Briefing

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Policy pointers

Governments and non-state actors are increasingly recognising EbA as a potentially highly cost-effective adaptation approach with the capacity to deliver significant co-benefits.

There is an urgent need to share learning on what makes EbA economically, socially and environmentally effective and to ensure that this information shapes the redrafting of nationally determined contributions in 2020.

Countries should be encouraged to establish measurable and meaningful EbA targets in national plans, report on progress towards these in their nationally determined contributions and rank EbA alongside other key elements of sustainable development.

Platforms that fund or support mitigation and resilience strategies — such as UN-REDD, the Carbon Fund, the Green Climate Fund and bilateral initiatives — should adopt a more holistic approach by highlighting and promoting EbA and its co-benefits for sustainable development.

Ecosystem-based adaptation: a win–win formula for sustainability in a warming world?

Many national and international environmental agreements acknowledge that the impoverishment of ecosystems is limiting the world's capacity to adapt to climate change and that ecosystem-based adaptation (EbA) approaches should be harnessed as a priority. EbA has the potential to increase adaptive capacity and social and ecological resilience to climate change in both developed and developing countries. Whilst only 23 of the 162 Intended Nationally Determined Contributions (covering 189 countries) submitted to the United Nations refer explicitly to EbA, 109 indicate ecosystem-orientated visions for adaptation. These, however, rarely translate into robust targets or involve local communities. This briefing highlights actions that need to be taken to increase the uptake of EbA in national action plans and ensure its proper implementation.

With global temperatures likely to exceed 1.5 °C of warming by the year 2100,[1] adapting to climate change is arguably the biggest challenge that humanity is currently facing. Here we examine the potential of ecosystem-based adaptation (EbA) to meet this challenge.

What is EbA?

The widely accepted definition of EbA is: "the use of biodiversity and ecosystem services … to help people adapt to the adverse effects of climate change." [2] EbA "may include sustainable management, conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities."[3] Examples include the restoration of coastal ecosystems to protect communities from storm surges,[4] the use of shade trees in coffee plantations to stabilise production in drier, more variable climates[5,6] and forest restoration in headwaters and riparian zones to regulate water supplies and protect communities from flooding.[7] EbA may provide multiple benefits in addition to adaptation, such as carbon storage, pollination services and livelihood diversification. Although it complements common approaches to natural resource and biodiversity management, EbA is distinctive because it focuses on adaptation needs and benefits and places these in the context of an overall adaptation strategy.[8] It also positions people at the centre because it involves community-based and fully participatory approaches.[9]

EbA as a cross-cutting approach

EbA is a unifying concept in a number of international sustainable development policy frameworks. Its emphasis on restoring and maintaining biodiversity and ecosystem services, and increasing habitat connectivity helps countries meet their obligations under the Convention on Biological Diversity (CBD). By providing co-benefits such as carbon sequestration, EbA helps countries to meet mitigation targets under the UN Framework Convention on Climate Change (UNFCCC). By increasing the resilience of vulnerable communities to extreme events such as coastal flooding and landslides, EbA helps countries to meet commitments under the Sendai Framework for Disaster Risk Reduction. EbA often involves maintaining or restoring the capacity of ecosystems to regulate water cycles and thus aligns with the goals of the UN Convention to Combat Desertification (UNCCD). EbA promotes sustainability in multiple sectors such as agriculture, forestry, energy, water, social justice, education and livelihood diversification, thus helping to achieve the Sustainable Development Goals.

To deliver social resilience and adaptive capacity, EbA activities should be implemented using participatory, community-led approaches

EbA in international agreements

Although communities have used natural resources for millennia to buffer the effects of adverse climatic conditions, EbA has only gained traction in international policies in recent years. In 2001, the CBD recognised that biodiversity and ecosystems could be used to help people adapt to climate change and in 2004 it acknowledged that ecosystem approaches could form the basis of climate change mitigation and adaptation. In 2008, the CBD formally defined EbA as "the use of ecosystem management activities to support societal adaptation". The definition was refined in 2009 and 2010 to be explicitly people-centred.

