

GUIDANCE NOTE

Seeking Clarity on Nature-Based Climate Solutions for Adaptation

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Introduction

As the world witnesses and experiences the impacts of climate change, turning to nature could be a pragmatic way to adapt. Governments are being urged to implement ecosystem-based approaches, including conservation, restoration, and improved land management, in both adaptation and mitigation (Intergovernmental Panel on Climate Change [IPCC], 2022; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES], 2021). Such approaches, framed under the umbrella concept of nature-based solutions (NbS), are expected to be a key component of the post-2020 Global Biodiversity Framework and are already integrated into many countries' National Adaptation Plans.

However, controversy remains about what constitutes as NbS and how to achieve equitable outcomes while enhancing biodiversity and ecosystem resilience. Compounding this challenge is the unprecedented scale of biodiversity loss as a result of climate change and other interrelated drivers of change.

This guidance note aims to clarify the concepts of NbS and Nature-Based Climate Solutions (NBCS) with an emphasis on climate adaptation. These adaptation-focused NbS are captured using the widely known term Ecosystem-based Adaptation (EbA). Beyond awareness and knowledge of these terms, it is vital to unpack the social and biodiversity safeguards necessary for NbS to ensure that solutions are gender responsive and socially inclusive while delivering biodiversity benefits. This guidance note is a knowledge product of the Nature for Climate Adaptation Initiative (NCAI) (see Box 1).



Box 1. About the Nature for Climate Adaptation Initiative

The NCAI seeks to enhance Global North and South civil society organizations' understanding, knowledge, and capacity to design and deliver NBCS for adaptation that provide biodiversity and livelihood benefits to people of all genders and social groups in developing countries.

The NCAI equips civil society organizations and practitioners involved in international development and climate adaptation with the knowledge to design compelling proposals and pursue projects, programs, and partnerships that will unleash the full potential of nature in confronting the climate crisis. The NCAI will create an environment for accelerated action on NBCS for adaptation while promoting gender equality, social inclusion, rights-based approaches, and positive outcomes for biodiversity and ecosystems.

The NCAI will strengthen the knowledge and capacity of civil society organizations using three key tools:

- A self-paced, accessible e-learning course developed in partnership with the Deutsche Gesellschaft für Internationale Zusammenarbeit and the International Union for Conservation of Nature (IUCN).
- An online learning space with technical guidance, resources, and case studies.
- Targeted online and in-person learning exchange opportunities, fostering a community of practice.

The NCAI is an initiative of the International Institute for Sustainable Development with support from Global Affairs Canada

For more information, please visit ncai.iisd.org.

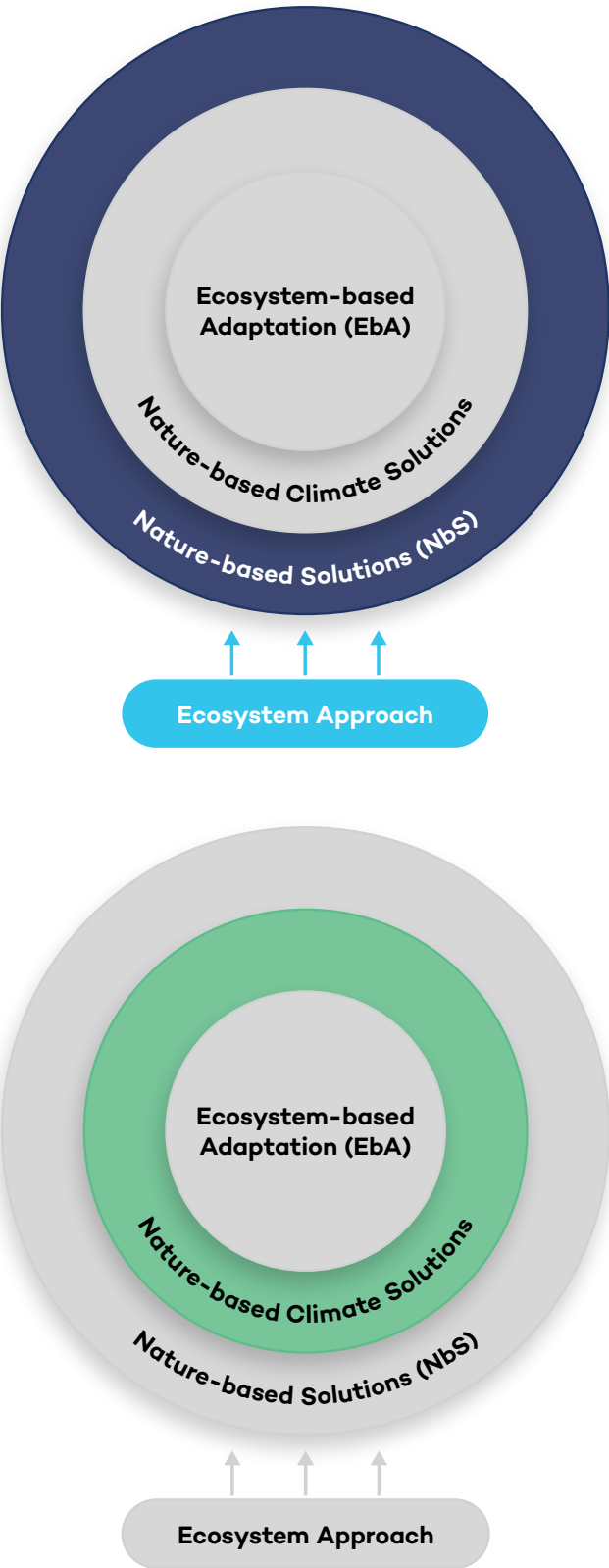
What Are NBCS?

