

*Keywords:*

Ecosystem-based adaptation (EbA), nature-based solutions (NbS), biodiversity, resilience, participation

## Policy pointers

**The growing evidence** base on the effectiveness of ecosystem-based adaptation (EbA) calls for this nature-based solution to be prioritised in development and climate change policymaking.

**Collaboration should be** facilitated across government departments and sectors, from local to national and international levels, to enhance EbA effectiveness.

**Local technical capacity** to implement EbA must be further developed; support for research and knowledge sharing on EbA is also needed to boost uptake.

**Successful EbA requires** implementers to adopt participatory approaches, value indigenous and local knowledge, work with or strengthen local organisations and planning processes, and address the differential benefits and trade-offs associated with EbA.

## Nature-based solutions to climate change adaptation

Ecosystem-based adaptation (EbA) — a subset of nature-based approaches to help people adapt to climate change — is an increasingly popular strategy. Evidence from 13 initiatives in 12 countries shows that EbA can provide important, wide-reaching and long-term benefits relating to adaptation, the environment and social issues. However, there can be differences and trade-offs between who benefits, and when and where benefits accrue. EbA can be cost-effective; often more cost-effective than alternative approaches. Given these findings, EbA should be prioritised when planning climate change adaptation strategies. Those implementing EbA should adopt participatory processes, work with local organisations, value local knowledge and take measures to address differential benefits and trade-offs. In this briefing, we present key findings and summarise the policy, capacity and governance conditions that enable EbA to flourish, extracting lessons for both government bodies and on-the-ground implementers.

### What is EbA?

EbA is a nature-based approach that uses biodiversity and ecosystem services to help people adapt to the adverse effects of climate change. It involves activities such as planting vegetation on slopes to prevent landslides, restoring coastal habitats to address sea level rise and storm surges, applying integrated water resource management to address water shortages, and managing forests sustainably to prevent erosion and regulate water flow. The approach rests on combining local knowledge with evolving information on climate change.

EbA has been applied to address the linked challenges of climate change impacts, biodiversity loss and poverty, especially in poor countries where people are heavily dependent

on natural resources. Despite its successes, however, it has been insufficiently adopted by national and international policy processes, and is neither consistently implemented nor adequately financed. This is partly due to limited understanding of EbA's effectiveness, particularly compared with alternative, often infrastructure-based adaptation options.

### Recent research shows EbA is effective

To address the knowledge gap on efficacy, IIED, together with the International Union for Conservation of Nature (IUCN) and the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), jointly studied<sup>1</sup> 13 EbA initiatives around the world

(see Table 1) to assess whether the approaches taken could:

- Support local people's capacity to adapt to climate change
- Help ecosystems produce services for local people and allow ecosystems to cope with the impacts of climate change and other stress factors (such as land degradation)
- Be financially and economically viable.

## *Despite its successes, EbA has not yet been sufficiently adopted, implemented or financed*

The study also looked at political, institutional and governance issues that help or hinder effective EbA.

When we analysed the results, our study returned positive responses (of varying strength) to all three key questions above.

Stakeholders at all 13 initiatives thought that EbA reduced the vulnerability of local communities to climate change or improved their resilience or ability to adapt to it. They also thought that EbA provided many other social benefits, including livelihood opportunities and health improvements.

Stakeholders thought that EbA benefited vulnerable groups, notably women. For example, women were in charge of fishing in the mangrove-related project activities in El Salvador,

and were left in charge of other project-related activities in China, Nepal and Peru because of male migration to cities.

Stakeholders at 11 sites thought that EbA enhanced the provision of ecosystem services,<sup>2</sup> for example by increasing water provision for domestic and agricultural purposes, reducing the risk of disasters, or improving soil quality.

At eight sites, stakeholders thought that EbA boosted the resilience of ecosystems at the watershed or water catchment levels. Stakeholders also considered interventions at the wider landscape level important. For example, in Kenya, the communal management of large dryland areas supported the seasonal mobility of pastoralists.

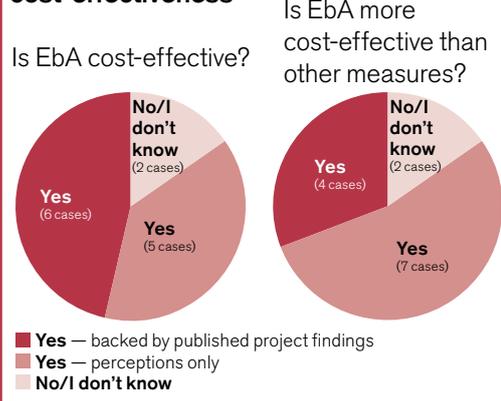
EbA can be cost-effective, and more so than many alternatives, as shown in Figure 1. However, this study emphasised the challenges of fully measuring financial and economic costs and benefits, and the importance of going beyond monetary values to reflect the true benefits of EbA. Six projects demonstrated that financial or economic benefits from EbA projects at one location spread elsewhere.

