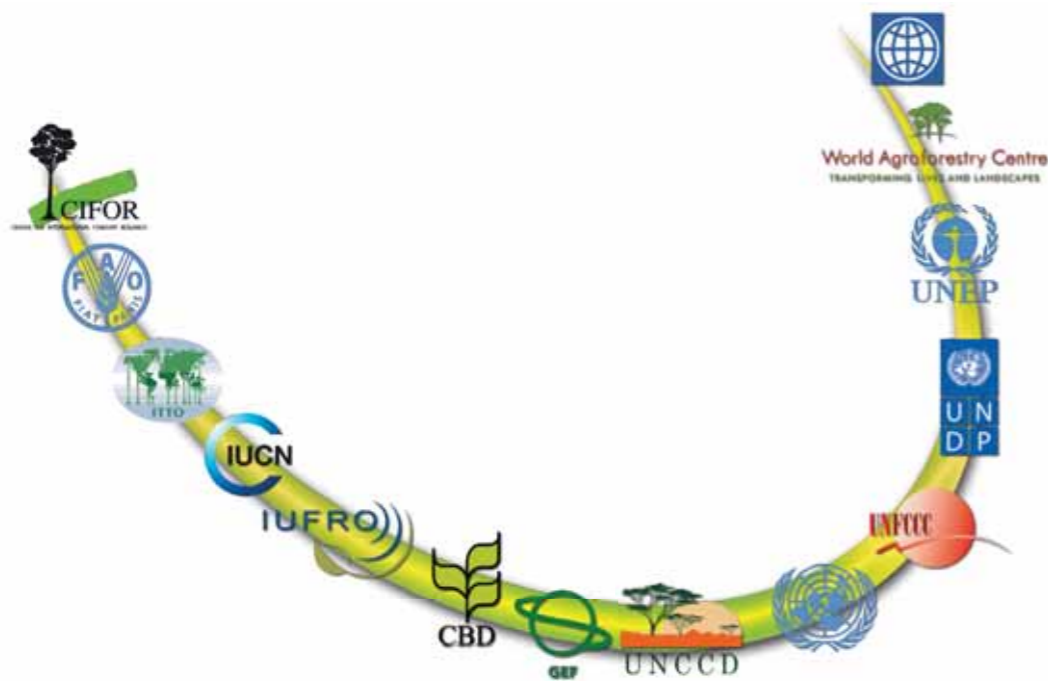




Strategic framework *for* forests *and* climate change



A proposal by the *Collaborative Partnership on Forests*
for a coordinated forest-sector response to climate change

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The CPF is a voluntary arrangement of 14 major forest-related international organizations, institutions and secretariats created in response to a resolution by the Economic and Social Council of the United Nations. They all have substantial programmes on forests and they work together to support the implementation of internationally agreed actions and sustainable forest management, for the benefit of people and the environment.

Through the *Strategic Framework on Forests and Climate Change*, the CPF aspires to show how forests, when sustainably managed, can play a positive role in climate change mitigation and adaptation. As part of the framework, the CPF conveys the following key messages:

1. Sustainable forest management provides an effective framework for forest-based climate change mitigation and adaptation.
2. Forest-based climate change mitigation and adaptation measures should proceed concurrently.
3. Inter-sectoral collaboration, economic incentives, and the provision of alternative livelihoods are essential for reducing deforestation and forest degradation.
4. Capacity building and governance reforms are urgently required.
5. Accurate monitoring and assessment helps informed decision-making but requires greater coordination at all levels.
6. CPF members are committed to a collaborative and comprehensive approach to forest-based climate change mitigation and adaptation.

The Collaborative Partnership on Forests (CPF): Promoting the sustainable management of all types of forests.

CPF member organizations: Center for International Forestry Research (CIFOR); Food and Agriculture Organization of the United Nations (FAO, Chair); International Tropical Timber Organization (ITTO); International Union for Conservation of Nature (IUCN); International Union of Forest Research Organizations (IUFRO); Secretariat of the Convention on Biological Diversity (CBD); Secretariat of the Global Environment Facility (GEF); Secretariat of the United Nations Convention to Combat Desertification (UNCCD); Secretariat of the United Nations Forum on Forests (UNFF); Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC); United Nations Development Programme (UNDP); United Nations Environment Programme (UNEP); World Agroforestry Centre (ICRAF); World Bank.

“Forestry can make a very significant contribution to a low-cost global mitigation portfolio that provides synergies with adaptation and sustainable development.”

Intergovernmental Panel on Climate Change, Fourth Assessment Report, 2007.

“Given the scale of emissions from deforestation, any climate change deal that does not fully integrate forestry will fail to meet the necessary targets.”

Nicholas Stern, 2008.

“Climate change cannot be won without the world’s forests. This, however, will be a complex and challenging feat. Nonetheless, it is one of the best large-scale investments we can make against climate change that could result in an equally large-scale dividend.”

Ban Ki-moon, UN Secretary-General, September 2008.

Foreword

This *Strategic Framework for Forests and Climate Change* is the proposal of the Collaborative Partnership on Forests (CPF) for a coordinated forest-sector response to global climate change.

Forests cover nearly one-third of the earth's land surface and account for almost half its terrestrial carbon pool. What happens to forests, therefore, is of crucial concern in the fight against climate change. Halting deforestation and forest degradation, and increasing forest and tree cover, could have significant impacts on global greenhouse gas emissions.

Environmental changes, such as those that might be induced by climate change, could have major effects on the growth and productivity of forests as well as on their capacity to provide multiple goods and services. It is essential, therefore, that any post-2012 arrangements on climate change address the role of forests in both mitigation and adaptation.

This document is intended as a resource for policymakers on climate change and forests. It puts forward a case for the strategic role of sustainable forest management in achieving long-term climate change mitigation and as a robust and flexible framework for effective adaptation to climate change. It presents what is intended to be a living concept of cooperation that will be enriched over time. It should help pave the road to the pivotal 15th

Conference of the Parties to the United Nations Framework Convention on Climate Change and to the 8th session of the United Nations Forum on Forests.

The *Strategic Framework for Forests and Climate Change* has been prepared jointly by the CPF with the financial support of FAO and ITTO and the in-kind support of other members. The CPF acknowledges with appreciation the contribution of Dr Hosny El-Lakany, Adjunct Professor, University of British Columbia, as the document's lead author, and Alastair Sarre, for his editing.

The members of the CPF will continue to coordinate their efforts to provide interested parties with relevant and timely information on the role of forests in climate change. Collectively and individually, they will also continue their work to advance the sustainable management, including conservation, of the world's forests, for the benefit of people and the environment.



Jan Heino, Chair

On behalf of the members of
the Collaborative Partnership on Forests

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Acronyms, symbols and abbreviations

CBD	Convention on Biological Diversity	IUFRO	International Union of Forest Research Organizations
CDM	Clean Development Mechanism	NFP	national forest programme
CER	certified emissions reduction	NGO	non-governmental organization
CPF	Collaborative Partnership on Forests	NLBI	Non-Legally Binding Instrument on All Types of Forests
CIF	climate investment fund	PES	payments for ecosystem services
CIFOR	Center for International Forestry Research	PROFOR	Program on Forests
CO ₂	carbon dioxide	REDD	reducing emissions from deforestation and forest degradation
CO ₂ -e	carbon dioxide equivalent	SFM	sustainable forest management
COP	Conference of the Parties	UN	United Nations
ECOSOC	United Nations Economic and Social Council	UNCCD	United Nations Convention to Combat Desertification
FAO	Food and Agriculture Organization of the United Nations	UNDP	United Nations Development Programme
GEF	Global Environment Facility	UNEP	United Nations Environment Programme
GHG	greenhouse gas	UNFCCC	United Nations Framework Convention on Climate Change
Gt	gigatonne	UNFF	United Nations Forum on Forests
ICRAF	World Agroforestry Centre	€	euro
IPCC	Intergovernmental Panel on Climate Change	US\$	United States dollar
IUCN	International Union for Conservation of Nature		
ITTO	International Tropical Timber Organization		

Executive summary

The Collaborative Partnership on Forests has prepared this document to support the United Nations Framework Convention on Climate Change (UNFCCC) process, particularly the Bali Action Plan, as well as the Non-Legally Binding Instrument on All Types of Forests of the United Nations Forum on Forests and other agreements, and in response to the need for concerted action on forests and climate change. It lays the groundwork for a coordinated response from the forest sector to climate change, notably through the widespread adoption of sustainable forest management (SFM) and its integration into broader development strategies.

Forests cover nearly one-third of the earth's land surface, harbour three-quarters of its terrestrial biodiversity and account for almost half its terrestrial carbon pool. Deforestation, forest degradation and other changes in forests contribute an estimated 17.4% of global greenhouse gas emissions.

According to FAO estimates, the total forest area continues to decrease but the rate of net loss is slowing. In the period 2000–05, 13 million hectares of forest were deforested, on average, each year. In 2000–05, 5.7 million hectares were added annually to the forest estate, giving a net annual forest loss of 7.3 million hectares, which was a lower rate than during the period 1990–2000. The estimated average global rate of forest carbon depletion is 1.6 gigatonnes per year, which is about 0.25% of total forest carbon. Tree-planting in agricultural landscapes is rising and efforts are under way to provide estimates of tree cover in such systems.

Deforestation and forest degradation have direct and indirect causes. The main direct cause is the expansion of agriculture. Indirect causes include policies that subsidize non-forest land use, as well as poverty, poor governance, and high prices for agricultural commodities.

Forests can contribute to the mitigation of climate change through carbon sequestration, carbon substitution, and carbon conservation. The extent to which they do so is a function of their management and the effectiveness of policies at the local, national and global levels.

Forests are much more than pools of carbon: they house a large part of the world's biological wealth, perform an important role in the provision of water and other ecosystem services, sustain many Indigenous cultures, and support the livelihoods of hundreds of millions of people. Therefore, comprehensive and integrated sustainable development approaches are needed to combat deforestation and forest degradation and to expand the role of forests as carbon sinks.

Forest-based approaches can make a substantial contribution to climate change mitigation. They are not, however, a panacea for climate change and should be pursued simultaneously with other measures, including a shift towards low-carbon energy production and measures to assist the forest sector to adapt to climate change.

Message 1: Sustainable forest management provides an effective framework for forest-based climate change mitigation and adaptation

SFM provides a flexible, robust, credible and well-tested framework for simultaneously reducing carbon emissions, sequestering carbon, and enhancing adaptation to climate change. At the same time it can help supply environmentally friendly forest products, protect biodiversity, secure freshwater supplies and provide other essential ecosystem services.

SFM encompasses seven thematic elements: 1) extent of forest resources; 2) biological diversity; 3) forest health and vitality; 4) productive functions of forests; 5) protective functions of forests; 6) socioeconomic functions; and 7) the legal, policy and institutional framework. It can be applied to forests in which wood production takes place, including planted forests, as well as to protected forests and to degraded forests in need of restoration.



R. Faidutti/FAO

Protected forest areas increase the resilience of ecosystems and landscapes to climate change and can provide a 'safety net' for climate change adaptation through their genetic resources and ecosystem services. Inadequate funding for the management of protected areas, however, poses a significant threat to climate change mitigation and adaptation and needs to be addressed.

Wood is a renewable resource and, when obtained from sustainably managed forests, an efficient material for storing carbon. Although wood-harvesting temporarily reduces carbon storage in the forest, a large part of the harvested carbon can be stored in wood products, potentially for many decades. When wood is used in long-term products such as housing and furniture, the reduction in greenhouse gas emissions is substantial compared to other, more energy-intensive and carbon-intensive substitutes such as concrete, steel, aluminium and plastics.

Sustainably managed forests are a valuable, renewable and carbon-neutral source of biomass for energy. Compared to other renewables such as solar, hydro and wind, wood-based bioenergy plantations require relatively little capital or technological development and could be an especially efficient land use on abandoned agricultural land and on soils too poor to produce annual crops.

Under SFM, harvested trees are replaced by others through regeneration, replanting or other silvicultural measures; many forests have been managed in this way for centuries without measurable declines in condition or productivity. Carbon lost during harvesting is eventually restored through new growth. Managed unsustainably, however, forests can lose carbon stock and productivity.

Forest plantations, which supply over 60% of industrial roundwood, are already important carbon sinks and pools and their role in climate change mitigation is likely to increase in importance.

Compared to other forest biomes, arid and semi-arid forests have low carbon values. Such forests can, however, act as buffers between agricultural lands and denser forests and thereby play an important role in carbon conservation. In some cases, semi-arid lands might also be suitable candidates for forest-based mitigation schemes.