NBCS are NbS that harness biodiversity and ecosystems to address the climate crisis through delivering positive climate adaptation and mitigation benefits. Four key concepts are relevant to NBCS (Figure 1).

NbS, NBCS, and EbA have evolved from a set of practices and concepts rooted in a holistic understanding of people's relationships with nature, including within the conservation, water, and agriculture sectors. Practices that are closely related to NBCS include ecological restoration, forest landscape restoration, integrated water resource management, agroforestry, climate-smart agriculture, green infrastructure, and community-based adaptation, among others. These practices can be considered NBCS for adaptation if they have been implemented for the specific purpose of helping people adapt to climate change and manage climate risks as identified through risk analyses, and if they have a strong emphasis on building the resilience of ecosystems and people.



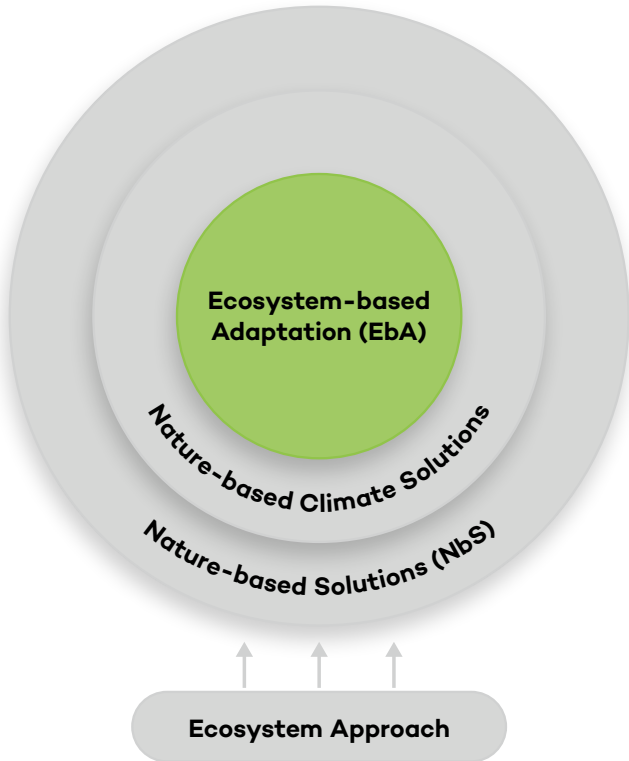
Figure 1. Key concepts relevant to NBCS



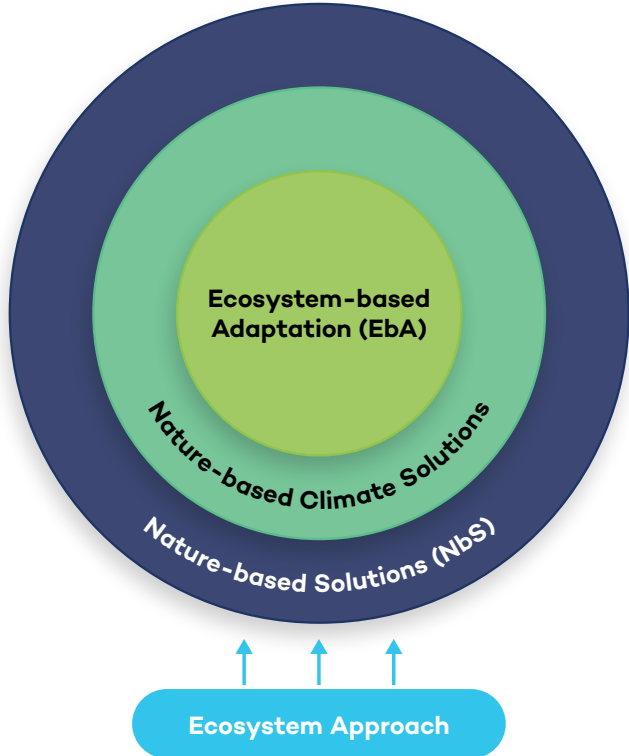
Nature-based Solutions (NbS) is an umbrella term that describes a wide suite of actions to “protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits” (United Nations Environment Programme, 2022, p. 2).

The NbS concept emerged from the **Ecosystem Approach**, the primary framework developed to implement the Convention on Biological Diversity (CBD). It is a strategy for “the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way” (CBD, 2004, p. 1). While the Ecosystem Approach focuses on integrated management, NbS address broader social, economic, and environmental challenges such as climate change adaptation and disaster risk reduction (Cohen-Shacham et al., 2019).

Nature-based Climate Solutions (NBCS), or Natural Climate Solutions, are a subset of NbS that focuses on reducing the effects of and adapting to climate change while supporting biodiversity. NBCS deliver measurable societal adaptation and/ or mitigation benefits while generating human development and biodiversity co-benefits (World Wide Fund for Nature, 2020). Examples usually involve the conservation, restoration, or sustainable management of forests, wetlands, grasslands, and agricultural lands.



Ecosystem-based Adaptation (EbA) is a type of NbS or NBCS with a focus on societal adaptation to climate change (rather than mitigation, although mitigation co-benefits can occur). EbA is “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.” It includes the sustainable management, conservation, and restoration of ecosystems to build resilience; generate social, economic, and cultural co-benefits; and contribute to the conservation of biodiversity (CBD, 2009, p. 31).



