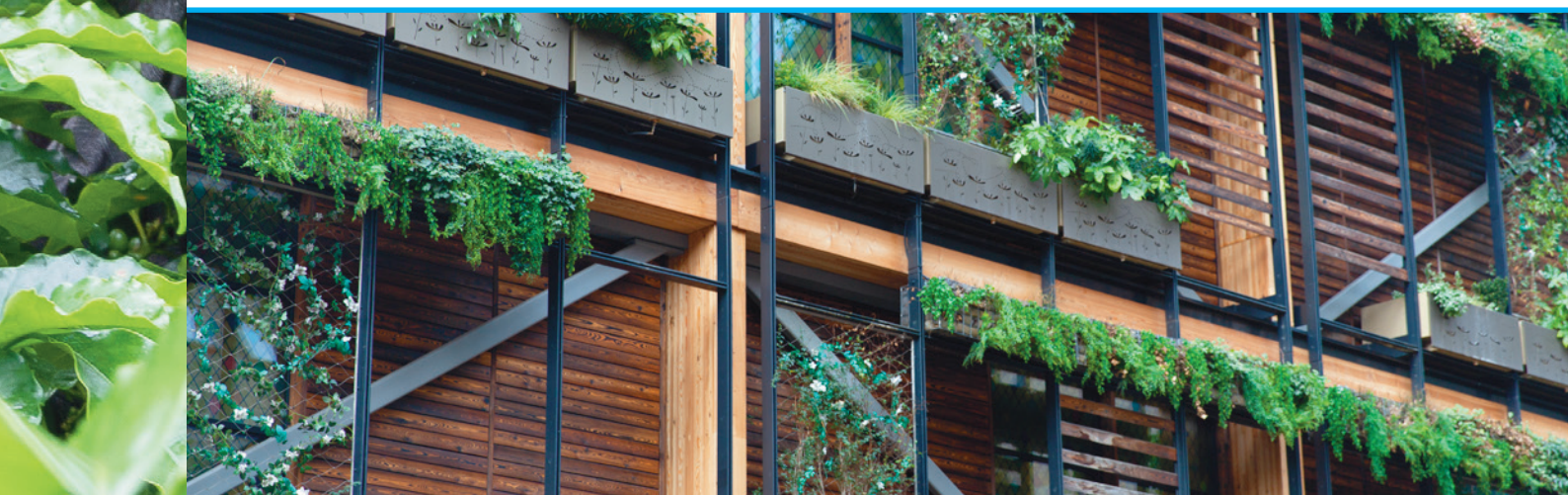




Nature-based Solutions: Opportunities and Challenges for Scaling Up

October 2022



© 2022 United Nations Environment Programme

ISBN: 978-92-807-3966-4

Job Number: DEP/2463/NA

This publication may be reproduced in whole or in part and in any form for educational or non-profit services without special permission from the copyright holder, provided acknowledgement of the source is made.

The United Nations Environment Programme would appreciate receiving a copy of any publication that uses this publication as a source. No use of this publication may be made for resale or any other commercial purpose whatsoever without prior permission in writing from the United Nations Environment Programme. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Communication Division, United Nations Environment Programme, P. O. Box 30552, Nairobi 00100, Kenya.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country territory or city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Mention of a commercial company or product in this document does not imply endorsement by the United Nations Environment Programme or the authors. The use of information from this document for publicity or advertising is not permitted. Trademark names and symbols are used in an editorial fashion with no intention on infringement of trademark or copyright laws. The views expressed in this publication are those of the authors and do not necessarily reflect the views of the United Nations Environment Programme. We regret any errors or omissions that may have been unwittingly made.

Cover photo: Main photo © Eduard - Adobe Stock
Inset photo © vladislavmavrin - Adobe Stock

Published by: United Nations Environment Programme (UNEP), Nairobi

Citation: United Nations Environment Programme (2022). *Nature-based Solutions: Opportunities and Challenges for Scaling Up*. Nairobi.

UNEP
promotes
environmentally
sound practices globally
and in its own activities.
Our distribution policy
aims to reduce UNEP's
carbon footprint.



Acknowledgements

Authors: Charlotte Hicks, Carolina Chambi, Hemant Tripathi, Katie Dawkins, Tania Salvaterra, Kollie Tokpah, Valerie Kapos, Hashim Zaman (UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC))

Report Director: Barney Dickson.

We would like to thank the following people for their contributions and review of this report.

Cordula Epple (UNEP-WCMC), Daniela Guaras (UNEP-WCMC),
Dianna Kopansky (UNEP), Dominic MacCormack (UNEP), Elisabeth Bernhardt (UNEP),
Han Meng (UNEP-WCMC), Jerry Harrison (UNEP-WCMC), Joakim Harlin (UNEP),
Julia Oliva (UNEP-WCMC), Matheus Couto (UNEP-WCMC), Matt Kaplan (UNEP-WCMC),
Melissa De Kock (UNEP), Padia Lariu (ZUG), Patrick Lutz (ZUG), Tobias Herzfeld (ZUG),
Rowan Palmer (UNEP), Susan Mutebi-Richards (UNEP), Victoria Qing Hong Wang (WCMC-Beijing)

The project on which this report is based was funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV).

Contents

Acknowledgements	1	4. Scaling up NbS	21
Acronyms and abbreviations	2	4.1 Build a common understanding of NbS	21
Key Messages	3	4.2 Adopt integrated approaches to scale up NbS, combining policy, finance, and safeguard measures	22
1. Introduction	5	4.3 Apply appropriate safeguards, standards, and guidelines for NbS	25
2. Background	7	4.4 Enable locally-led actions on NbS	28
2.1 Growing recognition of NbS	7	Conclusions	30
2.2 Concerns about NbS	10	References	32
3. The nature of NbS	13		
3.1 Defining NbS	13		
3.2 Understanding NbS	14		
3.3 Related terms	17		
3.4 NbS choices: synergies and trade-offs	18		



Acronyms and abbreviations

AAAP	Africa Adaptation Acceleration Program	LEAF	Lowering Emissions by Accelerating Forest finance
UNEA	United Nations Environment Assembly	LMICs	Lower and Middle Income Countries
AI	Artificial Intelligence	M&E	Monitoring and Evaluation
ASEAN-CRN	ASEAN Climate Resilience Network	MEAs	Multilateral Environmental Agreements
BMUV	German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV)	NAPs	National Adaptation Plans
CBD	Convention on Biological Diversity	NbS	Nature-based Solutions
DGM	Dedicated Grant Mechanism	NCA	Natural Capital Accounting
EbA	Ecosystem-based Adaptation	NCFF	Natural Capital Financing Facility
Eco-DRR	Ecosystem-based Disaster Risk Reduction	NDCs	Nationally Determined Contributions
EIA	Environmental impact assessment	NDRC	National Development and Reform Commission
ESG	Environmental, Social and Governance	NGOs	Non-governmental Organizations
ESIA	Environmental and social impact assessment	NTFP	Non-timber forest product
EU	European Union	NZD	New Zealand Dollar
EUR	Euro	ODA	Official development assistance
FAO	Food and Agriculture Organization of the United Nations	PES	Payments for Ecosystem Services
FEBA	Friends of Ecosystem-based Adaptation	REDD+	Reducing Emissions from Deforestation and forest Degradation +
FIP	Forest Investment Programme	SAVi	Sustainable Asset Valuation (an IISD methodology)
FPIC	Free, Prior and Informed Consent	SDGs	Sustainable Development Goals
GCA	Global Commission on Adaptation	SEA	Strategic Environmental Assessment
GCF	Green Climate Fund	SEEA	System of Environmental Economic Accounting
GHG	Greenhouse gas	SEEA-EA	System of Environmental Economic Accounting – Ecosystem Accounting
GPFLR	Global Partnership on Forest and Landscape Restoration	SNLG	Subnational and local governments
G7	Group of Seven	SPC	The Pacific Community
G20	Group of Twenty	SPREP	Secretariat of the Pacific Regional Environment Programme
GEF	Global Environment Facility	TEEB	The Economics of Ecosystem and Biodiversity
ICCCAD	International Center for Climate Change and Development	UN	United Nations
IIED	International Institute for Environment and Development	UNCCD	United Nations Convention to Combat Desertification
IISD	International Institute for Sustainable Development	UNEA	United Nations Environment Assembly
IFC	International Finance Corporation	UNEP	United Nations Environment Programme
IKI	The International Climate Initiative (of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection of the Federal Republic of Germany)	UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre
IPLCs	Indigenous peoples and local communities	USD	United States Dollars
IUCN	International Union for Conservation of Nature	VTEs	Village Tree Enterprises
		WRI	World Resources Institute
		WWF	World Wildlife Fund

Key Messages

- 1) **Nature-based solutions (NbS) work with nature to address a range of important social, economic and environmental challenges.** These challenges include climate change, land degradation, food security, water availability as well as urban development, poverty, unemployment, and biodiversity loss.
- 2) **Some of these challenges cannot be fully addressed without making use of NbS.** Individual NbS interventions can also deliver multiple benefits and, collectively, NbS can make a major contribution to the Sustainable Development Goals (SDGs) and to tackling the planetary crises of biodiversity loss, climate change and pollution.
- 3) **Recognition of the value of NbS has grown in recent years,** at international, national and local levels. This is reflected in an expanding number of commitments, expressions of support and policy statements from many countries and organizations across the world.
- 4) **There is now a multilaterally agreed definition of NbS,** agreed at the May 2022 United Nations Environment Assembly (UNEA) by 193 Member States, providing a basis for a common understanding.
- 5) **The opportunity exists for a large scaling up of the use of NbS.** This will require integrated approaches that link together policy, financial instruments and technical advances.
- 6) **Building a common understanding of the nature and value of NbS will be important for scaling up.** It is essential to address concerns that have been raised about NbS and to enable actions that respect the rights of indigenous peoples and local communities (IPLCs) and have strong financial, environmental and social integrity.
- 7) **Robust safeguards, standards and guidance for NbS are critical.** These need to be further developed, refined and applied to ensure that NbS are implemented in ways that are effective, gender-responsive, transparent and consensual.

1. Introduction

Nature underpins the functioning of our society and economies. The degradation of ecosystems and loss of biodiversity and ecosystem services reduces our ability to respond to climate change and other challenges. Nature-based Solutions (NbS) is a term used to refer to actions that conserve, manage and restore natural and modified ecosystems in ways that address these challenges. So while this term is relatively new, it builds on a long-standing recognition of our dependence on nature.

In 2022, the United Nations Environment Assembly (UNEA) delivered a multilaterally agreed definition of NbS, which states:

“nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits”.¹

NbS are important for the global sustainable development agenda for three key reasons:

- 1) NbS offer the potential to address, in an effective way, diverse challenges such as climate change, food and water insecurity, disaster impacts, and threats to human health and well-being, while reducing environmental degradation and biodiversity loss.
- 2) Individual NbS interventions can be designed to deliver multiple benefits for people, the economy and the environment, meaning that NbS targeted at a particular goal (such as improved water security) can also provide additional benefits (such as protecting infrastructure, supporting decent work, sequestering carbon and increasing habitat connectivity).
- 3) Some of the challenges addressed by NbS, including biodiversity loss and climate action, cannot be fully tackled without this contribution. This does not mean that *other actions*, such as rapid decarbonization of our economies, are not also essential.

There is growing support for NbS, which is reflected in international declarations and initiatives, national statements and policies, and public and private sector commitments and investments. At the same time, there remain important issues and concerns to address,

for example, around ensuring NbS demonstrate environmental integrity and respect the rights of indigenous peoples and local communities (IPLCs).

The multilaterally agreed resolution on NbS adopted at UNEA² is a step towards reaching a common understanding on what NbS are and the benefits they can bring. This common understanding is a pre-condition for achieving more extensive use of NbS, along with actions to fully and transparently address concerns and questions about their integrity. In the near future, intergovernmental consultations on NbS (as called for in the UNEA resolution) as well as other processes at global, regional and national levels* will provide further opportunities for governments, multilateral organizations, civil society and the private sector to build on this understanding of NbS, to promote best practices and to ensure that concerns raised about NbS are addressed.

Delivering on the expressions of support and realizing expectations around NbS will require a substantial scaling up of these solutions. This will need integrated approaches – coherently linking between policies, financial mechanisms and technical advances – especially at national and local scales. It will also require setting clear targets for the integration of NbS in strategies, policies and programs, and for NbS finance. This paper provides a set of recommendations for achieving the scaling up and replication of NbS, while also highlighting ways to recognize and respond to concerns about NbS. For example, these options include promoting robust safeguards and standards to guide NbS design and implementation, and supporting locally-led action on NbS that respects the rights of IPLCs.

This paper has three sections:

Section 2 outlines recent developments on NbS, with a focus on global, regional and national commitments, and key issues and concerns

Section 3 builds on the new multilaterally agreed definition of NbS to set out key elements in the concept, provides examples of NbS, and discusses related approaches

Section 4 provides recommendations for actions by governments, civil society and the private sector to substantially scale up the use of NbS

This report aims to inform NbS-related initiatives and discussions on NbS at global, regional, and national levels, with a focus on how NbS can be scaled up to more effectively address social, economic, and environmental challenges.

* For example international processes such as Conferences of the Parties under the United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD), and meetings of fora like the Group of Seven (G7) and Group of Twenty (G20)



2. Background

2.1 Growing recognition of NbS

NbS have gained prominence in global and national policy agendas in recent years. An overview and some key examples of these developments is provided below.

International recognition and commitments

In addition to the recent UNEA resolution, there are a range of other international expressions of support and commitments explicitly referring to NbS, including the following:

- The 2016 **IUCN World Conservation Congress**, which called on “governments and civil society, with IUCN Members taking the lead, to incorporate NbS into strategies and measures that encourage innovations and learning from on-the-ground activities”, as well as requesting “governments, donor countries and financial institutions, private funders and businesses to recognise NbS as a tool to achieve sustainable development”.³
- The **NbS for Climate Manifesto**, a plan to unlock the potential of NbS for climate action, which was launched at the 2019 UN Climate Action Summit; this summit had NbS as one of its main themes. The Manifesto was developed with the support of more than 70 governments, private sector, civil society, and international organizations.⁴
- The **Leaders Pledge for Nature**, a commitment agreed at the UN Summit on Biodiversity in September 2020 by 64 countries, which called for “a significant scale-up in nature-based solutions and ecosystem-based approaches on land and at sea” and mobilisation of resources to support NbS (among other actions).⁵
- A number of the **presidencies of both the G7 and G20 groups** have highlighted NbS. Examples include the G7 ministers’ commitment in June 2022 under the German G7 presidency to mobilize resources to increase “funding for NbS with strong environmental and social safeguards” and to “mainstreaming, enhancing and scaling up the implementation of NbS, harnessing their multiple benefits for people, agriculture, nature and climate, including job and business opportunities”.⁶ In 2021, leaders of the G7 also committed to increase finance contributions for climate mitigation and adaptation, including NbS, aiming to jointly mobilise USD 100 billion each year to 2025.⁷

- The **United Nations Convention to Combat Desertification (UNCCD)** decision 15/8 in 2022 mentions NbS and invites Parties to explore complementarities across Multilateral Environmental Agreements (MEAs) including, where appropriate, “in the implementation of sustainable land management, ecosystem-based approaches or nature-based solutions”.⁸

National recognition and commitments

NbS are also appearing more frequently in national commitments, policies, and action plans (as well as policies and measures that could be considered NbS but may use different terminology). For example, in the climate change arena, countries make commitments towards climate change mitigation and adaptation through **Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs)**. NDCs set out each country’s efforts to reduce national GHG emissions and adapt to the impacts of climate change. According to a 2021 review of updated NDCs by WWF-UK⁹, 105 out of 114 (92%) of NDCs include explicit reference to nature and nature-based approaches, and of these many make specific mention of “nature-based solutions”. A total of 69 of the 96 NDCs that include nature-based approaches for mitigation have numerical targets, mostly related to the forest sector. A wide range of ecosystems are also mentioned in most NDCs, including forests, agricultural lands, wetlands, and coastal and marine ecosystems. The role of IPLCs in the development and implementation of NbS is explicitly mentioned in 30 NDCs.

