

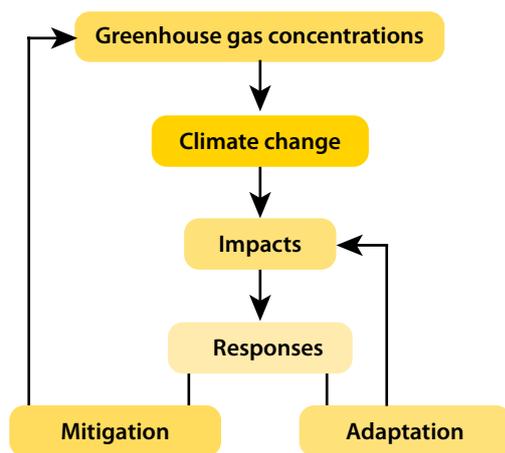
Synergies between adaptation and mitigation in a nutshell

Bruno Locatelli

Adaptation and mitigation

What are mitigation and adaptation?

Mitigation and adaptation are the two strategies for addressing climate change. Mitigation is an intervention to reduce the emissions sources or enhance the sinks of greenhouse gases. Adaptation is an 'adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities' (IPCC 2001).



How do adaptation and mitigation differ?

Adaptation and mitigation present some notable differences, particularly in their objectives. Mitigation addresses the causes of climate change (accumulation of greenhouse gases in the atmosphere), whereas adaptation addresses the impacts of climate change. Both approaches are needed. On the one hand, even with strong mitigation efforts, the climate would continue changing in the next decades and adaptation to these changes is necessary. On the other hand, adaptation will not be able to eliminate all negative impacts and mitigation is crucial to limit changes in the climate system.

What are the other differences between adaptation and mitigation?

Adaptation and mitigation differ in terms of spatial scales: even though climate change is an international issue, adaptation benefits are local and mitigation benefits are global. Adaptation and mitigation also differ in terms of temporal scales and concerned economic sectors (Tol 2005).

	Mitigation	Adaptation
Spatial scale	Primarily an international issue, as mitigation provides global benefits	Primarily a local issue, as adaptation mostly provides benefits at the local scale
Time scale	Mitigation has a long-term effect because of the inertia of the climatic system	Adaptation can have a short-term effect on the reduction of vulnerability
Sectors	Mitigation is a priority in the energy, transportation, industry and waste management sectors	Adaptation is a priority in the water and health sectors and in coastal or low-lying areas
	Both mitigation and adaptation are relevant to the agriculture and forestry sectors	

References

IPCC 2001 Climate change 2001. Synthesis report. Cambridge University Press.
 Tol, R.S.J. 2005 Adaptation and mitigation: trade-offs in substance and methods. Environmental Science and Policy 8(6): 572-578.

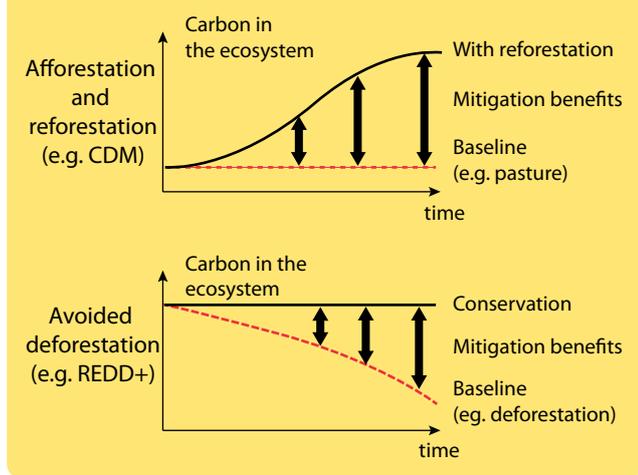
Forests and mitigation

How do forests relate to mitigation?

Forests contribute to mitigation because of their capacity of remove carbon from the atmosphere and

to store it. Deforestation and forest degradation cause 15-20% of global GHG emissions. The IPCC LULUCF (Land

Mitigation and forest: Examples



Use, Land-Use Change and Forests) report distinguishes three main mitigation activities in the forestry sector: afforestation (converting long-time non-forested land to forest); reforestation (converting recently non-forested

land to forest); and avoided deforestation (avoiding the conversion of forests to non-forested land) (Watson *et al.* 2000).

How do international mechanisms consider forests for mitigation?