Together, these terms form the basic conceptual landscape of NbS. The concepts underpinning the Ecosystem Approach and EbA contributed to the development of NbS as an umbrella term and catalyzed the idea that nature contributes to sustainable development to meet multiple societal challenges. NBCS and EbA are types of NbS that address the climate crisis, increase resilience, and reduce the vulnerability of communities and ecosystems facing climate impacts.



Box 2. Key terms and concepts

- **Biodiversity** is the variability among living organisms and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems (CBD, 1992, Article 2).
- **Ecosystem functioning** refers to the flow of energy and materials through ecosystems and includes many processes, such as biomass production, nutrient cycling, and water dynamics (IPBES, 2019, Annex I – Glossary).
- **Biodiversity underpins ecosystem functioning** and, in turn, the provisioning of ecosystem services such as clean water and food. This also includes essential services that help people adapt to the risk of climate change impacts and disasters, such as climate regulation and sediment stabilization (United Nations Framework Convention on Climate Change [UNFCCC], 2021).
- **Resilience** is the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure while also maintaining the capacity for adaptation, learning, and transformation (Matthews, 2018).
- **Ecosystem health** is a metaphor used to describe the condition of an ecosystem, by analogy with human health. There is no universally accepted benchmark for a healthy ecosystem. Rather, the apparent health status of an ecosystem can vary, depending upon which metrics are employed in judging it and which societal aspirations are driving the assessment (IPBES, 2019, Annex I – Glossary).

What Are NBCS For Adaptation?

Many sustainable natural resource management, restoration and conservation initiatives have been described as NBCS or EbA without underlying risk or vulnerability assessments (Lo, 2016). While NbS encapsulates many existing practices, they are not considered NBCS for adaptation or EbA unless:

- They are specifically oriented toward managing current and future climate risks and enhancing biodiversity and ecological resilience.
- They target and benefit particular groups and their livelihoods based on risk or vulnerability assessments.
- They include “nature-based” measures integrating ecosystem processes, e.g., flood water storage through wetlands.
- They take into consideration local, environmental, economic and social contexts, including traditions and culture.



