data on NbS can cause confusion (i.e. whether such solutions are linked with ecosystem-based adaptation or green infrastructure) (UNEP, 2021).

53. **There is nevertheless an opportunity, and pressing need, to mobilize both public and private sources of finance for NbS, as well as to use innovative approaches to**

[13] GCF supports the implementation of the Convention, Paris Agreement. GCF therefore ensures projects are aligned to developing countries' nationally determined contributions (NDCs), adaptation communications (ACs), national adaptation plans (NAPs), technology needs assessments (TNAs), technology plans (TPs and other national climate strategies and plans. (GCF, 2020: par 8, page 3 – Updated Strategic Plan for the Green Climate Fund 2020-2023.) https://www.greenclimate.fund/sites/default/files/document/updated-strategic-plan-green-climate-fund-2020-2023.pdf

[14] https://www.adaptation-fund.org/document/medium-term-strategy-2018-2022/

[15] http://thegef.org/sites/default/files/publications/GEF-2020Strategies-March2015_CRA_WEB_2.pdf

catalyse funding to increase investments in nature (e.g., investments in nature-based solutions, protection and preservation of biodiversity, etc.). The USD 133 billion spent on NbS (see para. 49 above), is not enough. UNEP (2020), *State of Finance for Nature* report estimates that over USD 536 billion per year will be needed to meet future goals to address climate, biodiversity and land degradation. Both the public and private sectors need to scale up resources for the climate and environmental agenda. Paragraphs 54-82 below highlight some sources of public and private finance for NbS, including from domestic and international sources, collaborative efforts, and other financing mechanisms and sources.

2. Public finance for nature-based solutions

(a) Domestic public finance

54. **Approximately 86 per cent of finance for NbS is estimated to come from public sector finance.** This is largely invested in biodiversity and landscape protection, rehabilitation and restoration (including biosphere protection, forest landscape restoration, habitat restoration and green corridors), followed by investments in agriculture, forestry and fishing, and activities related to NbS, including water and water resources, conservation and land management, pollution control and other activities funded by budgets for natural resources (UNEP. 2020).

(i) Public investment

55. **Domestic investments in nature take various forms and use different financial instruments.** Direct assistance can be in the form of grants (commonly provided by governments) or other financial outlays. For example, as part of a pilot project, the Government of Costa Rica funded the start-up costs of an initial 100 farmers to adopt new technologies and practices to reduce GHG emissions from livestock and increase carbon capture from farms (AILAC submission).[16] Furthermore, national climate funds serve as important funding instruments for nature-based climate actions. The funds, managed by the government, often feature multisectoral objectives and are useful for addressing climate objectives (e.g. NDCs) and concurrently support NbS (Rio Impact submission). Some examples of national climate funds include the Bangladesh Climate Change Resilience Fund, the Benin National Fund for Environment and Climate, the Indonesia Climate Change Trust Fund, the Mali Climate Fund, and the Rwanda Green Fund (Rio Impact submission). Guatemala has a National Conservation Fund that provides grants to projects that protect, conserve and restore biological diversity (Guatemala Ministry of Environment and Natural Resources submission). GIZ supported the People's Survival Fund in the Philippines, but experienced low demand for access to the fund due to a lack of proposals since local governments could not comply with the funding criteria (GIZ submission).

56. **International initiatives provide technical support for developing countries to map out current domestic investments to support the preservation and protection of nature and help find ways to improve levels of investment.** For example, BIOFIN supported Guatemala to estimate public spending on biodiversity in the country, which amounted to USD 38.2–54.7 million[17] from 2010 to 2014, 92.5 per cent of which was spent through the executive body and 7.5 per cent through local government. BIOFIN helped identify gaps in implementing the National Biological Diversity Strategy and its related Action Plan 2012–2022, including the implementation of a comprehensive budget strategy for select local governments (Guatemala Ministry of Environment and Natural Resources submission).

(ii) Public investment with support from international initiatives

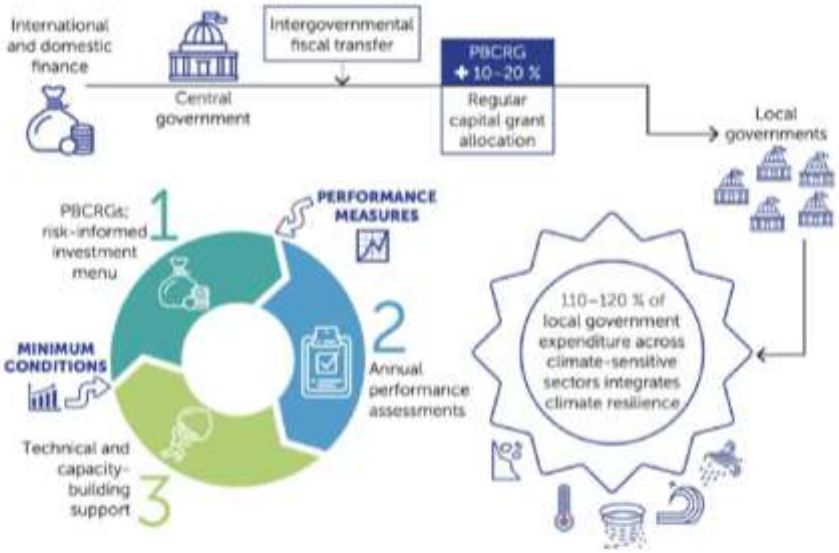
57. **Additional support for domestic investments is provided by international organizations in the form of grants and technical assistance**. For example, the UNCDF

[16] See https://www.ndcs.undp.org/content/ndc-support-programme/en/home/impact-and-learning/ideas-and-insights/2015/costa-rica-leads-the-way-towards-sustainable-livestock-managemen.html.

[17] Between 292.4 million quetzals and 418 million quetzales, converted to United States dollars using December 2014 exchange rates.

LoCAL Facility channels funds through local governments to finance NbS. LoCAL performance-based climate resilience grants top up between 10 and 20 per cent of existing fiscal transfer mechanisms with grants. Additionally, strict conditions and performance measures ensure accountability of local government partners and verify the proper use of funds. Governments also benefit from technical and capacity-building support (LoCAL submission) (see figure 6).

Figure 6
Summary of LoCAL performance-based climate resilience grants



Source: LoCAL submission.