Beyond NDCs, numerous countries are including commitments to **NbS in related national policies**. For example, Costa Rica launched its National Decarbonization Plan in 2018, setting out the government’s strategy with short-, medium- and long-term goals and actions to decarbonize the country’s economy by 2050. Organized in ten action areas, this plan includes the management of rural, urban, and coastal territories by applying NbS, focusing on conservation and sustainable use of forest ecosystems.¹⁰

In China, NbS has gained an increasing level of traction in recent years. China played a role in leading the coalition on NbS with New Zealand at the 2019 UN Climate Action Summit, which was highlighted in the country's October 2021 white paper on "Biodiversity Conservation in China".¹¹ Policy documents such as the "Implementation Plan for Important Reform Initiatives of the 19th Party Congress Report (2018-2022)" and the "Master Plan of Major Projects for the Protection and Restoration of Important National Ecosystems (2021-2035)"^{12,13}, also include key initiatives such as "the ecological security barrier system", which identifies core regions for ecological conservation and restoration (e.g. the Northern Sand Control Belt, the Yellow River Key Ecological Zone, etc). In addition, in January 2021, MEE released "Guiding Opinions on Integrating and Strengthening Efforts in Climate Actions and Ecological and Environmental Protection", which prioritize holistic governance approaches to "integrating, coordinating and strengthening" climate and ecological and environmental conservation". NbS are identified in the guidance as a priority.¹⁴

Some countries have also made explicit **financing commitments for NbS**. For example, in 2020, Canada committed to an investment of CAD 4 billion over ten years to support the implementation of nature-based climate solutions domestically, including planting two billion trees, along with investments in efforts to protect, restore, and improve the management of the country's grasslands, wetlands, peatlands, and farmlands.^{15,16} An additional CAD 780 million over five years was announced in 2022 to advance the conservation, restoration and enhancement of carbon rich habitats to store carbon and reduce emissions.¹⁷ In 2021, the Government of the United Kingdom also committed "at least £3 billion to climate change solutions that protect and restore nature and biodiversity over five years" via international climate finance.¹⁸ This will support a range of nature-based interventions overseas such as the protection, restoration and management of land and sea habitats.¹⁹ In 2022, the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), presented the Federal Action Plan on Nature-based Solutions for Climate and Biodiversity to conserve, restore and strengthen ecosystems. Investments of EUR 4 billion will be made in ten fields of action until 2026.²⁰

At the **subnational level**, the "Edinburgh process"[†] linked to the Convention on Biological Diversity (CBD), engages subnational governments in the implementation of the post-2020 global biodiversity framework, recognizing that "Subnational and local governments (SNLG) play a crucial role in delivering NBS", for example through their role in local environmental legislation, implementation at landscape and local scales, provision of financial and technical support, and in partnerships with various authorities, private, academic, and non-profit sectors.²¹

Regional recognition and commitments

NbS are increasingly being integrated into **regional plans and policies**. For example, the European Union's (EU) Green Deal emphasises NbS in action plans on climate adaptation and mitigation. NbS feature in the EU biodiversity strategy for 2030, the EU strategy on green infrastructure and the EU urban agenda, while the EU Flood Directive recognises the value of NbS for flood mitigation.²² The EU is positioning itself as a leader in supporting NbS, including through the EU Strategy on Adaptation to Climate Change, which specifically encourages NbS for adaptation.²³ Through the Natural Capital Financing Facility (NCFF) (which will be replaced by InvestEU), the European Investment Bank offers funding to a range of projects, including those "that promote the conservation, restoration, management and enhancement of natural capital for biodiversity and adaptation benefits, including ecosystem-based solutions".²⁴

In the Pacific, the Strategic Plan 2022-2031 of the Pacific Community (SPC) includes a goal of reaching a future state in 2031 of "Thriving, productive and resilient ecosystems and communities, responsibly harnessing our natural resources and biodiversity for security and prosperity".²⁵ The SPC and the Secretariat of the Pacific Regional Environment Programme (SPREP) launched the Kiwa Initiative in 2020. This is a EUR 35 million multi-donor programme "that aims to strengthen the climate change resilience of Pacific Island ecosystems, communities and economies through Nature-Based Solutions".²⁶

† The Edinburgh process, led by the Scottish Government in conjunction with the CBD, explores the role subnational governments (including regional, city and local authorities) have in the post-2020 global biodiversity framework and targets in the run up to the CBD Conference of the Parties (COP15). The "Edinburgh declaration" is an output of this process. For more information, please visit <https://www.gov.scot/publications/edinburgh-declaration-on-post-2020-biodiversity-framework>.

Private sector and finance sector commitments to NbS

Financial and private sector organizations are also increasingly involved in calls for action on nature and NbS. For example, act4nature’s[‡] list of ten commitments, includes: “Giving priority to the development of Nature-based Solutions, ensuring that they are implemented in a science-based and biodiversity-friendly manner, and promoting a certain variety in such solutions”.²⁷ The International Institute for Sustainable Development’s Nature-based Infrastructure Global Resource Centre is another initiative that aims to bring together infrastructure planners, policy-makers, decision-makers, and financiers to make the business-case for nature-based infrastructure, contributing to informing policy and investments.²⁸ The African Infrastructure Resilience Accelerator Pillar of the African Development Bank’s Africa Adaptation Acceleration Program (AAP) also seeks “to scale up new technologies, designs, and nature-based solutions to adapt urban and rural infrastructure to Africa’s current and future climate”. It aims to influence the USD 93 billion annual investment in infrastructure in the region so that 50% is “targeted to enhance the climate resilience of economies and communities, and to climate-proof projects”.²⁹

Investment in implementation of NbS has been growing worldwide in recent decades, although it is difficult to get a full picture of the scale of financing. For instance, The State of Finance for Nature report found that USD 133 billion per year “flows into NbS” (using 2020 as the base year and including a range of activities).³⁰ More than 400 climate adaptation projects using NbS have been supported by various multilateral funds ranging from USD 10 to 25 million in developing countries.³¹ The World Bank also reported that during 2012-2018 its disaster risk management portfolio (which has grown overall in the past decade) comprised 681 projects worth more than USD 52.8 billion, of which 76 projects utilised NbS.^{32,33} A review of examples of “repayable investment” into NbS between 2002 and 2021 identified 88 examples that met the International Union for Conservation of Nature (IUCN) definition (among other criteria), from a long list of 200 NbS-related transactions.³⁴ Financing for NbS can come from both public and private sources. However, most funds that could be used for NbS aren’t exclusive to NbS. This means it can be hard to determine exactly how much finance is flowing to NbS specifically and how much is being used for “nature-related” activities more broadly (see also Box 1 below). One example of a fund that specifically invests in NbS is the IUCN’s Nature+ Accelerator Fund.[§] This scalable market strategy for NbS builds on an initial investment of USD 8 million from the Global Environment Facility (GEF).³⁵

Box 1: Funding for specific types of NbS

In addition to financing for NbS overall, funds are increasingly supporting specific types of NbS. In the case of climate change, these include:

- **NbS for climate change mitigation:** For example, the public-private LEAF (Lowering Emissions by Accelerating Forest finance) Coalition is mobilizing USD 1 billion to halt deforestation through large-scale tropical forest protection as a contribution to climate mitigation.³⁶ Climate Asset Management (a joint venture of HSBC Asset Management and Pollination) offers investors “access to investments in nature based carbon projects that seek to deliver high impact carbon credits from activities that conserve, protect and restore nature and biodiversity with and for local communities”.³⁷ The UN Restoration Seed Capital Facility, launched in 2020 with initial capitalization of EUR 25 million, “aims to boost the contribution of private finance to forest restoration”, which it considers a type of NbS.³⁸
- **Ecosystem-based Adaptation (EbA):** Funding for EbA was estimated for 2018 as USD 3.8 – 8.7 billion. This has originated mainly from bilateral donors (in 2018), including Germany, the United Kingdom, Japan, and Sweden. The European Union (EU), Asian Development Bank, the Green Climate Fund (GCF), and the International Fund for Agricultural Development were the major sources of multilateral funding.³⁹ Most of these global funds also stipulate gender equality, participation, rights-based approaches, and environmental sustainability, elements which are also key to NbS. Other funding sources include wider climate funds such as the GCF, which supports REDD+ and EbA in its portfolio, as well as more targeted funds, such as the UNEP-IUCN Global EbA Fund.⁴⁰ The International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection of the Federal Republic of Germany, is supporting EbA mainstreaming, at the international, national, and local levels.⁴¹

‡ Act4nature international is an alliance aimed at accelerating business action on nature, led by Entreprises pour l’Environnement (EpE) and a multi-stakeholder steering committee. To join the coalition, businesses have to sign up to ten commitments and develop Specific, Measurable, Attainable, Relevant and Time-bound biodiversity business commitments, signed by their CEO. Commitment 6 cited here is on NbS. For more information, please visit <http://www.act4nature.com/en/>

§ For more information, please visit https://www.iucn.org/sites/default/files/content/documents/2020/iucn_news_nature_plus_accelerator_final_approved.pdf

2.2 Concerns about NbS

Despite recognition of the benefits of NbS and progress towards a common understanding, the concept has also been debated in global, national, and local policy processes. A range of concerns with implications for the role and future of NbS have been raised in recent years, in part as a response to the growing attention to NbS. Four important concerns or barriers to wider uptake of NbS are discussed below. Section 4 of this paper focuses on recommendations for NbS scaling up that can help to address these concerns and barriers.

NbS could infringe on the rights of IPLCs and other actors

Poor practices around NbS have led IPLCs and others to raise concerns around the security of land tenure rights, access to natural resources, and underestimation of the IPLC role in managing ecosystems sustainably,⁴² among others. There have also been concerns raised by IPLCs that NbS are a form of “land grabbing”, or a rush for other natural resources.⁴³ Linked to this issue, the way in which NbS are implemented can affect the flow of ecosystem services to users, including the access people may have to natural resources and natural resource-based livelihoods. In some situations, the focus on particular objectives of NbS, or particular actors (e.g. one sector or community over another) can also lead to inequitable distribution of costs and benefits (e.g. between upstream and downstream communities, or between private versus public interests).^{44,45} The design, implementation and scaling up of NbS need to explicitly address questions such as: the potential impacts of NbS on IPLCs as well as other rightsholders and stakeholders, including women, and implications for intergenerational equality; respect for the rights of IPLCs to determine if or how NbS will be implemented; how NbS initiatives will be governed and locally-led approaches promoted; and how grievances will be addressed, and information will be shared.

NbS could distract or detract from other urgently needed actions such as decarbonization

NbS can be perceived as a “false solution”,⁴⁶ distracting or detracting from other actions that are urgently needed to address challenges and crises. This is particularly true of climate mitigation, where it has been argued that a focus on the role of NbS in mitigating climate change diverts attention from the need for massive and rapid decarbonization of our economies. Statements, such as the one found in the UNEA resolution, pointing out that NbS do not replace the urgent need for decarbonization, can help address this concern.





NbS can be misinterpreted and misused

As a relatively new term encompassing multiple objectives, NbS can sometimes be misinterpreted and misused by decision-makers and stakeholders. Some interventions may be labelled NbS but don't meet the criteria set out in the UNEA resolution and other guidelines, thus risking negative effects. For example, planting a fenced, non-native tree stand on an area that was previously open grassland may contribute to climate mitigation, but could also reduce water availability, have negative impacts on biodiversity and is unlikely to provide much benefit for local communities.⁴⁷ Along with poor quality or poorly safeguarded interventions, these concerns have driven debates at global and national levels around the integrity of NbS. Key issues include oversimplification of NbS interventions (e.g. focusing on planting trees instead of restoring ecosystems), and avoiding open discussion of complexities and nuances (such as timeframes and trade-offs) associated with NbS.⁴⁸ Poor practices can thus jeopardise the environmental integrity and social sustainability of NbS, leading to poor outcomes, and poor outcomes can generate reluctance to apply these solutions.⁴⁹

Scepticism about the effectiveness of NbS

Although the evidence base for the effectiveness of NbS in addressing challenges is growing stronger,^{50,51,52,53} questions remain about their effectiveness in different circumstances and in addressing urgent challenges. This perception can lead to further scepticism about the suitability of NbS as a solution, and can be partly traced back to challenges in measuring the impacts of NbS and a lack of ongoing monitoring and evaluation for NbS interventions.

There are complexities that are unique to NbS, which can make the attribution of impacts more challenging. For example, the benefits provided by NbS are often difficult to quantify and value, and are therefore often not considered in decision-making. At the same time, the negative externalities from “grey” alternatives are often not accounted for, further complicating comparisons between different approaches. NbS are also often implemented with multiple objectives, and in combination with other interventions (such as grey infrastructure, or livelihoods support), further complicating efforts to distinguish NbS impacts. In addition, time lags and spatial variability in outcomes can lead to differences in perception of NbS success among stakeholders.⁵⁴



3. The nature of NbS

3.1 Defining NbS

As mentioned above, the UNEA of March 2022 brought together 193 Member States and delivered a multilaterally agreed definition and description of NbS.⁵⁵ UNEA decided that:

“nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits”.

This understanding of NbS, based on discussion and consensus among the UNEA Member States, is built upon several important features, described below and referred to in the resolution text.

While the term NbS is relatively new, it builds on a long-standing recognition of our dependence on nature and long-standing practices for protecting, managing, and restoring ecosystems. The UNEA definition of NbS closely follows the 2016 definition developed at the IUCN World Conservation Congress in 2016.⁵⁶ It has evolved from previous efforts to define NbS, including by the World Bank in 2008,⁵⁷ the Secretariat of the Convention on Biological Diversity’s 2009 definition of ecosystem-based adaptation,⁵⁸ and the European Commission’s definition.⁵⁹

The 2022 UNEA definition is broad in scope and sets out a number of key features of NbS. It notes that NbS can take place in a wide range of natural and modified ecosystems, and includes sustainable use as well as conservation, restoration, and management of ecosystems.

The resolution, as a whole, places NbS in the context of achieving the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs). It lists the major challenges that NbS can help to address: biodiversity loss, climate change, land degradation, desertification, food security, disaster risks, infrastructure resilience, urban development, water quality and availability, poverty eradication, inequality, and unemployment. It also recognises their role in contributing to sustainable social and economic development, and notes that NbS can deliver multiple benefits, including for human well-being, ecosystem services, resilience, and biodiversity (see Box 2 on biodiversity and NbS below).

In addition, the resolution notes that “bio-based products”⁶⁰ can be an important result of certain NbS, or linked to NbS (while not being NbS by themselves) and, if environmentally, economically, and socially sustainable, can deliver benefits for nature and communities.

The UNEA resolution implicitly acknowledges some concerns with regard to NbS. Its clear statement that NbS does not replace the need for rapid and deep GHG reductions is one example. The text also calls for respecting social and environmental safeguards, including for IPLCs, in line with the three “Rio Conventions” (on biodiversity, climate change and desertification), and for Member States “to follow a country-driven, gender-responsive, participatory and fully transparent approach when designing, implementing and monitoring nature-based solutions”. To further build a common understanding of NbS and address key issues, the resolution proposes an intergovernmental consultation process, to be convened “in a transparent, inclusive, regionally balanced manner, striving for gender balance”.

Box 2. Biodiversity and addressing the challenge of biodiversity loss

The UNEA resolution and other guidance requires that NbS should have positive impacts on biodiversity. A more complicated question is whether reducing biodiversity loss and ecosystem degradation can be the core problem that NbS are designed to tackle. While both the resolution and the IUCN Global Standard for NbS considers environmental degradation and biodiversity loss as challenges to be addressed by NbS, IUCN add the caveat that “at least one other societal challenge must be part of the design of the solution, to differentiate the NbS intervention from a pure conservation action”.⁶¹

Perceptions that NbS are merely being used to justify traditional or business-as-usual conservation practices can both affect the willingness of decision-makers to commit resources and create challenges for how NbS impacts are measured. It could be argued that investment in actions purely focused on conservation do not reflect increasing finance for NbS. The counter-argument would be that even “pure conservation action” often functions as a type of NbS for such action is likely to contribute, in some way, to addressing other challenges, due to the many dependencies of human society on ecosystems.

3.2 Understanding NbS

To understand the concept of NbS, it helps to distinguish three different elements in the concept.

First, NbS involve **working with different types of ecosystems, natural or modified**. In terrestrial ecosystems, NbS are delivered by and implemented in forests, grasslands, deserts, mountains and highlands, peatlands, and farmlands. Within freshwater ecosystems, NbS are deployed in rivers, streams, floodplains, wetlands, marshes, lakes, and ponds. NbS in coastal and marine ecosystems often occur in coral and oyster reefs, seagrass beds, mangrove forests, estuaries, salt marshes, sandy beaches, and dunes. Likewise, urban, peri-urban, and agricultural areas are critically important modified ecosystems where NbS are delivered.