For example, protected area management could be considered a type of NBCS for adaptation if management plans integrate and reflect risk assessments for communities and vulnerable groups, provide alternative sources of income and fuel and include restoration of native species in and around the protected areas to reduce climate risks.

NBCS for Adaptation in Practice

Many NBCS for adaptation have already been implemented across a wide range of ecosystems around the world to address different climate impacts (see Table 1). These examples illustrate the application of NBCS to local contexts, risk profiles, and ecosystems and demonstrate measurable co-benefits for biodiversity, livelihoods, carbon sequestration, stormwater management, and agricultural productivity.





Table 1. Examples of NBCS for adaptation measures

Climate impacts	EbA measure	Intended outcome	Co-benefits	Case study
Mountain and forest				
Drought	Sustainable watershed and wetland management	<ul style="list-style-type: none"> Improved water storage capacity 	<ul style="list-style-type: none"> Biodiversity co-benefits Sustainable livelihood and economic opportunities 	<p>Maintaining Water Security in Critical Water Catchments in Mongolia</p> <p>Supporting sustainable management, planning, and conservation in two catchments.</p> <p>Results: 10 ha wetlands restored; 72,000 ha pastureland and 254 ha forest under improved management; three river basin councils established; 20% decrease in surface water extraction for agriculture (USAID, 2017a).</p>
Soil erosion	Forest and pasture restoration	<ul style="list-style-type: none"> Erosion prevention 	<ul style="list-style-type: none"> Biodiversity co-benefits Mitigation co-benefits Ecotourism 	
Increased precipitation and erratic rainfall	Restoration of deep-rooting native species	<ul style="list-style-type: none"> Improved water regulation Erosion prevention 	<ul style="list-style-type: none"> Biodiversity co-benefits 	



Climate impacts	EbA measure	Intended outcome	Co-benefits	Case study
Agricultural				
Shift of seasons	Agroecological management	<ul style="list-style-type: none"> Improved water retention and soil health 	<ul style="list-style-type: none"> Biodiversity co-benefits Mitigation co-benefits 	Promoting Climate-Smart Livestock Management and Cocoa Production in Ecuador Building capacity in livestock and cocoa farmers to achieve climate-smart management practices. Results: >12% increased productivity and >16% increased incomes; USD 37,900 allocated to six capacity-building centres; 3,275 ha of forests conserved and 438 ha of forests restored; 75,271.29 t CO ₂ eq reduced (FAO, 2021).
	Intercropping of adapted species	<ul style="list-style-type: none"> Adaptation to higher temperatures and shifting seasons 	<ul style="list-style-type: none"> Biodiversity co-benefits Food security 	
Increased temperature and drought	Sustainable dryland and livestock management	<ul style="list-style-type: none"> Adaptation to higher temperatures 	<ul style="list-style-type: none"> Sustainable livelihoods Food security Pollution reduction 	
Increased precipitation	Ecosystem restoration and agroforestry	<ul style="list-style-type: none"> Improved water storage capacity Flood risk reduction 	<ul style="list-style-type: none"> Biodiversity co-benefits Sustainable livelihood and economic opportunities Mitigation co-benefits 	



Climate impacts	EbA measure	Intended outcome	Co-benefits	Case study
Urban				
Extreme heat events	Green aeration corridors and urban green spaces	<ul style="list-style-type: none"> • Heat wave buffering • Adaptation to higher temperatures 	<ul style="list-style-type: none"> • Biodiversity co-benefits • Health co-benefits • Pollution reduction • Mitigation co-benefits 	Sydney Park Water Re-Use Project Stormwater treatment, storage, and re-use system in a city park comprised of four constructed wetlands and bioretention areas. Results: 24% increase in bird species; water quality improved in wetlands between 6% to 49%; 850 million litres of stormwater harvested per year (Landscape Architecture Foundation, 2020).
	Green roofs and facades			
Floods	Stormwater management via green spaces	<ul style="list-style-type: none"> • Flood risk reduction 	<ul style="list-style-type: none"> • Mitigation co-benefits 	
	River restoration	<ul style="list-style-type: none"> • Improved water regulation 	<ul style="list-style-type: none"> • Biodiversity co-benefits • Ecotourism • Sustainable livelihoods 	
Inland water				
Flood	Wetland and peatland conservation and restoration	<ul style="list-style-type: none"> • Flood risk reduction 	<ul style="list-style-type: none"> • Biodiversity co-benefits • Health co-benefits • Water and food security • Sustainable livelihood and economic opportunities • Mitigation co-benefits 	Restoring Peatlands in Russia Large-scale peatland restoration Results: 35,000 ha of peatlands restored; 175,000 to 220,000 t CO ₂ eq reduced per year; 20 million people no longer exposed to dry peatland fire smoke/smog (UNCCD, n.d.).
Drought	River basin restoration	<ul style="list-style-type: none"> • Improved water storage capacity 		
	Transboundary water governance and ecosystem restoration	<ul style="list-style-type: none"> • Improved water provision 		