Message 2: Forest-based climate change mitigation and adaptation measures should proceed concurrently

Implicit in SFM is an adaptive approach, which will help ensure that forest management changes as conditions change. Measures that might assist forest ecosystems to adapt to climate change include the conservation of genetic variation, reduced impact logging, increasing the size and connectedness of buffer zones, and policies that ensure effective management responses to ecological change.

Under certain circumstances, climate change mitigation might take precedence over adaptation, especially in the short term. In forests, however, both are critical and should proceed concurrently. Adaptation and mitigation objectives are interlinked and complementary and policy approaches to address them can be mutually supportive.

The impacts of climate change are likely to affect poorer countries disproportionately and policy approaches to adaptation should therefore particularly address their needs. Many forest-dependent communities are highly vulnerable to the effects of climate change and will require financial and technical assistance in order to adapt.

Measures for climate change mitigation and adaptation should also aim to ensure the continued (or increased) delivery of other important forest-related benefits— "co-benefits". To do so will require strong engagement between the conservation and development communities,



climate-change policymakers, governments, and other stakeholders, including Indigenous communities. Often, tradeoffs between all the potential benefits of forests will be needed, and these should be negotiated between all stakeholders.

Afforestation and reforestation activities have been included under the Clean Development Mechanism (CDM) since 2001, but so far only one such project has been implemented due to high transaction costs. Given the potential of afforestation and reforestation in carbon sequestration, CDM procedures should be simplified.

Message 3: Inter-sectoral collaboration, economic incentives, and the provision of alternative livelihoods are essential for reducing deforestation and forest degradation

The Bali Action Plan identifies forest-based mitigation, particularly reduced emissions from deforestation and degradation (REDD), as a viable mechanism for reducing greenhouse gas emissions. Within a framework of SFM,

increasing the forest area through afforestation and reforestation, restoring degraded forests, and substituting carbon-intensive materials with wood and fossil fuels with wood-based biofuels are also viable strategies for climate change mitigation. All such strategies can generate increased revenues and employment, thereby providing economic alternatives to forest conversion.

An overriding principle of policy approaches to the role of forests in climate change mitigation and adaptation must be coordination at the regional and national levels. For REDD and SFM to succeed, their elements must be integrated into national development strategies and part of holistic national land-use planning. Moreover, they should be incorporated in national forest programmes or other equivalent national forest policy frameworks.

National and local forest administrations are well placed to facilitate the implementation of forest-based climate change adaptation and mitigation measures. Given that most of the underlying causes of deforestation are generated outside the forest sector, they do, however, need to increase their collaboration with other governmental agencies dealing with agriculture, water, energy and other related sectors and with other stakeholders, including Indigenous people, community groups,



T. Hofer/FAO

forest owners, the private sector, research institutes, NGOs and national planning and financing entities.

There have been many attempts to calculate the costs of REDD, especially in tropical countries. The financial flows needed are usually estimated as the opportunity costs of converting forests to other land uses and are in the order of up to tens of billions of dollars annually.

Schemes to offset the opportunity costs of forest conversion are not, in themselves, sufficient to prevent carbon emissions from forests. Those forests 'saved' by REDD, or reforested, restored or afforested, will still need to be managed.

Current global climate change arrangements provide no incentives for reducing deforestation and only very limited incentives for reforestation and afforestation. One reason for this is concern about leakage, in which the protection of one forest area merely displaces deforestation activities to other areas that are unprotected, as well as other issues such as baselines, additionality and permanence. SFM provides a suitable framework for addressing such issues within the forest sector, but cross-sectoral approaches will also be needed.

The implementation of forest-based measures to mitigate climate change will require significant start-up funds and sustainable financing over decades. Such funding is currently unavailable in most developing countries and forest communities in which REDD and other measures will be undertaken. Several new forest-carbon funds have been created, including by the World Bank and the Global Environment Facility. The UNFCCC has also created a fund to assist adaptation measures. There are concerns, however, that subsistence systems such as shifting cultivation and agroforestry might not qualify for REDD funding. Enabling smallholder farmers to benefit from carbon funds can be an incentive for the intensification of tree-planting on farms as part of mitigation and adaptation efforts.

While foreign direct investment is essential, the bulk of private investment remains domestic across all sectors. Private investment in SFM in developing countries should be encouraged, particularly through the establishment of small and medium-sized enterprises.

Under any new climate change finance scheme, especially REDD, care must be taken to prevent perverse effects, such as rewarding unscrupulous behaviour and disadvantaging

those countries and communities that are already conserving, sustainably managing and expanding their forests. Climate change mitigation funds will be most effective when they encourage SFM, including forest conservation, rehabilitation and restoration.

Message 4: Capacity building and governance reforms are urgently required

Many countries, particularly developing countries, have insufficient financial or technical resources to design, implement and monitor effective measures for forest-based climate change mitigation and adaptation. Building in-country capacity is an area in which CPF members can play an important role. Technology transfer is a major issue in current intergovernmental climate negotiations; many of the technologies and much of the knowledge required to implement mitigation activities exist today but are not universally available.

Many forest communities suffer disproportionately from conflicts, humanitarian crises and corruption, which often then spread nationally and internationally. The property rights of many forest communities are insufficiently recognized, and the human, civil and political rights of Indigenous peoples, women and other marginalized groups in forest areas are frequently limited.

Forestry is evolving towards more participatory forms that place greater emphasis on the involvement of local people and the contributions that forests make to local livelihoods. There is a risk, however, that climate change mitigation and adaptation measures could swamp such change. To date there has been little systematic analysis of the potential social implications of proposed climate change mitigation mechanisms, especially for the poor. Many Indigenous communities have serious concerns that global and national REDD schemes will further interfere with their rights, livelihoods, customs and traditions. They are demanding, therefore, that future policies recognize and adhere to the principles articulated in the UN Declaration on the Rights of Indigenous Peoples.

Current international discussions imply that using financial incentives to dissuade forest owners from clearing or degrading their forests will be sufficient to achieve substantial carbon emissions reductions. Such incentives will only work, however, if a number

of preconditions are met. There must be clear property rights and good forest governance, for example, and an SFM regime should be in place. Poorly directed, REDD incentives could further marginalize poor forest-dependent communities, exacerbate problems of forest governance, and hinder the application of SFM.

A key issue for effective post-2012 forest-based arrangements on climate change is accelerating progress in national and international governance reforms to ensure equity and fairness in the costs and benefits of forest-related mitigation and adaptation.

There is an increasing awareness among both policymakers and scientists that the forest science-policy interface must be strengthened if long-term sustainable strategies for the forest sector's contribution to climate change mitigation and adaptation are to be developed. Such a strengthening will be best achieved through interdisciplinary research and through sustained interactions between scientists, policymakers and practitioners. More support for research is urgently required and, in this regard, cross-sectoral policy efforts should be strengthened.

Message 5: Accurate forest monitoring and assessment helps informed decision-making but requires greater coordination at all levels

The robust monitoring of forest status and area change is necessary for the design, implementation and verification of climate change commitments. Considerable synergies can be achieved by integrating carbon monitoring requirements in overall forest inventory and monitoring efforts that address the full range of forest goods and services.

Carbon change in forests is usually estimated as a function of forest biomass using conversion factors. Remote sensing and imagery analysis, followed by ground verification, can be used to measure forest area and estimate forest biomass. Currently, however, there is no widely accepted standard practice for measuring forest carbon stocks remotely at the regional or national scales. Of all net carbon emissions, those from tropical land use change are the most uncertain, with a wide range of estimates. The main causes for the inaccuracies are related to the data used to calculate rates of deforestation, the carbon stocks of the forest being cleared, and the fate of carbon after clearing.

National forest monitoring systems need to deliver cost-effective, quality-controlled information on changes in carbon stocks on a regular basis. In many countries, existing systems are still unable to do so, although steps have been taken to increase monitoring capacity and to make use of new technologies. The full range of efforts to produce consistent, reliable data and analysis on the flux of carbon in forests, including for the setting of realistic reference emissions levels, could be harmonized through stronger collaboration among the main actors at the national and global levels.

The setting of national baselines and accountability measures for forest-based climate change mitigation is a prime candidate for further scientific research. Research is also needed into the socioeconomic implications of broadening the concept of SFM to include the management of carbon pools, and into the potential ecological and carbon impacts of resultant changes to forest management.

Message 6: CPF members are committed to a collaborative and comprehensive approach to forest-based climate change mitigation and adaptation

With their broad experience in the promotion of SFM, forest conservation, poverty alleviation and forest governance, the members of the CPF can greatly facilitate comprehensive approaches to the role of forests in climate change mitigation and adaptation. The CPF itself provides a mechanism by which its members can coordinate their climate-related actions.

CPF members are working together to provide information and to support the implementation of SFM and the

development and negotiation of forest-based climate change policies at all levels. Within their respective mandates, they are also committed to working collaboratively to assist countries to:

- Incorporate adaptation and mitigation, including REDD and other climate change initiatives, into national forest programmes, and to integrate national forest programmes within national development strategies through multi-stakeholder consultations.
- Build capacity for SFM and forest-based climate change mitigation and adaptation.
- Enhance the biophysical adaptation of forests to climate change while safeguarding the livelihoods of forest-dependent communities and small forest owners and protecting forest biodiversity and other essential forest services.
- Reduce and eventually eliminate unsustainable forest activities, thus reducing greenhouse gas emissions and enhancing forest-based carbon sequestration and storage.
- Enhance capacity to design, monitor, verify and report on their climate change mitigation and adaptation efforts.
- Improve the science-policy interface and ensure that decision-making at all levels is based on timely, reliable and scientifically sound information.
- Explore ways of securing international and national financing and private-sector investment to assist countries in achieving compliance with the provisions of arrangements on climate change and other conventions and instruments related to forests.
- Work in concert with other sectors such as agriculture, energy, transport, urban development and law enforcement towards realizing these elements.

1. Introduction

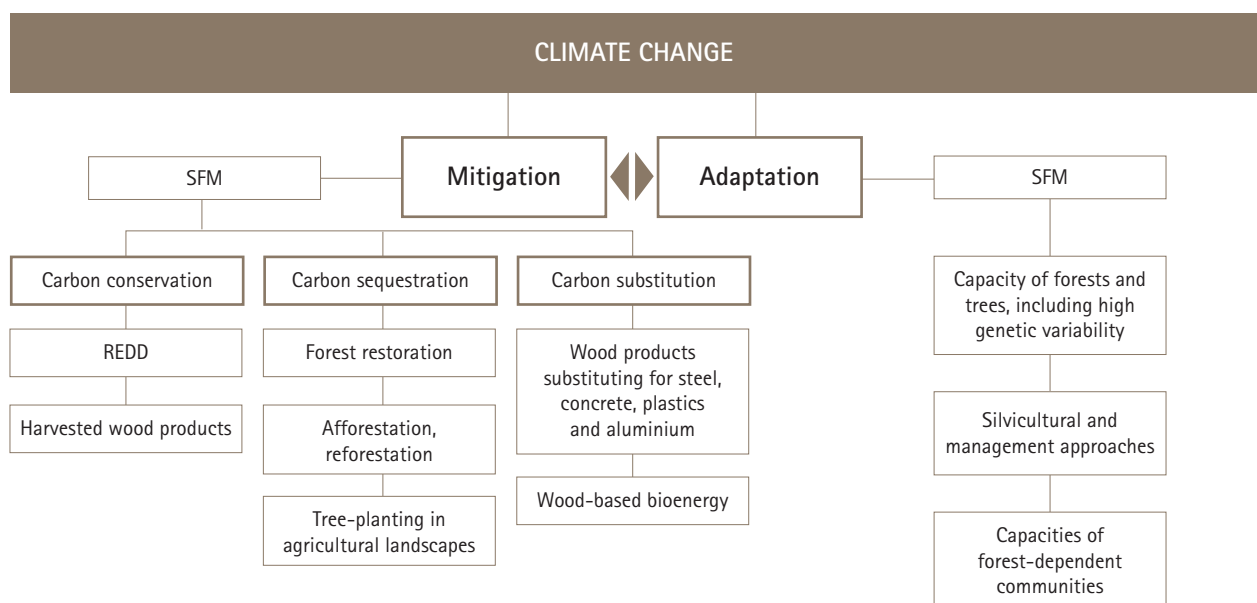
Forests cover nearly one-third of the earth's surface and harbour three-quarters of its terrestrial biodiversity. They also account for almost half the terrestrial carbon pool and thus play a significant role in regulating the earth's climate.

Tropical forests are particularly important in the global carbon budget because they contain as much carbon in their vegetation and soils as temperate and boreal forests combined.¹ The Intergovernmental Panel on Climate Change (IPCC) estimates that forestry—or, rather, deforestation, forest degradation and other changes in forests—contributes 17.4% of global annual greenhouse gas (GHG) emissions mainly in tropical developing countries. This is 5.8 gigatonnes (Gt) of carbon dioxide equivalent (CO₂-e) per year². This is equivalent to the total annual CO₂-e emissions of the United States³ and

more than global emissions by the transport sector. Most deforestation is caused by the expansion of agriculture and urban and infrastructure development.