58. Beyond mobilizing new and additional domestic investments for NbS, **governments can repurpose subsidies for industries that harm nature toward more sustainable endeavours.** An OECD report[18] found that subsidies that harm nature are at least five times the amount needed for nature conservation. The IMF notes that 6 per cent of global gross domestic product is spent on subsidizing fossil fuels (WWF submission). Even some subsidies for the agriculture sector could be harmful to the environment. Work by the Paulson Institute found that the USD 450 billion spent on agriculture subsidies that are potentially harmful to biodiversity exceeded spending on biodiversity conservation by a factor of four (FAIRR submission) (Deutz, et. al., 2020). Diverting these harmful subsidies can be a source of public finance, which would double the net effect as it removes support for harmful industries and adds it to more sustainable activities (WWF submission).

(b) International public finance

(i) Multilateral climate and environmental funds and initiatives

59. Global funding mechanisms such as the GCF, the GEF, the Forest Carbon Partnership Facility and the AF provide grant-based finance for nature-based climate actions in developing countries. Financial support is provided for mitigation and adaptation actions that use nature-based approaches to meet the objectives of the actions, as well as for actions in cross-cutting areas, such as forests and oceans (see box 6 for further information).

[18] See https://www.oecd.org/environment/resources/biodiversity/Executive-Summary-and-Synthesis-Biodiversity-Finance-and-the-Economic-and-Business-Case-for-Action.pdf

Box 6

Examples of global funding mechanisms and financing facilities

The Forest Carbon Partnership Facility (FCPF) implements REDD+ programmes with social safeguards, and monitoring, reporting and verification systems. These initiatives set the foundation for transformative programmes in the forest and broader land-use sectors through FCPF Readiness Fund to set up the building blocks to implement REDD+, and the FCPF Carbon Fund which pilots results-based payments to countries that have advanced through REDD+ readiness and implementation. For example, the Forest Carbon Partnership Facility funded a programme to construct the forest reference emission level for East Kalimantan province in Indonesia, which incorporates monitoring, reporting and verification systems at the national and subnational levels. The programme also makes Indonesia eligible to receive further funding of up to USD 110 million in REDD+ results-based payments for East Kalimantan province. Such mechanisms can then be used by future public funding facilities to incentivize climate action while at the same time helping de-risk national climate solutions and attract funding from the private sector.

The GCF aims to help countries reduce emissions and increase climate resilience. It has worked extensively in financing NbS, having invested around USD 2.9 billion (as at June 2020) across 41 projects linked to nature-based climate change mitigation and adaptation activities, USD 700 million of which was spent on projects that support or restore ecosystems and ecosystem services. One example related to forest ecosystems concerns a pilot programme launched by the GCF in 2017 for results-based payments for REDD+ programmes. To date, it has approved payments for countries including Brazil, Chile, Ecuador and Paraguay.

The GEF has served as a core member of the Global Commission on Adaptation Action Track on Nature-based Solutions since 2019 but has been actively involved in NbS initiatives over the past few decades, as NbS fall under GEF thematic programming on adaptation, climate change mitigation, biodiversity, land degradation, forestry and other areas. Beyond funding for NbS, the GEF has been involved in a joint initiative with the International Institute for Sustainable Development, the MAVA Foundation and the United Nations Industrial Development Organization to address critical evidence gaps, such as projects to assess the economic value of nature-based infrastructure that can help mainstream NbS in policy, planning and investments.

The AF has supported NbS projects that tackle climate change, many of which have been ecosystem-based adaptation interventions. Projects included in the AF portfolio have covered reforestation and other restoration and rehabilitation initiatives, the management of natural resources, improved sustainable practices and conservation efforts, among others.

60. **In addition to multilateral climate funds, international partnerships and networks also serve the important role of facilitating financial and technical support for developing countries' nature-based climate actions.** For example, IUCN is the largest environmental network that works with implementing partners to carry out climate change projects and programmes relating to the conservation of nature and its sustainable use Working with both the GCF and the GEF, for example, IUCN has a growing portfolio of NbS projects amounting to approximately USD 200 million to date. IUCN is also involved in the implementation of NbS financing initiatives such as the Blue Natural Capital Financing Facility and the Global Fund for Ecosystem-based Adaptation, as well as global initiatives such as the Bonn Challenge (IUCN submission).

(ii) Bilateral support for nature-based solutions

61. **Several submissions showed that support is available for nature-based climate actions through bilateral channels.** For example, the French Development Agency supports countries with their implementation of climate-adaptation policies, which includes a tool called Adapt'Action, designed to help countries improve their access to climate finance. It

has a budget of EUR 30 million over four years (2017–2021) and prioritizes actions that support gender-linked climate vulnerabilities and NbS (France submission).[19]

62. **GIZ provides technical assistance to strengthen national financial institutions and create the enabling institutional and regulatory framework for public and private investment in NbS.** GIZ has helped more than 120 countries apply ecosystem-based approaches over the last 50 years, providing technical assistance to develop the necessary conditions to finance NbS. It supports its partners by building the institutional structures, co-creating the enabling framework and designing the financial instruments necessary to mobilize international and national, public and private resources for NbS (GIZ submission).

3. Private finance for nature-based solutions

63. **There was consensus across the submissions that the private sector has a very important role to play in scaling up investments in NbS, mainstreaming nature into the commercial economy and ensuring the long-term sustainability of nature-based climate actions.** Increasing private investments in nature should speed up the development of corresponding markets, increase funding sources and attract further investment, improve confidence in NbS and help deliver more sustainable outcomes (Young et. al., 2020). A small portion of financing for NbS (around 14 per cent of the USD 133 billion per year that flows to NbS) comes from the private sector. This is relatively small compared with private sector financing for climate, which comprises 56 per cent (of the USD 579 billion spent annually on climate finance) (UNEP, 2021). Most of this financing is in the form of investments in sustainable supply chains and the use of environmental offset initiatives. Other types of less commonly used types of investments include impact investments, philanthropic investments, carbon markets, private financing channelled through multilateral banks, and payments for ecosystem services (UNEP, 2021).

64. **Unlike public finance, private finance is difficult to categorize into domestic and international finance.** The private sector does not have the clear sovereign delineations that the public sector does, and the open and global nature of private markets make it difficult to separate domestic and international firm activity and ownership.