Second, NbS **use and work with nature in different ways**, which can be broadly categorised as conservation, protection, restoration, management, and sustainable use. NbS can focus on conserving and protecting nature and the ecosystem services that nature provides,^{62,63} including protected areas⁶⁴ and other effective conservation measures (OECMs) outside of protected areas,^{65,66,67} indigenous and community conserved areas (ICCAs), and privately conserved areas, among others. NbS involving restoration focus on the long-term process of recovering ecosystems that have been degraded, damaged, or destroyed, aiming to bring back their ecological functionality so they can continue providing ecosystem services,⁶⁸ while aiding biodiversity recovery. NbS can also involve sustainable use and management interventions, such as sustainable management of wetlands to boost fish stocks⁶⁹ or management of watershed vegetation to reduce the risk of landslides and flooding.⁷⁰



In practice, NbS often involve combinations of these broad actions. For example, regenerating degraded areas through protection and active restoration, or coupling sustainable management with conservation activities.⁷¹ NbS may also entail hybrid solutions where “green/blue infrastructure”, such as woodland strips, green roofs, and wetlands, among others, are combined with “grey infrastructure” such as dams, pumps, and storm drains to provide various benefits from flood control, to cooling effects, biodiversity benefits, and human well-being.^{72,73,74}

Third, NbS are **solution-oriented**,⁷⁵ reflecting the fact that they can be used to address a range of social, economic, and environmental challenges^{76,77} such as climate change and disasters, land degradation and desertification, biodiversity loss, and inequality and unemployment.

It is argued that some challenges cannot be fully met without nature playing a role. UNEP’s Adaptation Gap Report 2020⁷⁸ focused on NbS as “key instruments for adaptation to the impacts of climate hazards”. A study across 52 sites found that natural habitats like mangroves, salt marshes and coral reefs are 2-5 times more cost-effective than engineered structures for lowering wave heights, including at increased water depths.⁷⁹ A review of a number of studies estimating the impacts of coastal NbS for adaptation shows that the protection of coastal ecosystems alone could benefit more than 500 million people globally, with economic benefits of over USD 100 billion per year.⁸⁰ In the case of food systems, although the importance varies among crop types, it has been estimated that more than three quarters of the world’s leading food crops depend in some way on animal pollination, with pollinator-dependent crops contributing to 35% of global crop production volume.⁸¹

In addition, NbS are often explicitly targeted at more than one challenge, and able to deliver benefits across a range of goals. For example, NbS for adaptation, such as conservation and restoration of mangroves to help reduce coastal flood risk, if well designed and implemented, may also increase carbon uptake and storage, conserve biodiversity and provide opportunities for sustainable livelihoods.⁸² NbS should be designed from the outset to provide a solution to a problem, rather than assuming working with nature will automatically provide the desired impact or benefits.

It is possible to classify NbS interventions based on these three elements: (i) the ecosystem or part of nature in which the action takes place, (ii) the different ways

through which it works with nature, and (iii) by the challenges addressed (see Table 1 below).

Table 1: Examples of NbS linked to the three elements

NbS example	Three elements		
	Working with different ecosystems	Working with ecosystems in different ways	Addressing challenges
Combination of natural biocontrol products for coffee crops, improving habitats for natural enemies of insect pests, and promoting agroforestry practices to provide shade for the coffee plants. ^{83,84}	Farmland; plantations	Sustainable Use/ Management	<ul style="list-style-type: none"> ✓ Pest regulation ✓ Economic development ✓ Climate adaptation
Restoration of natural forests under community management and promotion of agroforestry for carbon storage and diversified local livelihoods. ⁸⁵	Forests; farmland	Restoration Sustainable Use/ management	<ul style="list-style-type: none"> ✓ Climate change mitigation ✓ Land degradation ✓ Food security ✓ Biodiversity loss
Introducing wildlife management in protected areas to support wildlife-based tourism to diversify pastoralist livelihoods. ^{86,87}	Grasslands; pastoral lands	Sustainable Use/ Management Conservation/ protection	<ul style="list-style-type: none"> ✓ Biodiversity loss ✓ Poverty alleviation
Blocking drains and rewetting peatlands to re-establish their hydrology, and where needed apply paludiculture to support livelihoods. ^{88,89}	Peatlands	Conservation/ protection Restoration Sustainable Use/ Management	<ul style="list-style-type: none"> ✓ Climate change mitigation ✓ Water security ✓ Biodiversity loss ✓ Land degradation
Riparian buffer and floodplain management and restoration to manage flooding and reduce infrastructure assets at risk. ⁹⁰	Rivers; floodplains	Restoration Sustainable Use/ Management Conservation/ protection	<ul style="list-style-type: none"> ✓ Climate change adaptation ✓ Disaster risk reduction
Constructed or restored wetlands for water filtration and pollution abatement, flood control and restoration of biodiversity. ⁹¹	Freshwater (wetlands)	Restoration Sustainable Use/ Management	<ul style="list-style-type: none"> ✓ Disaster risk reduction ✓ Water security ✓ Biodiversity loss

NbS example	Three elements		
	Working with different ecosystems	Working with ecosystems in different ways	Addressing challenges
Network of effectively managed marine protected areas to maximise conservation of biodiversity while protecting the assemblage of fished species harvested outside the protected areas, benefiting local fisheries. ^{92,93}	Marine/Coastal	Conservation/ protection	<ul style="list-style-type: none"> ✓ Biodiversity loss ✓ Poverty alleviation ✓ Food security
Restoration and conservation of seagrasses aiming to stabilise sediments while providing habitat for invertebrates and fish. ^{94,95}	Marine/Coastal	Conservation/ protection Restoration	<ul style="list-style-type: none"> ✓ Biodiversity loss ✓ Disaster risk reduction ✓ Pollution
New assemblages of organisms for green roofs and walls to mitigate city warming and clean polluted air. ^{96,97}	Urban	Sustainable Use/ Management	<ul style="list-style-type: none"> ✓ Climate change adaptation ✓ Pollution ✓ Health and well-being
Renaturalization of abandoned urban areas via community-based green space to promote cultural identity and recreational spaces. ⁹⁸	Urban	Sustainable Use/ Management Restoration	<ul style="list-style-type: none"> ✓ Health and well-being ✓ Sustainable cities & communities
Protection of key micro-headwaters by local community agreements, while restoring mountain wetlands. ⁹⁹	Mountains/highlands; wetlands	Conservation/ protection Restoration	<ul style="list-style-type: none"> ✓ Water security ✓ Poverty alleviation

3.3 Related terms

There are a number of terms and practices that are related to the expression “nature-based solutions”. A rough distinction can be made between those terms that designate actions that can be understood as specific types of NbS, and more generally terms covering a broader range of actions that can overlap with NbS. Among these two categories, some have widely accepted definitions and some do not. Perhaps more importantly, some can include types of action that would not qualify as NbS, as defined by UNEA. Rather than a comprehensive survey of all the terms related to NbS and their meanings, this paper identifies some of the most commonly used terms and practices.

Among the category of **specific types of NbS** are:

- *Ecosystem-based adaptation (EbA)*. A commonly used definition of EbA was developed by the Secretariat of the CBD in 2009, as “the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change”.¹⁰⁰ EbA has been quite widely adopted outside the context of the CBD, while within the CBD, it is sometimes referred to as “ecosystem-based approaches to adaptation”. Both EbA and ecosystem-based approaches to adaptation can be treated as broadly equivalent to NbS for adaptation.
- *Ecosystem-based Disaster Risk Reduction (Eco-DRR)*. Eco-DRR is another term that has gained traction, particularly in the context of the Sendai Framework for Disaster Risk Reduction. The Framework recognises that environmental degradation can cause hazards, and that disasters also have an impact on the environment. It recognises that environmental management is a key component that can reduce disaster risk and increase resilience.¹⁰¹ The term Eco-DRR can be treated as broadly equivalent to NbS for Disaster Risk Reduction.
- *Natural infrastructure (or blue-green infrastructure)*. In a separate 2022 UNEA resolution on sustainable and resilient infrastructure, Member States acknowledged natural infrastructure as “strategically planned and managed networks of natural lands, water and soil, such as forests and wetlands, working landscapes and other open spaces that conserve or enhance ecosystem values and functions and provide associated benefits to human populations, and can provide cost-effective and resilient alternatives or complements to built infrastructure”.¹⁰² In light of this characterization, natural infrastructure can be treated as broadly equivalent to NbS that are focused on infrastructure.

Among the second category of **broader actions related to NbS** are:

- *Ecosystem-based approaches*. This is a term that has evolved in the context of the CBD. Although there has been no formally agreed definition in a CBD COP decision, the term typically encompasses ecosystem-based approaches to climate mitigation and adaptation and DRR. It therefore overlaps with a subset of NbS actions, i.e. those focused on climate change mitigation, adaptation and DRR. The UNEA resolution on NbS specifically acknowledges that the concept of NbS is cognizant of and in harmony with the concept of ecosystem-based approaches.
- *Natural Climate Solutions (NCS)*. NCS have been defined as “actions that avoid greenhouse gas emissions and increase carbon storage in forests, grassland and wetlands”.¹⁰³ It should be noted that NCS often include land use strategies or practices to avoid or reduce emissions that may not fully meet the criteria of NbS.¹⁰⁴ Therefore the concept of NCS is not equivalent to NbS for climate mitigation.
- *Nature-positive actions*. This term is increasingly being used. Although there isn’t yet a widely agreed definition, it is clear that its meaning is rather different from NbS. It refers to actions that have a positive, rather than a negative, impact on nature. Actions can be “nature-positive” in this sense without necessarily being “nature-based”.

These related terms and actions, as summarised above, have their own meanings, their own institutional histories, and their own areas of focus. For these reasons it would not make sense to try to replace them with the term “nature-based solutions”. Nevertheless, it is helpful to have an approximate understanding of how these, and other terms, relate to and overlap (or don’t) with NbS.

3.4 NbS choices: synergies and trade-offs

Any intervention, including NbS, has the potential to deliver both positive and negative impacts^{105,106} Depending on the context and the challenges being addressed, working with nature can lead to a range of **benefits and costs, synergies and trade-offs**.^{107,108} The use of NbS entails choices, including whether to prioritise NbS over other approaches, how to effectively combine NbS and other approaches, and, overall, how to increase synergies and co-benefits while reducing costs and trade-offs. Effective solutions also require tailoring to the ecosystems and communities in question.^{109,110}

When addressing challenges, there are usually **alternative interventions to NbS** (such as traditional engineered approaches) that can be more appealing in terms of cost-effectiveness, familiarity, or other reasons. This is especially the case where the intervention needs to address rapid and severe impacts, where the externalities of more traditional approaches are not considered (e.g. negative environmental impacts), or where effective NbS may need action on a wide scale (e.g. involving large amounts of land). A full estimation of the potential costs and benefits of both NbS and alternative approaches can highlight where NbS may in fact be more cost effective over the long-term, and opportunities to combine NbS with other approaches in order to maximise positive impacts.^{111,112} For example, a project to reforest coastal and riverine areas to reduce disaster risks in northern Viet Nam at a cost of USD 8.88 million over 17 years estimated benefits amounting to** around USD 15 million in avoided risks, additional income from aquaculture for coastal communities, and carbon benefits worth an estimated USD 218 million in the replanted forests.^{113,114} Another example is the World Resources Institute (WRI) assessment of Sao Paulo’s water crisis, which concluded that restoring 4,000 hectares of forest would cost approximately USD 37 million while generating a net benefit of USD 69 million over 30 years, mainly through avoided costs for the water system.¹¹⁵

NbS can be and are effectively **combined with other solutions**. For example, “grey” engineered solutions (such as dams, pumps, and storm drains) can complement “green” solutions (such as bioswales, forest and wetland protection, and stormwater retention basins) for water management.^{116,117} This combination not only serves for “grey and green” flood protection and water drainage, but can provide “green” benefits for conserving biodiversity and increasing green space. Additionally, NbS can protect and augment existing infrastructure, resulting in benefits like extending the lifespan of assets and more efficient maintenance. For example, flood damage to roads and railways can be reduced by introducing features that retain or stall water flows (e.g. swales and wetlands).¹¹⁸ Combinations (rather than only “green” replacing “grey” or vice-versa) may in some cases provide the best outcomes in terms of cost-effectiveness and co-benefits.

The design and implementation of NbS, as with any other intervention, needs to consider the **balance of costs and benefits**. It is crucial to identify – together with stakeholders – the key priorities in a given context and the expected impacts of NbS, acknowledging that prioritising some impacts or benefits may mean that others are reduced or not realized. For instance, Eco-DRR interventions, like mangrove restoration, broadly can help to protect coastal communities from disaster impacts, while also delivering additional benefits like capturing carbon and habitat for wildlife.¹¹⁹ However, a focus on reducing coastal erosion may need a particular density or pattern of mangrove restoration compared to NbS targeted at biodiversity conservation. Impacts can also be unevenly distributed. For instance, some stakeholders may benefit more than others, or some impacts may only be felt many years into implementation.

** Damages to dikes have been reduced by USD 80,000 to USD 295,000; total savings due to avoided risks in the communities at large approximately USD 15 million; direct economic benefits from aquaculture product collection, honeybee farming, etc., of between USD 344,000 and USD 6.7 million in selected communes; the present value of estimated minimum CO₂ emissions absorbed by the planted mangrove stands at USD 218 million, assuming a price of USD 20/t CO₂e.



Decisions on which NbS to implement and how will ultimately require prioritisation of the goals of the intervention, and which benefits are desired. The potential costs and benefits need to be explicitly addressed in the design of NbS, and governance mechanisms put in place to ensure rights are respected and benefits are distributed in an equitable manner. **Steps to ensure that these choices are fully considered** include:

- Appropriate assessment of the **social and ecological context, challenges, and drivers of change**, informing prioritisation of solutions (including NbS), and considering timeframes for impacts to be generated. For example, using a robust Theory of Change approach for the design of NbS.
- Integrating information on the **full range of potential costs and benefits** of NbS and other approaches in decision-making and design processes, including non-monetary costs and benefits. Various tools are available to support cost-benefit analysis or economic valuation of NbS, such as participatory assessment of benefits and risks, valuation guidance from The Economics of Ecosystem and Biodiversity (TEEB)^{††}, the System of Environmental Economic Accounting – Ecosystem

Accounting (SEEA-EA)^{††} to provide economic information to support decision-making, and the International Institute for Sustainable Development’s (IISD’s) Sustainable Asset Valuation (SAVi) methodology for nature-based infrastructure projects.^{§§}

- **Identification and full participation of rightsholders and stakeholders** in decision-making about interventions and their design, including assessment of costs and benefits. In particular, potential impacts on IPLCs and stakeholder groups such as women and children, as well as the distribution of benefits and burdens, need to be considered.
- **Robust monitoring and evaluation of NbS**, to ensure up-to-date information on the generation and distribution of impacts, costs, and benefits, and to enable adaptive management.

^{††} For more information, please visit <http://teebweb.org/>

^{††} For more information, please visit <https://seea.un.org/ecosystem-accounting>

^{§§} For more information, please visit <https://www.iisd.org/savi/> and <https://nbi.iisd.org/what-we-offer/>



4. Scaling up NbS

The severity and urgency of the various challenges we face means that if NbS are to deliver for people and biodiversity in a changing world, they need to be **substantially and rapidly scaled up**.¹²⁰

This section presents four sets of recommendations to support the scaling up of NbS. These recommendations focus on **international, national, and local actors that can promote change**, across all scales, be it local or global. There are connections between many of the recommendations, including across the four main categories. Although these recommendations deal with NbS overall, it is recognised that specific NbS and contexts will require modifications to the strategies to scale them up. For instance, some financial mechanisms, planning entry points and advocacy strategies may be relevant only to particular types of NbS. There are also differences between countries and within countries that need to be taken into consideration in relation to the recommendations (e.g. some may be more relevant for particular countries or ecosystems).

4.1 Build a common understanding of NbS

Limited awareness, understanding and agreement around NbS are still barriers to scaling up their use. Misunderstanding as well as misuse of NbS have the potential to undermine support for NbS. The definition provided in the UNEA resolution helps to overcome these barriers, but further actions are needed to build a common understanding of NbS among decision-makers at international and national levels. These include:

Actively support intergovernmental consultations and similar processes on NbS. There are a range of intergovernmental, international and regional processes that aim to promote exchanges on NbS and progress their implementation. The UNEA resolution calls on UNEP “to convene intergovernmental consultations in a transparent, inclusive, regionally balanced manner, striving for gender balance”, to further build a common understanding of NbS and address key issues. These consultations are aimed at: compiling examples of NbS best practices; assessing existing and new proposals, criteria, standards and guidelines to address divergences, with a view to achieving a common understanding and supporting Member States; and identifying options for supporting sustainable investment in NbS and sharing information on sources of finance. UNEP is also requested to enable the participation of developing countries and relevant partners and stakeholders in these consultations. Regional and/or sectoral consultations may also take place as part of this process.