Climate impacts	EbA measure	Intended outcome	Co-benefits	Case study
Marine and coastal				
Storm surges	<ul style="list-style-type: none"> • Mangrove restoration and coastal protection • Coastal realignment • Sustainable fishing and mangrove rehabilitation • Coral reef conservation and restoration 	<ul style="list-style-type: none"> • Storm and cyclone risk reduction • Flood risk reduction • Improved water quality 	<ul style="list-style-type: none"> • Biodiversity co-benefits • Health co-benefits • Food security • Sustainable livelihood and economic opportunities • Mitigation co-benefits 	Restoring Coral Reefs in the Face of Climate Change in the Seychelles Restoring coral reefs in degraded areas with rehabilitated and transplanted coral fragments. Results: >40 people certified in reef restoration; coral cover increased from 2% to 16%; 5x increase in fish abundance and 3x increase in fish species diversity (USAID, 2017b).
Cyclones				
Sea level rise				
Salinization		<ul style="list-style-type: none"> • Adaptation to higher temperatures 	<ul style="list-style-type: none"> • Biodiversity co-benefits • Food security 	

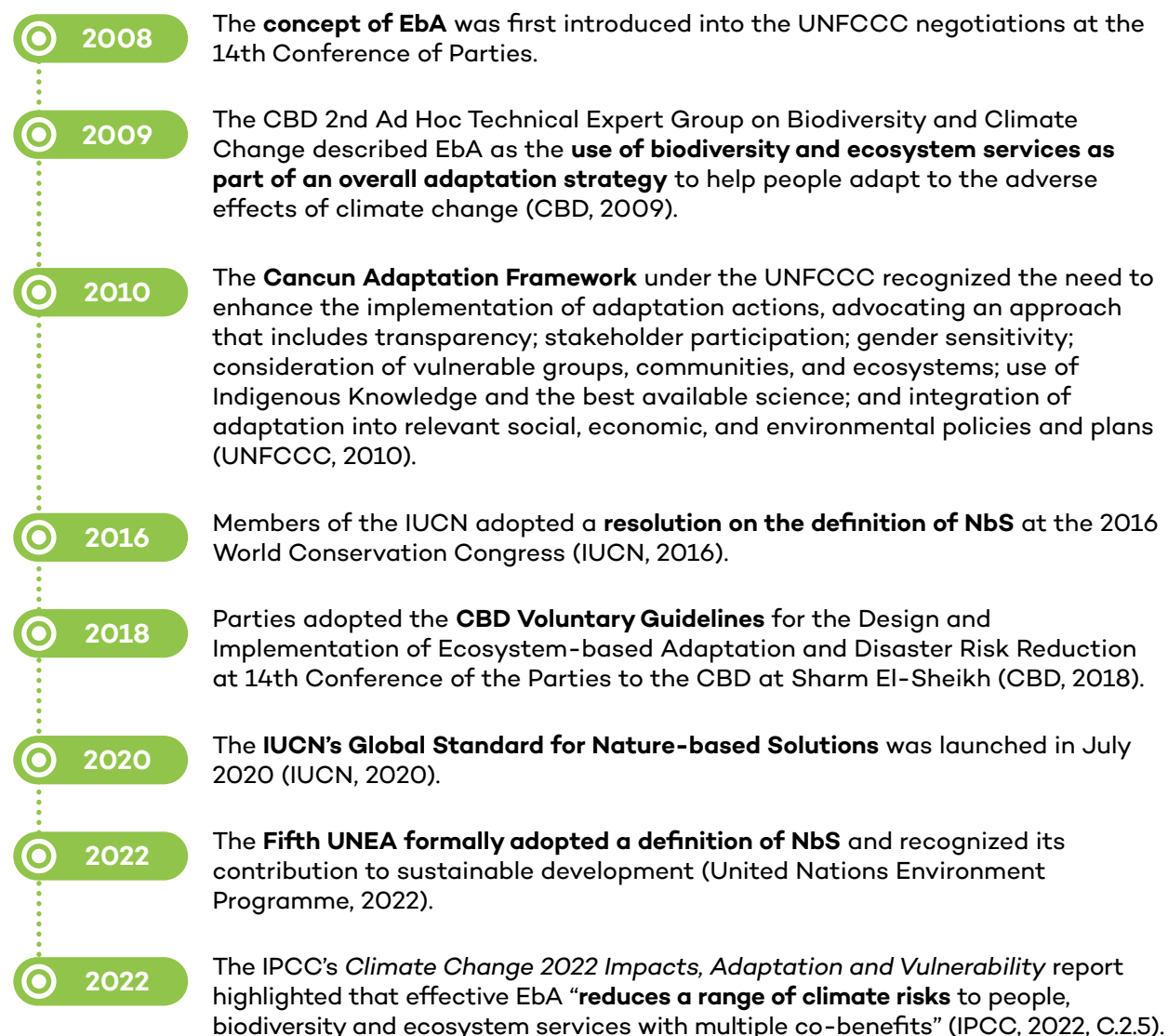
Modified from United Nations Environment Programme–International Ecosystem Management Partnership (2019) and Deutsche Gesellschaft für Internationale Zusammenarbeit (n.d.), with case studies from the Food and Agriculture Organization of the United Nations (2021), Landscape Architecture Foundation (2020), UNFCCC (n.d.), and USAID (2017a, 2017b).



