

# Harnessing Nature to build Climate Resilience:

Scaling up the use of  
Ecosystem-based  
Adaptation

Executive summary

**UN**  
environment  
programme



**50**  
1972-2022



**Global  
EbA  
Fund**



© United Nations Environment Programme 2022

Original English version: Harnessing nature for climate resilience: Scaling up the use of Ecosystem-based Adaptation © United Nations Environment Programme 2022. All rights reserved.

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. For general guidance on matters relating to the use of maps in publications please go to <http://www.un.org/Depts/Cartographic/english/htmain.htm>.

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.

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

Citation: United Nations Environment Programme (2022). *Harnessing Nature to build Climate Resilience: Scaling up the use of Ecosystem-based Adaptation – Executive summary*. Nairobi.

Author: Celia A. Harvey

Report Director: Barney Dickson

UNEP promotes environmentally sound practices globally and in its own activities. Our distribution policy aims to reduce UNEP'S carbon footprint. The report is printed on recycled paper.

## Executive summary

---

Ecosystem-based adaptation (EbA) has the potential to significantly enhance the resilience of society to climate change and could be a key part of national and global adaptation efforts. However, despite growing interest among policymakers, donors, scientists and practitioners, the current pace and scale of EbA implementation falls far short of its potential. The aim of this report is to highlight the opportunities for scaling up the use of EbA to help put the world on a more climate-resilient and nature-positive pathway.

The report begins by examining the role of EbA in helping society adapt to climate change, while also contributing to biodiversity conservation, climate mitigation and sustainable development efforts. It assesses the current state and trends in EbA implementation. Next, it explores the barriers that are currently slowing the widespread application of EbA in policy and practice. Finally, the report provides a set of recommendations on how to enhance the scale and pace of EbA implementation to more fully harness the potential of ecosystems to deliver adaptation benefits. The report is based on a detailed review of over 750 documents (including scientific papers, technical publications, policy briefs and project reports) as well as input from 59 global EbA experts from 30 organizations. Throughout the report, the term “ecosystem-based adaptation” is treated as equivalent to nature-based solutions (NbS) for adaptation, in line with the recent definition of NbS by the United Nations (United Nations Environment Assembly [UNEA] 2022).

### Building resilience to climate change

EbA can be defined as the use of ecosystems and biodiversity as part of a broader adaptation strategy to help people adapt to the adverse impacts of climate change. It involves the active conservation, restoration and management of ecosystems to foster climate resilience. EbA can help enhance the resilience of society to climate change by protecting communities

from the effects of climate hazards such as strong storms, floods and heatwaves, and by ensuring that ecosystems continue to deliver key ecosystem services (such as food or access to water) that help people meet their diverse needs in a changing climate.

Common examples of EbA measures include the conservation or restoration of mangroves to protect coastal communities from storm surges and sea level rise, the establishment of green roofs, street trees and urban parks to reduce the risks of heatwaves and flooding in cities, and the conservation of upslope forests to prevent landslides and downstream flooding under extreme weather events.

EbA has many qualities which make it a potentially attractive approach for policymakers, donors, investors and practitioners. EbA measures can be applied in a wide range of socioecological settings (from coastal zones to cities to mountains) and can meet the adaptation needs of a diverse set of sectors and stakeholders. In addition to providing significant adaptation benefits, EbA can generate a large and diverse array of co-benefits to society, including biodiversity conservation, climate mitigation, food security, job creation, livelihood opportunities and economic development. As such, EbA can make a significant contribution to multiple international policy goals related to climate change, biodiversity conservation, ecosystem restoration and sustainable development.

While EbA is a versatile and widely applicable approach, there are some limitations to its use. For example, there may be some circumstances in which EbA cannot address the specific adaptation needs of targeted stakeholder groups. In addition, ecosystems are themselves vulnerable to climate change, so unless urgent action is taken to reduce greenhouse gases and slow the rate of climate change, the ability of ecosystems to protect communities and deliver essential ecosystem services will decline over time.

## Current status and trends in ecosystem-based adaptation policy, practice and finance

Understanding the current status and trends in EbA implementation is difficult because data on EbA practice, policy and finance are incomplete, scattered and insufficiently detailed. Assessing the extent of action is also complicated due to the large diversity of EbA measures, the wide range of socioeconomic contexts and sectors in which EbA can be applied, and the diverse range of stakeholder groups involved.