Wide and active participation of UN Member States in these and other consultations and negotiations (including those under the Rio Conventions) will be key. Substantive inputs from national governments and other stakeholders are needed to ensure that key concerns are addressed, and that suitable pathways forward are identified. Although these processes will help to provide clarity and identify best practices, it is important to note that well-designed and safeguarded NbS can also be rapidly scaled up based on the expertise and frameworks already available.

Strengthen cross-sectoral and stakeholder engagement to build consensus on NbS at national level. In addition to building a common understanding at the international level, consensus on NbS is also important at the national level. As NbS are inherently multi-disciplinary and multi-sector, inter-ministerial, cross-sectoral and wider stakeholder engagement processes are needed to build consensus and share information across sectors. The development of a shared vision, action plans, and targets can help strengthen acceptance of NbS as a way to meet objectives, for instance supporting climate change adaptation within national infrastructure strategies, or agreement on explicit cross-departmental funding for NbS.¹²¹ Cross-sectoral and participatory processes can also help to highlight synergies associated with NbS. Mechanisms that promote a shared understanding of NbS - beyond ministries of environment and climate and including those responsible for finance, development and procurement - may help to overcome traditional siloes and barriers. Examples of processes that could support a shared understanding of NbS among different sectors and stakeholders include consideration of NbS proposals by development committees (e.g. those that assess nationally significant infrastructure development proposals) and promotion of NbS among business groups (e.g. the World Economic Forum’s Global Future Council on NbS^{***}). Another example comes from Chiapas State in Mexico. Poor linkages between watershed management and climate change bodies and an inactive Climate Change Advisory Council were hindering implementation of EbA and basin-wide approaches to reduce disaster and climate change impacts. Support has reactivated the Council, incorporating adaptation into their agenda, building links with watershed organizations that are implementing EbA, and helping to bridge the gap between policy-making at state level and adaptation needs at local level.¹²²

*** For more information, please visit <https://www.weforum.org/communities/gfc-on-nature-based-solutions>

Align with best practices for NbS. Information on best practices helps to build understanding of what effective, equitable and sustainable NbS should entail, and can thus contribute to scaling up. Recent years have seen an increase in efforts to compile resources, best practices and case studies related to NbS, and to make these more accessible to stakeholders. Among many examples, these include: OPPLA, an EU repository that brings together information on natural capital, ecosystem services and NbS^{†††}; PANORAMA – Solutions for a Healthy Planet, an online platform of examples of “replicable solutions” across a range of conservation and sustainable development topics, now comprising more than 1100 solutions^{†††}; the Nature-based Solutions Initiative, which shares information from “an interdisciplinary programme of research, education and policy advice”, including a case study platform, evidence platform and policy platform^{†††}; the EbA Tools Navigator, an interactive database that provides information on more than 200 tools to support EbA planning and implementation^{†††}; UNEP’s NbS Contributions Platform, set up to share inputs received following a global call for contributions to the NbS workstream for the UN Climate Action Summit in 2019^{†††}; and NetworkNature, a European Commission funded “resource for the nature-based solutions community” that aims to increase cooperation at various levels for greater NbS impact and reach.^{†††}

Such resources are valuable for sharing knowledge and experiences, guiding policy makers and practitioners, promoting safeguards (see Section 4.3 below) and reducing duplication of tools and guidance. However, compilations like these are also resource intensive to produce and maintain and it can be difficult to engage information providers and users over the long-term. In addition there are several key gaps which need to be addressed: certain ecosystems (such as grasslands and peatlands) remain under-represented in terms of dedicated tools and case studies; some emerging areas, such as NbS for health and well-being, also lack information and case studies; and compilations and resources are still largely provided in European languages. For example, inventorying as part of the development of the EbA Tools Navigator showed that only 32 of 222 tools and methodologies reviewed were produced in a language other than English. Of these, only seven had accompanying materials in a non-European language.¹²³ Resources and compilations also need to better support IPLCs and other local actors to lead implementation of NbS (see Section 4.4 below) and to recognize the role of indigenous and local knowledge. As noted above, the upcoming UNEA-mandated intergovernmental consultations will help to compile examples of NbS best practices, criteria, standards and guidelines.

4.2 Adopt integrated approaches to scale up NbS, combining policy, finance, and safeguard measures

Significant scaling up and the long-term sustainability of NbS will require international, national, and local decision-makers to apply an integrated approach, in which NbS are embedded in policies with concrete targets, backed up by appropriate financial resources and mechanisms, and compliant with social and environmental safeguards and standards. Although the design of NbS often recognises the importance of all of these elements, in practice scaling up has been restricted by siloed policies and programs, a lack of sufficient and long-term finance, inadequate technical capacity and a lack of confidence in their economic, social, and environmental integrity.

Embed NbS in a range of policies and programs across sectors, including detailed targets and actions.

To scale up the use of NbS, especially at national and local levels, NbS need to be integrated into, and linked across, different policies, strategies, action plans and programs. Building on national commitments (e.g. under international conventions, like NDCs), NbS need to be further integrated, with detailed actions and concrete targets, into national plans and policies to help deliver on those commitments. The inclusion of NbS within sectoral plans – such as for agriculture, water, biodiversity, infrastructure, health, urban planning, etc. – can be fostered in several ways. For example, mainstreaming of NbS in planning being mandated by a higher level of government, promoted through cross-sectoral working groups or committees, and incentivised through cross-sectoral funding mechanisms.

Ensuring that NbS interventions are included in integrated land use planning is another strategy to promote mainstreaming. For example, in South Africa, EbA is included in key policies such as the National Climate Change Response Policy (2011) and the National Climate Change Adaptation Strategy (2019). This policy mandate led to the development of an “Ecosystem-based Adaptation Action Plan and Priority Mapping”, which sets out “immediate tactics” for EbA implementation as well as pilot locations and a logical framework for a five-year pilot program.¹²⁴ Embedding NbS in policies and programs requires more than simple references to nature and NbS; it needs the adoption of concrete targets and practical actions to achieve those targets (with funding identified).

^{†††} For more information, please visit <https://oppla.eu/>

^{†††} For more information, please visit <https://panorama.solutions/en/>

^{†††} For more information, please visit <https://www.naturebasedsolutionsinitiative.org/>

^{†††} For more information, please visit <https://toolsnavigator.friendsofefa.com/>

^{†††} For more information, please visit <https://www.unep.org/nbs-contributions-platform>

^{†††} For more information, please visit <https://networknature.eu/>

Robust monitoring and evaluation of progress against targets for NbS and the implementation of interventions is also needed. For example, Thailand’s NDC Roadmap (2021-2030) is endorsed by cabinet and identifies a set of mitigation and adaptation actions and targets, such as increasing national forest cover to 40% through local community participation, including in particular headwater and mangrove forests to enhance adaptive capacities.¹²⁵

Link policies for NbS to financing strategies that secure and increase the funding available for NbS.

Policy instruments to promote NbS need to be accompanied by financial strategies and instruments. These financial strategies also need to reflect integrated approaches, meaning that financing should be allocated for policy development/reform, stakeholder participation, feasibility studies and assessments, technical capacity building, on-the-ground implementation, monitoring and evaluation, and safeguards. Some countries, such as Belize, are developing integrated policy and financing strategies, linking commitments to financing. Belize submitted its updated NDC to the UNFCCC in 2021, emphasising NbS for climate change mitigation and increasing coastal community resilience. To achieve its NDC targets, Belize has developed a Climate Finance Strategy (2021-2026) that aims to mobilise resources and to strengthen synergies among different sectoral plans and investments.¹²⁶

Rapidly and significantly increase the funding flowing to NbS.

If NbS are to be delivered to the extent suggested by expanding commitments and the urgency of challenges to be met, then current levels of funding are insufficient. Using 2020 as a base year, public funds directed towards NbS total some USD 115 billion/year, with over a third being invested by national governments in biodiversity and landscape protection.¹²⁷ The private sector invests around USD 18 billion/year in NbS-related activities, including biodiversity offsets and private equity impact investment.¹²⁸ In addition, across the past 20 years, less than 15% of funds directed at climate change mitigation and adaptation globally were spent on NbS.¹²⁹ For NbS to help meet global climate change, biodiversity, land degradation, and other goals, a funding gap of USD 4.1 trillion will have to be closed by 2050.¹³⁰ Both public and private action, as well as global and national mechanisms, will be needed to transform financing – including markets – for NbS.

Official development assistance (ODA) is a major source of funding for Lower and Middle Income Countries (LMICs) in particular to address the types of challenges that NbS target, from climate change mitigation and adaptation, to food insecurity, urban development, pollution, and poor health outcomes, among others. However, to date, NbS and other interventions focused on the environmental dimensions of these challenges have received a low proportion of the funding available. Actions to increase bilateral and multilateral funding to scale up NbS, especially by UN agencies and development partners, include: strengthening the ability of countries and local actors to apply for and access multilateral funds and build relationships with bilateral donors interested in supporting NbS; working with multilateral financing organizations to better document the impacts of NbS within current portfolios and increase the inclusion of NbS in funding programs; increasing the scale of NbS supported, e.g. moving towards larger, more extensive and/or more integrated, programmatic NbS implementation; and mainstreaming NbS in regional mechanisms, such as regional funding programs and strategies, including the European Green Deal^{§§§§} and the ASEAN Climate Resilience Network (ASEAN-CRN).^{*****}

Better integrate NbS into public budgets.

The public sector often takes the lead in identifying and channeling funding towards sustainable development options, such as NbS, and in developing regulatory frameworks to support public financing of NbS. Subsidy reform could re-direct funds from harmful activities toward NbS. One study found that “The world is spending at least \$1.8 trillion a year, equivalent to 2% of global GDP, on subsidies that are driving the destruction of ecosystems and species extinction”.¹³¹ Resources from subsidy reform, taxation, COVID-19 recovery packages and other public sources could be invested in NbS. For example, investing in NbS as ‘green’ infrastructure could account for part of the trillions of dollars in annual infrastructure investments that are expected over the coming decades.¹¹⁸ Post COVID-19 recovery and other stimulus packages offer another opportunity to deploy public funding synergistically, enabling actions for nature and NbS that can bring benefits for jobs, livelihoods, and health. For example, the Government of New Zealand’s 2020 NZD 1.1 billion investment responding to the impacts of COVID-19 aimed to create 11,000 environment-sector jobs, and includes a contribution to the Jobs for Nature Fund.¹³² The package allows businesses considering downscaling to redeploy their staff on environmentally focused activities. Similarly, Pakistan’s response to the COVID-19 pandemic includes an “Ecosystem Restoration Fund” platform to bring public and private partners together to work towards a green recovery, and has attracted USD 180 million from multilateral partners.¹³³

§§§§ For more information, please visit https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

***** For more information, please visit <https://asean-crn.org/>

A variety of approaches are available to fully consider NbS costs and benefits in decision-making, including impact assessment and tools that incorporate dependencies on nature¹³⁴ and Natural Capital Accounting (NCA). In the longer term, NCA approaches at the national or subnational level can help to identify opportunities for NbS and make the case for channeling finance towards them. Applying NCA can assist policymakers to value the goods and services provided by nature, and to scale up the use of NbS in the context of managing the wider natural environment. In line with the technical specifications of the System of Environmental Economic Accounting (SEEA), NCA can present and communicate information on biodiversity and ecosystems in a way that can be clearly understood, compared, and used across sectors, policies, and plans. It can provide information to help compare policy options and investments towards actions with the most potential to deliver benefits for building sustainable and resilient cities, communities, and ecosystems, including through the application of NbS. Development partners and countries can support the roll out of SEEA pilots, where possible firmly linked to ongoing policy processes. For example, piloting has taken place in Indonesia, Kenya, Malaysia, and Uganda focused on energy, air emissions and water accounts.

Better integrate public and private financing approaches. Scaling up NbS will not only require the channelling of public funds, and an increased role for the private sector; it will also benefit from recognising the role of both these sectors together. For example, while some private markets for NbS are growing, the public sector still plays an important role – particularly where NbS may not deliver a financial return in the short-term. Reducing the financial risks of interventions, through approaches like blended finance or guarantees, can help to increase private sector implementation of NbS.¹³⁵ Public-private partnerships (PPP) for NbS could also help to make these approaches more attractive by sharing risks and responsibilities. In addition, better consideration of NbS options in decision-making on publicly funded projects (as described above) can contribute to the private sector role. By requiring NbS to be considered as options in public procurement and in lending for public projects, it is likely that more companies will build expertise in NbS and integrate them into tenders.

Encourage private sector-led implementation of NbS.

As mentioned above, public sector actions can help to create an enabling environment for increased private sector collaboration. It is also important to support the uptake of NbS within company operations, across their value and supply chains, and through market mechanisms where appropriate. Encouraging appropriate and robust nature-based “insetting” (which involves implementing NbS along supply chains) could potentially help scale up the impact of private sector implementation. For example, coffee as a crop and smallholder coffee growers are considered particularly vulnerable to increased temperatures, reduced water availability, natural disasters, and market changes. The Nescafé Plan includes training in water efficiency and soil conservation, and promotion of agroforestry and intercropping. A 2021 summary of the Plan’s achievements in the previous decade indicated that 81% of farms under the plan in the Philippines have structured intercropping planting systems, while in Colombia farms under the plan in Valle Del Cauca have seen an 87% increase in productivity over seven years.¹³⁶

NbS are potentially more cost-effective, particularly when compared to relatively new and as yet untested technological measures, like carbon capture and storage¹³⁷ or artificial reefs. However, several barriers exist and markets for NbS are relatively restricted or nascent in some cases. Additional actions will be needed to expand the private sector role in delivering NbS that fully match the characteristics established in the UNEA resolution. Where private sector commitments to nature are widespread and markets are growing, financial mechanisms can be used to encourage further private sector uptake of NbS. Such mechanisms include carbon markets, green financial products (e.g. green bonds), payments for ecosystem services (PES), facilitating reduced insurance premiums through adoption of environmental measures, and the growing range of public (e.g. the European Agricultural Fund for Rural Development,^{†††††} the Adaptation Fund^{†††††} and the LEAF Coalition^{§§§§§}) and private funds (e.g. Climate Asset Management^{*****} and Mirova Natural Capital^{†††††††}).^{138,139,140} In the case of carbon markets, NbS have the potential to account for a certain proportion of the mitigation needed to meet the targets of the Paris Agreement.¹⁴¹ According to Forest Trends, the volume of REDD+ transactions on the voluntary carbon market nearly quadrupled from about 28 million tCO₂ in 2019 to 100 million tCO₂ in 2021.¹⁴² As these markets grow

††††† For more information, please see https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/european-agricultural-fund-rural-development-eafrd_en

†††† For more information, please see <https://www.adaptation-fund.org/>

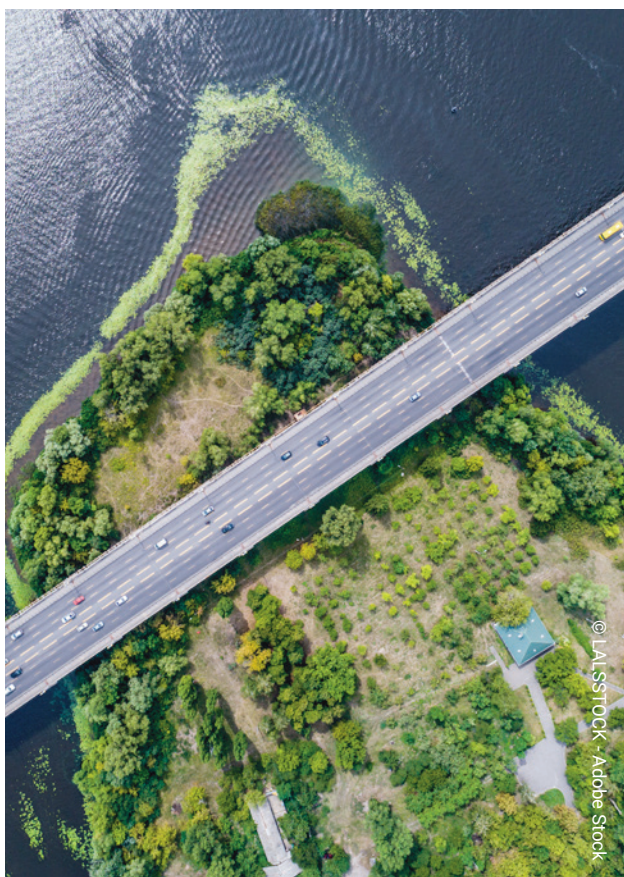
§§§§§ For more information, please see <https://leafcoalition.org/>

***** For more information, please see <https://climateassetmanagement.com/>

††††††† For more information, please see <https://www.mirova.com/en/invest/natural-capital>

and private sector actors increasingly pledge to net zero emissions, is critical that where companies purchase NbS-derived offsets to meet these pledges, these complement real decarbonization and are appropriately safeguarded.¹⁴³ Financial mechanisms that have been put forward for securing peatland ecosystem services include biodiversity offsets, PES and voluntary carbon markets (among others).¹⁴⁴ As an example of nature-based insurance products, the government of Quintana Roo, Mexico, purchased an innovative insurance policy for its coral reefs in 2019. Following Hurricane Delta in 2020, the policy will help offset the costs of reef restoration by almost USD 800,000.¹⁴⁵

However, mechanisms may suit one type of NbS but not another – for example carbon markets that support NbS for climate mitigation, or insurance products linked to EbA. Over the long term, the role of the private sector in scaling up NbS needs to be supported by the inclusion of dependencies on nature in economic, financial and private sector decision-making processes.¹⁴⁶ Like NCA at national and subnational levels, transparency about dependencies and the impacts of investments, through initiatives like the Taskforce on Nature-related Financial Disclosure (TNFD)¹⁴⁷, can help to clarify these impacts and contribute to reducing and removing them from financial and corporate portfolios, potentially driving more investment towards NbS.