Other major international conventions — including the UNFCCC, the UNCCD and the Ramsar Convention — incorporated EbA into their texts in 2010–12. EbA is now recognised as a cross-cutting policy instrument, with Rio+20's Action on Adaptation Plan describing it as a planning tool for realising synergy between the Rio Conventions.[10] The Global Environment Facility acknowledged the importance of EbA by publishing operational guidelines to help establish EbA in projects globally.[11]

Since 2013, the emphasis has been on mainstreaming EbA into national policies conforming with the Rio Conventions such as National Adaptation Programmes of Action, National Adaptation Plans, National Biodiversity Strategies and Action Plans, and Intended Nationally Determined Contributions (INDCs). To support this mainstreaming process however, there is an urgent need for robust data on the economic, social and environmental effectiveness of EbA in relation to hard infrastructural or other alternatives.[12-14]

EbA in the Paris Agreement

The role of EbA in the UNFCCC's Paris Agreement is particularly important. Recently signed by 177 nations, the Paris Agreement has huge political momentum. To date, most analyses and debates have focused on the agreement's mitigation targets and whether they are sufficiently ambitious to limit global warming to 1.5 °C above pre-industrial levels.[1] But the agreement also addresses adaptation, with the aim of "enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal" (Article 7.1). The agreement calls on its parties to pursue actions "on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty" (Article 4.1). Ratifying countries are obliged to submit new Nationally Determined Contributions every five years, in which they will report on progress towards the targets set out in the agreement.

Effective EbA should increase adaptive capacity while promoting sustainable development and equity. The proper implementation of EbA, therefore, will help countries to meet their obligations under the Paris Agreement. To determine the extent to which signatories have committed to using EbA, we reviewed the adaptation component of all 162 INDCs submitted to the UNFCCC.

Why adapt, and how? The role of ecosystems and biodiversity in the INDCs

Most INDCs feature ecosystems and biodiversity prominently as both the context for, and method of, adaptation. Of the 162 INDCs reviewed, 137 (85 per cent) have distinct adaptation components. Of these, 120 (88 per cent) include the terms "ecosystem" or "biodiversity", with their use occurring at greatest frequency in the INDCs of

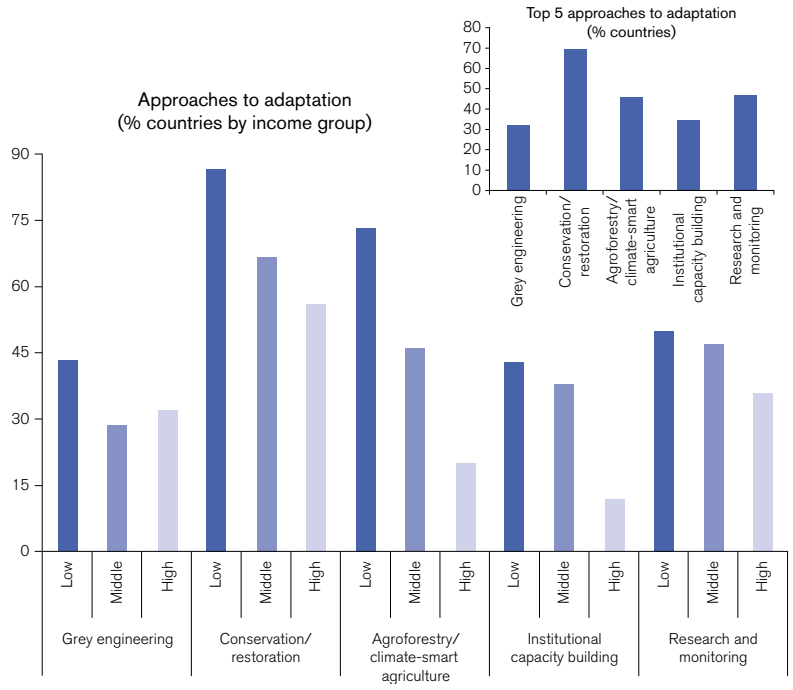
lower-income and middle-income tropical and subtropical countries. Of the INDCs with adaptation components, 64 per cent recognise the loss of biodiversity and ecosystem degradation as issues that justify adaptation planning, and just over half recognise 'biodiversity' as a distinct sector at risk due to climate change. The conservation or restoration of one or more ecosystems (particularly of forests in catchments and key coastal habitats) was the most commonly cited current or planned adaptation action, followed by agroforestry (see Figure 1). Engineered approaches were included explicitly in the adaptation plans of only 49 INDCs, all but six of which also referred to EbA explicitly or otherwise.