Forests can and should play an important role in climate change mitigation.⁴ To date, international debate has focused particularly on reducing emissions from deforestation and forest degradation (REDD)⁵ in tropical developing countries but, in the presence of sustainable forest management (SFM), all forests can help mitigate climate change through measures such as REDD, forest conservation, forest restoration, afforestation, wood-based bioenergy production, and the use of sustainably produced wood products as substitutes for emissions-intensive materials.⁶ Figure 1 shows some of the possible forest-related responses to climate change.

Figure 1: Possible forest-related responses to climate change



The increasing price of energy, coupled with the need to reduce GHG emissions, is directing attention towards bioenergy, including wood energy. This has major implications for the forest sector and, in some places, could lead to pressure to replace natural forests with energy crops.

The international community is already supporting developing country governments to move towards sustainable development. Forests and forest land need to be seen in this context so that they can contribute to national economies.⁷ The specific policies and measures chosen by governments or project implementers to address deforestation and forest degradation will also have significant implications for the poor. Well conceived, they can help increase local incomes and thereby address poverty. Poorly conceived, they can exacerbate it.

Under current proposals, REDD could become an additional basis for funding to help build technical and institutional capacities and to provide incentives to reduce deforestation. Any universal policy to control deforestation and forest degradation, however, is bound to face serious challenges when it comes to implementation unless retailed to fit national development needs.⁸ Issues include: who will manage funds; how authority will be distributed in the funding supply chain; the nature of benefit-sharing systems; the form of monitoring, reporting, verification and compliance; and legal mechanisms.⁹

Actions on climate change will be taken at many levels, but ultimately the biggest impacts will be felt by forest owners and forest-dwelling people. Many Indigenous communities have serious concerns that global and national REDD schemes will interfere with their rights, livelihoods, customs and traditions. They are demanding, therefore, that future policies recognize and adhere to the principles articulated in the UN Declaration on the Rights of Indigenous Peoples.

Relevant UN processes

Through its three Post-Rio multilateral environmental agreements¹⁰ and the United Nations Forum on Forests (UNFF), the United Nations has made several decisions on the role of forests in climate change.

United Nations Framework Convention on Climate Change

Under the UNFCCC, forests are addressed both as emissions sources and as carbon sinks. The Convention's Article 3 states that policies and measures to combat climate

change should "be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases ... and comprise all economic sectors." Article 4.1 calls on all parties to develop and update inventories of GHG emissions and removals; formulate programmes and make efforts to address emissions by sources and removals by sinks; promote technologies that lead to lower GHG emissions in forestry; promote the sustainable management of sinks and reservoirs; and prepare to adapt to the impacts of climate change and develop appropriate plans for areas that might be affected by flooding, drought or desertification.

Under the UNFCCC, all countries are expected to include their emissions and removals from land use change and forestry in national inventories. To date, however, only industrialized countries with binding commitments under the Kyoto Protocol are obliged to report on emissions and removals from certain land use, land use change and forestry activities as part of their reduction targets.

The UNFCCC's 13th Conference of the Parties (COP) held in 2007 welcomed the Fourth Assessment Report of the IPCC (UNFCCC Decision 5/CP.13) and adopted Decision 2/CP.13: 'Reducing emissions from deforestation in developing countries'. COP 13 also focused on post-2012 issues. Negotiators agreed on a two-year process called the Bali Action Plan (adopted as UNFCCC Decision 1/CP.13) to finalize a post-2012 regime by COP 15, which will be held in Copenhagen, Denmark, in December 2009. The Bali Action Plan identifies four key elements: mitigation, adaptation, finance, and technology. The plan also contains a non-exhaustive list of issues to be considered under each of these areas and calls for a "shared vision for long-term comprehensive action".

Convention on Biological Diversity

The CBD's COP 9, which convened in 2008, adopted a decision on biodiversity and climate change¹¹, including REDD, and invited Parties and other relevant organizations to ensure complementarities between REDD and CBD provisions.

COP 9 also invited the UNFCCC to take full account of opportunities for its work to provide benefits for biodiversity, including through collaboration among the subsidiary bodies of the three multilateral environmental agreements and the application of the ecosystem approach and SFM. It further invited the UNFCCC to adequately address traditional knowledge, innovations and practices related to the conservation and sustainable use of biodiversity, noting relevant provisions of the CBD.

United Nations Convention to Combat Desertification

The UNCCD acknowledges forests to the extent that land degradation and desertification disturb their hydrological, climatic and soil stabilization functions. The underlying socioeconomic causes of deforestation and desertification are similar.

Article 1 (f) of the Convention notes that combating desertification can contribute to achieving the objectives of the UNFCCC, CBD and other related environmental conventions.

COP Decision 6/1 invites Parties to carry out activities to, among other things, regenerate degraded forests and use forest resources assessment techniques in analyzing the status of land cover. COP Decision 6/12 notes that the UNCCD is a member of the Collaborative Partnership on Forests (CPF) and requests the Convention's Global Mechanism, among others, to consider the special needs and requirements of low-forest-cover countries. COP Decision 7/12 recommends the promotion of SFM as an effective additional means for addressing relevant objectives of the UNCCD, the UNFCCC and the CBD.

United Nations Forum on Forests

At its 6th session in 2006, the UNFF decided on four Global Objectives on Forests¹²:

1. Reverse the loss of forest cover worldwide through SFM, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation.
2. Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.
3. Increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests.
4. Reverse the decline in official development assistance for SFM and mobilize significantly increased new and additional financial resources from all sources for the implementation of SFM.

At its 7th session, the UNFF agreed on a Non-Legally Binding Instrument on All Types of Forests (NLBI), which was subsequently adopted by the UN General Assembly



in December 2007.¹³ Among other things, the NLBI reiterates the importance of curbing deforestation and enhancing SFM, as described in Global Objective 1.

Political commitment is higher than ever before

After many years of being accorded a low priority on the international agenda, the forest sector has recently risen to new heights. The period 2008–2009 will be crucial: in order to implement intergovernmental decisions and to facilitate discussions and negotiations leading to the post-2012 Kyoto regime, the sector must come up with a comprehensive strategy and a plan of action to address forests and climate change.

The Bali Action Plan and other decisions of the UNFCCC's COP 13 address REDD, forest conservation, sustainable management of forests, and the enhancement of forest carbon stocks. The implementation of all these measures would lead to an appreciable reduction in GHG emissions and ultimately contribute to the mitigation of global warming. It is reassuring that many other bodies, including all the members of the CPF, are already promoting such measures.

CPF and the rationale for a strategic framework

Urgent action is needed to harmonize the forest-related actions of the UNFCCC, the CBD and the UNCCD and to ensure that these are complementary to and synergistic with the UNFF's NLBI and Global Objectives on Forests and the programmes of other forest-related intergovernmental bodies. Actions are needed to:

- Invest available and new resources in the most efficient ways to mitigate and adapt to climate change in developing countries.
- Ensure that activities are undertaken in a manner consistent with SFM.
- Make best use of the vast experience and knowledge on SFM and avoid the counter-productive duplication of processes.

In this context, CPF members initiated a process to prepare a strategic framework for an integrated response of the forest sector to climate change.

The CPF

In 2000, in the same resolution in which it established the UNFF, the UN Economic and Social Council (ECOSOC) invited the heads of relevant UN, international and regional bodies to form a collaborative partnership on forests. The CPF was duly formed in April 2001, chaired by the Food and Agriculture Organization of the United Nations (FAO) and supported by the UNFF Secretariat.

The CPF is a voluntary arrangement among 14 international organizations and secretariats with substantial programmes on forests (members are listed and described on the inside back cover). CPF members cover practically all disciplines related to the forests and climate change interface, emphasizing practical actions on the ground and reportable outcomes. The UNFF and the CPF are part of an international arrangement on forests, the main objectives of which are to promote the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end. ECOSOC originally assigned six principal functions to the arrangement and later added three more. Among them is increasing cooperation on forest-related issues between international organizations, institutions and instruments and contributing to synergies between them.

The strength of the CPF stems from the variety and complementarities of the mandates of its members. Their collective initiatives augment individual actions. Members share their experiences and build on them to produce new benefits for their respective constituencies. They collaborate to streamline and align their work and to find ways of improving forest management and conservation as well as the production and trade of forest products for the benefit of people who depend on forests and the protection of the environment. They are also forming increasingly close and valuable strategic partnerships with one another, benefiting from shared expertise and pooled resources.

CPF members have acknowledged the relevance of climate change to their mandates and many are in the process of developing strategies and programmes related to forests and climate change. Member organizations have agreed on the importance of maximizing the synergies between forest-related climate change mitigation and adaptation measures, while also supporting the delivery of the other ecosystem services and livelihood benefits provided by forests.

CPF members join forces for coordinated support

Many CPF members are engaged, either individually or collectively, in forest-related activities to support countries in addressing climate change. Box 1 provides examples of ongoing CPF joint and collaborative activities with direct relevance to climate change.

CPF members have a range of forest-related mechanisms that are, or could be, relevant to climate change. These include the World Bank's Forest Carbon Partnership Facility, Forest Investment Program and Global Partnership on Forests; the Global Environment Facility (GEF)'s SFM Strategy; the UNFCCC's Adaptation Fund; the Bali Partnership Fund and Special Account of the International Tropical Timber Organization (ITTO); and the National Forest Programme Facility hosted by FAO. The Global Mechanism of the UNCCD is implementing a Forest Finance Programme to help mobilize resources for degraded forests outside protected areas.

Purpose of the CPF strategic framework

The CPF stresses the need for a long-term strategy on the role of all types of forests in climate change mitigation and adaptation, as well as for tangible action in the short term.

Box 1: Examples of outcome-oriented cooperation among CPF members

Joint Initiative on Forest Science and Technology

In 2007 the CPF established an International Expert Panel on Adaptation of Forests to Climate Change in the framework of the Joint CPF Initiative on Forest Science and Technology, led by the International Union of Forest Research Organizations (IUFRO). The Expert Panel's task is to carry out a comprehensive assessment of the state of knowledge on the impacts of climate change on forests and the people depending on them, their vulnerabilities, and the adaptation of forests to climate change, and to prepare a report for use by major international forest-related processes and conventions. The work is based on existing scientific research results, information and knowledge, including the reports published by the IPCC and the Millennium Ecosystem Assessment.

Global Partnership on Forest Landscape Restoration

The Global Partnership on Forest Landscape Restoration is a network of governments, organizations and companies who recognize the importance of forest landscape restoration and want to be part of a coordinated global effort. Partners include the following CPF members: CBD Secretariat, the Center for International Forestry Research (CIFOR), FAO, the World Agroforestry Centre (ICRAF), ITTO, IUFRO, the International Union for Conservation of Nature (IUCN), the UN Environment Programme (UNEP), the UNFF Secretariat and the World Bank.

Forest Day: Shaping the Global Agenda for Forests and Climate Change

Forest Day, hosted by CIFOR and partner organizations of the CPF, provides an international, multi-stakeholder forum for dialogue on forests and climate change policies at the global, national and local levels. The first Forest Day was organized during the UNFCCC's COP 13 in Bali, Indonesia; more than 800 people participated, including scientists, members of national delegations, and representatives from intergovernmental and non-governmental organizations. Future Forest Day events are planned for the UNFCCC's COP 14 in Poznan, Poland, and COP 15 in Copenhagen, Denmark.

UN-REDD Programme

The UN-REDD Programme is a major initiative among three CPF members—FAO, the UN Development Programme (UNDP) and UNEP—to support developing countries in their efforts to combat deforestation and forest degradation. Nine countries are in the pipeline for testing ways of better managing their existing forests in order to maintain ecosystem services, maximize carbon stocks, deliver benefits to the community, and boost livelihoods. Some countries are 'quick-starting' their REDD efforts by developing national strategies, establishing systems for monitoring, assessment, reporting and verifying forest cover and carbon stocks, and building capabilities. Norway is financing the initial phase (\$35 million). The initiative is a concrete example of the UN system's commitment to providing coordinated support to member states by bringing together the skills and expertise of the three agencies.