(a) Carbon markets

65. **There is a significant amount of untapped natural mitigation potential in the world's forests**, although the exact extent is uncertain. The submission from Conservation International estimates that for every USD 20/t CO_2 eq, almost 200 Mt CO_2 eq from forest mitigation may be available annually. A separate estimate suggests that for over 4 billion t CO_2 eq/year up to USD 100/t CO_2 eq may be available (Conservation International submission).

66. **The mitigation potential of NbS can be used to generate carbon credits and secure financing from carbon markets.** Carbon markets can play a role in diverting private sector finance toward nature-based climate actions (WBCSD submission).[20] For example, the Western Arnhem Land Fire Agreement, a project on traditional fire management, was able to secure financing by providing carbon offset credits. Through the project, ConocoPhillips received 100,000 t of carbon credits per year and permission to build a liquefied natural gas terminal in Darwin, Australia, after agreeing to pay traditional owners $1 million per year for 17 years to adopt traditional fire management practices (International Savanna Fire Management Initiative submission). Following the success of the Western Arnhem Land Fire Agreement, the International Savanna Fire Management Initiative has been working to scale up implementation of traditional fire management globally over the past 14 years. Some developing countries have expressed an interest in serving as pilot sites and the first proof of

[19] See https://www.afd.fr/en/adaptaction.

[20] Carbon markets, through emissions trading systems, commodify carbon. Article 17 of the Kyoto Protocol allows countries to trade unused emission units (carbon) with countries who have exceeded their predetermined emissions allowance. For more information, see https://unfccc.int/process/the-kyoto-protocol/mechanisms/emissions-trading.

concept pilot was launched in Botswana in 2018 (International Savanna Fire Management Initiative submission).

67. **There are some notable limitations to using carbon credits**. According to the submission from the World Union of Small and Medium Enterprises (WUSME), certified emission reductions, a type of carbon credit, were considered inefficient and could not be used by small and medium-sized enterprises to ensure the carbon neutrality of their investments. Instead, the WUSME recommended improved access to other financial programmes (World Union of Small and Medium Enterprises submission).

68. **Some submissions pointed out that carbon offsets should not be considered as removals and countries should be careful when using them.** Countries part of the Third World Network consider it a misconception to assume that the sequestration potential of NbS can offset the output generated by harmful activities (burning fossil fuels), as carbon offsets do not remove carbon from the atmosphere (Third World Network submission). This misconception can lead to further harm, as the use of credits or financial transfers to offset continued emissions can lower the ambition of NbS (Climate Land Ambition Rights Alliance submission).

(b) Impact investments

69. **Impact funds can be used to catalyse financing for NbS by linking conservation outcomes and financial markets.** For example, environmental impact bonds were tested as part of efforts to restore wetlands in Louisiana. Environmental impact bonds are designed as pay-per-performance debt financing, where investors provide upfront capital and are repaid when certain environmental outcomes are achieved. Positive results were achieved when they were used for wetlands restoration projects as part of Louisiana's Coastal Master Plan. The bonds can be used to fast track restoration and increase the benefits of investments in wetlands as the incentives for both investors and payers are aligned (EDF submission).

70. **Mercy Corps and the InsuResilience Global Partnership are working on an impact bond whereby the proceeds will be used to fund flood-resilience projects that include NbS.** In the pilot project, investors provide an upfront investment for the project and will receive a return once certain outcomes are achieved within a predetermined time frame. The key challenges noted were the complexity of calculating monetary benefits from ecosystem services and deciding on a time frame since some NbS can take time to demonstrate results (Zurich Flood Resilience Alliance submission).

71. **To fund the purchase of forest land, TNC looked beyond philanthropic investments and grants given the amount needed.** NatureVest, the TNC impact investing team, developed a private equity style fund, which raised USD 70 million in equity and USD 40 million in debt and reinvested USD 20 million from the proceeds of carbon offset sales toward the purchase price. The Nature Conservancy's sustainable forestry fund, with total funding of USD 130 million, has secured permanent protection of 23,000 acres (9,300 ha) of forest (TNC submission).[21]

(c) Insurance for nature

72. **Insurance contracts for NbS can help quantify risk, incentivize risk reduction and create a formal pay-out structure.** For example, in Mexico, the Quintana Roo Coastal Zone Management Trust for Social Development and Security insured coral reefs and beaches along the Mexican Caribbean coast to financially protect them against Category 3 and above hurricanes. The parametric insurance policy is designed to pay out when wind speeds reach 100 knots and affect a predefined area. The swift release of funds will be used to repair and restore the reefs and beaches (TNC submission).

73. **Certain conditions need to be met to "insure" nature** (Kousky and Light, 2019)**.** There should be interested parties seeking to purchase such insurance policies and they must be willing and able to pay the premium. To qualify, the target ecosystem must face an unexpected and random disaster (not slow onset or inevitable events). Restoration must be

[21] See https://www.environmental-finance.com/content/awards/sustainable-investment-awards-2020/winners/impact-fund-of-the-year-the-nature-conservancys-sustainable-forestry-fund.html

possible through the provision of additional finance and the insurance mechanism must be relatively cost-effective compared with other financial instruments. In the case of Quintana Roo (see para above), if wind speeds are below a certain threshold and the cost of restoration is relatively low, it would be more sensible to self-insure by setting aside their own funds to use post-disaster (Wharton Risk Management submission).

(d) Supply chain finance

74. **Financial arrangements between different value chain actors (farmers, traders, supply chain companies, retailers and consumers) can be used to support forest conservation initiatives, restoration and production intensification** (EDF submission). Supply chains form a significant component of sustainable agriculture; reducing emissions throughout the supply chain and improving climate resilience and adaptation is necessary to protect long-term investments. For example:

(a) TNC is working with key partners in Brazil to develop long-term lending products for soy farmers and cattle ranchers who do not resort to deforestation to increase yields and expand pastureland (TNC submission);

(b) CONSERV is a financial arrangement set up in Brazil that compensates farmers for protecting the forests they can legally deforest. The initiative is led by the Amazon Environmental Research Institute in partnership with EDF and the Woods Hole Research Center (EDF submission).

