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SFM and adaptation to climate change

The United Nations General Assembly defines sustainable forest management (SFM) as a “dynamic and evolving concept, which aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations”.¹ The SFM concept encompasses both natural and planted forests in all geographic regions and climatic zones, and all forest functions, managed for conservation, production or multiple purposes, to provide a range of forest ecosystem goods and services at the local, national, regional and global levels.

Criteria and indicators developed for boreal, temperate and tropical forests provide a framework to assess, monitor and report on the implementation of SFM based on: the extent of forest resources; biological diversity; forest

health and vitality; productive functions; protective functions; socio-economic functions; and the legal, policy and institutional framework. Certification processes and best-practices guidelines have been developed to guide, assess, attest to and monitor SFM at the forest management unit level.

There has been significant progress in implementing SFM, but many challenges remain. The objective of this series of fact sheets produced by the Collaborative Partnership on Forests² is to inform decision-makers and stakeholders about some of the issues and opportunities facing the implementation of SFM in the 21st century.³

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What is adaptation to climate change?

Adaptation to climate change is the “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation”.⁴ *Ecosystem-based adaptation to climate change* is an adaptation strategy that includes ecosystem management, conservation and the restoration of ecosystems to provide services that help people adapt to adverse impacts of climate change.⁵

What is at stake?

Adaptation for forests. Climate change is expected to affect the distribution of forest types and tree species, forest productivity, site and soil conditions, stand structure, and changes in disturbance regimes such as the incidence, severity and impact of wildfire, invasive alien species, insects, disease, floods, drought, temperature extremes, landslides and storm surges. Recent changes in climate have been observed to have considerable ecological impacts. For example, earlier leaf budding, flowering and fruiting and changes in species’ migration and life cycles have been detected and the ranges of some forest plants and animals have shifted towards the poles and in altitude.⁶

Without adaptation, further climate change combined with factors such as deforestation, forest degradation, habitat fragmentation, poor forest management and extreme weather events threatens 20–30 percent of global vascular plants and higher animals.⁷ The loss of forest biodiversity at this scale would threaten forest ecosystem resilience and erode the provision of forest ecosystem services. Forest ecosystems comprise about half the total carbon in terrestrial ecosystems. Several models project that without adaptation measures, the carbon-regulating services of forests could be degraded under a global warming of 2.5 °C or more; they could become net emitters of carbon, thus exacerbating climate change.⁸ However, forest ecosystem functions can be maintained and resilience can

be enhanced by adopting sustainable forest management (SFM) approaches.

Forests for adaptation. The impacts of climate change – and natural disasters linked to climate change – significantly affect the most vulnerable people and communities, especially those already fighting hunger and poverty in developing countries. Forests provide a wide range of ecosystem services that are important for human well-being, food security, poverty alleviation and livelihoods. Climate change, combined with deforestation, forest degradation and population pressure, threatens the continued provision of such services. Forests and SFM have been insufficiently considered in climate-change adaptation policies and practices in areas of the economy beyond the forest sector.

Key issues

Adaptive forest management. SFM can be deployed to improve ecological resilience and the adaptation of forest ecosystems to environmental change, for example through the selection of tree species, management regimes and stand structures that suit anticipated changes in soils, water, disturbance regimes and site productivity. However, unmitigated climate change is still likely to exceed the adaptive capacity of some forests during this century. Large reductions in greenhouse gas emissions, coupled with measures to reduce other pressures on forests, for example through agroforestry in production landscapes, are needed to maintain the adaptive capacity of forests and to enable them to continue their contribution to the mitigation of climate change.⁹

Synergies between adaptation and mitigation. Climate-change adaptation and mitigation are closely linked and complementary. Given the importance of forest ecosystems to climate, successful mitigation requires that forests are able to adapt to climate change.¹⁰ Investments in the conservation, restoration and sustainable management of forests can result in win-win opportunities, yielding high returns for both mitigation and adaptation.