An interesting finding was that despite the many reported positives, our study found unequal distribution of benefits and trade-offs in several of the EbA projects (see Box 1). The study also

**Table 1. EbA initiatives included in our study<sup>4</sup>**

Country	In-country partner	EbA project and dates
China	Centre for Chinese Agricultural Policy, Chinese Academy of Science	Participatory Plant Breeding and Community Supported Agriculture, southwest China (2000–16)
Nepal	IUCN	Ecosystem-based Adaptation in Mountain Ecosystems (2011–16)
Bangladesh	Bangladesh Centre for Advanced Studies	Incentive-based Hilsa Fish Conservation (2003–ongoing)
Kenya	Adaptation Consortium; Kenya Drought Management Authority	Supporting Counties in Kenya to Mainstream Climate Change in Development and Access Climate Finance (2013–16)
South Africa	Conservation South Africa	Climate Resilient Livestock Production on Communal Lands — rehabilitation and improved management of dryland rangelands in the Succulent Karoo (2011–15)
Uganda	IUCN	Ecosystem-based Adaptation in Mountain Ecosystems (2011–16)
Burkina Faso	IUCN	Ecosystems Protecting Infrastructure and Communities (2012–17)
Senegal	IUCN	Ecosystems Protecting Infrastructure and Communities (2012–17)
Peru	IUCN	Ecosystem-based Adaptation in Mountain Ecosystems (2011–16)
	Asociación para la Naturaleza y el Desarrollo Sostenible (Association for Nature and Sustainable Development)	The Potato Park project, which protects indigenous biocultural heritage for local rights, livelihoods, conservation and sustainable agrobiodiversity use (2000–ongoing)
Chile	IUCN	Ecosystems Protecting Infrastructure and Communities (2012–17)
Costa Rica/ Panama	IUCN	Adaptation, Vulnerability and Ecosystems project in the Sixaola River Basin (2015–18)
El Salvador	IUCN	The Governance for Ecosystem-based Adaptation: Transforming Evidence into Change project (2015–18)

**Figure 1. Research results: EbA project cost-effectiveness**



noted various models for funding scaled up EbA implementation (see Box 2).

## Enabling effective EbA

The 13 EbA initiatives highlight common policy, governance and capacity issues that are key for EbA effectiveness. These must be considered by those setting out to apply EbA approaches for climate change adaptation:

- **Government prioritisation** of EbA. Dedicated national, government-level climate change bodies and budgets enable more effective EbA implementation than when responsibility for climate change or EbA lies only with relatively under-resourced and politically weak environmental ministries.
- **Strong national policies.** EbA must be integrated into policies related to climate change, disaster risk reduction and natural resource management. Policies relating to decentralised governance and support for local organisations, and planning processes that recognise indigenous land rights and protect traditional knowledge, also enable EbA.
- **Sufficient implementation capacity.** Local government capacity must be strengthened to legislate for, implement and manage EbA activities, enforce policies and prevent corruption. The technical skills of community organisations and traditional leaders may also need to be boosted.
- **EbA champions to drive and support implementation.** These leaders can be government officials or members of civil society.
- **Collaboration between sectors and levels.** EbA is typically a multi-sectoral effort and requires collaboration across a range of government levels — from local to national, and even international, if natural resources or catchment areas straddle borders.

## Box 1. Distribution of benefits and trade-offs

In all the projects studied, some groups accrued more adaptation-related benefits than others. For example, intermediaries in the hilsa fish market chain in Bangladesh benefited more from larger fish catches than the fishers themselves. Several studies also reported trade-offs in social, environmental or economic benefit accrual:

- In eight projects, one group reportedly accrued adaptation-related benefits at the expense of others
- In six projects, there were possible similar trade-offs for social co-benefits. For example, in El Salvador those dependent on fishing benefited more than those dependent on mangrove cutting for their livelihoods
- In five projects, there were potential trade-offs between ecosystem services provided at different sites. For example, grazing restrictions at the mountain project site in Peru could have led to increased environmental degradation in the replacement grazing areas
- Many projects reported economic costs beyond those related to implementation. For example, five projects demonstrated possible economic trade-offs whereby one group of people benefited financially at the expense of others. Project activities may have prevented other land uses such as mining (at the Potato Park in Peru), or stopped riverside vegetable cultivation (in Uganda), or excluded livestock from areas under restoration (in South Africa).

Some trade-offs were temporal, with benefits (social, environmental or economic) taking time to materialise. For example, it could take 20 years to restore rangeland in Namaqualand in South Africa, and for timur (a spice) plantations to break even in Nepal. Short-term costs, such as those affecting people excluded from grazing areas, accrued before longer-term benefits emerged. Some projects tackled these challenges by providing incentives to offset short-term losses or covering high initial costs until longer-term benefits emerged. In Bangladesh, for example, the government distributed rice to fishers subjected to fishing restrictions.

Many of these trade-offs are not unique to EbA, and the study showed that they were generally outweighed by social, environmental or economic synergies. For example, in Burkina Faso, the project reduced risks and losses from flooding along the whole river. In Bangladesh, the fish sanctuaries increased hilsa fish populations throughout the river system. At many project sites, upstream restoration activities improved downstream water availability, quality or regulation.

