Introduction to Ecosystem-based Adaptation: A Nature-based response to climate change.

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What is Ecosystem-based Adaptation?

Climate change, combined with pollution, over-exploitation and human encroachment, are increasingly altering and degrading ecosystems and their ability to deliver the services that are vital to human lives and wellbeing (World Bank 2014). If conserved, restored and well-managed, however, these ecosystems can help enhance the resilience of people to the impacts of climate change, while providing multiple benefits to both society and the environment (Colls and others 2009). Ecosystem-based adaptation – or EbA for short - is therefore being increasingly promoted as a nature-based approach that actively uses biodiversity and ecosystem services to help people adapt to the adverse effects of climate change.

The Convention on Biological Diversity defines EbA as "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change" (CBD 2010).

EbA involves the conservation, sustainable management and restoration of ecosystems – such as forests, grasslands, wetlands, or coral reefs - to reduce the harmful impacts of climate hazards including shifting patterns or levels of rainfall, changes in maximum and minimum temperatures, stronger storms, and increasingly variable climatic conditions.

Specific actions can be 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. Healthy ecosystems can play a vital role in reducing disaster risk by acting as natural buffers or protective barriers to floods and landslides. They can also effectively act as water filtration and absorption systems.

The EbA approach rests on combining local knowledge with evolving information on climate change. EbA measures can be implemented on their own or in combination with engineered approaches (such as the construction of water reservoirs or dykes), hybrid measures that combine man-made and natural elements (such as artificial reefs) and approaches that strengthen the capacities of individuals and institutions to address climate risks (such as the introduction of early warning systems).

The importance of managing, conserving and restoring ecosystems to be climate-resilient

Central to the concept of EbA is the importance of seeing beyond the role of ecosystems as providers of a set of static 'natural resources' and instead seeing them as generators of a number of inter-connected ecosystem services (Reid and Alam 2014). The Millennium Ecosystem Assessment (MEA) report defines these services and their importance to human wellbeing, as shown in Figure 1 below.