Integrated adaptation policies, plans and practices. Forest ecosystems provide services that contribute to human well-being and reduce social vulnerability and therefore should be considered when planning adaptation policies and practices within and beyond the forest sector.¹¹

Lack of adaptation awareness and measures. Individuals, institutions and societies are insufficiently aware of the likely impacts of climate change on forests and forest-dependent communities.¹² Adaptation needs to be integrated into forest management and

agroforestry land-use policies and practices, but many forest stakeholders lack understanding of their vulnerability to climate change, the options available for adaptation, and how to implement adaptation measures.

Economic benefits and costs. Maintaining the natural capacity to adapt to the impacts of climate change is usually less costly than technological fixes for restoring or replacing lost ecosystem functions. Cost-benefit analyses favour public investment in ecological infrastructure (e.g. forests, agroforestry, landscape restoration, mangroves and wetlands) because of their contributions to climate-change adaptation.¹³

Experience and knowledge

Multipurpose forest management. SFM reduces environmental, social and economic vulnerability to climate change by generating multiple benefits, including private forest goods (e.g. food, biofuel and wood and non-wood products); regulating services and public goods (e.g. water, carbon sequestration and soil conservation); and cultural services (e.g. recreational, spiritual and religious).

Reactionary or anticipatory forest management. To date, forest and societal adaptation to climate change has primarily been reactive, with measures carried out in response to impacts. Given adequate planning and robust projections of future conditions, anticipatory measures and actions aimed at reducing vulnerability and increasing resilience are likely to be more effective and efficient.

Forest ecosystem-based adaptation. The most effective approaches to SFM employ ecosystem-based adaptation strategies, policies and practices such as landscape management, conservation and restoration and agroforestry. They adopt

inter-sectoral, multi-disciplinary, multi-scale ecosystem approaches that recognize the role of ecosystem services in reducing the vulnerability of communities to climate change.¹⁴

Adaptive and participatory forest management. Adaptation to climate change can be incorporated into SFM and agroforestry through adaptive and participatory management approaches. These can be cost-effective and generate environmental, social, cultural and economic benefits. Such approaches can reduce the threats posed to forests in the face of climate change by fire, invasive alien species, insects and diseases. Forest adaptation measures aim to buffer forests against such threats and, in the longer term, to facilitate an ecological transition towards a new state that is better adapted to the changed conditions.¹⁵

Challenges

Capacity gaps. There is a large gap between developed and developing countries in their scientific, policy, planning and operational capacities for forest-related adaptation. While richer countries are investing in multidisciplinary risk assessments and adaptation and mitigation measures, many developing countries lack the information, leadership and funding needed to implement adaptation and tend to focus on immediate needs. Poverty and political instability make planned adaptation difficult. Yet most of the opportunities to conserve and restore forests for climate-change adaptation (and other reasons) are in developing countries.

Capacity building for adaptive forest management. Multi-stakeholder learning and capacity-building are needed to determine the roles and responsibilities of stakeholders – government, private actors and local and indigenous communities – involved in

adaptive forest management. Investment is needed to develop the institutional capacity for flexible, participatory and adaptive forest management.

Local knowledge and experience. A better understanding is needed of local circumstances and the vulnerability of forest-dependent communities to climate change, considering not only national and international frameworks but also local experience and knowledge.

Anticipatory management. Catastrophic events happen abruptly and can overtax conventional capacity. The challenge of planned forest adaptation is to build sufficient flexibility and capacity into forest-related organizations, structures and policies such that extreme events can be anticipated and their impacts mitigated.

Payment for forest ecosystem services. There remains insufficient understanding or explicit recognition of the full value and role of forests. Other sectors benefit from the ecosystem services provided by forests but rarely acknowledge or pay for those services. A challenge is to increase such payments so that the costs of SFM and climate-change adaptation are shared equitably across sectors.¹⁶

Tropical deforestation. Reducing deforestation and forest degradation remains a major challenge, particularly in tropical developing countries. Climate change adds to the scope and severity of this challenge.¹⁷

Opportunities

Restoration. The Global Partnership on Forest Landscape Restoration estimates that 1–2 billion hectares of deforested and degraded landscapes have potential for forest landscape restoration.¹⁸ The CBD's Strategic Plan for Biodiversity 2011–2020 calls for the restoration of at least 15 percent of degraded ecosystems by 2020.