4. Innovative sources of finance and financial instruments for nature-based solutions

(a) Blended finance

75. **Blended finance has facilitated the uptake of investments in NbS and refers to the use of development capital (public sector or philanthropic) to mobilize commercial capital (private sector) toward investments in sustainable development.** Blended finance crowds in private capital by mitigating investment risks, for example through credit guarantees, risk insurance, first loss and subordinate debt arrangements, and technical assistance. The following are examples of blended finance:

(a) The &Green Fund, established with the Government of Norway, Unilever and IDH Sustainable Trade Initiative, uses concessional or first loss capital to invest in sustainable, deforestation-free commodities and supply chains (Norway submission);

(b) The Global Commission on Adaptation has a blended finance initiative (led by the GEF) to provide micro-, small and medium-sized enterprises and smallholder farmers with access to capital that can be invested in NbS for climate adaptation. The blended finance structure creates lines of accessible credit with financial institutions (Global Commission on Adaptation submission; GEF submission);

(c) The Conservation Finance Initiative Accelerator Fund uses a blended finance approach to combine USD 8 million from the GEF, USD 16 million from the private sector and USD 6 million from the public sector to support early and viable investment deals via equity and debt instruments over 10 years (IUCN submission).

76. **Risk mitigation can come in the form of technical assistance as it sets up projects for higher chances of success.** IUCN provided several examples of financing solutions that use a blended finance approach to develop investment-ready projects, such as the following:

(a) The Blue Natural Capital Financing Facility helps businesses and projects with high climate adaptation and mitigation benefits reach a more ‘bankable’ stage where they are ready for commercial investments, with the aim of attracting private investors (IUCN submission);

(b) Similarly, members of the Coalition for Private Investment in Conservation (including civil society organizations, private and public sector financial institutions and academia) work to create investment products that meet conservation and financial goals that can attract private investors (IUCN submission);

(c) The Subnational Climate Fund, established by IUCN and its private sector partners, uses both a blended finance approach to structure investments and technical assistance to promote bankable sustainable infrastructure projects at the subnational level (IUCN submission).

(b) Water funds

77. **The water fund model mobilizes private and public sector funds (downstream users) to invest in upstream conservation, protecting water at its source.** Users pay into the water funds to receive clean water, while the funds use that money to invest in forest conservation along rivers, streams and lakes to ensure that users receive what they pay for. For example, TNC worked with a local water company and other water users in Quito, Ecuador, to protect watersheds and help reverse the degradation of their water sources.[22]

(c) Debt swaps

78. **Debt-for-nature swaps result from the exchange of one country's debt for environment-related action.** A country's debt is either cancelled or reduced and the savings can be used for climate, environmental and conservation initiatives. Examples include the following:

(a) The Guatemala Fund for the Conservation of Tropical Forests resulted from a debt swap with the United States of America. The deal was facilitated by both the Government of Guatemala and the Government of the United States, as well as international non-governmental organizations (TNC and Conservation International). The exchange fund is valued at USD 24 million to be executed over 15 years until 2021, and it supports projects that carry out conservation and restoration actions (Guatemala Ministry of Environment and Natural Resources submission);

(b) In the Seychelles, the Government agreed to a 'debt for conservation' deal with TNC. Under the deal, private and philanthropic loan capital was raised for the Seychelles Conservation and Climate Adaptation Trust, which then loans the funds to the Government of the Seychelles to avail of discounted sovereign debt. The Government repays the debt on favourable terms and a portion of the proceeds are used to fund marine conservation and climate change adaptation projects (TNC submission).

(d) Payment for ecosystem services

79. **Payment for ecosystem services is a market-based solution where the owners of natural capital are paid to protect natural assets (e.g. watersheds), conserve biodiversity, and preserve or restore natural carbon** (UNEP, 2021). Examples include:

(a) The Costa Rica Payments for Environmental Services Program, which involves the State providing direct payments to private landowners (owners of forest and forest plantations) for their ecosystem services (AILAC submission). Also in Costa Rica, the Pew Charitable Trusts is working with Conservation International and the Tropical Agricultural Research and Higher Education Center on designing a payment for ecosystem services programme for mangroves. It would form part of the country's REDD+ Strategy and National Decarbonization Plan (Pew Charitable Trusts submission);

(b) The novel CONSERV financial mechanism in Brazil, which will compensate farmers for protecting forests that they can legally deforest (EDF submission).

5. Summary of finance for nature-based solutions

80. **Countries can finance their NbS options through various channels, most of which rely on funding from the public sector. Tables 5 and 6 below provide a summary of Nbs financing options according to type of actor and financial instruments respectively.** In general, public-sector funding remains the major source of finance. Multilateral funds and other development finance institutions have helped fill the funding gaps that governments

[22] See https://www.nature.org/en-us/about-us/where-we-work/latin-america/stories-in-latin-america/water-funds-of-south-america/.

cannot afford to fill, providing technical assistance where needed and helping to create an enabling environment for investments in nature (nature-based climate actions or actions to protect and conserve nature and biodiversity) (see Section II, chapter F below for further information). The private sector helps direct financial flows toward NbS, offering cost-effective solutions to protect biodiversity. Initiatives to mitigate investment risk, develop bankable projects and solidify the business and economic case for nature have attracted in the private sector.

Table 5
Summary of financing options for nature-based solutionsaccording to type of actor, from 45 submissions

Domestic public finance	*International public finance*	*Private finance*	*Innovative sources of funding and financial instruments*
• Public investment • Public investment supported by international financial institutions • National climate funds	• Multilateral climate and environmental funds and initiatives • Development finance institutions	• Carbon markets • Impact investments • Insurance to protect and help restore nature • Supply chain finance	• Blended finance • Water funds • Debt swaps • Payment for ecosystem services

Table 6
List of financial instruments available for nature-based solutions with examples, from 45 submissions