Nevertheless, our assessment of available information (databases, publications, websites and reports) suggests that there is already substantial EbA action under way. There are at least several thousand EbA initiatives being implemented across the world, with support from a diverse suite of actors, including United Nations organizations, bilateral and multilateral development agencies, multilateral development banks and funds, international NGOs, research organizations, national governments, local communities and the private sector. Since many EbA initiatives are not labelled as such, the number of initiatives is certainly much larger than what is currently documented in the literature. EbA also has significant traction in the international policy arena and features prominently in the Nationally Determined Contributions and National Adaptation Plans of many (but not all) countries. In addition, numerous high-level policy initiatives, reports and declarations have called for greater deployment of ecosystem conservation, restoration and management in support of climate change adaptation. EbA is currently being funded by a small number of key bilateral donors, multilateral donors and climate and environment funds, with public finance for EbA in 2018 estimated to be between US\$3.8 billion and US\$8.7 billion in 2018 (Swann *et al.* 2021).

Our assessment suggests that the pace of EbA activity is increasing, albeit at a slow rate. Several key bilateral and multilateral organizations have increased the number of projects using EbA to foster climate resilience. There is a growing number of organizations that have joined collaborative networks that support

EbA action. There also appears to be a trend of increasing finance for EbA among some of the major bilateral and multilateral donors. Finally, there has also been a growing number of policy declarations and commitments by multilateral development banks, bilateral donors and others to increase the finance directed towards ecosystem-based approaches. The burgeoning number of publications, case studies, research and guidelines on EbA also points to growing interest in EbA and increased implementation.

However, at the same time, the current level of level of EbA implementation falls far short of its potential. The number of EbA initiatives under way, while significant, is too little to have a meaningful impact on the hundreds of millions of people who are threatened by climate change. There is a significant funding gap for EbA, as the amount of available funding falls short of what is needed. International public finance for EbA, for example, still makes up less than 2 per cent of total climate finance flows. There have been numerous high-level calls (such as the Nature-based Solutions for Climate Manifesto (2019)<sup>1</sup>, the Leaders' Pledge for Nature (2020)<sup>2</sup>, the Glasgow Climate Pact (2021; (United Nations Framework Convention on Climate Change [UNFCCC] 2021b), and the Glasgow Leaders' Declaration on Forests and Land Use (2021))<sup>3</sup>, to better harness the conservation, restoration and management of ecosystems for delivering climate adaptation, and to significantly scale up financial support for NbS.

In short, there is a growing consensus that EbA can play a much greater role in global adaptation efforts.

## Barriers to the use of ecosystem-based adaptation

Our review of the scientific and technical literature suggests there are multiple barriers that are hindering the widespread adoption and scaling up of EbA.

One of the most common barriers is the lack of awareness and understanding of the role of ecosystem conservation, restoration and sustainable management in fostering climate resilience. This

1 For more information, please visit <https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/29705/190825NBSManifesto.pdf?sequence=1&isAllowed=y>.

2 For more information, please visit <https://www.leaderspledgefornature.org/>.

3 For more information, please visit <https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>.



Source: Freepik - inguskruklitis

limited awareness and understanding of EbA (especially among policymakers, private sector actors and the local authorities and technicians who are tasked with implementing EbA on the ground) can discourage or prevent its inclusion in relevant policies, regulations, budgets, adaptation plans and investments.

A related challenge is the lack of sufficient knowledge and information for scaling up EbA. Despite a rapidly growing evidence base, many policymakers, donors and practitioners lack the necessary information to design and implement EbA. For example, they may lack climate change projections, information on stakeholder vulnerability, adaptation and the extent of ecosystems, or information on the costs, benefits and effectiveness of different EbA measures. In addition, there is limited information on the biophysical limits to EbA and the opportunities to integrate EbA with conventional engineering approaches. These knowledge gaps often make it difficult to design effective EbA initiatives.

Inadequate technical capacity is another key constraint. Policymakers and local authorities often lack staff with the necessary technical skills to effectively design, implement and mainstream EbA into relevant policies, plans and investments. In addition, many of the engineers, planners and technicians who are tasked with implementing EbA on the ground are trained in conventional engineering approaches and lack the requisite skills for ecosystem management and related stakeholder consultation processes.