Expert Meeting on Tropical Forests and Climate Change, hosted by ITTO

This meeting, convened in Yokohama, Japan, in April 2008, made the following recommendations for members of the CPF and other relevant organizations:

- Generate information on the relationship between forests and climate change and support national forest inventories and design monitoring methods to assist in generating such information.
- Strengthen research on the links between climate change, forests and human wellbeing.
- Provide information and guidelines on the management of forest types that are especially vulnerable to climate change.
- Develop and test options for adapting the forest sector to climate change.
- Help build capacity among forestry officials in member countries to increase their awareness of and participation in climate change negotiations.
- Collaborate more strongly on assisting members to mitigate and adapt to climate change.
- Raise awareness of the role of forests in climate change mitigation and adaptation.
- Facilitate free access to remote sensing for monitoring the role of forests in climate change mitigation and adaptation.



The purpose of the strategic framework set out in this document is to lay the groundwork for a coordinated response from the forest sector to global climate change. It is also expected to assist major donors who are committing funds for forest-related and climate change activities and to help increase the effectiveness of new and existing funds and initiatives.

The CPF strategic framework has been developed in synchrony with a statement on forests and climate change produced by The Forests Dialogue¹⁴, a network of private-sector and civil-society leaders seeking solutions for the challenges facing forests globally. The messages conveyed by both documents are largely complementary.

2. Forests and carbon

Global forest resources

The main official mechanism for reporting on forest cover and forest cover change globally is FAO's Global Forest Resources Assessment.¹⁵ It reported that, in 2005, the world had nearly 4 billion hectares of forest covering 30% of the land area. Of all the regions, Europe (mainly Russia) had the largest forest area, followed by South America, Central and North America, Africa, Asia, and Oceania (Figure 2, Table 1). About half the total forest area was tropical or subtropical.

The world's forest area is nearly evenly distributed between the UNFCCC's Annex I countries¹⁶ (1.8 billion hectares) and non-Annex I (i.e. developing) countries (2.1 billion hectares). Almost all current net loss of forest area, however, occurs in non-Annex I countries.¹⁷

Deforestation continues—especially in the tropics

In the period 2000–05 an average 13 million hectares per year were deforested globally. At the same time, 5.7 million hectares were added annually to global forest cover through the natural expansion of forests, the planting of new forests, and landscape restoration. The annual net loss of forest cover, therefore, was 7.3 million hectares, which was a lower rate than during the period 1990–2000.

Most deforestation was in South America, with about 4.3 million hectares lost per year over the period, followed by Africa, which lost an estimated 4 million hectares annually. The predominant cause of deforestation in South America in the decade 1990–2000 was conversion to large-scale agriculture (permanent agricultural crops and pastures for grazing; Figure 3). In Africa, small-scale

permanent agriculture accounted for about 60% of deforestation, although there are recent indications that, in some central and southern African countries, rapid large-scale deforestation for timber and oil-palm plantations is under way.¹⁸

Increase in forest area—Europe and parts of Asia

In contrast to most of the tropics, the forest area in Europe expanded by nearly 660,000 hectares per year in 2000–05, largely due to the natural regeneration and reforestation of abandoned farmland. Despite continuing high rates of deforestation in many countries in Southeast Asia, the forest area in Asia as a whole expanded by more than 1 million hectares per year, mainly due to large-scale reforestation and afforestation in China. This was a significant change from the 1990s, when the continent had a net loss of some 800,000 hectares per year.

Forest carbon storage and carbon release

Globally, forests contained an estimated 572 Gt of standing biomass (equivalent to 280 Gt of carbon) in 2005, 33% of which was in South America, 21% in Africa, 15% in Europe, 15% in North and Central America, 11% in Asia and 4% in Oceania. In 2005 the estimated total carbon in forests (i.e. that contained in living biomass, dead wood, litter and soil) was 633 Gt, which was equivalent to 160 tonnes of carbon per hectare (Table 2). While the total carbon in forest biomass in Europe was only 16% of the global total, soil carbon in Europe was the highest of all regions, amounting to 40% of the global total.

Figure 2: The world's forests

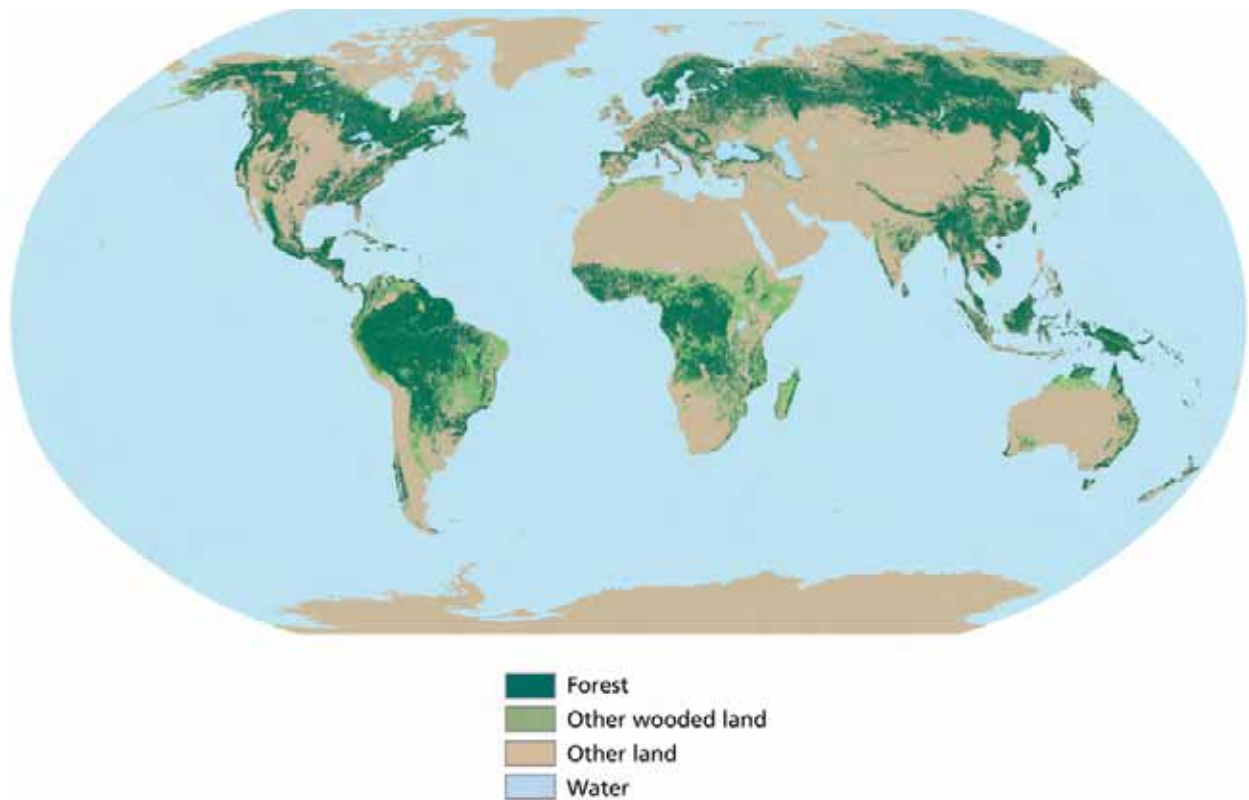
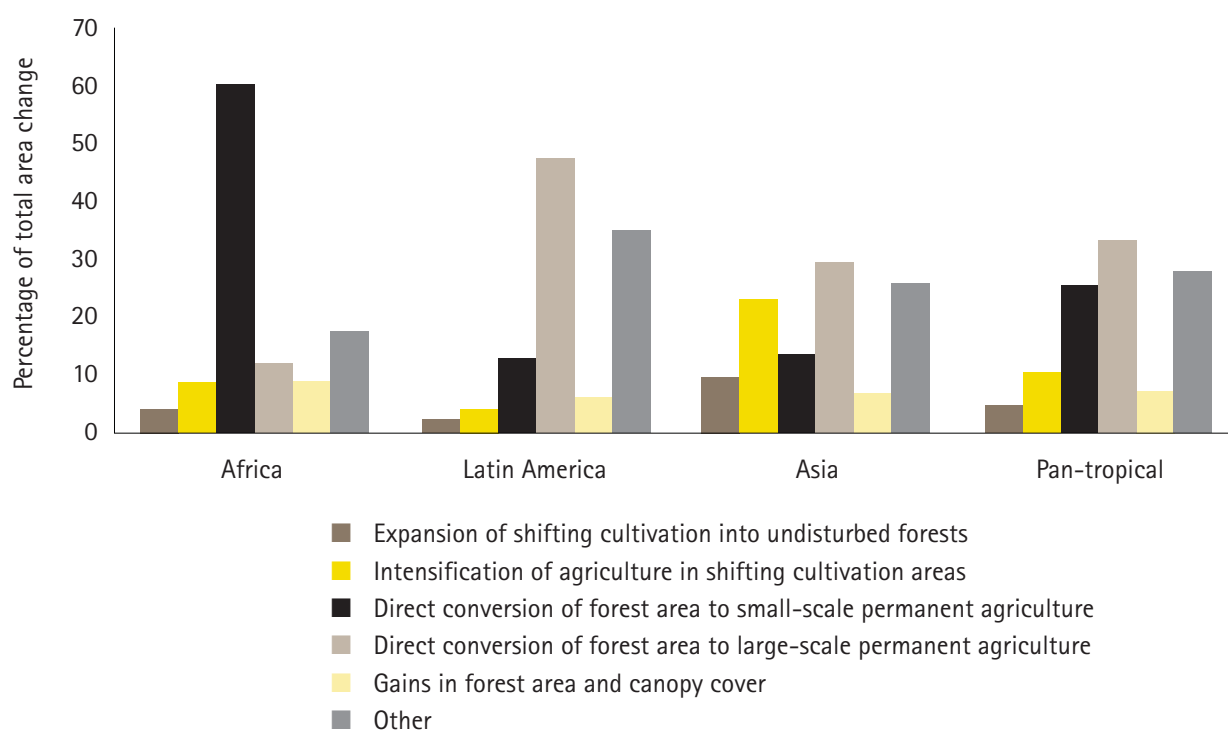


Table 1: Global forest cover, 2005, and net changes by subregion, 2000–05

Region/subregion	Forest area (‘000 hectares)	% of land area	Net change, 2000–05	
			(‘000 hectares)	%
Eastern and Southern Africa	226 534	27.8	-1 702	-0.74
Northern Africa	131 048	8.6	-982	-0.73
Western and Central Africa	227 829	44.1	-1 356	-0.48
Africa	635 412	21.4	-4 040	-0.62
East Asia	244 862	21.3	3 840	1.65
South and Southeast Asia	283 127	33.4	-2 851	-0.98
Western and Central Asia	43 588	4	14	0.03
Asia	571 577	18.5	1 003	0.18
Europe	1 001 394	44.3	661	0.07
Caribbean	5 974	26.1	54	0.92
Central America	22 411	43.9	-285	-1.23
North America	677 464	32.7	-101	-0.01
North and Central America	705 849	32.9	-333	-0.05
Oceania	206 254	24.3	-356	-0.17
South America	831 540	47.7	-4 251	-0.50
World	3 952 025	30.3	-7 317	-0.18

Note: Percentages represent the proportion of remaining forest area lost and gained each year during the respective period.
Source: FAO (2006). *Global Forest Resources Assessment 2005*. FAO, Rome, Italy.

Figure 3: Direct causes of changes in forest area, by region, 1990–2000



Source: FAO (2001). *Global Forest Resources Assessment 2000*. FAO, Rome, Italy.

Rates of GHG emissions (mainly CO₂) are calculated based on the loss of biomass, which is based on estimates of deforestation and land use change. The estimated global average annual rate of forest carbon depletion is 1.6 Gt, or about 0.25% of total forest carbon.

Tropical forests have a significant effect on both inputs and outputs in the global carbon budget. Forest vegetation of the Amazon region, for example, stores about 70 Gt of carbon¹⁹; deforestation between 1970 and 1998 caused the release of 7 Gt of carbon to the atmosphere, which is equivalent to 0.4 Gt of carbon per year.²⁰

Despite uncertainties in estimates of forest-related carbon emissions, there is no doubt about the scale of carbon storage and emissions from forests and the importance of their role in the global carbon cycle.

Deforestation and forest degradation

What is deforestation?

Particularly since the United Nations Conference on Environment and Development, which was convened in Rio de Janeiro, Brazil, in 1992, the term deforestation has captured the attention of the international community

and instigated public debate. What constitutes a forest and hence deforestation is not the same in different countries and different sectors of society.

When countries report on forest cover to FAO they use an agreed global definition of forest which includes a minimum threshold for the height of trees of 5 m, a minimum crown cover of 10% and a minimum forest area of 0.5 hectares. This definition explicitly excludes tree-covered land which is predominantly under agricultural or urban use (i.e. urban parks, orchards and other agricultural tree crops as well as agroforestry systems used for agriculture).