4.3 Apply appropriate safeguards, standards, and guidelines for NbS

An important element in an integrated approach to scaling up NbS are measures to ensure that rights are respected, that NbS do not have other unwanted social and environmental consequences, and that they are sustainable over the long-term. There are different ways in which to achieve these aims, but currently most attention has been paid to the use of safeguards and standards. In the simplest definition, safeguards are principles or measures that aim to protect someone or something from harm or damage. In the context of NbS, safeguards aim to prevent negative impacts and promote positive impacts. Standards outline the requirements to meet a certain level of quality or achievement and can serve as a basis for assessing compliance or quality. Some of the key safeguards issues relevant to NbS include¹⁴⁷ respect for the rights of IPLCs including to land and natural resources, the inclusion and participation of stakeholder groups (including people of all genders) and design of gender-responsive actions, transparency and access to information, prevention of negative environmental impacts, and the long-term sustainability of interventions.

There are growing calls for safeguards and standards to guide NbS design and implementation.¹⁴⁸ For example, the recent Glasgow Climate Pact¹⁴⁹ mentions the need to ensure social and environmental safeguards in relation to natural climate sinks and reservoirs. The UNEA resolution on NbS specifically calls for the respect of social and environmental safeguards in line with the three “Rio conventions”, including safeguards for IPLCs.¹⁵⁰ Box 3 below provides a summary of current safeguards and standards that are or may be applied to NbS.

147 For more information, please see <https://tnfd.global/>

Box 3: Safeguards and standards for NbS

To date there are limited examples of agreed and institutionalized standards and safeguards specifically aimed at ensuring the integrity of NbS. The most prominent examples are: the IUCN Global Standard for NbS,¹⁵¹ which sets out criteria for effective NbS (though does not explicitly include safeguards); and the internationally agreed requirements and guidance for REDD+ under the UNFCCC, which include the Cancun Safeguards¹⁵² and Safeguard Information Systems (SIS). There are also other quality and effectiveness criteria for specific types of NbS, which aim to help planners and implementers assess whether their activities are effective and meet quality expectations. These include the Friends of Ecosystem-based Adaptation (FEBA) Framework for Defining Qualification Criteria and Quality Standards,¹⁵³ the CBD Voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction,¹⁵⁴ the International Institute for Environment and Development (IIED)-led framework for assessing EbA effectiveness,¹⁵⁵ and a set of four high-level guidelines for NbS for climate developed by a consortium of 20 UK-based organizations.¹⁵⁶

There is also a growing range of resources and procedures that - even if not developed for NbS specifically - can be and are being applied to NbS activities. These include:

- **Donor and institutional safeguards.** The major funders and implementers of NbS projects through official development assistance, such as the GCF, the IKI, the World Bank, regional development banks, the GEF and UN agencies all require safeguards policies to be applied to the activities that they support. NbS specific examples include the World Bank principles on NbS for disaster risk reduction and water management¹⁵⁷ and the guidelines for evaluating the impacts of NbS by the European Commission.¹⁵⁸
- **Lending/investment guidelines from banks and other financial institutions.** Often encompassed in Environmental, Social and Governance (ESG) Frameworks or Performance Standards, these provide criteria for investments to be considered for funding. For example, Mirova has ESG principles and policies for its Natural Capital fund.¹⁵⁹ Other relevant standards (though not specifically designed for NbS) include the International Finance Corporation's (IFC's) Environmental and Social Performance Standards. Performance Standard 6 on biodiversity, for instance, sets out expectations related to adherence to the mitigation hierarchy, no net loss and maintenance of ecosystem services,¹⁶⁰ while other Performance Standards cover NbS-relevant topics, such as cultural heritage, community safety, and indigenous peoples.¹⁶¹ Many individual private funds/banks also have guidelines on investing in NbS-relevant activities, such as forests, agriculture, water, or infrastructure.
- **Relevant sectoral and ecosystem guidelines and standards.** These exist for a wide range of activities that fall under the umbrella of NbS, and include: Food and Agriculture Organization of the United Nations (FAO) voluntary guidelines on plantations and tenure; IUCN guidelines on protected area categories, management and other topics, e.g. forest landscape restoration guidelines;¹⁶² Global Partnership on Forest and Landscape Restoration (GPFLR) Principles on forest landscape restoration;¹⁶³ Principles on ecosystem restoration to guide the United Nations Decade on Ecosystem Restoration; ¹⁶⁴ guidelines on ecological restoration by the Society of Ecological Restoration;¹⁶⁵ forest certification standards; WWF principles on for flood risk management;¹⁶⁶ technical guidelines produced by relevant conventions, such as the Ramsar Convention on Wetlands technical handbooks on wetlands¹⁶⁷ and the recently launched Guidance for Peatlands Restoration,^{168,169} and guidelines for implementation of Eco-DRR.¹⁷⁰
- **National safeguards frameworks and systems.** Some countries have developed national safeguards frameworks, setting out key safeguards issues and requirements (including regulatory requirements like environmental impact assessment (EIA)). Examples include national REDD+ safeguards and safeguards of nationally accredited entities to funders like the GCF.
- **Generic instruments.** These instruments and approaches are often incorporated into safeguards policies at national and international level, such as: participatory appraisal and planning; Free, Prior and Informed Consent (FPIC) for rights holders; environmental and social impact assessment (ESIA) and strategic environmental assessment (SEA); benefit sharing plans; and gender assessment and action plans. For example, the UN-REDD Programme's Guidelines on FPIC for REDD+.¹⁷¹

Although there are few examples of internationally agreed and institutionalized standards and safeguards specifically for NbS, there is a wide body of resources to support improved safeguarding of NbS (see Box 3 above). However, at the same time, there are challenges and considerations in operationalising these safeguards and standards for NbS, and in ensuring that they are comprehensively applied and monitored. Key considerations include:

- Because there are many different existing safeguard frameworks and standards that could be applied to different NbS, it can be difficult for implementers to know which ones to select or apply, if selecting one on a voluntary basis. This is especially the case for NbS interventions that do not have a mandatory safeguards requirement (e.g. when the funder does not specify safeguards) or where a clear, specific standard is not available (in contrast to REDD+, for instance).
- Most existing safeguards policies are generic, either in terms of content (e.g. a standard set of safeguards to be applied to any project, such as those of the IFC or GCF), or because they were developed at the global level to be applied in any geography (e.g. Cancun Safeguards for REDD+).¹⁷² This means that when applied to NbS, these safeguards policies may require interpretation or unpacking, and contextualisation (such as defining what full participation means in the context in question). This usually requires a combination of safeguards expertise and local knowledge.
- Except where specifically mandated by a funder, an international agreement or a certification process, safeguards frameworks and standards may lack coordination, compliance, or reporting mechanisms.¹⁷³ The implementation of safeguards and standards on the ground, i.e. what procedures to follow and how, and how to pay for it, can be a significant knowledge and resource gap. The lack of full implementation and reporting forms a key missing piece between the development of a safeguards policy and compliance.
- Similarly, various funders and financial institutions may require the use of safeguards and standards for the projects, including NbS, that they support, and may require reporting on safeguards implementation. However, this does not necessarily translate into comprehensive and transparent reporting on the technical and safeguards performance of their project and/or lending portfolios.
- As mentioned above, apart from the IUCN NbS Standard, there is no specific set of safeguards that have been agreed at international level for NbS. It can be argued that there will never be a globally agreed set of safeguards for NbS as a category, due to the wide range of actions that fall under the NbS umbrella, which are covered by multiple international conventions and involve multiple sectors.

Given these challenges and considerations, recommendations for improving the application of safeguards, standards, and guidelines for NbS include those listed below.

Comprehensive application of safeguards and standards for NbS interventions, regardless of the source of financing. There are already sufficient safeguards policies and standards to apply to NbS design and implementation, although they may differ across different types of NbS (for example, technical standards for water sector NbS compared to forest sector NbS). Appropriate instruments should be applied to all NbS regardless of their type, funding source, level, or location, and who is leading their implementation. Safeguards are needed in new and emerging platforms for NbS (e.g. those based on digital technologies, small-scale funds, private sector schemes) as well as in large, publicly funded programs. There is also a need to build capacity around the standards and safeguards instruments already available for NbS, and to ensure these are known and useful to key NbS actors, including in non-European languages (see also Section 4.1 above). Beyond project level safeguards and donor mandated safeguards, countries can also be supported to expand the application of safeguards, including to publicly funded programs. This could include the development of national policies and standards on NbS broadly or for specific types of NbS where appropriate, or the development of national streamlining of multiple safeguards frameworks. For example, the Safeguards+ Honduras platform brings together its “National Environmental and Social Safeguards Framework for Climate Change Projects and Programs in Honduras” with a set of tools to facilitate its implementation in climate projects across the country.¹⁷⁴ It includes nine national safeguards aligned to the Cancun safeguards for REDD+, UNDP’s Social and Environmental Standards, and various standards from the World Bank, GCF and the Central American Bank for Economic Integration (among others). It is aimed at government agencies, project developers, civil society, academia, and IPLCs.¹⁷⁵

A comprehensive review of the standards and safeguards available. This paper presents only an overview of the wide range of safeguards, standards, and guidelines available to support NbS design and implementation. Further assessment is needed of the completeness and applicability of existing safeguards and standards for NbS, the extent of current application of safeguards and safeguard information systems, and options for practical implementation and monitoring. For example, there is long-standing experience and resources available in relation to safeguards for REDD+ that can inform this process.^{176,177} The upcoming intergovernmental consultations on NbS convened by UNEP are to support the compilation of best practice examples and the assessment of standards and guidelines, among other topics, and may thus provide an opportunity to also review resources available for safeguards for NbS.

Robust monitoring of social and environmental safeguards. Monitoring of safeguards compliance and reporting on safeguards outcomes is still lacking, especially where safeguards reporting is not mandated by governments or funders. Support should be provided for the development of Monitoring and Evaluation (M&E) systems for understanding safeguards risks and tracking the application of safeguards. Attention should be paid to collection of data disaggregated by stakeholder group, gender, and other important categories. This can include integration of environmental and social safeguards information into disclosures by the private sector, and strengthening analysis and monitoring of this information in donor portfolios. For example, the IFC has developed MALENA, an Artificial Intelligence (AI) powered platform that identifies ESG impact risk from unstructured text data, and makes sentiment analysis available to institutional investors to identify ESG risk and create better-aligned investment portfolios.¹⁷⁸

4.4 Enable locally-led actions on NbS

In addition to the development of integrated approaches linking policy, finance, technical advances and safeguards, the scaling up of NbS can also be facilitated at the local level. Local actions, including local participation and knowledge, are an important element of effective NbS. Evidence, particularly in the climate adaptation arena, shows that community-led actions are key to ensuring the effectiveness and sustainability of projects. For example, the Principles for locally-led Adaptation,¹⁷⁹ proposed by the Global Commission on Adaptation (GCA) and developed by IIED, WRI and the International Center for Climate Change and Development (ICCCAD) through a consultative process, are designed to empower local people and build their capacities for climate resilience.¹⁸⁰ Realizing the potential of locally-led NbS will require leadership by and co-design with IPLCs as well as finance and capacity building that specifically targets the local level.

Recognise and protect rights to land, resources, and decision-making. IPLCs, women, youth and other groups are often in the best position to comprehend their own needs, priorities, and capabilities,^{181,182} as well as vulnerabilities and risks.¹⁸³ Yet local rightsholders and stakeholders may be seen as mere beneficiaries, and are often not fully involved in decision-making processes, funding allocation, and leadership.¹⁸⁴ As noted in Section 2.2, a lack of respect for IPLC rights, traditional knowledge and historical role in managing natural resources forms a key concern for the future of NbS. Effective scaling up of NbS requires that this concern is addressed and that rights are recognised and respected – including rights to land, to access and use natural resources, and rights to decision-making and participation in NbS design and implementation, including whether or not NbS will be implemented at all. In addition to the need for legal frameworks to recognise rights, there are a range of other mechanisms that can strengthen the role

of local actors, such as: devolution of responsibilities and budgets for planning and implementing NbS;¹⁸⁵ consistent application of safeguards by all actors planning and implementing NbS, particularly the use of instruments like FPIC (see Section 4.3 on safeguards above); and meaningful, gender-responsive consultation and collaboration mechanisms.

Existing processes can be adapted to support participation in NbS, such as “town hall meetings”, community-based forest and wetland management groups, and river basin management committees. National and local policies and guidelines can also be put in place that require multi-stakeholder participation in assessment and design of programs and projects including NbS (e.g. public participation requirements in EIAs) and that promote community-based or co-design of NbS (e.g. budget incentives for local governments that use such guidelines). An example of a local governance mechanism for NbS for economic development comes from Papua New Guinea. In 2009, a nationwide ban on fishing for all sea cucumber species (a highly valuable product) was put in place. In Manus Province, with the support of The Nature Conservancy, the Mwanus Endras Tribal Network mapped their whole seascape and designated protected areas for key habitats for fish and other marine species. They also evaluated the sea cucumber fisheries, and developed sustainable management plans. Manus Province has now re-opened fishing and the revenues are returned to the tribal co-operative, paying fair salaries to fishers and reinvesting in local community projects.¹⁸⁶

Establish and expand financial mechanisms to support locally-led NbS actions. According to research by IIED, less than 10% of global climate finance targets local action, and it is even rarer that investments reaching this level are actually “locally-led”. For local communities to effectively replicate and implement NbS, simpler access to funding and feasible timeframes are needed.^{187,188} The financing of NbS implementation by local governments, local communities, NGOs and other actors may need different channels and approaches, in contrast to large-scale loans or national scale programs.¹⁸⁹ Some examples of these mechanisms include: public budgeting exercises allowing community participation in local budget allocation; small grants programs supporting NbS; and local-level PES schemes and voluntary carbon market projects. An example of locally targeted finance is the Forest Investment Program (FIP) Dedicated Grant Mechanism (DGM), which dedicates around USD 80 million to IPLC organizations, which in turn delegate funds to local projects. So far, this DGM has demonstrated that forest restoration and management led by IPLCs fulfil community needs more accurately and produce results with fewer resources than standard projects.¹⁹⁰

Targeted capacity building and support networks for locally-led NbS. Similar to finance, there are special considerations for building capacity and maintaining knowledge networks for locally-led NbS. Specialised training should be built into projects and programs to strengthen the technical and institutional capacities at local level to ensure the effective implementation and long-term sustainability of NbS.¹⁹¹ For example, Singapore’s Active, Beautiful, Clean Waters (ABC Waters) Programme aims to integrate parks, reservoirs, waterways and recreational facilities to both improve stormwater management and create inviting spaces. It includes a range of capacity development approaches, such as ABC Waters Design Guidelines, ABC Waters Professionals programme, training of third parties on maintenance, incorporation into the tertiary education curriculum, and ABC Waters Certification.¹⁹² The wealth of local and traditional knowledge and expertise already

existing at local levels also forms an important resource, provided it is appropriately and equitably accessed, with local knowledge holders in the lead. Other approaches include working with universities and colleges to develop joint research and monitoring with local communities. For example, Thailand’s Office of National Water Resources together with GIZ and five university partners are testing M&E approaches for EbA in the water sector involving local communities and digital technologies.¹⁹³ In Mali, a community-based project aimed at reducing erosion, restoring soil quality, and creating jobs¹⁹⁴ has set up community-led Village Tree Enterprises (VTEs). The VTEs have received support to improve non-timber forest product (NTFP) production processes, product quality, and business and financial skills, run savings and loans schemes, and trade as one entity — through which they can often negotiate better prices.