Only afforestation and reforestation projects are eligible under the Clean Development Mechanism (CDM). Reducing emissions from deforestation and forest degradation (REDD), an initiative now at the top of the international negotiation agenda, is based on financial incentives to preserve forests and thus maintain or increase carbon stocks. A REDD+ approach has been proposed for financing not only forest conservation but also the enhancement of forest carbon stocks (e.g. with reforestation) and sustainable forest management.

Reference

Watson, R.T., Noble, I.R., Bolin, B., Ravindranath, N.H., Verardo, D.J. and Dokken, D.J. 2000 IPCC special report on land-use, land-use change and forestry. Cambridge University Press. Cambridge, UK.

Forests and adaptation

How do forests relate to adaptation?

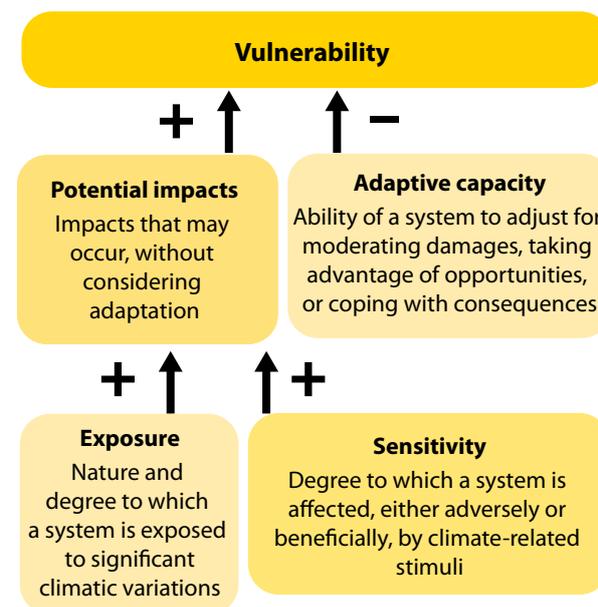
The linkages between forests and adaptation are two-fold (Locatelli *et al.* 2010). First, as climate change will affect forests, adaptation measures are needed for forests to reduce negative impacts and maintain ecosystem functions (adaptation for forests). Second, forest ecosystems contribute to adaptation by providing local ecosystem services that reduce the vulnerability of local communities and the broader society to climate change (forests for people's adaptation).

What is vulnerability?

Vulnerability is a central concept to adaptation. Vulnerability to climate change is the "degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes" (IPCC 2001). Vulnerability is a function of exposure, sensitivity, and adaptive capacity. High exposure or sensitivity and low adaptive capacity causes high vulnerability.

What is ecosystem-based adaptation?

Despite its name, 'ecosystem-based adaptation' (EbA) is a human-centred approach to adaptation. It aims at reducing human vulnerabilities through the provision of ecosystem services. It is increasingly recognised that well-managed ecosystems can help societies to adapt to both current climate hazards and future climate change by providing a wide range of ecosystem services, for examples mangroves protecting coastal areas against storms and



waves, forests providing products used as safety nets by local communities when agriculture is affected by climate, or forests regulating water quality and river flows. For EbA, it is necessary to understand the coupled vulnerabilities of people and ecosystems and to look at ecosystems in their broader context.

Should we pursue 'forests for adaptation' and 'adaptation for forests' together?

Ideally, yes. 'Forests for adaptation' is relevant in most places, especially where people depend directly on forests for their livelihoods. But integrating adaptation into forest

Ecosystem-based adaptation: Examples

Soil conservation and hydroelectricity in Central America

- Increasing rainfall intensity and soil erosion.
- Increasing sedimentation in hydroelectric dams.
- Upstream soil conservation: Part of adaptation.

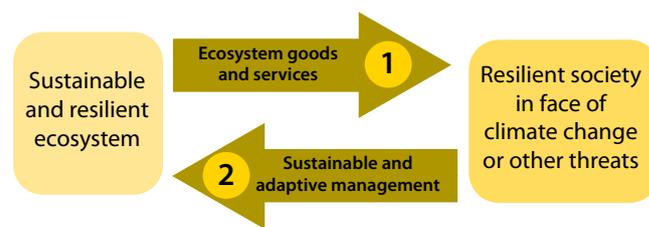
Forests and local people in Central Africa

- Climate events affect local livelihoods.
- Some forest products, less sensitive than agriculture, are used as safety nets.
- Better forest management: Part of adaptation.