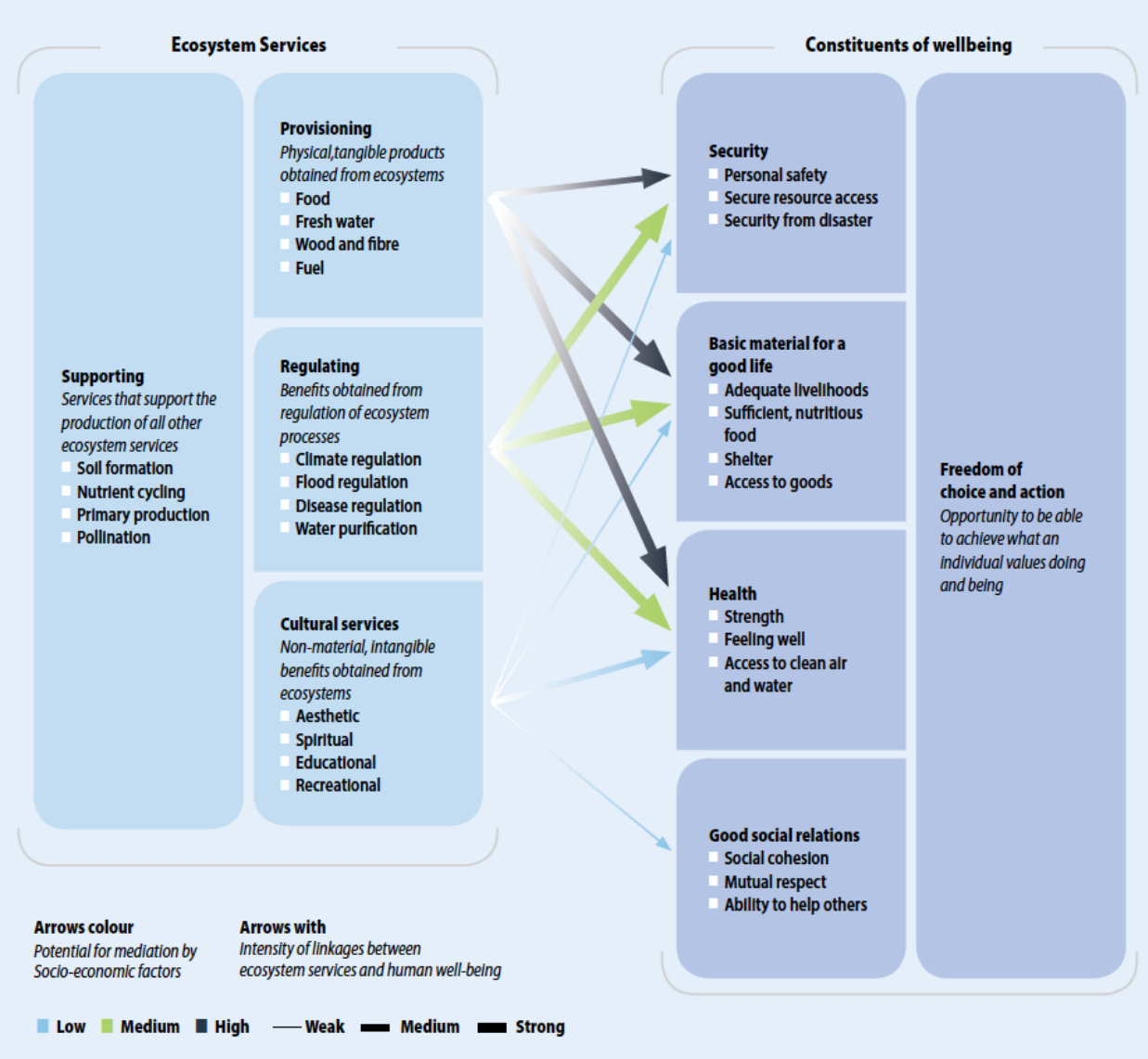
Extensive research proves that the more ample and diverse ecosystem services people benefit from, the more likely they are to be resilient to challenges. Climate change increasingly threatens the provision of ecosystem services that support basic human needs, such as food, water, energy and protection from natural hazards.

Like humans, ecosystems are more resilient to stressors and better able to adapt to adverse conditions when they are healthy and fully functioning. According to the MEA, resilience is "the capacity of a system to tolerate impacts of drivers without irreversible change in its outputs or structure (Millennium Ecosystem Assessment 2005)."

Ecosystems have limits, however, beyond which they cannot function in their current form. When these limits are breached, an ecosystem may no longer be able to provide the services on which humans have come to depend. According to the MEA and ample other more recent research, growing human demands on nature have become unsustainable. Climate change is expected to aggravate the ongoing ecosystem degradation by causing changes to the hydrological regime, vegetation shifts, habitat loss, species loss and change in species diversity (Dixit and Shukla 2014). Moreover, disruptive impacts on the function and integrity of ecosystems from human actions also have disruptive effects on regional and local climate systems (IPCC 2013).

A key focus for EbA, therefore, is to protect or enhance ecosystem functioning sufficiently to generate an entire suite of benefits for the human communities who live within and depend upon them for their well-being. More concretely, this involves securing the stability and resilience of ecosystems as a whole; how they connect with one another; and the multiple roles they can play in increasing the adaptive capacity and resilience of people depending on these ecosystems (Epple and Dunning 2014).

Figure 1. Ecosystem services and their links to human wellbeing



Source: Millennium Ecosystem Assessment/Reid and others (2005)

References

This learning brief was based on an earlier learning brief prepared by Tine Rossing that can be accessed here: https://www.adaptation-undp.org/resources/project-brief-fact-sheet/introduction-ecosystem-based-adaptation-nature-based-response

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