For reporting to the Kyoto Protocol, however, no land use restrictions apply and countries must select their own threshold values within certain limits: i.e. 2–5 m for minimum tree height, 10–30% for minimum crown cover, and 0.01–1.0 hectares for minimum area. The threshold values chosen must be used for all subsequent reporting during the commitment period and countries must justify their thresholds if they differ from the ones used to report to FAO.²¹

The Global Forest Resources Assessment 2005 defines deforestation as the conversion of forest land to other

Table 2: Global estimates of total carbon in forests

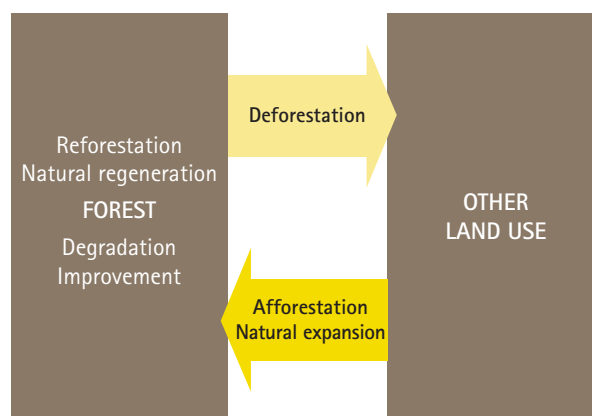
Region/subregion	Total carbon in forests (million tonnes)	Carbon in forests (tonnes per hectare)
Eastern and Southern Africa	29 069	128.3
Northern Africa	8 505	64.9
Western and Central Africa	61 937	222.9
Africa	99 511	156.6
East Asia	27 184	111.0
South and Southeast Asia	44 471	157.1
Western and Central Asia	4 189	96.1
Asia	75 845	132.7
Europe	177 134	176.9
Caribbean	1 082	181.2
Central America	4 017	179.3
North America	79 611	117.5
North and Central America	84 710	120.0
Oceania	35 713	173.1
South America	160 192	192.6
World	633 105	160.2

land uses or a long-term reduction in crown cover to less than the minimum 10% threshold. The UNFCCC defines deforestation as a human-induced change in forest cover.

Figure 4 shows a conceptual model of the dynamics of forest change. There is a general acceptance, at least in forestry circles, that the harvesting of trees (logging) in a forest is not deforestation but, rather, part of the forest management cycle. From a forest manager's perspective, sustainable low-density logging (such as selective logging) should be regarded as neither deforestation nor degradation. Under SFM, harvested trees are replaced by others through either replanting or silvicultural techniques that encourage natural regeneration; many forests have been managed in this way for hundreds of years without measurable declines in productivity or other forest functions. The carbon lost during wood harvesting is eventually restored through new growth; moreover, the harvested wood products continue to store the carbon sequestered during tree growth until they burn or decompose.

It is only when the harvesting of wood is accompanied by conversion to agriculture and other land uses that deforestation occurs. Reducing emissions from deforestation, therefore, can be defined as not

Figure 4: Forest change dynamics



Source: FAO (2006). *Global Forest Resources Assessment 2005*. FAO, Rome, Italy.

incurring the emissions associated with the burning or natural degradation of stored biomass on the site as it is converted to another land use that maintains and restores a lower quantity of carbon in biomass.²²

UNFCCC Decision 16/CMP.1 stipulates that young natural forest stands and all plantations that have yet to reach a crown density of 10–30% or tree height of 2–5 m are identified as forest, as are areas within the forest that are temporarily understocked due to harvesting but which are expected to revert back to

forests. Similarly, Global Forest Resources Assessment definitions imply that plots within or on the boundaries of forests that are temporarily devoid of mature trees are still considered forests. Nevertheless, the carbon stocks of such plots might be considerably less than they were originally and might remain so for some years.

The inclusion in definitions of forest of young natural stands, planted forests and shifting cultivation is especially important if forest communities who clear small patches of forest land for subsistence cultivation are to access funds for REDD and other climate mitigation measures.

How deforestation entered into the UNFCCC

In the UNFCCC's Marrakesh Accords, agreed by the COP in 2001, deforestation avoidance was excluded as an eligible Clean Development Mechanism (CDM) activity due to problems related to leakage, additionality and baselines and the possibility that the scale of carbon credits from deforestation avoidance could be quite large.²³

At the UNFCCC's COP 11, in 2005, the Coalition for Rainforest Nations, a group of Parties spearheaded by Papua New Guinea and Costa Rica, tabled a motion to include the reduction of emissions from deforestation and forest degradation in the Convention's provisions. A process was subsequently launched to consider a policy for reduced emissions from deforestation in developing countries with a view to its inclusion in post-2012 arrangements on climate change.

What is forest degradation?

Many definitions of forest degradation have been proposed with parameters related to canopy cover, ecological conditions, carbon stocks and other forest attributes (Box 2). A definition that is useful in the context of climate change discussions has proved elusive and to date seems to have been limited to the quantity of carbon sequestered by a forest area (both above- and below-ground). Equally challenging is the provision of accurate data on the extent of forest degradation and its contribution to carbon emissions, which, in any case, will depend on an agreed definition of degraded forests.²⁴

Causes of deforestation and forest degradation

The causes of deforestation and degradation can be separated into two categories. The first involves factors that are directly linked to the act of clearing or degrading land, referred to as direct or proximate causes. The



second category includes the background societal factors that drive these direct causes, which are referred to as underlying causes. Direct causes include the expansion of agriculture (for food, fodder, fibre or fuel production), infrastructure development, and wood extraction (which, if poorly executed, can degrade forests and open up forest areas to agriculture). Indirect causes include macroeconomic factors (such as high prices for agricultural commodities, which serve as an incentive for agricultural expansion, and government incentives that promote land conversion), and poor governance.^{25,26}

Deforestation is often an unavoidable part of development: as their agricultural sectors grew, many now-developed countries experienced periods of intensive deforestation which helped to fuel economic growth. Development strategies in some (particularly forest-rich) countries allow and sometimes even encourage certain levels of deforestation for agriculture or urban expansion.

Forest losses due to fire and pests

In all forest biomes, factors such as wildfire, drought, insects and disease can cause massive forest degradation. Fire burns millions of hectares of forest annually, releasing significant volumes of carbon and particulates to the atmosphere. The amount of CO₂ released by the decay of trees killed by fire adds substantially to emissions.

Box 2: Definitions of forest degradation by selected international organizations

FAO 2000: A reduction of canopy cover or stocking within the forest. *Explanatory note:* For the purpose of having a harmonized set of forest and forest change definitions that also is measurable with conventional techniques, forest degradation is assumed to be indicated by the reduction of canopy cover and/or stocking of the forest through logging, fire, windfelling or other events, provided that the canopy cover stays above 10% (cf. definition of forest). In a more general sense, forest degradation is the long-term reduction of the overall supply of benefits from a forest, which includes wood, biodiversity and other products or service.

FAO 2001, 2006: Changes within the forest which negatively affect the structure or function of the stand or site, and thereby lower the capacity to supply products and/or services. *Explanatory note:* Takes different forms particularly in open forest formations deriving mainly from human activities such as overgrazing, overexploitation (for fuelwood or timber), repeated fires, or due to attacks by insects, diseases, plant parasites or other natural sources such as cyclones. In most cases, degradation does not show as a decrease in the area of woody vegetation but rather as a gradual reduction of biomass, changes in species composition and soil degradation.

Unsustainable logging practices can contribute to degradation if the extraction of mature trees is not accompanied with their regeneration or if the use of heavy machinery causes soil compaction or loss of productive forest area.

FAO, 2003: The long-term reduction of the overall potential supply of benefits from the forest, which includes carbon, wood, biodiversity and other goods and services.

UNEP/CBD, 2001: A degraded forest is a secondary forest that has lost, through human activities, the

structure, function, species composition or productivity normally associated with a natural forest type expected on that site. Hence, a degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. Biological diversity of degraded forests include many non-tree components, which may dominate in the under-canopy vegetation.

ITTO, 2002: A long-term reduction of the overall potential supply of benefits from the forest, including wood, biodiversity and other products or services.

ITTO, 2005: The reduction of the capacity of a forest to produce goods and services. 'Capacity' includes the maintenance of ecosystem structure and functions.

IPCC 2003a: A direct human induced loss of forest values (particularly carbon), likely to be characterized by a reduction of tree cover. Routine management from which crown cover will recover within the normal cycle of forest management operations is not included.

IPCC, 2003b: A direct human-induced activity that leads to a long-term reduction in forest carbon stocks.

IPCC, 2003c: The overuse of poor management of forests that leads to long-term reduced biomass density (carbon stocks).

IPCC, 2003d: A direct human-induced long-term loss (persisting for X years or more) of at least Y% of forest carbon stocks (and forest values) since time T and not qualifying as deforestation or an elected activity under Article 3.4 of the Kyoto Protocol.

Source: FAO 2006. *Definitional Issues related to Reducing Emissions from Deforestation in Developing Countries*. Forests and Climate Change Working Paper 5. FAO, Rome, Italy.

Box 3: The mountain pine beetle

The mountain pine beetle (*Dendroctonus ponderosae*) is a native insect of the pine forests of western North America, and its populations periodically erupt into large-scale outbreaks. The current outbreak, which has been under way since 1994 and particularly since 2000, has already destroyed more than 170 million m³ of timber, which is nearly equivalent to the total global wood trade in 2005. By 2008, 10–13 million hectares had been infected. It is estimated that 40% of trees killed by the insect remain standing, posing a huge potential fire hazard and, as they decay, a source of GHG emissions.²⁷

Recent research suggests that climate change has been partially responsible for the spread of the beetle. Usually, extreme winter cold reduces beetle numbers, but recent warm winters have affected the efficacy of this control mechanism. The mountain pine beetle prefers mature timber: the Canadian province of British Columbia is believed to have three times more mature lodgepole pine now than it had 90 years ago, mainly because equipment and techniques for protecting forests against wildfire have greatly improved over time.²⁸

The impacts of insects on forest carbon dynamics are generally ignored in large-scale modelling. It is estimated that the cumulative impact of the pine bark beetle outbreak during 2000–2020 will be 270 million

tonnes of released carbon, changing affected forest from a small net carbon sink to a large net carbon source. Insect outbreaks are an important mechanism by which climate change could undermine the ability of forests to take up and store atmospheric carbon, and such impacts should be accounted for in large-scale modelling analyses.²⁹



Photo courtesy University of British Columbia

Infestation of mature lodgepole pine forest by mountain pine beetle, British Columbia, Canada

The natural and human-induced burning of peat land, both in the tropical and boreal forests, is another significant source of GHG emissions.

In some forests, fire is an essential ecological process, often serving as a mechanism for regeneration. Climate modelling predicts, however, that the extent and severity of wildfire will increase under most climate change scenarios. Management strategies are already in place in many countries, or can be put in place, to reduce the risk of wildfire. Prescribed fire can serve several ecological purposes as well as reduce the fire hazard; its contribution to CO₂ emissions is usually balanced by other processes

(such as regeneration) that enhance carbon sequestration and storage. Some CFP members (e.g. FAO, UNEP and ITTO) are working with member countries to improve forest fire management.

Outbreaks of pests and disease can reduce forests to a state comparable to deforestation, causing major economic losses and significant environmental degradation. During outbreaks, tree mortality and dieback reduce carbon uptake, and the decay of trees and other vegetation causes the increased release of GHGs to the atmosphere. Moreover, affected forests are more prone to fire. Some outbreaks are caused by a combination of climatic factors



M. Kashio/FAO

(e.g. drought) and unsustainable forest practices. In the northern hemisphere, perhaps the starkest contemporary example of a devastating insect attack is the mountain pine beetle infestation in western North America (Box 3).

Need for common definitions

Sound, agreed definitions based on measurable principles will be essential for efficient negotiations and for the

implementation and monitoring, modelling and reporting of REDD and other mitigation measures.^{30,31} The CPF initiative on harmonizing forest-related definitions³², a process that brings forest-related stakeholders together with the aims of minimizing the forest reporting burden on countries and reducing the confusion that inconsistent definitions can cause, could be used to address this issue.

3. Mitigation and adaptation

Mitigation

Further to the adoption of a decision under the UNFCCC on long-term cooperative action on climate change, The Bali Action Plan stresses forest-based mitigation, particularly REDD, as a viable mechanism for reducing emissions of GHGs. In Decision 2/CP.13, the COP requested the Convention's Subsidiary Body for Scientific and Technical Advice to undertake a programme of work on outstanding methodological issues related to a range of policy approaches and positive incentives for REDD.

Forest-based mitigation activities implemented under the Kyoto Protocol, including the CDM, have to date been limited. Opportunities to increase activities include simplifying procedures, developing certainty over future commitments, reducing transaction costs, and building confidence and capacity among potential buyers, investors and project participants.³³ Forest-based mitigation projects in a post-2012 agreement, and afforestation and reforestation activities in particular, would benefit from the simplification and clarification of issues such as the base year, ceilings on the use of credits, and the question of whether to include sink credits in certain emissions trading schemes.