Mangroves and coastal areas in Southeast Asia

- Coast vulnerability (storms, waves, sea level rise).
- Protective role of mangrove + provision of goods.
- Better mangrove management: Part of adaptation.

management requires forests to be managed or conserved, which is not the case everywhere. For ensuring that forests provide relevant ecosystem services for the society (forests for adaptation), a sustainable management must first be achieved. When immediate pressures on forests (e.g. deforestation for land conversion) are addressed, a longer term perspective and climate change can be considered (adaptation for forests).



1 Forests for adaptation

2 Sustainable management for sustainable provision of services + Adaptation for forest if sustainable management is in place

Reference

Locatelli, B., Brockhaus, M., Buck, A. and Thompson, I. 2010 Forests and adaptation to climate change: challenges and opportunities. In: Mery, G., et al. (eds) Forest and society: responding to global drivers of change. IUFRO World Series (25), Vienna.

Adaptation and mitigation: Links

What are the links between mitigation and forest adaptation?

Forest mitigation projects (e.g., REDD+ projects) have the potential to facilitate the adaptation of forests to climate change by reducing anthropogenic pressures on forests, enhancing connectivity between forest areas and conserving biodiversity hotspots. However, mitigation projects may have to incorporate additional forest adaptation measures for reducing the impacts of climate change on these forests, as such impacts may jeopardise the permanence of carbon storage.

How can a mitigation project affect people's adaptation?

Forest mitigation projects can have positive impacts on local livelihoods and their adaptive capacity. They can increase the provision of local ecosystem services to local communities, diversify incomes and economic activities, develop infrastructure or social services, and strengthen local institutions (Caplow *et al.* 2010). But impacts can be also negative. For example, concerns have been raised regarding the possibility that REDD+ projects restrict the rights and access of local people to land and forest resources, or increase the dependence of local people to insecure external funding.

How can an adaptation project contribute to mitigation?

Adaptation projects can directly affect ecosystems and carbon stocks, thus having an impact on mitigation. Ecosystem-based adaptation projects can directly benefit climate change mitigation, through either increasing or maintaining carbon stocks. The synergies between ecosystem services explain the mitigation impacts of an adaptation project; for example, mangroves simultaneously contribute to protecting coastal areas and to storing carbon. However, there may be trade-offs between carbon and the local ecosystem services prioritised by an adaptation project. For example, spatial priorities for the conservation of hydrological ecosystem services and carbon may be different.

In addition to these direct impacts of adaptation projects, other indirect impacts can result if an adaptation project prevents activity displacement and induced deforestation, for example if an agricultural adaptation project sustain crop productivity and reduce clearing forest through agricultural expansion.

Reference

Caplow, S., Jagger, P., Lawlor, K. and Sills, E. 2010 Evaluating land use and livelihood impacts of early forest carbon projects: lessons for learning about REDD+. Environmental Science and Policy 14: 152-167.

Integrating adaptation and mitigation

What are the main reasons for considering both adaptation and mitigation in forest projects?

Mitigation needs adaptation. A REDD+ project is more likely to be sustainable and its carbon to be permanent if it integrates adaptation measures for communities and ecosystems. Integrating adaptation can also increase the local legitimacy of the project, as adaptation puts emphasis on local needs (Locatelli *et al.* 2011).

Adaptation needs mitigation. An adaptation project contributing to mitigation may benefit from carbon funding and capacity building from international instruments such as REDD+. Adaptation donors may favor projects with global benefits such as mitigation, in addition to the local adaptation benefits.

What can facilitate the integration of adaptation and mitigation?

Several factors can facilitate the integration of adaptation and mitigation (Locatelli *et al.* 2011):

National policies. For example, national authorities can approve mitigation projects only if they consider adaptation.

International policies. So far adaptation and mitigation have been treated separately, even though some countries have asked that 'adaptation measures should be developed considering [...] the synergies between adaptation and mitigation, and within which REDD+ options are particularly relevant' (UNFCCC 2009).

Standards. For example, the Climate Community Biodiversity Standards, which evaluate the impacts of land-

based mitigation projects, explicitly integrate adaptation criteria (CCBA 2008).

Knowledge generation, communication and capacity-building. Adaptation and mitigation stakeholders (practitioners, decision-makers, and scientists) form separate communities. There is a need for informing mitigation stakeholders about adaptation and vice-versa, as well as strengthening their capacities on appropriate tools and methods. There is also a need for more research: methods, tools and evidence must be produced, for example on the role of ecosystems in the adaptation of the society or on the impacts of REDD+ projects on local communities and their adaptive capacity.

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- CCBA 2008 The Climate, Community and Biodiversity Project Design Standards (CCB Standards), 2nd version. Conservation International.



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