Conclusions

This paper aims to inform ongoing discussions and progress on mainstreaming NbS at global, regional, and national levels. Despite the increased recognition of the interconnections between nature and many of the challenges that we face, there is continuing degradation of ecosystems and loss of biodiversity which is damaging our ability to respond to these challenges. NbS aims to work with nature and natural processes to address various social, environmental and economic challenges. In 2022, the UNEA resolution on NbS¹⁹⁵ represented significant progress in reaching consensus on what NbS are and how they can be used.

As this paper shows, NbS are being considered by a range of actors to help address sustainability challenges, and are the subject of growing expressions of support and commitments – by governments, international organizations, the private sector and civil society. However, despite this growing consensus around the role and value of NbS, there are still a set of important issues, concerns and barriers that need to be addressed before these solutions can be scaled up and deliver on their potential. These concerns are implicitly acknowledged in the UNEA resolution and include the need for NbS to demonstrate environmental, social, and economic integrity, to respect the rights of IPLCs, and to ensure that they do not replace or distract from other urgently needed solutions.

NbS offer effective ways to tackle particular challenges, including climate change, food and water insecurity, disaster impacts, and threats to human health and well-being, among others, while reducing environmental degradation and biodiversity loss. As discussed, single NbS can deliver multiple benefits, and can be effectively combined with other strategies, such as engineered “grey” measures for climate change adaptation, decarbonization for climate change mitigation, early warning and surveillance for disaster risk reduction, and combating health threats.

Building on the growing recognition of NbS, there is an opportunity to translate commitments into concrete action to scale up these solutions on the ground. Actions to support the scaling up of NbS have been a key focus of this paper, with recommendations set out in four main areas:

- Continue to build a common understanding of NbS, tackling the lack of awareness and agreement that forms one barrier to their scaling up. The definition provided in the UNEA resolution and growing recognition of NbS helps to overcome these barriers, but further actions are needed. These include active support for upcoming intergovernmental consultations and similar processes on NbS, strengthened cross-sector and stakeholder engagement to build consensus at national level, and improved exchange of information on best practices for NbS.

- **Apply integrated approaches for NbS** that coherently link policies, financial mechanisms and technical advances, especially at national and local levels. Scaling up and long-term sustainability will require an integrated approach, in which NbS are embedded in policies with concrete targets, backed up by financial resources and mechanisms and compliant with social and environmental safeguards and standards. Creating cross-sector support and platforms for NbS, increasing and redirecting finance towards NbS, improving technical capacity, and the use of safeguards and standards are all elements of these integrated approaches.

- **Robust safeguards, safeguards systems and standards** must be in place to guide NbS design and implementation. These involve measures to ensure that IPLC rights are respected, that NbS do not have other unwanted social and environmental consequences, and that they are sustainable over the long-term. There are a range of existing safeguards, safeguards information systems, standards, and guidelines relevant to NbS, though challenges remain in their operationalisation. The consistent application of safeguards and standards for all types of NbS, comprehensive review of existing standards and safeguards, and promotion of monitoring and reporting can all contribute to ensuring the integrity of NbS and their scaling up.

- **Empower locally-led action on NbS** that is built on respect for the rights of IPLCs, through targeted funding and technical support to local actors. In addition to integrated approaches, the scaling up of NbS can also be facilitated at the local level. Local leadership, participation and knowledge are important elements of effective NbS, but must be supported by respect for the rights and decision-making of IPLCs as well as finance and capacity building that specifically targets the local level.

In the near future, governments, international organizations, and other actors will have further opportunities to shape the global agenda around NbS. Intergovernmental consultations to be convened by UNEP, as well as consultation processes and discussions under climate change, biodiversity, and other conventions, will provide a window to continue to build consensus on what constitutes appropriate and effective actions, to promote best practices, and to put in place frameworks for effective, sustainable, and socially inclusive NbS going forward.



References

- 1 UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- 2 UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- 3 IUCN (2016). *IUCN Resolutions, Recommendations and other Decisions*. Gland, Switzerland: IUCN. Available from <https://portals.iucn.org/library/sites/library/files/documents/IUCN-WCC-6th-005.pdf>
- 4 UN Climate Action Summit (2019). *The Nature-based solutions manifesto*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/29705/190825NBSManifesto.pdf?sequence=1&isAllowed=y>
- 5 Leaders Pledge for Nature (2021). *Leaders Pledge for Nature*. Available from https://www.leaderspledgefornature.org/wp-content/uploads/2021/06/Leaders_Pledge_for_Nature_27.09.20-ENGLISH.pdf
- 6 G7 Germany (2022). *G7 Development Ministers Meeting Communiqué*. Available from <https://www.bundesregierung.de/resource/blob/974430/2041312/aa2f4b131c4e0463bcb1a9be5eadac5a/2022-05-19-g7-development-ministers-data.pdf?download=1>
- 7 G7 (2021). *G7 Climate and Environment: Ministers' Communiqué*, London, 21 May 2021. Available from <https://www.gov.uk/government/publications/g7-climate-and-environment-ministers-meeting-may-2021-communicue/g7-climate-and-environment-ministers-communicue-london-21-may-2021>
- 8 ICCD/COP(15)/23/Add.1 (2022). *Report of the Conference of the Parties on its fifteenth session, held in Abidjan, Côte d'Ivoire, from 9 to 20 May 2022*. Part two: Action taken by the Conference of the Parties at its fifteenth session. Addendum. Available at <https://www.unccd.int/sites/default/files/2022-06/cop23add1-advance.pdf>
- 9 WWF-UK (2021). *NDCs – a force for nature*. 4th Edition. Nature in Enhanced NDCs. Available from https://wwfint.awsassets.panda.org/downloads/wwf_ndcs_for_nature_4th_edition.pdf
- 10 Government of Costa Rica (2018). *National Decarbonization Plan 2018–2050*. Available from <https://cambioclimatico.go.cr/wp-content/uploads/2020/01/NationalDecarbonizationPlan.pdf?x36599>
- 11 China State Council Information Office of the People's Republic of China (October 2021). *Biodiversity Conservation in China*. White Paper. Available from http://english.www.gov.cn/archive/whitepaper/202110/08/content_WS615fb228c6d0df57f98e1552.html
- 12 Xinhua Net (2017). "Implementation Plan for Important Reform Initiatives of the 19th Party Congress Report (2018-2022)", 划重点！十九大报告提出的N个重大改革举措-新华网. Available from http://www.xinhuanet.com/politics/2017-10/23/c_1121843777.htm
- 13 NDRC (2020). "Master Plan of Major Projects for the Protection and Restoration of Important National Ecosystems (2021-2035)", 全国重要生态系统保护和修复重大工程总体规划（2021—2035年）. Available from <https://www.ndrc.gov.cn/xxgk/zcfb/tz/202006/P0200611354032680531.pdf>
- 14 China Council for International Cooperation on Environment and Development (2021). *Scoping Study: Nature-Based Solutions (NbS)*. Available from <https://cciced.eco/research/special-policy-study/scoping-study-nature-based-solutions-nbs/>
- 15 Government of Canada (2020). *Fall Economic Statement 2020: Supporting Canadians and Fighting COVID-19*. Available from <https://www.budget.gc.ca/fes-eea/2020/report-rapport/FES-EEA-eng.pdf>
- 16 Government of Canada (2021). *The Government of Canada Provides an Update on Planting Two Billion Trees*. June 4, 2021. Natural Resources Canada. Available from: <https://www.canada.ca/en/natural-resources-canada/news/2021/06/the-government-of-canada-provides-an-update-on-planting-two-billion-trees.html>
- 17 Government of Canada (2022). *Budget 2022: A Plan to Grow Our Economy and Make Life More Affordable*. Available from <https://budget.gc.ca/2022/home-accueil-en.html>
- 18 Prime Minister's Office (2022). *Prime Minister commits £3bn UK climate finance to supporting nature*. Available from <https://www.gov.uk/government/news/prime-minister-commits-3bn-uk-climate-finance-to-supporting-nature>; HM Government (2021). *UK International Climate Finance: A UK Government commitment to building resilience and accelerating transition*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1029990/icf-brochure-2021.pdf
- 19 Nature-based Solutions Initiative (2021). *£3bn of UK's international climate finance committed to nature*. Available from <https://www.naturebasedsolutionsinitiative.org/news/3bn-of-uks-international-climate-finance-committed-to-nature/>
- 20 BMUV (2022). *Federal Action Plan on Nature-based Solutions for Climate and Biodiversity – Key issues paper*. Available from <https://www.bmu.de/en/download/federal-action-plan-on-nature-based-solutions-for-climate-and-biodiversity>
- 21 Scottish Government (2021). *Post-2020 global biodiversity framework - Edinburgh Process: report*. Available from <https://www.gov.scot/publications/report-edinburgh-process-subnational-local-governments-development-post-2020-global-biodiversity-framework/pages/2/>
- 22 European Environment Agency (2021). *Nature-based solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction*. Available from <https://www.eea.europa.eu/publications/nature-based-solutions-in-europe>
- 23 European Commission (2021). *Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change*. Available from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN>
- 24 European Investment Bank (2022). *Natural Capital Financing Facility*. Available from <https://www.eib.org/en/products/mandates-partnerships/ncff/index.htm>
- 25 SPC (2022). *Strategic Plan 2022-2031: sustainable Pacific development through science, knowledge and innovation*. Available from <https://spc.int/strategic-plan>
- 26 SPC (2021). *Nature-based solutions for climate resilience*. Available from <https://www.spc.int/updates/blog/director-general/2021/03/nature-based-solutions-for-climate-resilience-and>; SPC (no date). *The Kiwa Initiative*. Available from <https://www.spc.int/cces/the-kiwa-initiative>
- 27 Act4Nature (2022). *Commit to act4nature international*. Available from http://www.act4nature.com/wp-content/uploads/2020/11/act4nature_international_commit_en-1.pdf
- 28 IISD (2021). *The NBI Global Resource Centre*. Available from <https://nbi.iisd.org/our-mission/>
- 29 AFDB (2022). *The Africa Adaptation Acceleration Program (AAAP)*. Available from <https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/africa-adaptation-acceleration-program>
- 30 United Nations Environment Programme (2021). *State of Finance for Nature 2021*. Nairobi. Available from <https://www.unep.org/resources/state-finance-nature>
- 31 United Nations Environment Programme (2021). *Adaptation Gap Report 2020*. Nairobi. Available from <https://www.unep.org/resources/adaptation-gapreport-2020>
- 32 World Bank Group and WRI (2018). *Nature-based Solutions for Disaster Risk Management*. Available from <https://documents1.worldbank.org/curated/en/253401551126252092/pdf/Booklet.pdf>
- 33 World Bank (2022). *Disaster Risk Management – Overview – Strategy*. Available from <https://www.worldbank.org/en/topic/disasterriskmanagement/overview#2>
- 34 Finance Earth (2021). *A Market Review of Nature-Based Solutions: An Emerging Institutional Asset Class (Commissioned by the Green Purposes Company; based on a review of 88 NbS transactions)*. Available from <https://finance.earth/wp-content/uploads/2021/05/Finance-Earth-GPC-Market-Review-of-NbS-Report-May-2021.pdf>
- 35 IUCN (2020). *IUCN and partners launch novel fund to drive investment to nature-based solutions*. Gland, Switzerland, 04.11.2020. Available from: https://www.iucn.org/sites/default/files/content/documents/2020/iucn_news_nature_plus_accelerator_final_approved.pdf
- 36 The LEAF Coalition (2022). *The LEAF Coalition*. Available from <https://leafcoalition.org/>
- 37 Climate Asset Management (2022). *Investment strategies*. Available from <https://climateassetmanagement.com/investment-strategies/>
- 38 United Nations Environment Programme (2020). *New Restoration Seed Capital Facility launched to promote investment in forest landscape restoration*. Available from <https://www.unep.org/news-and-stories/press-release/new-restoration-seed-capital-facility-launched-promote-investment>
- 39 Swann, S., Blandford, L., Cheng, S., Cook, J., Miller, A., and Barr, R. (2021). *Public International Funding of Nature-based Solutions for Adaptation: A Landscape Assessment*. Working Paper. Washington, DC: World Resources Institute. Available from <https://doi.org/10.46830/wriwp.20.00065>.
- 40 Global EbA Fund (2022). *Global EbA Fund*. Available from <https://globeabafund.org/>

- ⁴¹ IKI (no date). *Ecosystem-based Adaptation (EbA)*. Available from <https://www.international-climate-initiative.com/en/topics/ecosystem-based-adaptation-eba/>
- ⁴² Friends of the Earth International (2021). *Nature based solutions: a wolf in sheep's clothing*. Position paper. Available from https://www.foei.org/wp-content/uploads/2021/11/Nature-based-solutions_a-wolf-in-sheeps-clothing.pdf
- ⁴³ IISD (2021). *Seeking Common Ground for Climate, Biodiversity, and People: How to get the debate on nature-based solutions right*. Available from <https://www.iisd.org/articles/common-ground-nature>
- ⁴⁴ Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C. et al. (2021). Getting the message right on nature-based solutions to climate change. *Global Change Biology* 27(8), 1518-1546. Available from <https://doi.org/10.1111/gcb.15513>
- ⁴⁵ Price, R. (2021). *Nature-based Solutions (NbS) – what are they and what are the barriers and enablers to their use?* Institute of Development Studies. Available from <https://doi.org/10.19088/K4D.2021.098>
- ⁴⁶ IISD (2021). *Seeking Common Ground for Climate, Biodiversity, and People: How to get the debate on nature-based solutions right*. Available from <https://www.iisd.org/articles/common-ground-nature>
- ⁴⁷ Chausson, A., Turner, B., Seddon, D., Chabaneix, N., Girardin, C., Kapos, V. et al. (2020). Mapping the effectiveness of Nature-based Solutions for climate change adaptation. *Global Change Biology* 26, 6134-6155. Available from <https://doi.org/10.1111/gcb.15310>
- ⁴⁸ Global Youth Biodiversity Network (no date). *What are nature-based solutions? Risks, concerns and opportunities*. Available from <https://networknature.eu/product/22441>
- ⁴⁹ Nesshöver, C., Assmuth, T., Irvine, K.N., Rusch, G.M., Waylen, K.A., Delbaere, B. et al. (2017). The science, policy and practice of nature-based solutions: An interdisciplinary perspective. *Science of the Total Environment* 574, 1215 – 1227. Available from <https://doi.org/10.1016/j.scitotenv.2016.11.106>
- ⁵⁰ Chausson, A., Turner, B., Seddon, D., Chabaneix, N., Girardin, C.A.J., Kapos, V. et al. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation. *Global Change Biology* 26(11), 6134-6155. Available from <https://doi.org/10.1111/gcb.15310>
- ⁵¹ Hou-Jones, X., Roe, D. and Holland, E. (2021). *Nature-based Solutions in Action: Lessons from the Frontline*. Available from <https://www.bond.org.uk/resources/nature-based-solutions-in-action-lessons-from-the-frontline>
- ⁵² ReNature (2022). *The ReNature Nature-Based Solutions Compendium*. Available from <http://www.renature-project.eu/compendium>
- ⁵³ Doswald, N., Munroe, R., Roe, D., Giuliani, A., Castelli, I., Stephens, J. et al. (2014). Effectiveness of ecosystem-based approaches for adaptation: review of the evidence-base *Climate and Development* 6:2, 185-201. DOI: 10.1080/17565529.2013.867247
- ⁵⁴ Giordano, R., Pluchinotta, I., Pagano, A., Scricciu, A. and Nanu, F. (2020). Enhancing nature-based solutions acceptance through stakeholders' engagement in co-benefits identification and trade-offs analysis. *Science of the Total Environment* 713. Available from <https://doi.org/10.1016/j.scitotenv.2020.136552>
- ⁵⁵ UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- ⁵⁶ WCC-2016-Res-069-EN (2016). *Defining Nature-based Solutions*. Available from https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_069_EN.pdf
- ⁵⁷ World Bank (2008). *Biodiversity, Climate Change, and Adaptation: Nature-based Solutions from the World Bank Portfolio*. World Bank, Washington, DC. Available from <https://openknowledge.worldbank.org/handle/10986/6216>; Pauleit, S., Zolch, T., Hansen, R., Randrup, T.B. and Bosch, C.K. (2017). Nature-Based Solutions and Climate Change – Four Shades of Green. *Theory and Practice of Urban Sustainability Transitions*. Available from https://doi.org/10.1007/978-3-319-56091-5_3
- ⁵⁸ Secretariat of the Convention on Biological Diversity (2009). *Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change*. Available from <https://www.cbd.int/doc/publications/cbd-ts-41-en.pdf>; CBD/COP/DEC/14/5 (2018). *Biodiversity and climate change*. Available from <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-05-en.pdf>
- ⁵⁹ European Commission (2022). *The EU and nature-based solutions*. Available from https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en
- ⁶⁰ UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- ⁶¹ IUCN (2020). *Guidance for using the IUCN Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of Nature-based Solutions*. First edition. Gland, Switzerland: IUCN.
- ⁶² Chausson, A., Turner, B., Seddon, D., Chabaneix, N., Girardin, C.A.J., Kapos, V. et al. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation. *Global Change Biology* 26(11), 6134-6155. Available from <https://doi.org/10.1111/gcb.15310>
- ⁶³ Cohen-Shacham, E., Andrade, A., Dalton, J., Dudley, N., Jones, M., Kumar, C. et al. (2019). Core principles for successfully implementing and upscaling Nature-based Solutions. *Environment Science & Policy* 98, 20-29. Available from <https://doi.org/10.1016/j.envsci.2019.04.014>
- ⁶⁴ Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (2016). *Nature-based Solutions to address global societal challenges*. Gland, Switzerland.
- ⁶⁵ IUCN-WCPA Task Force on OECMs (2019). *Recognising and reporting other effective area-based conservation measures*. Gland, Switzerland.
- ⁶⁶ IUCN (2022). *World Commission on Protected Areas*. Available from <https://www.iucn.org/commissions/world-commission-protected-areas/our-work/oecms>
- ⁶⁷ Asia Protected Areas Partnership (2021). *Other effective area-based conservation measures (OECMs)*. Available from <http://asiaprotectedareaspartnership.org/index.php/oecms>
- ⁶⁸ Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Johnson, J. et al. (2019). International principles and standards for the practice of ecological restoration. *Restoration Ecology* S1 – S46.
- ⁶⁹ Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (2016). *Nature-based Solutions to address global societal challenges*. Gland, Switzerland.
- ⁷⁰ Kapos, V., Wicander, S., Salvaterra, T., Dawkins, K. and Hicks, C. (2019). *The Role of the Natural Environment in Adaptation*. Background Paper for the Global Commission on Adaptation. Rotterdam and Washington D.C.: Global Commission on Adaptation.
- ⁷¹ Chausson, A., Turner, B., Seddon, D., Chabaneix, N., Girardin, C.A.J., Kapos, V. et al. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation. *Global Change Biology* 26(11), 6134-6155. Available from <https://doi.org/10.1111/gcb.15310>
- ⁷² European Environment Agency (2015). *Green infrastructure: better living through nature-based solutions*. Interview. Available from <https://www.eea.europa.eu/articles/green-infrastructure-better-living-through>
- ⁷³ European Commission, Directorate-General for Research and Innovation. (2015). *Towards an EU research and innovation policy agenda for nature-based solutions & re-naturing cities*. Final report of the Horizon 2020 expert group on 'Nature-based solutions and re-naturing cities'. Available from <https://data.europa.eu/doi/10.2777/479582>
- ⁷⁴ Kabisch, N., Korn, H., Stadler, J. and Bonn, A. (2017). Nature-Based Solutions to Climate Change Adaptation in Urban Areas. *Theory and Practices of Urban Sustainability Transitions*. Available from <https://link.springer.com/content/pdf/10.1007/978-3-319-56091-5.pdf>
- ⁷⁵ Albert, C., Schroter, B., Haase, D., Brilling, M., Henze, J., Herrmann, S. et al. (2019). Addressing societal challenges through nature-based solutions: How can landscape planning and governance research contribute? *Land Scape and Urban Planning* 182, 12 – 21. Available from <https://doi.org/10.1016/j.landurbplan.2018.10.003>
- ⁷⁶ IUCN (2020). *Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS*. Gland, Switzerland.
- ⁷⁷ UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- ⁷⁸ United Nations Environment Programme (2021). *Adaptation Gap Report 2020 - Executive summary*. Nairobi.
- ⁷⁹ Narayan, S. et al. (2016). The effectiveness, costs and coastal protection benefits of natural and nature-based defences. *PLoS ONE* 11(5). Available from <https://doi.org/10.1371/journal.pone.0154735>
- ⁸⁰ Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C. et al. (2021). Getting the message right on nature-based solutions to climate change. *Global Change Biology* 27(8), 1518-1546. Available from <https://doi.org/10.1111/gcb.15513>
- ⁸¹ IPBES (2016). *Summary for policymakers of the assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production*. Available from <https://ipbes.net/assessment-reports/pollinators>
- ⁸² United Nations Environment Programme (2021). *Adaptation Gap Report 2020*. Nairobi. Available from <https://www.unep.org/resources/adaptation-gapreport-2020>