	Instrument type	*Sector*	*Examples*
Capital supply instruments	Grants	Public and private	Grants from the Blue Natural Capital Financing Facility (IUCN submission; LoCAL performance-based climate resilience grants (LoCAL submission)
	Equity	Public and private	The Packard Foundation; the equity fund Ecotrust Forests LLC (UNEP, 2020)
	Debt instruments (bonds, securities)	Public and private	Blue bonds (IUCN submission); impact bonds (environmental impact bonds) (EDF submission)
	Loans (concessional and non-concessional)	Public and private	Agrobanco's loan products to promote agroforestry (GIZ submission)
	Insurance	Public and private	Mexico's parametric insurance policy for coral reefs and beaches along the Mexican Caribbean coast (TNC submission)
Risk mitigation instruments	Blended finance instruments	Public and private	Conservation Finance Initiative Accelerator Fund (IUCN submission); &Green Fund established with the Government of Norway, Unilever and the Sustainable Trade Initiative IDH (Norway submission)
	Pay for success	Public and private	GCF pilot programme for REDD+ results-based payments (GCF submission)
	Guarantees	Public and private	Natural Capital Financing Facility and European Union guarantees
Fiscal/revenue instruments	Taxes/subsidies	Public	Oil taxes in Colombia and Costa Rica where proceeds go to climate action and forest conservation (National Wildlife Federation submission)
	National budget allocations	Public	People's Survival Fund in the Philippines (GIZ submission); Guatemala's National Conservation Fund (Guatemala submission)
	Payments for ecosystem services	Public and private	Costa Rica's Payments for Environmental Services Program (AILAC submission)
	User fees and service charges	Public and private	Conference and event fees in Cartagena, Colombia (GIZ submission)
	Debt-for-nature swaps	Public and private	Guatemala's Fund for the Conservation of Tropical Forests resulted from a debt swap with the United States of America (Guatemala submission)

F. Enabling environments for nature-based solutions

81. The financing and implementation of NbS can be vastly encouraged by putting in place the required regulatory and institutional arrangements and investment environment. Consideration of country perspectives can address key factors affecting the enabling environments for NbS. This chapter discusses some common barriers and enablers identified by the submissions.

1. Governance arrangements

82. **In view of the number of actors involved in the financing and implementation of NbS, good governance, institutional arrangements and coordination mechanisms are necessary to facilitate the financing of NbS.** NbS require involvement from multiple actors across multiple sectors and differ across different ecosystems and climate hazards. Lack of efficient coordination and collaboration among these actors was highlighted by the submissions as a barrier to leveraging finance for NbS. Stakeholder engagement and its facilitation need strengthening, especially in relation to the private sector, financial institutions and academia, to increase awareness and understanding of NbS and therefore their financing.

83. **National and subnational governments and regulators** are key actors that drive economic development and therefore climate ambition and investments, through their contextualized policies, strategies and action plans. Policymakers must provide strong signals, consistent guidance and outline the business case for companies to increasingly incorporate NbS in their responses to environmental and development challenges, with targets established using the best available science and appropriate safeguards.

2. National planning processes and policies

84. Supportive policies can promote the uptake of NbS and subsequently drive up demand for financing. This can be done for example by integrating NbS into national and subnational planning and policy frameworks, encouraging the use of NbS in sectoral policies and using net zero pledges to increase demand for NbS. This can then lead to increased demand for financing because NbS become an acceptable solution to climate mitigation and adaptation issues and are integrated into government policy.

85. NDCs are core country-level climate policies that include key climate actions for driving ambition on NbS and improving accountability to meeting corresponding country ambitions. A clear mandate from the highest policy level has the potential to accelerate the uptake of NbS (OECD submission).

Box 7

Use of nature-based solutions in nationally determined contributions

Various submissions referred to the IUCN and Oxford University report *Nature-based Solutions in Nationally Determined Contributions*[a] published in 2020, which reviewed 168 NDCs, assessing the current level of consideration of NbS in NDCs (see also **Error! Reference source not found.**). The following aspects were reviewed:

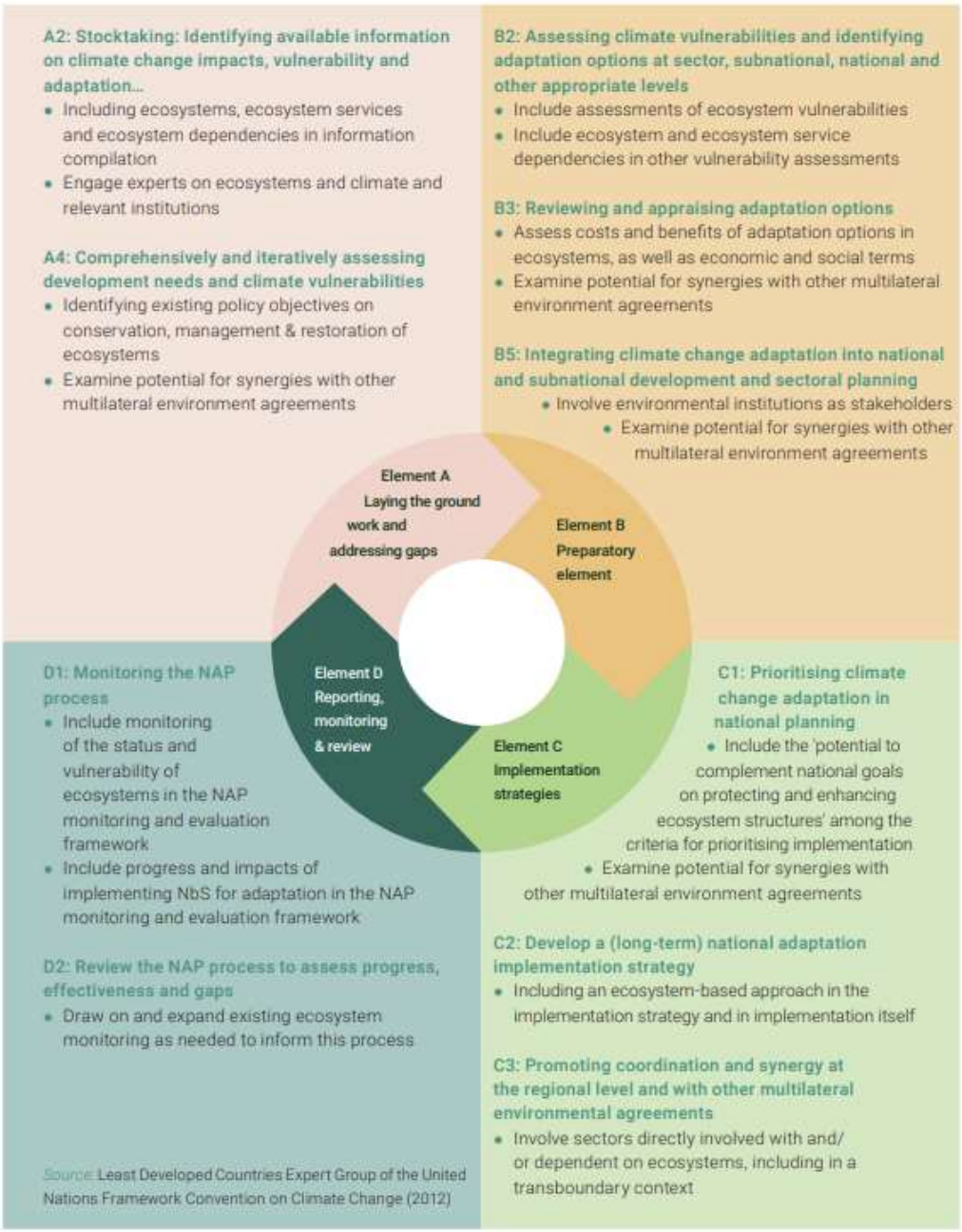
- **Context:** Between half and two thirds of countries' NDCs acknowledge that ecosystems and biodiversity are vulnerable to climate change. Over 60 per cent of NDCs list ecosystem protection as an important motivation for adaptation planning and include ecosystems in their overall statements of adaptation needs and approaches;
- **Finance:** Most countries that have so far included NbS in either the mitigation or adaptation components of their NDCs have made implementation of NbS conditional on the provision of external financing and support. This underestimates the urgent need to secure robust enabling conditions and enhanced financial flows for NbS;
- **Targets:** Most NDCs that consider NbS do not include quantifiable targets. Only 30 of the NDCs that address the use of NbS in the context of adaptation include relevant measurable targets that are distinct from broader adaptation goals;
- **Geography:** NbS were presented in the NDCs of 90 per cent of the least developed countries, but in only 26 per cent of the NDCs of high-income countries, including plans referring to the use of NbS in the adaptation components of their NDCs.