Another challenge to scaling up EbA action is the lack of sufficient political and public support. Without strong political leadership and public support, it is difficult to raise the profile of EbA, secure funding, mainstream EbA into policies, regulations and budgets, and mobilize action and collaboration across diverse institutions, governance levels and stakeholders.

EbA implementation is often constrained by the lack of clear institutional arrangements and collaboration among the multiple government departments, institutions and sectors that are involved in ecosystem conservation, restoration and sustainable management. In addition, building effective, cross-sectoral and multi-stakeholder partnerships that address the diverse vulnerability and adaptation needs of different stakeholder groups (including Indigenous Peoples, local communities and women) is often challenging.

The lack of supportive policies and regulations can also slow EbA implementation. Since EbA is a fairly new approach, it has not yet been fully integrated into relevant national policies, sectoral strategies, regulations and related budgets. As a result, many national policies do not explicitly promote the use of EbA or provide the resources necessary for its application. Mainstreaming the use of EbA into economic development strategies and relevant sectoral strategies (e.g. infrastructure, transportation, energy and agriculture) has also been challenging. In addition, the lack of coherence across policies, laws and regulations related to ecosystem conservation, restoration and management can constrain EbA implementation.

Financial challenges are also commonly encountered by EbA initiatives. The main challenge is the lack of sufficient funding from both the public sector and the private sector to support EbA at scale. Despite growing interest in EbA, the current levels of funding fall far below what is needed. Other challenges include the lack of financial incentives and business models that could entice greater private sector investment in EbA, and the fact that existing financial instruments (e.g. subsidies or tax breaks) often discourage businesses or private sector actors from implementing EbA.

A final challenge is the fact that most EbA interventions require that space be set aside for the conservation, restoration and sustainable management of ecosystems for climate adaptation. In places where land is already built upon or used for livelihood activities or where land is prohibitively expensive, finding space for EbA implementation can be difficult.

## Recommendations for scaling up the use of ecosystem-based adaptation globally

In order for EbA to play a greater role in global adaptation efforts, it is important to overcome the current barriers to EbA implementation and find ways of accelerating both the pace and scale of action. Overcoming these barriers and scaling up EbA will require action on diverse fronts by a broad set of stakeholders, including indigenous and local communities, national and local governments, civil society organizations, the private sector, the research

community, bilateral and multilateral organizations, United Nations organizations and others.

Based on our analysis and discussions with EbA experts from around the world, we suggest that there are five broad categories of action that could help overcome many of the current barriers to EbA and ramp up the pace and scale of EbA implementation globally. These are:

1. creating a supportive policy and regulatory framework
2. using innovative policy and regulatory instruments to promote EbA
3. increasing the number of actors supporting EbA
4. using innovative approaches to finance EbA
5. targeting EbA implementation to the contexts where the greatest benefits will likely accrue.

### Creating a supportive policy and regulatory framework

Creating a conducive policy and regulatory framework for EbA is a critical – and often foundational – step for mobilizing action on EbA. Policy and regulatory frameworks are important because they reflect government priorities, determine which actions can be undertaken and guide the allocation of public technical and financial resources.

One important opportunity is to raise the profile of EbA in national commitments to international policy processes related to climate change, biodiversity conservation and sustainable development. While many national governments have already included EbA as a key component of their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), there is scope for more ambitious action. In both existing and future rounds of NDCs, governments could set more specific, ambitious and measurable targets for how, when and where EbA will be deployed and funded. They could also ensure that NDCs cover all relevant ecosystem types (not just forests, but also grasslands, wetlands, coral reefs and mangroves, among others). In addition to raising the profile of EbA within the climate agenda, governments should

also seek to integrate EbA into their national-level commitments for biodiversity, sustainable development, ecosystem restoration and related policy initiatives, and foster linkages across these commitments.

Another way to ensure policy support is to mainstream the consideration of EbA not only into national climate adaptation and related environmental policies, but also into economic development plans and other long-term strategies. The EbA approach could be systematically mainstreamed into the national strategies, policies, plans and budgets of all key sectors where its use can support sectoral goals (e.g. agriculture, water, forestry, health, energy, infrastructure and transportation). Mainstreaming EbA will help align policies and decision-making within governments, facilitate planning and implementation of ecosystem-based initiatives, promote cross-sectoral collaboration across different ministries, departments and institutions, and reduce the cost of adaptation planning, ultimately resulting in the greater use of EbA.