Policy Momentum for NBCS

Currently, only the concepts of Ecosystem Approach and EbA have been legally adopted by parties to the CBD, with corresponding guidelines on their implementation.¹ Although the UN Environment Assembly (UNEA) has passed a resolution on a legal definition for NbS,² the policy landscape for NbS and NBCS is more contested, and there is neither a universally accepted legal definition for NBCS nor legally binding implementing guidelines.

Figure 2. Major NBCS milestones



¹ CBD decisions on the Ecosystem Approach include Decisions IV/1 B, V/6, VI/12, VII/11, and IX/7; principles and operational guidance are codified in CBD, 2004. For EbA, CBD Decision 14/5 defines the concept and parties have adopted Voluntary Guidelines for the Design and Implementation of EbA. See CBD, 2018.

² For UNEA Resolution 5/5, see United Nations Environment Programme (2022).



Nevertheless, over the past 2 decades, awareness of NbS and NBCS has grown substantially, as has the recognition that sustainable development and people's livelihoods and well-being are inherently embedded in and rely on healthy and functioning ecosystems. Some important milestones leading up to the current definition of EbA and its adoption by the parties to the CBD are outlined in Figure 2.

Key Criticisms of NBCS and NbS

While NbS has received widespread support and growing policy momentum, it is still a contentious and divisive concept for several reasons (Forest Peoples Programme, 2021; Melanidis & Hagerman, 2022). One of the concerns arises from the potential misuse of NbS—in particular for climate change mitigation, leading to rights violations, lack of respect for customary access to natural resources, and lack of free, prior, and informed consent (Qi et al., 2021). The criticism stems in part from past infringement of the rights of Indigenous Peoples from related initiatives such as the Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+) projects, which seek to offset greenhouse gas emissions through sequestering carbon on land, particularly forests.³ Implementation of REDD+ in countries with weak governance and structural discrimination, the lack of implementation and enforcement of safeguards, and the technical nature of the initiative are some of the reasons it has been challenged and at times has led to negative outcomes for vulnerable groups (Sarmiento Barletti & Larson, 2017).

Misgivings about NbS also relate to fears that its application leads to the commodification of nature while ignoring the intrinsic value of nature and diverse worldviews and ways of framing nature. For example, the government of Bolivia's Nationally Determined Contribution submitted to the UNFCCC is based on the “cosmo-biocentric horizon of life that respects life and the rights of Mother Earth, as a living and sacred being” and further seeks “eradication of the commodification of the environmental functions of nature, of carbon markets and nature-based solutions” (Estado Plurinacional de Bolivia, 2022).