[a] Seddon, N., Sengupta, S., García-Espinosa, M., Hauler, I., Herr, D. and Rizvi, A.R., 2019. Nature-based Solutions in Nationally Determined Contributions: Synthesis and recommendations for enhancing climate ambition and action by 2020. Gland, Switzerland and Oxford, UK: IUCN and University of Oxford.

86. **The NAP process is another key vehicle for adaptation planning under the Convention. The submissions agreed that the NAP process supports national governments to understand and prioritize adaptation investment needs, including those for NbS.** The process involves a planning and implementation phase to develop a framework, enabling the determination of medium- and long-term adaptation needs at the national level. The UNFCCC technical guidelines for the NAP process emphasize that the NAP process should be inclusive of vulnerable groups, communities and ecosystems, promote the integration of gender perspectives and encourage countries to recognize the need to protect and build ecosystem resilience. All the elements of the NAP process include key entry points for applying an ecosystem perspective, including through vulnerability assessments and explicit consideration of ecosystem-based approaches to adaptation Figure 7 illustrates the entry points according to each of the four elements of the NAP process).

Figure 7

Entry points for integrating nature-based solutions for adaptation into the national adaptation plan process



Source: United Nations Environment Programme (2021). Adaptation Gap Report 2020. Nairobi. Available at https://www.unep.org/resources/adaptation-gap-report-2020

87. **However, there are currently limitations to the consideration of NbS in NAPs.** A review undertaken for the NAP Global Network found that the 19 NAPs submitted to the secretariat by March 2020 included considerations of NbS. Specifically, reference to ecosystems and their vulnerability to climate change, ecosystem services at risk from climate change, ecosystem-based adaptation and related measures as NbS options, and sectoral focus in forest, freshwater and coastal ecosystems (which were also those most commonly identified as vulnerable). In addition, several countries demonstrated the link between their NAPs to their sectoral policies and plans, including national biodiversity strategies. However, countries did not clearly explain how the individual measures described were expected to address climate-related hazards and risks and deliver measurable adaptation outcomes, or who the beneficiaries would be.

88. **National sectoral policies** relating to spatial planning and land use, biodiversity conservation, agriculture, water management and health are entry points for NbS. The

submissions outlined the importance of these sectors to the feasibility and appeal of implementing NbS.

89. **The recent net zero pledges made by countries, cities and companies are influencing demand for NbS**. The submissions highlighted that the pledges that are not grounded in deep decarbonization and rely heavily on NbS, with or without carbon offsetting, are creating an increased demand for NbS. This includes among the private sector, where net zero pledges have facilitated alignment of the corporate sector's goals with the goals of the Paris Agreement. Examples of this include the Collective Commitment to Climate Action initiative under the UNEP Finance Initiative Principles for Responsible Banking and the Net-Zero Asset Owner Alliance, established by 33 institutional investors in 2019. The Alliance represents around USD 5.1 trillion in managed assets (UNEP, 2020).

3. Regulatory environment

90. **Regulatory environments have a significant influence on the feasibility of financing and implementing NbS.** The submissions agreed that the lack of established regulatory processes to account for nature as a whole in national policies across developing countries limits knowledge flow and therefore understanding of how to best protect nature. Beyond accounting for nature, regulatory barriers also have the potential to either incentivize or disincentivize investments in actions to protect and conserve nature.

91. **Integrating natural capital in national accounts can help economies properly value nature.** Some submissions stated that national governments and companies can adopt natural capital accounting policies, such as the United Nations System of Environmental-Economic Accounting (see box 7). Various submissions promoted the adoption of natural capital accounting. Natural capital accounts organize biophysical and economic data to take stock of natural resources and flows of resources and ecosystem services that support the economy. Including natural capital in government budget documents would allow national leaders to monitor and manage their environment for economic purposes. This would also allow the financial sector to price the risk of natural capital depletion.

Box 8
Example of natural capital accounting

The international standard for natural capital accounting of the United Nations System of Environmental-Economic Accounting has developed a common framework based on the accounting principles of the System of National Accounts that has enabled at least 89 countries to implement natural capital accounting by integrating environmental and economic statistics into national accounting processes. However, the majority of accounts are incomplete and only 34 countries have developed ecosystem accounts. In addition, natural capital is not given equal weighting compared with economic data, highlighting the need to increase both the supply of and demand for natural capital accounts (OECD, 2021).