In addition to REDD, forest-related mitigation options under the umbrella of SFM include forest conservation, forest restoration, afforestation, wood-based bioenergy production, and the use of sustainably produced wood products as substitutes for emissions-intensive materials. Sustainably produced forest biomass, for example, could contribute 12–74 exajoules (10^{18} joules) per year to energy consumption, with a mitigation potential of 0.4–4.4 Gt CO₂ per year depending on whether it replaces coal or gas in power plants.³⁴

The potential of GHG emissions reductions from reduced deforestation and from forest management, afforestation and agroforestry differs greatly between activities, regions and system boundaries, as well as over time. In the short term, the mitigation benefits of reducing deforestation are likely to be greater than the benefits of afforestation and reforestation.

REDD policy options

CPF members consider that there is no need to re-invent measures to achieve REDD in the context of climate change: policy options for reducing deforestation are among the most researched subjects in international forestry.³⁵

For REDD to be successful, a distinction should be drawn between acceptable and unacceptable deforestation. Some countries (particularly—and perhaps only—developing countries) might need a certain degree of deforestation to support national development objectives. Unacceptable deforestation is the conversion of forest to other, often unsustainable land uses for windfall profit, or when forests are clearfelled and degraded beyond restoration.³⁶ Issues that need to be addressed include providing sufficient incentives for reducing unacceptable deforestation while only rewarding deforestation reductions beyond business-as-usual scenarios, addressing risks arising from forest degradation and international leakage, and ensuring the permanence of emission reductions.³⁷

Achieving climatic benefits through REDD will depend on the design of a workable compensation mechanism and on striking appropriate tradeoffs between environmental integrity, political and economic incentives, and scientific rigour and pragmatism regarding data requirements. It will also require a careful analysis of land use change dynamics in individual countries.



R. Faidutti/FAO

Forests in arid and semi-arid regions

Compared to other forest biomes, arid and semi-arid forests have low carbon values, partly because they are inherently less productive and partly because many are already highly degraded. Such forests can, however, act as buffers between agricultural lands and denser forests and thereby play an important role in preventing encroachment, degradation, conversion and eventual desertification. In some regions, their role as buffers, and their potential for supporting low-cost plantations, might make such lands a target of national and international mitigation schemes. It is also likely that, in contrast to purely profit-maximizing players in future carbon markets, some government and donor-funded initiatives in arid and semi-arid regions will aim to integrate carbon management with other policy goals such as soil conservation and poverty alleviation. Given the large number of people in developing countries who depend on arid and semi-arid forests, such initiatives could be highly significant both for climate change mitigation and human development goals.

REDD-related definitions should cater for low-density forest ecosystems and woodlands, as well as for silvopastoral and agroforestry systems and savannas

and bushlands. While this would not guarantee a business case for carbon investment in such areas, it would be a necessary precondition.

Adaptation

Mitigation and adaptation are equally important, especially given the potential for climate change to reduce the mitigation ability of forests, and should proceed simultaneously. Mitigation will succeed only if appropriate adaptation measures are in place.

Even the most aggressive climate stabilization targets under discussion imply an inevitable global average temperature rise of 1–3°C. This will lead both to more frequent and severe climate-related disturbances such as droughts, floods and storms and to longer-term stresses such as changed rainfall patterns, ecosystem degradation, reduced biodiversity, and higher sea levels.³⁸ These changes will affect poorer countries disproportionately: not only are such countries typically more reliant on climate-sensitive industries such as agriculture and forestry, but poverty, poor health and limited capacity and resources also increase their vulnerability.³⁹ Policy approaches to adaptation should therefore particularly address the needs of vulnerable people.

Adaptive capacity is the ability of a system to adjust to climate change, to moderate potential damage, to take advantage of opportunities, or to cope with the consequences.⁴⁰ Under some climate change scenarios, current levels of adaptive capacity will be insufficient to prevent significant negative impacts on biodiversity and the many goods and services that forests provide.

In many circumstances, adaptation and mitigation objectives are interlinked and compatible, and policy approaches to address them can be mutually supportive. For some forest ecosystems, however, the speed and human-driven nature of climate change might put adaptation beyond reach.

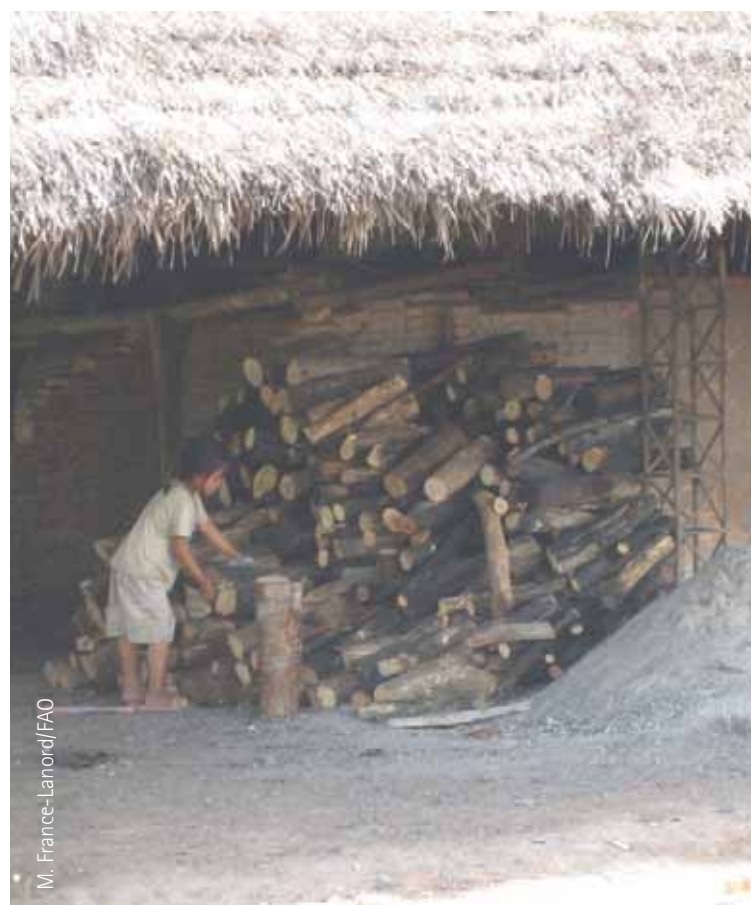
The cost of adaptation and the magnitude of its benefits are increasingly relevant issues, from both a national perspective and in a global context. It will be important to distinguish between mainstreaming adaptation into forest management (i.e. helping forest ecosystems adjust to the direct impacts of climate change) and mainstreaming forests into adaptation planning (i.e. to ensure that the role of forests in buffering the impacts of climate change on other sectors such as agriculture, energy, etc. are appreciated and accounted for).

Adaptation as a development issue

Many forest-dependent communities are highly vulnerable to the effects of climate change and will require financial and technical assistance in order to adapt.⁴¹ Adaptation should be treated as part of national development, even if it is sometimes seen as an additional cost and even if it adds complexity to the delivery of other development goals. In many cases, adaptation will have the same target outcomes as development—such as sustaining or improving social protection, health and security, and economic wellbeing. Basic development is critical for building adaptive capacity, but climate change will make it more costly and difficult to deliver and to sustain the Millennium Development Goals⁴² beyond 2015.⁴³

SFM provides a suitable framework for the development of the forest sector's capacity for climate change adaptation. SFM also serves as a vehicle for sustainable development by promoting the maintenance and improvement of environmental quality, social justice, and economic wellbeing.

To ensure that SFM responds to the changing environment, processes are needed for the continuous collection and analysis of information and to enable adaptive management, including the effective participation



M. France-Lanord/FAO

of stakeholders. Forest policymakers, administrators, managers and dwellers need to be well informed about changes to the forest environment. CPF members and financial institutions can assist with capacity building, and other natural resource management sectors should also be involved.

Adaptation of forest ecosystems

Implicit in SFM is an adaptive approach, which will help ensure that forest management changes in the light of changing conditions. Various measures aimed at assisting forests to adapt to climate change, especially in the tropics, have been proposed.⁴⁴ They include facilitating the adaptive capacity of tree species⁴⁵, mainly by maximizing genetic variation; silvicultural and management approaches such as minimizing slash, reduced impact logging and widening buffer strips and firebreaks; and institutional and policy measures such as increasing awareness, improving fire management, seed exchange and participatory genetic improvement programmes for smallholders, mainstreaming adaptation into national development plans, and establishing financial mechanisms to help implement adaptation measures.

Such measures should constitute an integral part of forest-sector strategies to adapt to climate change in both natural and planted forests.

Costs of adaptation

How much adaptation might cost, and how large its benefits might be, are issues that are increasingly relevant for on-the-ground implementation, as well as in the global context where tradeoffs between the costs of adaptation and the potential damage of climate change might need to be considered. So far, the costs of adaptation have not been reliably estimated, but they might be as high as the costs of mitigation.

Realistic estimates of adaptation costs and benefits are needed for actors directly exposed to climate risks, such as forest industries, forest communities, field foresters, project managers and sectoral planners, who need to make decisions about whether, how much, and when to invest in adaptation. They are also needed at the national and global levels to establish aggregate adaptation 'price tags' that would then need to be met through international, domestic and private funding sources.⁴⁶

Other essential functions and benefits of forests

Implementing measures for climate change mitigation and adaptation are expected to not only reduce harmful GHG emissions and enhance forest resilience but also

to provide a range of other benefits—sometimes called co-benefits. These include biodiversity conservation, benefits for the hydrological cycle, soil stabilization, the maintenance of a wide range of livelihood options, and meeting recreational and spiritual needs. Optimizing such benefits requires strong engagement between the conservation and development communities, climate-change policymakers, governments, forest-dependent people, and other stakeholders.

Maintaining the adaptive capacity of forest ecosystems to environmental change is essential for maintaining their biological diversity and other ecosystem services⁴⁷ and might require basic changes in forest management. Equally important is the adaptation—or reinventing—of forest institutions to enable them to respond effectively to the new challenges and emerging issues and in that way to better serve the needs of society.

Options for improving essential forest co-benefits include influencing the international policy framework regarding the valuation of non-carbon benefits, and the provision of supplementary funds to implement REDD measures in areas of high conservation priority.

While it is important not to raise unrealistic expectations, climate change mitigation offers an historic opportunity to reduce deforestation and at the same time maintain the other interdependent economic, environmental and social values of forests.

4. Monitoring and verification

Accurate estimates of forest cover and biomass, especially for those forests threatened by conversion, are of critical importance because they are used to determine the amounts of stored carbon that would be released to the atmosphere as a result of deforestation. The incorporation of parameters such as forest type, composition, age and health in estimates of net carbon emissions from deforestation will be necessary for effective REDD and other mitigation measures. Robust and cost-efficient forest monitoring and assessment is needed that is able to simultaneously respond to the basic information needs of climate change processes and provide accurate information for decision-making on other aspects of forest management.

Estimates of forest cover and the rate of net loss have been confounded by differences in the definitions of terms and the methodologies used, not only by different agencies but even by the same agencies over time.⁴⁸

There is currently no widely accepted standard practice for measuring forest carbon stocks remotely at the regional or national scales.⁴⁹ Of all sources, net emissions of carbon from tropical land use change are the most uncertain, with a wide range of estimates. The main causes for the inaccuracies are related to the data used to calculate rates of deforestation, the carbon stocks of the forest being cleared, and the fate of carbon after clearing (e.g. how much is oxidized immediately versus decomposed over time). Ultimately all these variables must be accounted for in forest inventories, which are also at the core of effective forest management. Forest inventory procedures and tools, however, require relatively large investments and sound technical skills, both of which are often in short supply in developing countries.

Methods for estimating carbon and current sources of information

Carbon sequestration, storage and release in forests are not measured directly but rather estimated as functions of forest biomass using conversion factors. Forest biomass, in turn, is a function of forest type, forest area, the size of standing timber (growing stock and dead wood), forest health and management system. It is also usually estimated from the growing stock using conversion factors.

The IPCC allows, as one method for calculating changes in carbon stocks over time, the combination of spatial and temporal measurements of changes in forest area and estimates of carbon stocks. Remote sensing and imagery analysis are used for indirectly measuring forest carbon by measuring forest cover and estimating forest biomass, sometimes followed by ground verification. The estimation of total emissions from deforestation and degradation, however, also needs information on what happens to the wood once it is removed from the forest.

The IPCC identifies five main forest carbon pools: above-ground biomass, below-ground biomass, dead wood, litter, and soil organic carbon. Inventories of carbon stock, loss and gain need to include all five pools.