Aside from the potential for rights abuses and the privatization of nature, there is also concern about using NbS to offset harm (whether in emissions or degradation of ecosystems) in one area by conserving or restoring another. This could enable greenwashing—allowing the private sector to claim “no net harm” while avoiding the emissions reductions or other changes critical for a liveable future (Forest Peoples Programme 2021; Qi et al., 2021). Attempts to offset harm, for example, through ecological compensation schemes,⁴ is limited when more land is required than is available for compensation activities or when compensation is only required for a subset of

³ The Warsaw Framework for REDD+ under the UNFCCC is an internationally agreed approach to guide activities in the forest sector that reduce emissions from deforestation and forest degradation, as well as the sustainable management of forests and the conservation and enhancement of forest carbon stocks in developing countries.

⁴ Ecological compensation widely refers to creating, restoring, or enhancing ecosystems in order to counterbalance ecological damage caused by development.



harmful activities (Sonter et al., 2020), or when it is not feasible to achieve equivalent values for people or nature in the area being used to offset harm.

Finally, the ambiguity of the term “NbS” means that it can be widely interpreted to suit a variety of interests, whether it be those of the private sector, government, or civil society (Melanidis & Hagerman, 2022). This ambiguity enables flexibility but does not easily lend itself to a robust and consistent application of NbS.

Robust Social and Environmental Safeguards at the Heart of NBCS

While the concept of NbS has been divisive, proponents of NbS point to their potential to bring together diverse stakeholders, bridge silos across ministries or sectors, and enable creative solutions for societal challenges. An added advantage is the ability of NbS to synergistically achieve global targets—addressing climate, biodiversity, and land agreements across the Rio Conventions while contributing to the achievement of other multilateral agreements such as the Sustainable Development Goals and the



Sendai Framework for Disaster Risk Reduction. NBCS have the potential to deliver measurable benefits to communities and ecosystems in cost-effective, equitable ways (see Table 1). And the cost of not upscaling implementation is clear—in an era when biodiversity loss is accelerating and threatening human well-being and capacity to adapt, we need creative solutions that incorporate biodiversity conservation, restoration, and sustainable use.

Careful implementation of NBCS with strong social inclusion principles and robust safeguards with adequate enforcement can help address current concerns and enhance the efficacy, legitimacy, and local acceptance of NBCS measures. When the rights and knowledge of Indigenous Peoples and local communities are undermined or excluded, the most vulnerable communities can be adversely affected. Integrating gender-responsive, rights-based, and socially inclusive approaches into NBCS planning and implementation is crucial for avoiding negative social impacts such as “land grabs,” appropriation of resources, and “displacing and marginalizing poor and vulnerable communities through securitization of resources” (Seddon et al., 2021).

Safeguards are also needed to protect biodiversity and ecosystems and the communities that rely on their resources. Despite well-intentioned efforts to mitigate climate change with NbS through large-scale afforestation initiatives, some of these projects have instead harmed, rather than benefited, biodiversity and local communities (Lofts et al., 2021). Scientists now



underscore the need to consider appropriate environmental and socio-economic contexts when implementing NBCS (IPBES, 2019; IPCC, 2022), including planting trees only where they are suited to grow and where they do not have negative impacts on ecosystems or communities. For example, grasslands and savannahs are already under threat globally from multiple stressors, and tree planting in these areas can further harm the livelihoods of communities dependent on grasslands for livestock forage, game habitat, and groundwater recharge (Veldman et al., 2019).

Healthy and resilient ecosystems underpin NBCS for adaptation measures, but climate change is increasingly threatening ecosystem functioning. Adverse impacts of climate change, such as intensified drought, flooding, heat waves, forest fires, and extreme weather events, are undermining ecosystems' natural ability to adapt to these disturbances, thereby undermining the effectiveness of NBCS for adaptation. It is thus crucial to integrate risk assessments and adaptive management into NBCS to plan for future changes to systems due to climate change or other drivers.