The prominence of EbA in INDCs

Twenty-three INDCs (17 per cent) explicitly mention EbA (ie they include the terms 'ecosystem-based adaptation' or 'ecosystem-based approaches to adaptation'). Of these, nine were from Least Developed Countries and all but one (Armenia) were submitted by tropical or subtropical countries rich in biodiversity and/or particularly vulnerable to climate change. EbA is an especially strong component (ie the term is used more than once, and the terms 'ecosystem' or 'biodiversity' are used frequently in the context of adaptation) of the INDCs submitted by Bangladesh, Costa Rica, Lao People's Democratic Republic (Lao PDR), Mexico, Myanmar, Nepal, the Seychelles, Vanuatu and Vietnam. A few countries (eg Peru and the Seychelles) describe current EbA activities but most present EbA as a future priority. Mexico is the only country to cite the CBD definition of EbA and it lists EbA as one of three broad areas of proposed adaptation (ranked alongside "adaptation for the social sector" and "adaptation of strategic infrastructure and productive systems"). Mexico gives six tangible targets for the implementation of EbA in 2020–30, focusing on ecosystem conservation and restoration.

Although only 23 countries mention EbA explicitly, many more have ecosystem-orientated visions for adaptation and propose a range of conservation, restoration, agroforestry and community-led approaches to achieve these visions. Mongolia, for example, aims to increase "adaptive capacity to overcome negative impacts of climate change, and to strengthen resilience of ecosystem and socio-economic sectors". Guinea commits to putting "in place the measures needed to protect, conserve and manage ecosystems, revive economic activities and boost the resilience of communities in its coastal zone". Bolivia's striking vision of

Figure 1. Top five approaches to climate change adaptation, as indicated by countries in their Intended Nationally Determined Contributions



adaptation "prioritizes the scope of holistic development in harmony with nature and as [a] structural solution to the global climate crisis."

Overall, we found that 109 countries are implicitly doing EbA or are planning to do so. For example, although only five African countries explicitly refer to EbA in their INDCs, 44 include it implicitly (with a focus on agroforestry). In Latin America and the Caribbean, eight countries include EbA explicitly but 18 are planning for it implicitly, while in Asia and the Pacific six countries mention EbA explicitly but an additional 18 are planning for it implicitly.

Measurable and locally meaningful targets

Many countries articulate a theoretical commitment to EbA but this rarely translates into clear targets. Even where measurable targets are set, it is unclear whether they will be sufficient to meet the adaptation needs of the communities and ecosystems involved. Of the 23 countries that explicitly mention EbA, eight have measurable targets, three have broad but essentially non-measurable targets, and the rest either have no targets (eg Lao PDR) or refer to national adaptation plans for details (eg Nepal). Of countries implementing or planning to implement EbA implicitly, African countries give it the strongest weight: the INDCs of 25 African countries have detailed adaptation plans with

some measurable EbA targets. In Latin America and Southeast Asia however, only a handful of INDCs include measurable EbA targets. This is concerning, given that these two regions encompass a large part of the world's biodiversity and some of the most climate-vulnerable communities.

Measurable targets generally concern the conservation or restoration of specific areas of habitat within given timeframes. For example, Madagascar aims to restore 35,000 hectares of primary and mangrove forests by 2020 and Mexico aims to achieve zero deforestation by 2030. Some measurable targets centre on the dissemination of knowledge or research: Angola, for example, aims to "disseminate sustainable land management and adaptation practices in agroforestry and land ecology in 350 communities".

More commonly, countries cite broad aims which are difficult to measure: Morocco aims to protect "natural heritage, biodiversity, forestry and fishery resources, through an ecosystem-based adaptation approach" and South Sudan will strive to "develop forest reserves and management plans to protect watersheds and improve future water availability". Although such aims are important, it will be difficult to determine the extent to which they are being achieved.