### Using innovative policy and regulatory instruments to promote ecosystem-based adaptation

A second major category of actions that can help spur EbA interventions is the use of innovative policy instruments. If designed and implemented appropriately, such policy instruments can help to increase awareness of the importance of EbA, encourage its widespread use by both the public and private sectors, and channel greater levels of funds towards EbA implementation.

The use of natural capital accounting by national governments could help to spur greater action on EbA. Natural capital accounting involves measuring the stock, condition and value of ecosystems and ecosystem services (including services that contribute to climate adaptation), assessing how ecosystems and their ability to provide services are changing over time, and integrating this information in accounting and reporting systems. The widespread adoption of natural capital accounting by governments could lead to greater use of EbA by creating greater awareness and understanding among policymakers, technicians and other decision makers of the value of nature and its critical role in delivering adaptation (and other) services. In addition, natural capital accounting can help decision makers to identify the specific geographic areas where

the intentional conservation, management or restoration of ecosystems is critical for delivering adaptation services. It can also provide valuable information for government investment and budgeting decisions, for example, helping to ensure that public finance is directed towards activities that maintain or enhance ecosystems (and ecosystem services flows) and away from activities that undermine ecosystem functioning.

Governments, multilateral organizations, international development agencies, climate funds and other public funders could encourage the use of EbA by establishing green public procurement processes. “Green public procurement” refers to the public purchase of products and services which are less environmentally damaging than alternatives, when taking into account the whole life cycle of the product or service. Governments with existing green procurement procedures could review and update their technical standards and procedures to ensure that EbA options are always included as potential options in the assessment of new infrastructure or development projects (e.g. roads, energy infrastructure, coastal development, agricultural infrastructure). They could also require that any purchase of goods and services from the agricultural, forestry and fishery sectors come from sustainably managed ecosystems that meet voluntary sustainability standards. Governments also have the potential to ramp up the use of existing green procurement policies by mandating that a certain percentage of public procurement be “green” and that this percentage increase over time. National governments that have not yet adopted green public procurement policies can draw on existing experiences to set up robust systems that encourage ecosystem conservation, restoration and sustainable management for climate adaptation.

Another approach that could significantly accelerate action on EbA is to integrate the use of “green” and “blue” infrastructure (e.g. ecosystems such as forests, parks, wetlands and mangroves) in future infrastructure investments. National and local governments can promote the use of green and blue infrastructure by including it in infrastructure standards, regulations and procurement policies, by requiring that key service providers (such as water utilities, stormwater departments, flood management agencies and power companies) consider its application, and by integrating its use into local and regional planning initiatives. Multilateral development banks and development agencies can similarly require that infrastructure

initiatives consider the use of green and blue infrastructure, and provide loans with better rates to support this approach.

Building codes and zoning regulations can be used to promote the conservation, management and restoration of ecosystems for climate change adaptation. National and local governments can develop or update building codes and standards so that they require the consideration of climate risks to buildings, roads, ports and other infrastructure, and mandate the consideration of EbA options for addressing climate risks. Governments can also revise and improve land and coastal zoning regulations so that they protect ecosystems that are critical for adaptation, for example, prohibiting development of vulnerable coastal ecosystems or floodplains that provide valuable flood protection.

### Increasing the number of actors supporting ecosystem-based adaptation

A third approach for accelerating EbA action is to increase the number of actors that support EbA, so that there is a larger group of actors who can catalyse action. The effective design and implementation of EbA requires collaboration among a large and diverse suite of stakeholders and entails both bottom-up and top-down action. However, to date, most of the action has been led by national and local governments, international public funders, international and national NGOs and the research community. For EbA to be implemented at scale, it will be necessary to more actively engage a much wider and more diverse set of actors.

Indigenous Peoples, local communities and women can potentially play a much greater role in delivering EbA, as they manage large parts of the world’s land and seas, have livelihoods that are dependent on ecosystems, and stand to directly benefit from effective EbA action. However, to date, the role of local and indigenous actors (including women) has often been overlooked by governments, donors and practitioners, with only 10 per cent of international adaptation funds having reached this local level (Soanes *et al.* 2017). Governments, development agencies and civil society organizations can support greater leadership of local actors by building capacity on EbA, sharing knowledge and information, facilitating their engagement in





Source: UNEP and Climate Adaptation

adaptation policy and planning processes, and mobilizing finance for locally led initiatives. Applying the principles for locally led action on adaptation and adopting a gender-responsive approach can also help ensure EbA initiatives meet the diverse needs of Indigenous Peoples, local communities, women and other marginalized groups.