A suite of principles and safeguards was adopted by parties to the CBD in 2018 in the *Voluntary Guidelines for the Design and Implementation of Ecosystem-Based Adaptation and Disaster Risk Reduction* (CBD, 2019). The principles serve as high-level, foundational beliefs to guide planning and implementation and address the themes of building resilience and enhancing adaptive capacity, inclusivity and equity, consideration of multiple scales, and effectiveness. Safeguards are social and environmental measures to avoid unintended consequences to people, ecosystems, and biodiversity (see Box 3). They complement existing national environmental and social impact assessment regulations and guidelines.

Box 3. Safeguards adopted by the CBD

- Environmental impact assessments in line with Akwé: Kon Voluntary Guidelines
- Prevention of transfer of risks and impacts
- Prevention of harm to biodiversity and ecosystems
- Sustainable resource use
- Full, effective, and inclusive participation
- Fair and equitable access to benefits
- Transparent governance and access to information
- Respecting the rights of women and men from Indigenous and local communities, including access to and use of physical and cultural heritage

Source: CBD, 2019.



Further guidance includes qualification criteria and standards for EbA, with criteria for equitable governance along with restoring, maintaining, or improving ecosystem health (Bertram et al., 2017). The IUCN NbS Global Standard, released in 2020, proposes criteria and indicators for assessing and upscaling NbS while addressing the pillars of sustainable development (economy, environment, and society) (IUCN, 2020).

Sector- and practice-specific principles provide further guidance on particular subsets of NbS, such as the International Principles and Standards for Ecological Restoration (Gann et al., 2019), principles for integrating community-based adaptation and ecosystem-based disaster risk reduction in mountain ecosystems (Klein et al., 2019), or landscape approaches (Sayer et al., 2013). Under the REDD+ framework, safeguards also emphasize protection for the environment and society,⁵ but it has been argued that these safeguards need stronger implementation and enforcement (Forest Peoples Programme, 2021).

Gender-Responsive and Socially Inclusive NBCS With Biodiversity Benefits: Pillars for effective and legitimate NBCS

This guidance note sets the stage for unpacking the main concepts and controversy around NBCS. Future technical briefs will provide a deep dive into three main pillars of implementing and upscaling NBCS that are rooted in rights-based approaches while enhancing the efficacy and legitimacy of these initiatives:

- **Gender responsive:** Ensuring that NBCS actively promote gender equality.
- **Socially inclusive:** Integrating principles of good governance and equity in NBCS implementation, understanding what constitutes a rights-based approach, and weaving Indigenous and local knowledge or Traditional Knowledge and diverse knowledge systems into NBCS.
- **Biodiversity benefits:** Highlighting NBCS that enhance biodiversity and ecosystem resilience.

NBCS that integrate these three pillars as part of incorporating safeguards can improve the success of financing, including through Canada's Partnering for Climate initiative. Careful application of safeguards and integration of these pillars can enhance the legitimacy and acceptance of NBCS by rights holders and stakeholders and promote the equitable distribution of benefits. However, while gender-responsive and socially inclusive NBCS are an integral component of adaptation strategies, they must also be accompanied by deep and systemic shifts in values, governance, institutions, and practices to reduce greenhouse gas emissions and conserve biodiversity.

⁵ See <https://redd.unfccc.int/fact-sheets/safeguards.html>



Building Partnerships for Knowledge

The NCAI aims to foster partnerships and knowledge exchange, working with diverse actors and tapping into a growing community of practice. The hope is to create an enabling environment for practitioners and policy-makers across sectors and disciplines to strengthen the implementation of equitable and effective NBCS that enhance biodiversity.

The EbA e-learning course takes policy-makers, practitioners, and members of civil society deep into the phases of designing, planning, and implementing EbA. Topics include climate risk assessment and valuation, along with monitoring, evaluation, and learning, each illustrated with case studies presented by implementing organizations and governments. Insight units are dedicated to the topics of gender-responsive EbA, Traditional Knowledge, governance, and enhancing biodiversity and ecosystems. This free, self-paced course is a collaboration between the Deutsche Gesellschaft für Internationale Zusammenarbeit, IUCN, and the International Institute for Sustainable Development, with funding from Global Affairs Canada and the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection. It will be launched in fall 2022.

Key Resources

- [CBD Technical Series No. 93: Voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction and supplementary information](#)
- [FEBA EbA Qualification Criteria](#)
- [IUCN Global Standard for Nature-based Solutions: A user-friendly framework for the verification, design and scaling up of NbS](#)
- [Ecosystem-based Adaptation Tools Navigator](#)



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