92. **Private sector financial risk disclosure increases the accountability of firms.** Various submissions emphasized the need for improved regulatory frameworks for increased transparency in corporate environmental disclosure, including for NbS, to foster the integration of environmental protection in business operations. Two initiatives in particular were referred to in the submissions:

(a) **The Taskforce on Nature-related Financial Disclosures.** Currently, there are limited company disclosures on companies' impacts and dependencies on nature, which deters the ability of financial institutions to comprehensively assess investment risks. The submissions referred to the Taskforce on Nature-related Financial Disclosures, launched in June 2021, which encourages companies to disclose financial risks, so that it can hold firms accountable and assure investors that their investments have factored in the real risks associated with the degradation of nature. More specifically, the Taskforce's 'double materiality' approach allows nature-related financial risk disclosures not only on how nature impacts a company and its operations, but also on how the operations of a company impact nature. This differs from the approach of the Task Force on Climate-Related Financial Disclosures, whereby only the financial risks from the impacts of climate change on a

company or financial institution are disclosed. It is recommended that the Taskforce on Nature-related Financial Disclosure should be taken into account in the financial architecture of NbS;

(b) **The Carbon Offsetting and Reduction Scheme for International Aviation.** There is potential to scale up investments in carbon credits through the development of fair and equitable rules in alignment with the Article 6 of the Paris Agreement and the Carbon Offsetting and Reduction Scheme for International Aviation. This includes natural climate solutions (a form of NbS), and emission reductions and removals, especially through REDD+ programmes, which can help realize landscape change within countries and transform forestry and agriculture sources into carbon sinks. By continuing to ensure that high-quality programmes are eligible to participate in the Carbon Offsetting and Reduction Scheme for International Aviation, global finance for climate action can be increased. These programmes should build on existing programmes at the country level.

93. **Other forms of regulatory barriers and safeguards** include regulations, procurement, engineering standards and codes that affect the uptake of NbS. Overall, the submissions suggested that countries evaluate aspects such as land-use regulation and zoning, safety and performance codes and standards, procurement policies, land rights and environmental protection regulations, to enhance the enabling environment for financing and implementing NbS:

4. Technical assistance and capacity building

94. **The submissions emphasized the need to address the lack of technical capacity, along with the awareness of the potential of NbS among key stakeholders in developing countries to finance and implement NbS.** The skills and knowledge needed to identify and implement NbS are often lacking across key professionals involved in designing and implementing risk management interventions. Risk management relies on "an understanding of the risk drivers, processes and mechanisms for each approach, the limitations to its effectiveness, and measures that can enhance that effectiveness and provide co-benefits" (OECD submission).

95. **This need for technical capacity extends to the capacity to quantify the business case for action to protect and conserve nature.** As mentioned in chapter D above, existing methods to value nature are difficult to apply as is its understanding among experts limited. The submissions emphasized that to scale public and private sector finance, there is a need to increase understanding of the business case for investing in NbS. This can be done through targeted technical support on the following topics according to the specific type of NbS:[23]

(a) Quantification of the costs and benefits of NbS;

(b) Identification of high-quality and relevant investment models;

(c) Access to and use of climate information;

(d) Development of relevant and effective metrics for measuring outcomes in alignment with climate policies and strategies.

96. **The submissions referred to many existing initiatives and tools that address such barriers and bolster technical capacity.** They also aim to increase partnerships and information-sharing among the many different actors involved in financing and implementing NbS across different sectors and ecosystems. Table 7 provides a summary of existing initiatives and tools.

[23] Global Commission on Adaptation (GCA) Forum discussion notes from consultations with multiple stakeholders at the Climate Adaptation Summit held in January 2021.

Table 7
Summary of existing initiatives and tools to build technical capacity

Initiative/tool	*Purpose*
Global Commission on Adaptation Action Track on Nature-based Solutions	To monitor NbS action at the global level (recently launched)
IUCN Global Standard for Nature-based Solutions	First international attempt to set eight standards for implementing NbS. The initiative is new and provides operational guidance to implement NbS
The Economics of Ecosystems and Biodiversity global initiative	Focused on "making nature's values visible", this global initiative is driving this through a structured approach to valuing natural capital. It should provide useful tools for decision makers to recognize the benefits of and reliance on natural ecosystems and biodiversity, as well as demonstrate their value in economic terms to build into investment case
FAO monitoring data tools: Open Foris and SEPAL	To support climate finance mechanisms in decision-making, trustful, transparent and innovative tools are needed to monitor and support the reporting of NbS data. Open Foris provides a set of free and open-source software tools that facilitate flexible and efficient data collection, analysis and reporting. SEPAL is a cloud-based computing data platform for satellite-based forest monitoring. The adoption and use of Open Foris and SEPAL have had a positive impact on country reporting to the UNFCCC
FAO Hand-in-Hand geospatial portal	Hand-in-Hand is a geographic information system data platform that supports stakeholders with the rich, shareable data (on agroecology, water, land, soils, GHGs, etc.) needed to support evidence-based NbS. The platform also includes a subnational repository of donor information developed by FAO and its partners
FAO TAPE tool	Based on various existing assessment frameworks, TAPE is a comprehensive global tool that aims to measure the performance of agroecological transitions across the different dimensions of sustainability. It applies to all types of agricultural systems. TAPE can be used to establish a baseline of agricultural sustainability for project or investment design, monitoring and evaluation, and to diagnose and compare the performance of different agricultural systems over time, at the farm and territorial level. TAPE is being piloted in over 10 countries, including for a GEF project (baseline and monitoring and evaluation)
FAO GLEAM tool	GLEAM is an open and free online calculator developed by FAO that estimates GHG emissions from the livestock sector. It considers the life cycle of animal products, from production of inputs to farm gate. It is accessed by over 400 users a month to establish baselines of GHG emissions and estimate project/investment impacts. FAO is building the capacity of international financial institutions and national banks (e.g. the European Bank for Reconstruction and Development, International Finance Corporation, International Fund for Agricultural Development, World Bank and Uganda Development Bank) on low-carbon livestock investments using GLEAM-I
Coller FAIRR Protein Producer Index	This is the world's only comprehensive assessment of the largest animal protein producers regarding critical environmental, social and governance issues
WBCSD Nature Action project	This project is developing a collective action platform for businesses to scope, scale and implement NbS. It also aims to provide guidance to companies on the value of NbS and help clarify and align definitions of NbS, NbS to address climate change and natural climate solutions, and their relationship with other initiatives including Apex goals and Science-based Targets for Nature
European Commission programme: Capacity Building related to Multilateral Environmental Agreements (MEAs) in	The programme aims to bring cross-sectoral, ecosystem-based practices and approaches to biodiversity and chemical management to scale in order to increase the environmental sustainability of agriculture. It supports producers to transition to more sustainable, resilient and productive production systems