Another group that could play a much larger role in delivering EbA is the business community. Many businesses are unaware of the significant risks that climate change poses and are not taking action to address these risks. Despite its potential to address both climate change and biodiversity risks, few businesses use EbA. National and local governments can spur greater uptake and use of EbA by businesses by creating supportive policy and regulatory frameworks, mandating climate financial risk disclosures by private businesses, requiring the consideration of EbA in public sector procurement of goods and services, and creating building codes and zoning regulations that incentivize the conservation and restoration of ecosystems. Governments can also incentivize businesses to adopt EbA measures through local fee or tax discounts, reduced property taxes, rebates and other policy instruments.

Greater involvement of the financial sector could also help to accelerate EbA action. Banks, pension funds, microfinance institutions, insurance companies, equity funds and other investors could leverage significant private finance for EbA and help address the current funding gap. To catalyse greater involvement by the financial sector, governments can create supportive policies and regulations for EbA, facilitate access to information on climate change risks and adaptation options, and provide robust business models and proof of concepts to build confidence within the finance community. The public sector can also improve the risk profile of EbA investments by applying public finance instruments that reduce the risks of private sector investment, such as government guarantees, credit lines, or blended finance.

### Using innovative approaches to finance ecosystem-based adaptation

A fourth broad set of actions that can help accelerate EbA action is the use of innovative finance mechanisms to generate funding at the pace and scale required.

While most funding for EbA continues to stem from public budgets and international assistance, there are increasing opportunities to use new innovative mechanisms to attract greater public and private investment. These innovative finance mechanisms may tap into new sources of funds, blend different sources of funds, de-risk private sector investments or develop novel ways to unlock funds for the conservation, management and restoration of ecosystems for climate resilience.

One promising opportunity is to use green bonds to channel greater levels of private finance towards EbA. While the use of green bonds for EbA is still nascent, there are a number of new initiatives that seek to use bonds to generate finance to fund ecosystem-based initiatives (such as mangrove restoration, wetland conservation or reforestation projects) that can confer adaptation benefits to society. There is a need to grow awareness, interest and capacity on EbA among both bond issuers and bond investors and to develop more pilot initiatives that can demonstrate success and serve as examples for replication.

Debt relief could provide another important financial mechanism for fostering greater action on EbA. Many low- and medium-income countries are facing record high debt levels and are having difficulties servicing their debt payments; at the same time, many of these countries lack sufficient resources to invest in climate adaptation. There is growing momentum among economists and policymakers to offer debt relief to countries in exchange for special action on climate change and/or nature conservation. In these “debt for climate” or “debt for nature” swaps, instead of continuing to make external debt payments to the creditor in a foreign currency, the debtor nation makes payments in a local currency to finance climate projects or nature conservation actions based on agreed-upon terms with the creditor. As part of these green debt swaps, countries can commit to using the debt relief to finance the conservation, restoration and sustainable management of ecosystems that provide protection against climate hazards, thereby promoting greater investment and implementation of EbA.

Another opportunity is to leverage COVID-19 stimulus and recovery funds in support of EbA. Investing stimulus and recovery funds in EbA initiatives could help countries recover from the unprecedented socioeconomic impacts of the pandemic by creating

jobs and other economic benefits, and by improving the long-term resilience of communities, businesses and economies to climate change. In order to spur the use of EbA in economic recovery plans, governments, multilateral development banks, development agencies and other donors could directly provide grants, loans or other types of funding for priority EbA measures, such as investing in green infrastructure in cities to reduce heat exposure and urban flooding, or financing mangrove and wetland restoration to minimize coastal flooding.