- ⁸³ CABI (2021). *Interventions: Invasive Species Management – a nature-based solution for climate and environment*. Available from <https://blog.cabi.org/2021/11/11/invasive-species-management-a-nature-based-solution-for-climate-and-environment/>
- ⁸⁴ CABI Bio protection portal (2021). *Pest and climate change*. Available from <https://bioprotectionportal.com/blog/2022/pests-and-climate-change-using-nature-based-solutions>
- ⁸⁵ UNDP (2022). *Uganda Pilot Project Global Mountain Eba Program*. Available from <https://www.adaptation-undp.org/projects/mountain-eba-uganda>
- ⁸⁶ Chausson, A., Turner, B., Seddon, D., Chabaneix, N., Girardin, C., Kapos, V. et al. (2020). Mapping the effectiveness of Nature-based Solutions for climate change adaptation. *Global Change Biology* 26, 6134–6155. Available from <https://doi.org/10.1111/gcb.15310>
- ⁸⁷ Osano, P.M., Said, M.Y., Leeuw, J., Moiko, S.S., Kaelo, D.O., Schomers, S. et al. (2013). Pastoralism and ecosystem-based adaptation in Kenyan Masailand. *International Journal of Climate Change Strategies and Management* 5(2), 198-214. DOI 10.1108/17568691311327596
- ⁸⁸ Strack, M., Davidson, S.J., Hirano, T. and Dunn, C. (2022). *The Potential of Peatlands as Nature-Based Climate Solutions*. Available from <https://www.researchgate.net/publication/361263904>
- ⁸⁹ Tanneberge, F., Appulo, L., Ewert, S., Lakner, S., Brolchain, N.O., Peters, J. et al. (2021). The Power of Nature-Based Solutions: How Peatlands Can Help Us to Achieve Key EU Sustainability Objectives. *Advanced Sustainability Systems* 5, 2000146. Available from <https://onlinelibrary.wiley.com/doi/epdf/10.1002/advs.202000146>
- ⁹⁰ Kapos, V., Wicander, S., Salvaterra, T., Dawkins, K. and Hicks, C. (2019). *The Role of the Natural Environment in Adaptation, Background Paper for the Global Commission on Adaptation*. Background paper for the Global Commission on Adaptation, Rotterdam and Washington D.C.
- ⁹¹ Nagabhatla, N. (2018). *Multi-functional Wetlands and Nature-based Solutions (NBS) – The Ecosystem Services perspective is the link*. Available from https://www.researchgate.net/publication/328228351_Multi-functional_Wetlands_and_Nature-based_Solutions_NBS_-_The_Ecosystem_Services_perspective_is_the_link
- ⁹² Grorud-Colvert, K., Claudet, J., Tissot, B.N., Caselle, J.E., Carr, M.H., Day, J.C. et al. (2014). Marine Protected Area Networks: Assessing Whether the Whole Is Greater than the Sum of Its Parts. *PLOS ONE*. Available from <https://doi.org/10.1371/journal.pone.0102298>
- ⁹³ Eggermont, H., Balian, E., Azevedo, J.M.N., Buemer, V., Brodin, T., Claudet, J. et al. (2015). Nature-based Solutions: New Influence for Environmental Management and Research in Europe. *Ecological Perspectives for Science and Society* 24(4), 243-248. Available from <http://dx.doi.org/10.14512/gaia.24.4.9>
- ⁹⁴ Nature-based Solutions Initiative (2022). *Seagrass Restoration in the UK*. Available from <https://www.naturebasedsolutionsinitiative.org/news/seagrass-restoration-plymouth-sound-uk/>
- ⁹⁵ Kapos, V., Wicander, S., Salvaterra, T., Dawkins, K. and Hicks, C. (2019). *The Role of the Natural Environment in Adaptation, Background Paper for the Global Commission on Adaptation*. Background paper for the Global Commission on Adaptation. Rotterdam and Washington D.C.
- ⁹⁶ Eggermont, H., Balian, E., Azevedo, J.M.N., Buemer, V., Brodin, T., Claudet, J. et al. (2015). Nature-based Solutions: New Influence for Environmental Management and Research in Europe. *Ecological Perspectives for Science and Society* 24(4), 243-248. Available from <http://dx.doi.org/10.14512/gaia.24.4.9>
- ⁹⁷ European Commission (2015). *Nature-Based Solutions & Re-Naturing Cities Final Report of the Horizon 2020 Expert Group on 'Nature-Based Solutions and Re-Naturing Cities'*. Available from <https://www.transition-europe.eu/en/publication/nature-based-solutions-re-naturing-cities>
- ⁹⁸ URBINAT (2022). *EU project on Urban Innovative & Inclusive Nature*. Available from <https://urbanat.eu/>
- ⁹⁹ Peru Ministry of Environment (2019). *PRODERN promotes restoration of wetlands as a measure of adaptation to climate change in mountain ecosystems*. Available from <https://www.minam.gob.pe/glaciares/2014/09/24/prodern-impulsa-restauracion-de-humedales-como-medida-de-adaptacion-al-cambio-climatico-en-ecosistemas-de-montana/>
- ¹⁰⁰ Secretariat of the Convention on Biological Diversity (2009). *Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change*. Available from <https://www.cbd.int/doc/publications/cbd-ts-41-en.pdf>
- ¹⁰¹ UNDRR (2021). *Nature-based Solutions for Disaster Risk Reduction: Words into action*. Available from <https://www.undrr.org/publication/words-action-nature-based-solutions-disaster-risk-reduction>
- ¹⁰² UNEP/EA.5/Res.9 (2022). *Sustainable and Resilient Infrastructure*. Resolution adopted by the United Nations Environment Assembly on 2 March 2022. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39852/SUSTAINABLE%20AND%20RESILIENT%20INFRASTRUCTURE.%20English.pdf?sequence=1&isAllowed=y>
- ¹⁰³ World Economic Forum (2021). *What are natural climate solutions?* Available from <https://www.weforum.org/agenda/2021/09/what-are-natural-climate-solutions-ncs-alliance/>
- ¹⁰⁴ The Nature Conservancy (2017). *Nature's Make or Break Potential for Climate Change*. Available from <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/natures-make-or-break-potential-for-climate-change/>
- ¹⁰⁵ Raymond, C.M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Razvan, M. et al. (2017). A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environmental Science & Policy* 77, 15-24. Available from <https://www.sciencedirect.com/science/article/pii/S1462901117306317>
- ¹⁰⁶ Maes, J., Paracchini, M.L., Zulian, G., Dunbar, M.B. and Alkemada, R. et al. (2012). Synergies and trade-offs between ecosystem service supply, biodiversity, and habitat conservation status in Europe. *Biological Conservation* 155, 1-12. Available from <https://www.sciencedirect.com/science/article/abs/pii/S0006320712002856?via%3Dihub>
- ¹⁰⁷ Raymond, C.M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Razvan, M. et al. (2017). A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environmental Science & Policy* 77(15-24). Available from <https://www.sciencedirect.com/science/article/pii/S1462901117306317>
- ¹⁰⁸ Maes, J., Paracchini, L.M., Zulian, G., Dunbar, M.B., and Alkemada, R. (2012). Synergies and trade-offs between ecosystem service supply, biodiversity, and habitat conservation status in Europe. *Biological Conservation* 155, 1-12. Available from <https://www.sciencedirect.com/science/article/abs/pii/S0006320712002856?via%3Dihub>
- ¹⁰⁹ Stafford, R., Chamberlain, B., Clavey, L., Gillingham, P.K., McKain, S., Morecroft, M.D., Morrison-Bell, C. and Watts, O. (Eds.) (2021). *Nature-based Solutions for Climate Change in the UK: A Report by the British Ecological Society*. London, UK.
- ¹¹⁰ Giordano, R., Pluchinotta, I., Pagano, A., Scricciu, A. and Nanu, F. (2020). Enhancing nature-based solutions acceptance through stakeholders' engagement in co-benefits identification and trade-offs analysis. *Science of the Total Environment* 713. Available from <https://doi.org/10.1016/j.scitotenv.2020.136552>
- ¹¹¹ Browder, G., Ozment, S., Bescos, I.R., Gartner, T. and Lange, G.M. (2019). *Integrating Green and Gray: Creating Next Generation Infrastructure*. Available from <https://www.wri.org/research/integrating-green-and-gray-creating-next-generation-infrastructure>
- ¹¹² IISD (2021). *How Can Investment in Nature Close the Infrastructure Gap?* Available from <https://nbi.iisd.org/wp-content/uploads/2021/10/investment-in-nature-close-infrastructure-gap.pdf>
- ¹¹³ IFRC (2018). *Mangrove plantation in Viet Nam: measuring impact and cost benefit*. Available from <https://preparecenter.org/wp-content/sites/default/files/case-study-vietnam.pdf>
- ¹¹⁴ Kapos, V., Wicander, S., Salvaterra, T., Dawkins, K., Hicks, C. (2019). *The Role of the Natural Environment in Adaptation*. Background Paper for the Global Commission on Adaptation. Rotterdam and Washington, D.C.
- ¹¹⁵ WRI (2018). *Natural Infrastructure in São Paulo's Water System*. Available from <https://www.wri.org/research/natural-infrastructure-sao-paulos-water-system>
- ¹¹⁶ Browder, G.J., Ozment, S., Bescos, I.R., Gartner, T., Lange, G.M. (2019). *Integrating Green and Gray: Creating Next Generation Infrastructure*. Available from <https://www.wri.org/research/integrating-green-and-gray-creating-next-generation-infrastructure>
- ¹¹⁷ IISD (2021). *How Can Investment in Nature Close the Infrastructure Gap?* Available from <https://nbi.iisd.org/wp-content/uploads/2021/10/investment-in-nature-close-infrastructure-gap.pdf>
- ¹¹⁸ IISD (2021). *How Can Investment in Nature Close the Infrastructure Gap?* Available from <https://nbi.iisd.org/wp-content/uploads/2021/10/investment-in-nature-close-infrastructure-gap.pdf>
- ¹¹⁹ Rahman, M.M., Zimmer, M., Ahmed, I., Donato, D., Kanzaki, M. and Xu, M. (2021). Co-benefits for protecting mangroves for biodiversity conservation and storage. *Nature Communications* 12. Available from <https://www.nature.com/articles/s41467-021-24207-4>
- ¹²⁰ Dick, J., Carruthers-Jones, J., Carver, S., Dobel, A.J. and Miller, J.D. (2020). How are nature-based solutions contributing to priority societal challenges surrounding human well-being in the United Kingdom: a systematic map. *Environmental Evidence* 9. Available from <https://doi.org/10.1186/s13750-020-00208-6>
- ¹²¹ Smith, A. and Chausson, A. (2021). *Nature-based solutions in UK climate adaptation policy*. A report prepared by the Nature-based Solutions Initiative. Available from <https://www.rspb.org.uk/globalassets/downloads/policy-briefings/nature-based-solutions-adaption-report.pdf>