African, Caribbean and Pacific (ACP) Countries	by facilitating access to, inter alia, innovative solutions, adaptive management trainings and financial and non-financial incentives
Flood Resilience Measurement for Communities	Created by the Zurich Flood Resilience Alliance in 2013, the Flood Resilience Measurement for Communities is an innovation in community flood resilience theory and practice. It allows users to generate evidence on the ways in which a given area or community is already resilient to floods and provides a guide to further develop this resilience. A core component of the tool is an assessment of natural capital; the tool assists in understanding how natural capital interacts with the other capitals of the sustainable livelihood framework
Post Event Review Capability	This award-winning methodology was created by Zurich Insurance to provide research on and independent reviews of large flood events. It seeks to answer questions related to aspects of flood resilience, flood risk management and disaster intervention. It examines which aspects worked well, as well as opportunities for improvement, and results in a set of recommendations for reducing future risk
ThinkNature platform	As part of Horizon 2020 EU research projects, this platform is a multistakeholder communication platform supporting the understanding and promotion of NbS. It focuses on sharing lessons learned from small-scale projects and providing insight into implementation of NbS.
European Union Natural Water Retention Measures platform	The platform provides a comprehensive database of NbS to address flood risk, with technical specifications and over 100 case study applications throughout the European Union
Nature-based Solutions Evidence Tool	Developed by the University of Oxford, the tool is a database of systematically peer-reviewed literature on NbS projects. Based on this tool, the top 10 countries with the highest amount of peer-reviewed case studies are China, United States of America, Kenya, Spain, United Kingdom of Great Britain and Northern Ireland, Australia, Canada, Germany, Portugal and Austria

5. Access to finance for nature-based solutions

97. **The submissions highlighted the need to continue supporting developing countries' access to finance for NbS to help address climate change.** The submissions emphasized that NbS currently lack appropriate financing instruments and standardized financing models, which makes them particularly unattractive for potential financiers. Overall, limited access to appropriate finance is cited as a major barrier preventing the delivery of NbS. Increased uptake of NbS therefore depends not only on the enabling environment but also on the ability to match ambition with financing.

98. **Donors, United Nations organizations and climate funds, among other actors, are actively supporting developing countries to access and leverage finance, including for NbS.** As highlighted in chapter E above on finance for NbS, some of these initiatives include technical assistance provided to the public sector, public investments (such as official development assistance), government incentives and blended finance mechanisms that can de-risk investments for the private sector, thereby leveraging further finance for NbS. The submissions also mentioned the following initiatives:

(a) The GCF Readiness Programme helps developing countries establish the building blocks needed to access climate funds. This includes setting up national REDD+ strategies, forest reference emission levels, measurement, reporting and verification systems, and appropriate environmental and social safeguards;

(b) Similarly, the AF and the GEF fund projects that contribute to the enabling institutional and governance environment, helping to coordinate and inform actors with the capacity to address appropriate adaptation and mitigation measures in the medium and long term. By working across multiple sectors, these efforts have included NbS and have therefore aimed to reduce carbon emissions and build climate resilience.

(c) FAO also supports several countries to **access carbon finance**. This includes providing strategic advice toward accessing international carbon finance opportunities,

including results-based payments from multilateral sources and market-based finance. FAO also provides technical capacity development for countries that require the necessary systems and frameworks for reporting high-quality emission reductions in line with the requirements of markets and donors.

(d) GIZ, a financial contributor, works with national ministries and regulatory authorities in developing countries on their respective institutional and regulatory frameworks to attract public and private investments. It provides advice, helps assess a country's readiness for climate investments and supports the development of a pipeline of NbS projects.

99. Finally, **submissions have listed key initiatives that are promoting climate action through NbS.** The ecosystem approach taken across NbS encourages breaking siloes, where these events and organisations offer platforms to do so through for example partnership opportunities and knowledge sharing activities. Key international events and organisations that are influencing uptake and understanding of NbS are listed in table 8.

Table 8
List of events and organizations influencing uptake and understanding of nature-based solutions

Events	*Suggested by (submission)*
Climate Adaptation Summit	GCA
Climate Week NYC	Emergent Forest Finance Accelerator
GLF Biodiversity Digital Conference 2020: One World – One Health	CIFOR
GLF digital forums or conferences	CIFOR
GLFx	CIFOR
IUCN World Conservation Congress	IUCN
London Climate Action Week	Emergent Forest Finance Accelerator
SBSTA Dialogues on Land and Adaptation and on Oceans	WWF International
Organizations	*Suggested by (submission)*
California Department of Insurance	Wharton Risk Management
Chairs of the SBSTA and the SBI	CBD secretariat
Climate Neutral Alliance 2025	World Union of Small and Medium Enterprises
Co-chairs of the open-ended working group on the Post-2020 Biodiversity Framework	CBD secretariat
COP Bureau	CBD secretariat
EDF	EDF
ELATIA (Indigenous Peoples' Global Partnership on Climate Change, Forests and Sustainable Development)	Tebtebba Foundation
Emergent Forest Finance Accelerator	EDF
FAIRR	FAIRR
GCA	GEF, GCA
GEF Scientific and Technical Advisory Panel	GEF
GEF secretariat	GEF, GCA
GLF convened by CIFOR on behalf of over 25 Charter members	CIFOR
Global Center on Adaptation	GEF

Global Ecosystem Resilience Facility – Willis Towers Watson	Wharton Risk Management
International Institute for Sustainable Development	GEF
Investment Partnership Network	WBCSD
MunichRe	Wharton Risk Management
Ocean Risk and Resilience Action Alliance	GEF
SBSTA Bureau	CBD secretariat
Tebtebba Foundation and other accredited non-governmental observers under the UNFCCC	Tebtebba Foundation
TNC	Wharton Risk Management
UNCCD	CBD secretariat
UNCDF	LoCAL
UNEP Finance Initiative and climate finance advisers	GEF
United Kingdom Presidency of COP 26	WWF International
United Nations General Assembly	Emergent Forest Finance Accelerator
United Nations Industrial Development Organization	GEF
UN-REDD Programme	UNEP
World Resources Institute	GEF, GCA

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