Another way to accelerate action on EbA is to support the disclosure of risks to climate and nature among private sector actors, including businesses and financial institutions. There are currently two initiatives under way to promote greater transparency on climate- and nature-related risks to companies: the Task Force on Climate-related Financial Disclosures and the Task Force on Nature-related Financial Disclosures. The broad-scale adoption of these risk disclosure frameworks could spur greater use of EbA, as private sector actors become more aware of the risks they face from climate change and nature loss and the potential for ecosystem management to address these risks. Governments can support these risk disclosure efforts by creating national regulations that require companies to report their climate-related and nature-related financial risks and the actions they are taking to address these risks (including EbA).

There are opportunities to leverage more financial resources for EbA from the insurance sector. The insurance sector can incentivize the use of EbA among its clients by providing discounts for clients who use EbA to reduce their vulnerability, thereby reducing the cost of insurance. They could also support EbA by creating innovative insurance mechanisms that support the conservation, management and restoration of ecosystems that are important for adaptation. Finally, the insurance industry can invest directly in the restoration, conservation and sustainable management of ecosystems for climate resilience.

### Targeting ecosystem-based adaptation implementation to the contexts where the greatest benefits will likely accrue

A fifth, and final, approach that holds promise for scaling up EbA is to prioritize EbA implementation in

those contexts in which it will deliver the greatest and most significant adaptation benefits (i.e. where its implementation reduces the vulnerability or enhances the resilience of the greatest number of people). Decisions about whether, how, where and which EbA measures to include in adaptation initiatives for a given location should be based on a detailed, spatially explicit analysis of climate risks, stakeholder vulnerabilities and adaptation needs, potential adaptation measures, and numbers of potential beneficiaries. While the specific priority areas for EbA will differ from one country to the next, there are three contexts where EbA implementation holds particular promise for delivering adaptation benefits at scale.

Firstly, EbA should be prioritized in low-lying cities that are vulnerable to heat stress and flooding. As the world becomes urbanized, cities are increasingly at the forefront of climate change adaptation efforts. It is estimated that 55 per cent of the world's population already lives in urban areas and the urban population continues to grow (United Nations 2018). Climate change poses significant risks to many cities because they are located in the floodplains of major rivers, on drained wetlands, along estuaries or along coastlines, and are therefore vulnerable to flooding and storm surges. An estimated 700 million people live in urban or peri-urban areas that are less than 10 m above sea level (Center for International Earth Science Information Network 2019). Flooding already causes an estimated US\$ 120 billion of damage to urban property each year and this is expected to increase significantly in coming years (Browder *et al.* 2019). Urban residents are also threatened by rising temperatures and heat stress. EbA measures, such as the establishment and management of green roofs, street trees, urban parks and other green areas, can help manage heat and flooding risks in cities, while also providing additional benefits such as energy savings, recreation opportunities and improved health. In low-lying coastal cities, additional EbA measures are needed (see the next recommendation). To encourage widespread uptake of EbA in cities, national and local governments can mainstream EbA into urban development strategies, ensure urban planning and zoning include the use of green and blue infrastructure, update building codes and zoning restrictions, and create incentives for EbA uptake.

Secondly, the use of EbA should be prioritized in coastal communities that are vulnerable to the risk of sea level rise, storm surges and erosion. Coasts are home to

more than 40 per cent of the world's population (UNEP 2016) and are vital economic hubs. Climate change poses a significant threat to coastal towns, villages and cities, with rising sea levels, increased storm surges, accelerated land erosion and increased flooding threatening the well-being and livelihoods of coastal residents, damaging coastal infrastructure and affecting trade. The widespread implementation of EbA (such as the conservation and restoration of mangrove forests, coral reefs, salt marshes and other coastal and marine ecosystems) can be a particularly effective means of protecting coastal communities, infrastructure and assets against climate hazards. National and local governments can encourage the use of EbA in coastal regions by updating coastal development regulations to protect ecosystems that provide critical protective functions by requiring that coastal defence projects consider EbA options, by increasing investment in the use of green and blue infrastructure and by prohibiting activities (such as sewage pollution, habitat damage and loss, overfishing and uncontrolled coastal development) that degrade existing coastal ecosystems and undermine their protective functions.