To deliver social resilience and adaptive capacity, especially in low-income countries where livelihoods are so dependent on natural resources, EbA activities should be implemented using participatory, community-led approaches.[15] Yet only 22 per cent of countries describing EbA activities in their INDCs refer to the involvement of local communities (eg using the term 'community-based adaptation' or similar).

EbA activities should be designed in light of the best available science, but it is unclear whether the EbA targets set out in the INDCs derive from a scientific understanding of the effects of different management practices on ecosystems or take into account future climate change scenarios. A major challenge is to base future adaptation planning on both local needs and current ecosystem and climate science.

Conclusion

EbA is central to the adaptation vision of many countries but some of the most biologically diverse and climate-vulnerable countries do not refer to it in adaptation plans submitted to the UNFCCC. Few countries that recognise the importance of EbA include clear and measurable targets by which progress towards implementation can be assessed; even fewer acknowledge the importance of local community involvement in designing and implementing adaptation activities. Given the huge potential of EbA to help countries achieve sustainable and equitable development in a warming world, there is an urgent need to set measurable targets and involve communities.

Many organisations worldwide are evaluating EbA effectiveness and they need to share their knowledge widely, thereby providing greater clarity on optimal EbA strategies. The key challenge is to build the capacity of communities worldwide to develop robust adaptation plans that are fine-tuned to their economic, social and environmental needs, access suitable levels of adaptation finance, and ultimately implement EbA at scale for the benefit of people and planet.

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Notes

[1] UN Framework Convention on Climate Change (2015) *Synthesis report on the aggregate effect of the intended nationally determined contributions.* / [2] 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. CBD Technical Series No. 41. Secretariat of the Convention on Biological Diversity, Montreal, Canada. / [3] Convention on Biological Diversity (2010) Decision adopted by the Conference of the Parties to the Convention on Biological Diversity at its Tenth Meeting. X/33. UNEP/CBD/COP/DEC/X/33. / [4] Das, S and Vincent, JR (2009) Mangroves protected villages and reduced death toll during Indian super cyclone. *Proceedings of the National Academy of Sciences* 106(8) 7357–60. / [5] Lin, BB (2007) Agroforestry management as an adaptive strategy against potential microclimate extremes in coffee agriculture. *Agriculture and Forest Meteorology* 144(1) 85–94. / [6] Philpott, SM *et al.* (2008) A multi-scale assessment of hurricane impacts on agricultural landscapes based on land use and topographic features. *Agriculure, Ecosystems and Environment* 128(1) 12–20. / [7] Daignault, A *et al.* (2016) Dredging versus hedging: comparing hard infrastructure to ecosystem-based adaptation to flooding. *Ecological Economics* 122 25–35. / [8] Vignola R *et al.* (2015) Ecosystem-based adaptation for smallholder farmers: Definitions, opportunities and constraints. *Agriculture, Ecosystems and Environment* 211 126–32. / [9] GIZ (2012) *Ecosystem-based adaptation (EbA): a new approach to advance natural solutions for climate change adaptation across different sectors*, Bonn. / [10] Seddon, N *et al.* (2016) *Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy.* International Institute for Environment and Development, London. / [11] Convention on Biological Diversity *et al.* (2012) *The Rio Conventions: action on adaptation.* Convention on Biological Diversity, UN Convention to Combat Desertification and UN Framework Convention on Climate Change. / [12] Global Environment Facility (2012) *Operational guidelines on ecosystem-based approaches to adaptation*, Washington, DC. / [13] Doswald, N *et al.* (2014) Effectiveness of ecosystem-based approaches for adaptation: review of the evidence-base. *Climate and Development* 6(2) 185–201. / [14] Jones, HP *et al.* (2012) Harnessing nature to help people adapt to climate change. *Nature Climate Change* 2(7) 504–9. / [15] Travers, A et al. (2012) *Ecosystem-based adaptation guidance: moving from principles to practice.* Working document. UN Environment Programme.

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