## Box 2. Funding to scale-up EbA

Various models for funding scaled-up EbA implementation were noted by the study:

- In South Africa, a government-funded, expanded public works programme is incorporating ways to measure success in terms of increased capacity to adapt to climate change using EbA, as well as job creation, poverty reduction and water provision improvements
- In Kenya, county-level climate change legislation and management structures are channelling funds to local EbA initiatives from government development budgets or external sources
- In Uganda, the project (Table 1) converted watershed and carbon services into credits to be sold to organisations such as the National Water and Sewerage Corporation
- In Bangladesh, a proposed conservation trust fund would support the incentive-based hilsa conservation programme.

- **Meet basic development needs.**

High levels of poverty can undermine EbA. For example, indebtedness can affect compliance with restrictions on use of natural resources. EbA approaches should therefore include poverty alleviation measures and build links with markets to incentivise local involvement.

- **Improve understanding of EbA in local communities and government.**

Learning approaches include farmer-to-farmer meetings and exchange visits, which have been effective in Burkina Faso, China, Senegal and Uganda.

## Lessons for policymakers

Governments can help realise the full potential of EbA by supporting the enablers listed above. In particular, they need to:

- **Prioritise EbA in climate change and development policymaking**, such as national adaptation plans. EbA is known to benefit vulnerable people and can deliver on national and international development-related priorities, including the Sustainable Development Goals, as well as supporting adaptation
- **Strengthen collaboration** across departments and sectors at all levels
- **Build local technical capacity** to implement EbA, and support research and knowledge sharing on EbA to increase uptake
- **Scale up EbA** to reach the large number of people living in poverty who are particularly vulnerable to the impacts of climate change.

## Lessons for project implementers

The 13 EbA initiatives also provided a number of lessons for project implementers, such as NGOs or local government:

- **Adopt participatory processes and value indigenous or local knowledge.** This is essential for building the capacity of communities to adapt to climate change. For example, many project activities in China and Peru were founded on participatory plant-breeding processes.

## Notes

<sup>1</sup> The 'Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy' project undertook stakeholder interviews and reviewed project documentation using this methodology: Reid, H, Seddon, N, Barrow, E, Hicks, C, Hou-Jones, X, Rizvi, AR, Roe, D and Wicander, S (2017) Ecosystem-based adaptation: question-based guidance for assessing effectiveness. IIED, London. <https://pubs.iied.org/17606IIED> / <sup>2</sup> Reid, H, Hou Jones, X, Porras, I, Hicks, C, Wicander, S, Seddon, N, Kapos, V, Rizvi, AR and Roe, D (2019) Is ecosystem-based adaptation effective? Perceptions and lessons learned from 13 project sites. IIED, London. <https://pubs.iied.org/17651IIED> / <sup>3</sup> See: [www.iied.org/help-pilot-navigator-tools-for-ecosystem-based-adaptation](http://www.iied.org/help-pilot-navigator-tools-for-ecosystem-based-adaptation) / <sup>4</sup> The project website provides links to case study reports for all 13 initiatives, and policy briefing papers for Kenya, Bangladesh, China, Chile, Nepal, Uganda and El Salvador: [www.iied.org/ecosystem-based-adaptation](http://www.iied.org/ecosystem-based-adaptation)

- **Work with or strengthen local organisations and planning processes.**

These include community natural resource management groups and risk reduction committees.

- **Understand and address differential benefits and trade-offs.**

There are frequently differences in when, where and for whom adaptation, social, environmental and economic benefits from EbA accrue. This means incentives may be needed to compensate people in the early phases of a programme or to strengthen community support for an EbA project. Project designers should factor this into planning.

- **Cost-benefit analysis can inform decision making**

on whether it makes economic sense to invest in EbA; other information that reflects the full economic benefits of EbA must also be taken into consideration.

- **Use existing tools for EbA to overcome challenges.** UNEP-WCMC found over 245 relevant tools that can be explored through the EbA Tool Navigator.<sup>3</sup> This navigator can help practitioners and other stakeholders identify appropriate tools for incorporating EbA into climate adaptation plans.

In summary, growing global interest in EbA is well placed: our study confirms these approaches can be effective in helping people adapt to meet the challenges presented by climate change, as well as cost-effective. But our study also signals necessary considerations and suggests ways to manage EbA that will be key to build on existing effectiveness.

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## Knowledge Products

The International Institute for Environment and Development (IIED) promotes sustainable development, linking local priorities to global challenges.

IUCN is a membership Union composed of both government and civil society organisations. It harnesses the experience, resources and reach of its more than 1,300 Member organisations and the input of more than 10,000 experts.

The UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the UN Environment Programme, the world's foremost intergovernmental environmental organisation.

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ISBN 978-1-78431-727-0

This briefing presents findings from the International Climate Initiative (IKI) project 'Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy', coordinated by IIED, IUCN and UNEP-WCMC. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports the IKI on the basis of a decision adopted by the German Bundestag.