Most of the conversion factors and default values published in the IPCC guidelines for national GHG inventories⁵⁰ have a high degree of uncertainty. In particular, estimates of change based on carbon stocks at two different points in time are very uncertain. Moreover, if the forest is subject to a degradation process, the distribution of carbon between the various pools is likely to change, and this change will not be captured when default values and conversion factors are used.⁵¹



On average, soil carbon accounts for about 45% of the total carbon stock in forests⁵², but the proportion varies considerably depending on soil type. Peat soils in particular contain large amounts of carbon; deforestation and burning of peat swamp forests can cause a considerable loss of soil carbon. Given the significance of soil carbon in the carbon cycle, it is important to take it into consideration when discussing REDD monitoring and verification efforts. It is, however, difficult to measure.

In addition to forest-related data collated by intergovernmental organizations such as FAO⁵³ and ITTO⁵⁴, bodies such as UNEP's World Conservation Monitoring Centre and the World Resources Institute report on forest area, biomass and carbon stocks. Universities and national and international research institutions (such as CIFOR) undertake scientific research to refine estimates and to work out appropriate plot sizes, measurement frequencies and conversion factors for different forest biomes.

National level

Due to the size and complexity of the task of tracking changes in forest-based emissions, and the timeframe over which it must be undertaken⁵⁵, national-level forest

carbon inventories will require detailed documentation, a simple, repeatable, standardized methodology, and complete transparency in reporting. The task of ongoing forest carbon inventories are likely to fall mostly within the purview of national and international forest agencies.

In most countries, carbon-related forest inventory programmes use the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* as the basis of their methodologies for estimating anthropogenic emissions by sources and removals by sinks. Other resources include the *IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry*⁵⁶ and FAO's global forest resources assessments and national forest monitoring and assessments (Box 4).

Currently, very few countries are able to provide reliable estimates of their deforestation rates. Instead they report on the net change in forest area, which is calculated as the difference in forest area between two points in time and represents a combination of changes due to deforestation, afforestation and the natural expansion of forests. National forest monitoring systems are needed to deliver cost-effective and quality-controlled information on a regular basis. They must encompass a wide range of variables in addressing biophysical as well as sociocultural and economic issues.⁵⁷ In response to these requirements, the national forest inventory concept has been expanding from traditional measurements of trees and other biological features to also include the collection and presentation of data from local forest managers and other stakeholders.

A recent review of the current status of national systems for monitoring changes in forest area and carbon stocks found that, in most developing countries, the quality of such systems would not satisfy an accounting system of carbon credits.⁵⁸ Therefore, capacity building in forest monitoring is crucial to the success of REDD and other forest-based climate change mitigation measures. To ensure transparency, data and information services should be readily accessible to all stakeholders, and data collection can be strengthened by involving local communities.

Countries actively engaged in efforts to slow deforestation and reduce net forest loss might feel at a disadvantage when it comes to financial transfers.⁵⁹ Some countries might even be tempted to 'revisit' inventories they have previously reported for the period 1990 onwards. Ultimately, the estimation of past deforestation for national baselines will be a serious concern and a potentially major obstacle for REDD.



In this regard, the expert opinions of national forest specialists will often be essential. Several CFP members and other international organizations already assist countries to carry out credible forest inventories and assessment, but such efforts need to be expanded to cater for the needs of climate change.

Methods for monitoring REDD and other mitigation measures are available but more attention needs to be paid to increasing access to and the availability and efficient use of data, particularly remote sensing data, and also to in-country capacity building.

Global level

FAO's periodic global forest resources assessments are widely used as a source of information on a range of global forest variables. The *Global Forest Resources Assessment 2005*, for example, requested countries to report on more than 40 variables, including forest cover, for three points in time (1990, 2000 and 2005). One hundred and seventy-three countries duly submitted reports, while 56 reports (primarily for small island states and some dependent territories) were compiled by FAO as desk studies.

There is a serious debate about the reliability of methods used to estimate global deforestation and net forest loss as well as the interpretation of the data. Variability in the quality of data provided by countries reduces the quality of compiled results at the global level.

In producing *Global Forest Resources Assessment 2010*, FAO will follow a similar approach to that taken in previous assessments but is also setting up a system for the global monitoring of forest and land use change through remote sensing with the aim of substantially improving knowledge on land use change dynamics and addressing international information requirements on forestry. Using a participatory process, the capacities of countries to determine historical trends in deforestation rates and to monitor future rates using a common framework and methodology will be considerably strengthened, thus enabling them to take advantage of current and future mechanisms under the UNFCCC and post-2012 arrangements on climate change.

The full range of efforts to produce consistent, reliable data and analyses on the flux of carbon in forests could be better harmonized. CFP members could play a significant role in supporting and coordinating such efforts.

Box 4: Forest Resources Assessment 2010 and the National Forest Monitoring and Assessment Programme

FRA 2010

One of the most interesting components of FRA 2010 will be a new and ambitious global remote sensing survey.

Using satellite data from 1975, 1990, 2000 and 2005, forest cover will be surveyed across the planet in about 13,500 plots, providing a sampling intensity of 1% of the global land surface. This survey will generate unprecedented information on global forest change—deforestation, afforestation and natural forest expansion. It will provide insight into the land uses that are replacing forests and identify changes in biomes that transcend national boundaries. It will improve understanding of the global contributions of forests to GHG emissions and reductions.

FRA 2010 will also include a survey of the area of forest under SFM and data on forest laws, policies and institutions. It will also help countries report on land use and land use change for the UNFCCC and the Kyoto Protocol, with the remote sensing survey providing a common measurement baseline.

FRA 2010 will help boost country expertise (where needed), provide opportunities for sharing information and experiences, raise the profile of forests within countries, and assist national forest-related decision-making. It will also help countries view their forest sectors in a regional and global context and inform international deliberations on forests.

Source: FAO (2008). Brochure on the Global Forest Resources Assessment 2010. FAO, Rome, Italy.

National Forest Monitoring and Assessment

FAO supports countries in their efforts to establish or improve their national forest inventory systems based on systematic field inventories and the establishment of comprehensive databases on forests and trees outside forests. The national forest monitoring programme, which has been active since 2000 in a growing number of countries, supports national forest monitoring and assessments and integrated land use assessments with the main objective of strengthening the ability of countries to update, expand and manage their information bases on forestry and land use.

To accommodate the need for timely information in a rapidly advancing climate change process, a commonly agreed monitoring system would ideally produce forest cover data and indicators much more frequently than once per decade. Forest assessments, whether done using remote sensing or ground sampling, or a combination of both, are very expensive and technically daunting, and increasing their frequency to the level required for efficient forest-based mitigation is a major challenge, especially in countries where capacity is currently low.

Reference emission levels (baselines)

For REDD to produce credible carbon benefits, the setting of realistic reference emissions levels is required. Existing IPCC methods provide a sound basis for developing national REDD strategies that are sufficiently robust and technically feasible to be operational at a large scale⁶⁰, although some argue that they need to be improved and simplified.

A three-step method, for example, could be used for setting the baseline in a REDD scheme: 1) estimate historic land use change and deforestation, including an analysis of historic baseline drivers and the identification of major drivers. These drivers should be weighed according to their importance and the 'time one' or calibration period; 2) generate a baseline projection for deforestation, including a projection of future land use change with projected rates of deforestation and carbon stock estimates; and 3) review and reassess the baseline at agreed intervals.⁶¹

Some CPF members are uniquely placed to assist countries in setting reference emission levels including by using historical data on deforestation at the national and regional levels.

5. Strategic responses by the forest sector

Sustainable forest management

The UNFF recognizes SFM as “a dynamic and evolving concept that aims to maintain and enhance the economic, social and environmental values of all types of forests for the benefit of present and future generations”.⁶² Conceptually, it encompasses the following seven thematic elements ('criteria'), which have been acknowledged by the UNFF and articulated in various sets of regional criteria and indicators for SFM⁶³:

1. Extent of forest resources
2. Biological diversity
3. Forest health and vitality
4. Productive functions of forests
5. Protective functions of forests
6. Socioeconomic functions
7. Legal, policy and institutional framework.

These elements encompass the three main dimensions of sustainable development and a wide range of issues (Table 3).

Table 3: SFM dimensions and issues

Dimension	Issues addressed by SFM
Social	Rural livelihoods, Indigenous people's rights, rights of access, tenure and land ownership
Economic	Poverty, food security, supply of wood and non-wood forest products, valuation of forests and services, equity, trade, energy
Environmental	Biological diversity, soil and water protection, maintenance of forest productivity, climate change, desertification, air pollution, invasive species, wildfire, pests

Source: Marklund, L. and Schoene, D. (2006). *Global Forest Resources Assessment 2005: Global Assessment of Growing Stock, Biomass and Carbon Stock*. Working Paper 106/E, FAO, Rome, Italy.

SFM approach to curbing deforestation and forest degradation

SFM is widely accepted as a flexible, robust, credible and well-tested approach to forests for producing timber, conserving biodiversity, improving forest governance, and fighting desertification. It also offers a viable mechanism for achieving emissions reductions from reduced forest degradation and for sequestering carbon through afforestation and improved forest management. Sustainably managed forests can help to reduce deforestation by providing income for forest-dwellers and to sequester carbon through treatments that, for example, adjust species composition, age classes and rotation ages, ensure optimum stocking, improve and maintain forest health and vitality, and reduce the incidence of pests and diseases.

SFM should be an integral part of any policy approach to forest-based climate change mitigation. Equally, forest agencies should take steps to ensure that climate change mitigation is integrated into national SFM strategies and demonstrate that funds to support SFM also help to curb deforestation and forest degradation.



As a framework for forest-related action on climate change, the success of SFM is a function of good governance, the recognition of the rights of forest communities (particularly in terms of land tenure and benefit-sharing) and adequate and sustained funding.

Given that most of the underlying causes of deforestation are generated outside the forest, it would be unrealistic to expect the forest sector alone to implement REDD. Collaboration with and the support of other sectors, especially those contributing most to deforestation, will be essential. Policies to promote REDD and SFM in the context of climate change will be best implemented as part of holistic national land use planning.

In many forest-rich countries, some degree of deforestation is unavoidable; an integrated approach to sustainable management through land use planning is therefore essential. This could mean: setting aside forest land for conservation purposes and other environmental services; converting some forest to sustainable agriculture; and allocating some forest for production objectives such as the sustainable harvesting of timber and other forest products. Resolving associated governance issues is vital for the success of such policies.

As national forest management plans are modified to meet evolving objectives or in the face of changing circumstances, tradeoffs should be carefully evaluated. In all cases, however, protecting the multiple functions of forests and safeguarding the rights and livelihoods of forest-dwellers should be paramount. A narrow focus on REDD and the role of forests as carbon sinks at the expense of other forest values would be unsustainable.

Forest protection and production

Protected areas and conservation issues

Protected forest areas (i.e. areas managed mainly for the conservation of biodiversity) can play an important role in climate change adaptation and mitigation. By conserving unbroken blocks of habitat, protected areas increase ecosystem resilience to climate change, since ecosystems with high biodiversity and intact structural components recover more easily from climatic disturbances and also act as a genetic resource of genotypes adapted to changed climatic conditions and provide refuges for wildlife. Moreover, protected areas can mitigate the physical impacts of climate change—such as rising sea levels (in the case of mangroves and other coastal forests), rising temperatures and extreme weather events.⁶⁴ In arid regions, protected forests and woodlands can help mitigate the effects of drought. Carbon sequestration is one of the natural ecosystem services provided by protected areas.

Ecological corridors between protected areas and other restoration areas can help create a positive feedback loop between adaptation and mitigation. Their primary objective lies in adaptation (e.g. facilitating species migration) and their restoration and protection contributes to mitigation (as well as to livelihoods).

Depleting natural resources or making them inaccessible (such as through strict protection) can further impoverish the poor.⁶⁵ It is increasingly recognized that the basic needs of forest-dwelling people for food, health and shelter, and the recognition of their rights, should receive greater priority in the conservation agenda⁶⁶; post-2012 arrangements on climate change provide an important opportunity for this.

Since the CBD came into force in 1993, protected areas globally have grown by almost 100% in number and by 60% in area. In the same period, however, international funding for biodiversity conservation has grown by only



38%. The inadequate management of protected areas poses a significant threat to climate change mitigation and adaptation and needs to be addressed.

Production forests and planted forests

Wood is a renewable resource and, when obtained from sustainably managed forests, is an efficient material for storing carbon.⁶⁷ Although wood harvesting temporarily reduces carbon storage in the forest, a large part of the harvested carbon can be stored in wood products, potentially for many decades. When wood is used in construction and furniture, for example, the reduction in GHG emissions is substantial compared to other, more energy-intensive and carbon-intensive substitutes such as concrete, steel and plastics.