Redefining goals, policies and practices. Planned adaptation involves redefining forest-related goals, policies and practices in view of climate-related risks and uncertainties. It requires deliberate, anticipatory interventions at different scales and across sectors.¹⁹

Monitoring and reporting. Intensive forest monitoring and reporting are key components of planned adaptation; they can provide early warning of extreme climatic and weather events, reduce uncertainty and minimize losses. After such events, rapid damage assessments are useful for planning salvage operations and conservation and for predicting impacts on forest goods and ecosystem services, markets and socio-economic conditions.

New modes of governance. In many countries, conventional forest governance may be incapable of addressing the challenges of climate-change adaptation. National policies may be needed to integrate forest adaptation into SFM and to ensure inter-sectoral coordination on forest adaptation through multi-stakeholder consultations. There is an opportunity for international policy forums to better integrate processes related to forests, climate-change adaptation and mitigation, biodiversity and sustainable land management.

Agroforestry. Agroforestry has the potential to generate synergy between climate-change adaptation and mitigation in developing countries because it enhances diversification, reduces risk and helps stabilize livelihoods.

REDD+ and SFM. REDD+ and SFM provide important monitoring, governance and management frameworks as well as capacity-building and funding support (see fact sheet 5). They have an important role to play in helping to prepare, in each country, institutions, strategies, policies and practices for the adaptation of forest ecosystems and communities to climate

change. To make the most of this opportunity, climate-change adaptation and mitigation forest policies and practices need to be better integrated at the local, national and international levels.

Support for developing countries. The adaptation capacities of developing countries can be strengthened by international support. Strategies to do so should combine improved tools and methods at the local level, capacity-building among institutions and stakeholders, and pilot projects, using both international best practice and local knowledge and experience.

What is still to be learned?

Better understanding is needed of:

- Ecosystem-based adaptation approaches, and their benefits and tradeoffs.
- The vulnerability, resilience and adaptability of forest ecosystems and forest-dependent communities to climate change.
- Stakeholder participation in scenario-building and decision-making to ensure that forest-related climate-change adaptation measures decrease the vulnerability of marginalized communities and contribute to their well-being.²⁰
- The complex interactions between forests and the climate system (more precise regional and local climate-change projections are needed urgently).
- Forest ecosystem modelling and vulnerability.
- The forest-related social and economic impacts of climate change, especially on forest-dependent people and the supply of food and water.



Key messages

The most effective approaches to increasing the resilience of forest ecosystems, continuing the provision of forest ecosystem services and reducing the vulnerability of local communities to climate change are to adopt:

- Adaptive and participatory approaches to SFM policies and practices.
- Anticipatory rather than reactionary adaptation policies and practices.
- Adaptation strategies that include inter-sectoral, multi-disciplinary, multi-scale approaches to landscape management, conservation, restoration and agroforestry.



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Collaborative Partnership
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The Collaborative Partnership on Forests consists of 14 international organizations, bodies and convention secretariats that have substantial programmes on forests. The mission of the Collaborative Partnership on Forests is to promote sustainable management of all types of forests and to strengthen long-term political commitment to this end. The objectives of the Partnership are to support the work of the United Nations Forum on Forests and its member countries and to enhance cooperation and coordination on forest issues.

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Endnotes

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- 3 Topics: SFM and the multiple functions of forests; SFM and primary forests; SFM, food security and livelihoods; SFM and indigenous peoples; SFM and REDD+; SFM and biodiversity; SFM and gender; and SFM and adaptation to climate change. The Partnership hopes to periodically update these fact sheets and to prepare new fact sheets on other important topics, including financing.
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