Finally, there are significant opportunities to scale up the use of EbA in key agricultural landscapes that are critical for food and water provision in a changing climate. Agriculture is a critical sector because it covers larger parts of the world, provides most of the world's food, and is an important source of employment. An estimated 2 billion people depend on agriculture for their livelihoods. Agricultural communities are often at the front lines of climate change, as higher temperatures, changes in precipitation patterns and increased frequency of extreme weather events directly threaten agricultural and livestock production, food security, and rural livelihoods. EbA measures such as the use of agroforestry to protect livestock from heat stress or the use of agroecological methods that improve soil health and resilience or the protection of forests within broader agricultural landscapes can help improve the resilience of these landscapes to the adverse impacts of climate change. EbA could enable farmers to continue to produce food for the world's rapidly growing population and ensure the provision of water in a changing climate, without undermining the

ecosystems and natural resources on which society depends. To encourage greater implementation of EbA in agricultural landscapes, there is a need to build the capacity of farmers, agronomists, extension agents and farmer-led organizations to design and apply EbA measures, increase the funding of public extension and outreach services for agriculture and natural

resource management, and facilitate access to finance for farmers so that they can adopt EbA measures. There is also an urgent need for governments to remove perverse agricultural subsidies that lead to deforestation, degradation and unsustainable agricultural practices and redirect these funds towards EbA and other sustainable management practices.

## Conclusions

There is significant scope for EbA to play a much greater role in putting the world on a more climate-resilient and nature-positive pathway. In order to harness the full potential of EbA, it is critical to accelerate both the pace and scale of EbA action. This will require: creating more supportive policy and regulatory frameworks; applying innovative policy instruments in support of EbA; broadening the EbA constituency to include Indigenous Peoples and local communities, the business community and the finance sector; using innovative finance approaches to secure greater levels of private and public funding; and ensuring that EbA is targeted to the contexts in which it will provide the greatest adaptation benefits.

We recognize that these recommendations are ambitious and that their implementation will require tremendous effort, political will, and significant financial and human resources. Scaling up will take time and success is not guaranteed. However, inaction is not an option. Without rapid and significant adaptation action, climate change will have increasingly devastating impacts on human communities, natural ecosystems and economies worldwide. Ambitious and rapid action on EbA is needed on many fronts and by many stakeholders if we are to put the world on a more climate-resilient and nature-positive pathway.

## References

- Browder, G., Ozment, S., Rehberger Bescos, I., Gartner, T., Lange, G.M. (2019). *Integrating Green and Gray: Creating Next Generation Infrastructure*. Washington, DC: World Resources Institute and World Bank Group. <https://openknowledge.worldbank.org/handle/10986/31430>.
- Center for International Earth Science Information Network (2019). Rising seas threaten low-lying coastal cities, 10% of the world population, 25 October. <https://news.climate.columbia.edu/2019/10/25/rising-seas-low-lying-coastal-cities/>. Accessed 23 May 2022.
- Soanes, M., Rai, N., Steele, P., Shakya, C., and MacGregor J. (2017). *Delivering real change: getting international climate finance to the local level*. London: International Institute for Environment and Development. <https://pubs.iied.org/sites/default/files/pdfs/migrate/10178IIED.pdf>.
- 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. [https://files.wri.org/d8/s3fs-public/public-international-funding-nature-based-solutions-adaptation\\_0.pdf](https://files.wri.org/d8/s3fs-public/public-international-funding-nature-based-solutions-adaptation_0.pdf).
- United Nations Environment Programme (2016). *Options for Ecosystem-based Adaptation in Coastal Environments: A Guide for environmental managers and planners*. Nairobi. [https://www.sprep.org/attachments/bem/PEBACC/EbA\\_resources/Options\\_for\\_Ecosystem-based\\_Adaptation\\_in\\_Coastal\\_Environments\\_UNEP.pdf](https://www.sprep.org/attachments/bem/PEBACC/EbA_resources/Options_for_Ecosystem-based_Adaptation_in_Coastal_Environments_UNEP.pdf).
- United Nations (2018). *The World's Cities in 2018. Data booklet*. New York, NY. ST/ESA/SER.A/417 [https://www.un.org/en/development/desa/population/publications/pdf/urbanization/the\\_worlds\\_cities\\_in\\_2018\\_data\\_booklet.pdf](https://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2018_data_booklet.pdf).
- United Nations Framework Convention on Climate Change (2021b). *Glasgow Climate Pact*. [https://unfccc.int/sites/default/files/resource/cma3\\_auv\\_2\\_cover%20decision.pdf](https://unfccc.int/sites/default/files/resource/cma3_auv_2_cover%20decision.pdf).