- 122 Panorama Solutions (2020). *Governance for adaptation in Chiapas – Mexico*. Contributed by Unión Internacional para la Conservación de la Naturaleza (IUCN). Available from <https://panorama.solutions/en/solution/governance-adaptation-chiapas-mexico>
- 123 UNEP-WCMC (2017). *Initial Results from the Inventory of Tools and Methodologies Relevant for EbA*. Summary Report (final draft) (unpublished).
- 124 Department of Environment, Forestry and Fisheries (DEFF) (2019). *Ecosystem based adaptation Action Plan and Priority Areas Mapping report*. Pretoria, South Africa. Available from <https://www.sanbi.org/wp-content/uploads/2020/10/Action-Plan-Priority-Maps-Full-Report-Digital-High-res.pdf>
- 125 Government of Thailand (2021). *Mid-century, Long-term Low Greenhouse Gas Emission Development Strategy* (Submitted under the Paris Agreement). Available from https://unfccc.int/sites/default/files/resource/Thailand_LTS1.pdf; ONEP, MONRE (2017). *Thailand's NDC Roadmap on Mitigation (2021 – 2030)*. Thailand.
- 126 Government of Belize (2021). *Belize's Updated Nationally Determined Contribution*. Available from <https://unfccc.int/sites/default/files/NDC/2022-06/Belize%20Updated%20NDC.pdf>; Commonwealth Secretariat (2021). *National Climate Finance Strategy of Belize 2021–2026*. Available from https://thecommonwealth.org/sites/default/files/inline/Climate_Finance_Strategy_of_Belize_UPDF.pdf
- 127 United Nations Environment Programme (2021). *State of Finance for Nature 2021*. Nairobi. Available from <https://www.unep.org/resources/state-finance-nature>
- 128 United Nations Environment Programme (2021). *State of Finance for Nature 2021*. Nairobi. Available from <https://www.unep.org/resources/state-finance-nature>
- 129 United Nations Environment Programme (2021). *Adaptation Gap Report 2020*. Nairobi. Available from <https://www.unep.org/resources/adaptation-gap-report-2020>
- 130 United Nations Environment Programme (2021). *State of Finance for Nature 2021*. Nairobi. Available from <https://www.unep.org/resources/state-finance-nature>
- 131 Business for Nature (no date). *Financing our survival: Building a nature positive economy through subsidy reform*. Available from https://static1.squarespace.com/static/5d777de8109c315fd22af3a/t/620d33b868c7486475f06303/1645032379783/Financing_Our_Survival_Brief_FINAL.pdf
- 132 New Zealand Government (2020). *\$1.1 billion investment to create 11,000 environment jobs in our regions*. Available from <https://www.beehive.govt.nz/release/11-billion-investment-create-11000-environment-jobs-our-regions>
- 133 World Economic Forum (2021). *How Pakistan is aiming for a green recovery from the pandemic*. Available from <https://www.weforum.org/agenda/2021/02/pakistan-green-recovery/>
- 134 Nature Capital Finance Alliance (2022). *ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)*. Available from <https://encore.naturalcapital.finance/en>
- 135 Inter-American Development Bank and United Nations Environment Programme (2021). *Resilient by Nature - Increasing Private Sector Uptake of Nature-based Solutions for Climate-resilient Infrastructure*. A Market Assessment for Latin America and the Caribbean. Available from <https://publications.iadb.org/en/resilient-nature-increasing-private-sector-uptake-nature-based-solutions-climate-resilient>
- 136 Johr, H. (2017). *Embeddedness in the context of corporate sustainability at Nestlé*. Presentation at University of Zurich, 19 January 2017; Nestlé (2021). *Our sustainability journey: Ten years of the Nescafé Plan*. Available from: <https://www.nestle.com/sites/default/files/2021-01/sustainable-journey-ten-years-nescafe-plan-2021-en.pdf>
- 137 IPCC (2022). Summary for Policy Makers. In: *Climate change 2022: Mitigation of climate change*. Contribution of the Working Group III to the sixth assessment report of the Intergovernmental Panel Climate Change. Available from <https://www.ipcc.ch/report/ar6/wg3/>
- 138 The Commonwealth Secretariat (2021). *Accelerating Financing for Nature-based Solutions to Support Action Across the Rio Conventions*. Discussion Paper 28. Available from https://production-new-commonwealth-files.s3.eu-west-2.amazonaws.com/migrated/inline/Accelerating_Financing_for_Nature_Based_Solutions_Discussion_Paper_UPDF.pdf
- 139 European Environment Agency (2021). *Nature-based solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction*. EEA Report No 01/2021. Available from <https://www.eea.europa.eu/publications/nature-based-solutions-in-europe>
- 140 Crossboundary (2021). *Unlocking private capital for nature based solutions in emerging and frontier markets*. Available from https://www.crossboundary.com/wp-content/uploads/dlm_uploads/2021/08/Unlocking-private-capital-for-nature-based-solutions-in-emerging-and-frontier-markets-FINAL.pdf
- 141 United Nations Environment Programme and IUCN (2021). *Nature-based solutions for climate change mitigation*. Nairobi and Gland.
- 142 Forest Trends (2021). *State of the voluntary carbon markets 2021*. Available from <https://www.forest-trends.org/publications/state-of-the-voluntary-carbon-markets-2021/>
- 143 United Nations Environment Programme and IUCN (2021). *Nature-based solutions for climate change mitigation*. Nairobi and Gland.
- 144 United Nations Environment Programme (2021). *Economics of Peatlands Conservation, Restoration, and Sustainable Management - A Policy Report for the Global Peatlands Initiative*. Edward B. Barbier, Joanne C. Burgess. United Nations Environment Programme, Nairobi
- 145 Nature Conservancy (2020). *World's first coral reef insurance policy triggered by Hurricane delta*. Available from <https://www.nature.org/en-us/newsroom/coral-reef-insurance-policy-triggered/>
- 146 Crossboundary (2021). *Unlocking private capital for nature based solutions in emerging and frontier markets*. Available from https://www.crossboundary.com/wp-content/uploads/dlm_uploads/2021/08/Unlocking-private-capital-for-nature-based-solutions-in-emerging-and-frontier-markets-FINAL.pdf
- 147 Global Youth Biodiversity Network (no date). *What are nature-based solutions? Risks, concerns and opportunities*. Available from <https://networknature.eu/product/22441>; Seddon, N., Chausson, A., Berry, P., Girardin, C.J.A., Smith, A. and Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Biological Sciences* 375 (1774). Available from <https://royalsocietypublishing.org/doi/10.1098/rstb.2019.0120>; CBD/COP/DEC/14/5 (2018). *Biodiversity and climate change*. Available from <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-05-en.pdf>; FCCC/CP/2010/7/Add.1 (2011). *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010*. Addendum. Part Two: Action taken by the Conference of the Parties at its sixteenth session. Available from: <https://unfccc.int/documents/6527>
- 148 IUCN (2020). *Global Standard for Nature-based Solutions*. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN; UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>; DIIS (2022). *How to support a rights-based approach to nature-based solutions*. Available from <https://www.diis.dk/en/research/how-to-support-a-rights-based-approach-to-nature-based-solutions>; WWF (2021). *Nature-based Solutions in the Convention on Biological Diversity (CBD)*. Available from https://www.fint.awsassets.panda.org/downloads/nature_based_solution_in_the_cbd_gbf_wwf_proposal.pdf
- 149 FCCC/PA/CMA/2021/10/Add.1 (2022). *Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021*. Addendum. Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its third session. Available from <https://unfccc.int/documents/460950>
- 150 UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- 151 IUCN (2020). *Global Standard for Nature-based Solutions*. A user-friendly framework for the verification, design and scaling up of NbS. Gland, Switzerland.
- 152 UNFCCC (no date). *Safeguards*. Available from <https://redd.unfccc.int/fact-sheets/safeguards.html>
- 153 FEBA (Friends of Ecosystem-based Adaptation) (2017). *Making Ecosystem-based Adaptation Effective – A Framework for Defining Qualification Criteria and Quality Standards*. Available from <https://pubs.iied.org/g04167>
- 154 CBD/COP/DEC/14/5 (2018). *Biodiversity and climate change*. Available from <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-05-en.pdf>
- 155 Reid, H., Bourne, A., Muller, M., Podvin, K., Scorgie, S., and Orindi, V. (2018). A framework for assessing the effectiveness of ecosystem-based approaches to adaptation. *Resilience: The Science of Adaptation to Climate Change*, 207-216.
- 156 NbS Guidelines (2021). *Nature-based Solutions to Climate Change: Key messages for decision makers in 2021 and beyond*. Available from <https://nbsguidelines.info/>
- 157 World Bank and WRI (2018). *Nature-based Solutions for Disaster Risk Management*. Available from <https://documents1.worldbank.org/curated/en/253401551126252092/pdf/134847-NBS-for-DRM-booklet.pdf>
- 158 European Commission (2021). *Evaluating the impact of nature-based solutions: a handbook for practitioners*. Available from <https://data.europa.eu/doi/10.2777/244577>
- 159 Mirova (2022). *Natural Capital*. Available from <https://www.mirova.com/en/invest/natural-capital>
- 160 IFC (2012). *Biodiversity Conservation and Sustainable Management of Living Natural Resources*. Available from https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps6
- 161 IFC (2012). *Biodiversity Conservation and Sustainable Management of Living Natural Resources*. Available from https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps6

- ¹⁶² Craig, R.B., Cox, N.A. and Kuzee, M.E. (2018). *Biodiversity guidelines for forest landscape restoration opportunities assessments*. First edition. Gland, Switzerland.
- ¹⁶³ GPFLR (2018). *Restoring Forests and Landscapes: the key to a sustainable future*. Available from https://afr100.org/sites/default/files/GPFLR_FINAL%2027Aug_0.pdf
- ¹⁶⁴ FAO, IUCN CEM and SER (2021). *Principles for ecosystem restoration to guide the United Nations Decade 2021–2030*. Rome, FAO. Available from <https://www.decadeonrestoration.org/publications/principles-ecosystem-restoration-guide-united-nations-decade-2021-2030>
- ¹⁶⁵ Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J. (2019). International principles and standards for the practice of ecological restoration. *Restoration Ecology* 27(1)
- ¹⁶⁶ World Bank (2017). *Implementing nature-based flood protection - principles and implementation guidance*. Available from <https://elibrary.worldbank.org/doi/abs/10.1596/28837>
- ¹⁶⁷ Ramsar (2022). *The Handbooks*. Available from <https://www.ramsar.org/resources/the-handbooks>
- ¹⁶⁸ Ramsar (no date). *Guiding Peatland Restoration for Climate and Biodiversity Action*. Available from <https://ramsar.org/guiding-peatland-restoration-for-climate-and-biodiversity-action>
- ¹⁶⁹ Ramsar (2021). Briefing note 11: *Practical Peatland Restoration*. Available from <https://www.ramsar.org/document/briefing-note-11-practical-peatland-restoration>
- ¹⁷⁰ CBD/SBSTTA/22/INF/1 (2018). *Voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction*. Available from <https://www.cbd.int/doc/c/3f7a/4589/5cc1b7058bf52427fa9bae84/sbstta-22-inf-01-en.pdf>
- ¹⁷¹ UN-REDD Programme (2013). *Guidelines on Free, Prior and Informed Consent*. Available from <https://un-declaration.narf.org/wp-content/uploads/2013unredd-fpic-guidelines.pdf>
- ¹⁷² Rey, D. and Swan, S. (2014). *A country-led safeguards approach: Guidelines for national REDD+ programmes*. Available from https://snv.org/assets/explore/download/redd_cls_g_final_9.10.14.pdf; UN-REDD Programme (2016). Technical Brief 2: *Conceptual framework for country approaches to safeguards*. Available from <https://unredd.net/documents/redd-papers-and-publications-90/un-redd-publications-1191/technical-brief-series/11892-un-redd-framework-for-supporting-the-development-of-country-approaches-to-safeguards-en-11892.html>
- ¹⁷³ Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C. et al. (2021). Getting the message right on nature-based solutions to climate change. *Climate Change Biology* 27(8), 1518-1546. Available from <https://doi.org/10.1111/gcb.15513>
- ¹⁷⁴ Gobierno de la Republica de honduras (2022). *Salvaguardas Honduras*. Available from <https://salvaguardashonduras.gob.hn/repositorio/>
- ¹⁷⁵ Gobierno de la Republica de honduras (no date). *Alineamiento del Marco de Salvaguardas+ con otros marcos internacionales de salvaguardas*. Available from <https://salvaguardashonduras.gob.hn/wp-content/uploads/2022/04/BROCHURE-2.-Alineamiento-del-Marco-de-Salvaguardas-1.pdf>; Gobierno de la Republica de honduras (2022). *Salvaguardas Honduras*. Available from <https://salvaguardashonduras.gob.hn/repositorio/>
- ¹⁷⁶ UNREDD Programme (2022). *Safeguards and multiple benefits*. Available from <https://www.un-redd.org/work-areas/safeguards-multiple-benefits>
- ¹⁷⁷ FCPF (2020). *Carbon Fund methodological framework*. Available from https://www.forestcarbonpartnership.org/system/files/documents/fcpf_carbon_fund_methodological_framework_revised_2020_final_posted.pdf
- ¹⁷⁸ IFC (2022). *What is MALENA?* Available from https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Company-Resources/MALENA_SA/
- ¹⁷⁹ Tye, S. and Suarez, I. (2021). *Locally led climate adaptation: what is needed to accelerate action and support?* Working paper. Available from https://files.wri.org/d8/s3fs-public/locally-led-adaptation-accelerating-action-and-support_0.pdf
- ¹⁸⁰ Global Commission on Adaptation (2020). *Principles for Locally Led Adaptation Action*. Statement for Endorsement. Available from https://files.wri.org/s3fs-public/uploads/Locally_Led_Adaptation_Principles_-_Endorsement_Version.pdf
- ¹⁸¹ Tye, S. and Suarez, I. (2021). *Locally led climate adaptation: what is needed to accelerate action and support?* Working paper. Available from https://files.wri.org/d8/s3fs-public/locally-led-adaptation-accelerating-action-and-support_0.pdf
- ¹⁸² IIED (2020). *Calling for Business Unusual: Mechanisms for Delivering Change*. Briefing. London: IIED. Available from <https://pubs.iied.org/pdfs/17749IIED.pdf>
- ¹⁸³ United Nations Environment Programme (2022). *Harnessing Nature to Build Climate Resilience: Scaling Up the Use of Ecosystem-based Adaptation*. Nairobi
- ¹⁸⁴ Tye, S. and Suarez, I. (2021). *Locally led climate adaptation: what is needed to accelerate action and support?* Working paper. Available from https://files.wri.org/d8/s3fs-public/locally-led-adaptation-accelerating-action-and-support_0.pdf
- ¹⁸⁵ McQuaid, S., Rhodes, M.L., Andersson, T., Croci, E., Feichtinger-Hofer, M., Grosjean, M. et al. (2021). *From Nature-Based Solutions to the Nature-Based Economy - Delivering the Green Deal for Europe*. Draft White Paper for consultation - Recommendations. Nature-based Economy Working Group of EC Task Force III on Nature Based Solutions. Available from <https://networknature.eu/sites/default/files/images/Recommendations%20-%20NBE%20White%20Paper%20-%20.pdf>
- ¹⁸⁶ Nature Conservancy (2022). *High value fisheries model*. Available from <https://www.nature.org/en-us/about-us/where-we-work/asia-pacific/the-pacific-islands/stories-in-the-pacific-islands/creating-a-new-high-value-fisheries-model-in-manus-papua-new-guinea/>; Hausheer, J.E. (2019). *Sustainable Sea Cucumbers: Saving the "Gold Bars" of the Ocean*. Available from <https://blog.nature.org/science/2019/02/12/sustainable-sea-cucumbers-saving-the-gold-bars-of-the-ocean/>
- ¹⁸⁷ Soanes, M., Rai, N., Steele, P., Shakya, C. and Macgregor, J. (2017). *Delivering real change: getting international climate finance to the local level*. IIED Working Paper. IIED, London. Available from <http://pubs.iied.org/10178IIED>
- ¹⁸⁸ WRI (2021). *Locally Led Adaptation*. Principles for Locally Led Adaptation. Available from <https://www.wri.org/initiatives/locally-led-adaptation/principles-locally-led-adaptation>
- ¹⁸⁹ Soanes, M., Addison, S. and Shajya, C. (2020). *Calling for business unusual: why local leadership matters*. IIED Briefing. Available from <http://pubs.iied.org/17767IIED>
- ¹⁹⁰ Patel, S., Soanes, M., Rahman, F., Smith, B. and Steinbach, D. (2020). *Good climate finance guide: lessons for strengthening devolved climate finance*. IIED Working Paper, IIED, London. Available from <http://pubs.iied.org/10207IIED>
- ¹⁹¹ USAID (2019). *Ecosystem based adaptation*. Available from https://www.climatelinks.org/sites/default/files/asset/document/2019_USAID%20Series%20Synthesis%20Ecosystem-based%20Adaptation.pdf
- ¹⁹² PUB (2022). *Active, Beautiful, Clean Waters Programme*. Available from <https://www.pub.gov.sg/abcwaters/about>; Tan Nguan Sen (no date). *Singapore's Active, Beautiful, Clean Waters Programme: Water in Singapore*. Available from <https://edepot.wur.nl/315106>; Centre for Liveable Cities (CLC) (2017). *Urban Systems Studies*. The Active, Beautiful, Clean Waters Programme: Water as an environmental asset. Available from <https://www.clc.gov.sg/docs/default-source/urban-systems-studies/rb172978-mnd-abc-water.pdf>
- ¹⁹³ GIZ (2022). *Thai-German Climate Programme – Water*. Available from https://www.thai-german-cooperation.info/en_US/thai-german-climate-programme-water/
- ¹⁹⁴ Hou-Jones, X., Roe, D. and Holland, E. (2021). *Nature-based Solutions in Action: Lessons from the Frontline*. London. Bond. Available from <https://pubs.iied.org/sites/default/files/pdfs/2021-09/20451g.pdf>
- ¹⁹⁵ UNEP/EA.5/Res.5 (2022). *Nature-based Solutions for supporting sustainable development*. Available from <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>