Production forests in all biomes, but especially in tropical, temperate and boreal regions, are likely to require adaptive silvicultural and forest management measures to limit reductions in their economic value that might occur due to climate change.

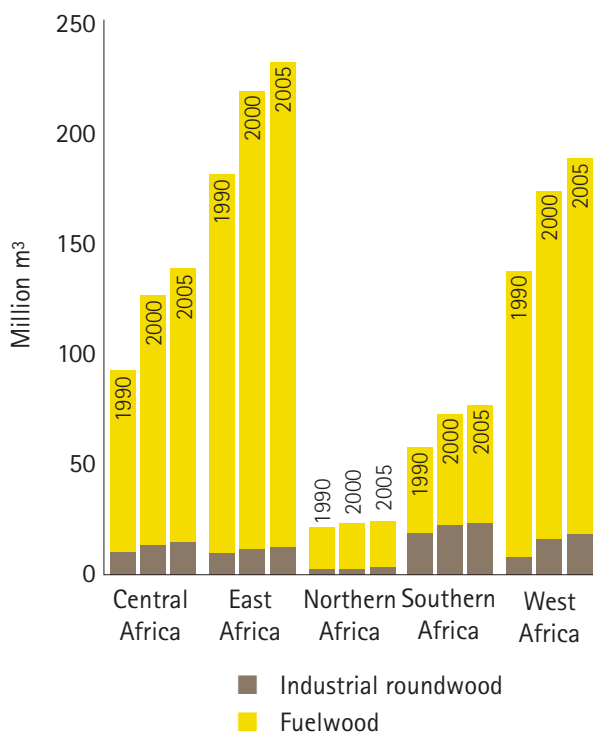
Afforestation and reforestation

The area of planted forests is expanding. In 2005, planted forests covered an estimated 271 million hectares, which was about 7% of the total global forest area, with the potential to supply over 60% of global industrial roundwood.⁶⁸ Planted forests are already important carbon sinks and pools and their role in climate change mitigation seems likely to increase in importance.

Afforestation and reforestation are integral components of the forest management response to climate change and they are included as eligible activities under the CDM. Afforestation and reforestation are gaining ground as a means to mitigate climate change; recent analyses⁶⁹ have shown that the potential to mitigate climate change through tree-planting is relatively high.

Negotiators and policymakers should not lose sight of the importance of afforestation and reforestation projects in generating economic benefits, especially for forest-dwelling communities.

Figure 5: Fuelwood removals in Africa, 2005



Source: FAO (2006). *Global Forest Resources Assessment 2005*. FAO, Rome, Italy.

Soaring food and energy prices will lead to more forest conversion

The conversion of forests to other land uses, especially agriculture and increasingly biofuel production, continues to be the subject of heated discussions at both national and international levels. Some analysts have predicted a 'great global land grab' that could greatly affect the rate of deforestation and exacerbate the disenfranchisement of Indigenous and other forest-dwelling communities.⁷⁰ In addition to the GHG emissions that further deforestation would cause, increases in the production of grains, meat and edible oils would also substantially increase GHG emissions.

Bioenergy

Forests have provided people with bioenergy for millennia. Fuelwood continues to be a major source of energy in many developing countries and is re-gaining importance in many industrial countries, particularly Nordic countries. Nearly 50% of the wood harvested in the world is used as fuel: in 2005, global wood harvesting amounted to 3.1 billion m³, of which 1.4 billion m³ was used as firewood (compared to 0.5 billion m³ used by the pulp and paper industry).⁷¹

The consumption of woodfuels (fuelwood, charcoal, black liquor and wood gas) is growing. Fuelwood supplies up to 90% of energy in some African countries, and consumption there is growing (Figure 5). This growth in demand, unless matched by a growth in sustainable supplies, has serious implications for deforestation, desertification and their associated environmental problems.

With growing concerns about climate change, the use of woodfuels as a substitute for fossil fuels is gaining considerable interest. Compared to other renewable resources such as solar, hydro and wind, wood-based bioenergy plantations require relatively little capital or technical development and could be an especially efficient land use on abandoned agricultural land and soils too poor to produce annual crops.

There is increasing global interest in the use of wood for the production of liquid fuels (mainly ethanol) and electricity. The energy efficiency of wood ethanol is twice that of sugarcane ethanol and more than ten times that of corn ethanol. Wood-based bioenergy offers countries, including developing countries in the tropics, an opportunity to increase their energy security.⁷² Moreover, by increasing the use of wood residues for the co-generation of energy, wood industries can increase their cost-effectiveness, improve energy efficiency, and reduce their GHG emissions.

If commercially successful, the use of bioethanol from wood-based cellulose can spread very quickly in industrialized forest-rich countries. Forest-rich developing countries might also profit financially from the export of wood-based bioenergy.

While the potentially huge markets for bioenergy from natural and planted forests open up new possibilities for forestry, their implications for deforestation need to be managed carefully.

There are indications that plantation-based bioenergy production is on the rise in several temperate and boreal regions. Such plantations will need special management procedures if they are to be sustainable⁷³: some of the factors to be considered include soil fertility, forest type and management regime (species composition, rotation, etc), biomass productivity, and the site history of natural disturbances such as fires and diseases, as well as the potential need for tradeoffs with other values such as forest biodiversity.

6. Policies, institutions and governance

National forest programmes

There are numerous possible policy approaches to realizing the role of forests in climate change mitigation and adaptation, but an overriding principle must be coordination at the regional and national levels. For REDD and SFM to succeed, their elements must be integrated into national development strategies as part of holistic national land-use planning. Moreover, they should be incorporated in national forest programmes (NFPs) or other equivalent national forest policy frameworks.

NFP is a generic term for a wide range of approaches towards forest policy formulation, planning and implementation at the sub-national and national levels. As one of the most important outcomes of the international forest policy dialogue, the NFP is the first commonly agreed national-level framework for SFM which is applicable to all countries and all types of forests. Hence, an NFP can serve as a framework for putting international agreements on SFM into practice.⁷⁴ Countries could include national deforestation reduction and forest restoration plans in their NFPs and national development strategies.

NFPs generally aim to promote forest-sector reform and development as contributors to sustainable development and poverty alleviation. The basic pillars of NFPs are national sovereignty, participation and cross-sectoral integration. The NFP is a process rather than a tangible programme and operates on a set of procedural principles that outline the scope of activities. While advocating donor coordination in support of sustainable forest-sector development, an NFP is driven from within the country itself.

The international community uses various measures to support countries in devising national forest plans and

to integrate them into national development strategies. Multi-stakeholder consultation processes are increasingly used in an effort to ensure policy harmonization, address livelihood issues such as poverty alleviation, secure land tenure, and acknowledge the rights of forest-dwellers and small forest owners. Successful modalities for international assistance include the National Forest Programme Facility, hosted by FAO, and the Program on Forests (PROFOR), hosted by the World Bank (Box 5). Although these were established before the role of forests in climate change reached its current prominence, they are accommodating climate change mitigation and adaptation measures. To help incorporate REDD into NFPs, countries could develop national deforestation reduction programmes as a special chapter of national development strategies and NFPs.

Box 5: NFP Facility and PROFOR

The FAO's NFP Facility supports the NFP process by facilitating active stakeholder participation and training, capacity building and awareness-raising as well as through the review of ongoing forest national policies. It provides direct country-level support in two stages: concluding partnership agreements with interested eligible countries; and providing financial and technical support to stakeholders within partner countries through Facility grant contracts, training and policy assistance. (www.nfp-facility.org)

The World Bank's PROFOR helps in the identification and conceptual development of tools and action for making progress in SFM. It is catalytic in nature and its role in mobilizing funds for SFM is indirect. (www.profor.info)



Box 6: What is 'readiness'?

REDD readiness can be defined in various ways. In a strict sense it is the setting of a national reference scenario, preparing REDD strategies, and developing the capacity to monitor emissions over time. Considering the complexity of deforestation and degradation, however, in a broader sense readiness can also be taken to mean that a country meets the more fundamental prerequisites for the sustainable use of forest resources in terms of forest governance, land tenure, law enforcement, etc. It also means that a country has put in place mechanisms to address the real causes of deforestation, can create and enforce its policies on deforestation and forest degradation, and has been able to reach out to forest-dependent communities, including Indigenous peoples and other forest-dwellers, that may play an important role in the implementation of such policies. Experience has shown that a country must ultimately address these issues before reducing emissions from the forest sector in a sustainable way.

Capacity building

Realizing the climate change mitigation and adaptation potential of forests requires institutional capacity, capital for investment and funds for incentives, large investments in research, technology transfers, and the enactment of appropriate policies within a framework of international cooperation.⁷⁵ Many countries, particularly developing countries, have insufficient financial or technical resources to design, implement and monitor effective measures for forest-based climate change mitigation and adaptation. Building in-country capacity is an area in which CPF member organizations can play an important role.

With deforestation rates high, support from the international community for capacity building to address deforestation, promote afforestation and reforestation, and prepare developing countries for entry into a global climate change mechanism ('readiness'— Box 6), is urgently needed. In the near term, support through existing multilateral funding channels should be scaled up.⁷⁶ Technology transfer is a major issue in current intergovernmental climate negotiations; the technologies and knowledge required to implement mitigation activities exist today but are not universally available.⁷⁷

Since mitigation and adaptation strategies are relatively new as an objective of forest management, forestry practitioners need to be fully involved and trained in these fields. Similarly, there is an urgent need to build the capacities of Indigenous people, forest communities and small forest owners to participate meaningfully in the design and implementation of these new initiatives. Equally important is training on how to equitably handle the funds that may come with them. There is a need to invest in capacity building in government agencies, especially those dealing with environment, natural resources and finance. There is a need for a coordinated approach to capacity building at the national level, including: 1) training on existing methodologies and data; 2) development and use of manuals and standards; and 3) making best use of existing data.

Livelihood, tenure and forest governance

The issues of livelihood, tenure and forest governance have been debated for many years. Many forest communities suffer disproportionately from conflicts, humanitarian crises and corruption, which often then

spread nationally and internationally. The property rights of forest communities are often insufficiently recognized, and the human, civil and political rights of Indigenous peoples, women and other marginalized groups in forest areas are frequently limited.⁷⁸

Forestry is evolving towards more participatory forms that place much greater emphasis on the involvement of local people and the contributions that forests make to local livelihoods, although there has been less change in some forests than in others.⁷⁹ There is a risk, however, that climate change mitigation and adaptation measures could swamp such change. Unless major efforts are devoted to making REDD and other mitigation measures work for the poor, the strong political forces currently driving their development and the technical complexities of implementing them are likely to hinder the ability of poor countries and poor people to take advantage of the opportunities they present.⁸⁰ To date there has been little systematic analysis of the social implications of proposed climate change mitigation mechanisms, especially for the poor. This is partly because negotiations are still dominated by political and technical issues and the nature of such mechanisms is still uncertain.

There is convincing evidence that deforestation and forest degradation are exacerbated when property rights are poorly defined or unrecognized.⁸¹ Illegal logging that leads to deforestation and degradation is mostly associated with poorly administered forests and an open-access resource.⁸² Yet secured property rights, while critical, are often insufficient for ensuring SFM. Non-transparent decision-making regarding the allocation or conversion of state forest resources, and associated rent-seeking behaviour, also foster the unsustainable exploitation of forest resources, especially in the tropics. A third set of governance factors involves inadequate forest laws and weak law enforcement capacity.⁸³

Addressing these and other factors, whether purely in pursuit of SFM or specifically to reduce GHG emissions, is likely to be beyond the capacities of either the forest or conservation sectors alone.⁸⁴ A key issue for effective post-2012 forest-based arrangements on climate change is accelerating progress in national and international governance reforms to address the causes of deforestation and forest degradation.

Illegal forest-based activities are a serious obstacle to achieving SFM and must be addressed internationally as well as nationally. The Forest Law Enforcement and Governance processes led by the World Bank in collaboration with some countries, CPF members and civil society organizations are a step forward in this regard.

It should not be assumed that, on its own, creating a market for forest carbon will change behaviour in forests or the rate of forest loss. The capacity and will to govern the resource and to capture potential revenues for national and local benefit, and identifying and managing the drivers of illegal and uncontrolled activities, will also be vital prerequisites.⁸⁵

Role of research

To facilitate their deliberations and negotiations, the UNFF, UNFCCC and other forest-related intergovernmental processes need scientifically valid information on the role of forests in climate change. There is increasing awareness among both policymakers and scientists that the forest science-policy interface must be strengthened if long-term sustainable strategies for the forest sector's contribution to climate change mitigation and adaptation are to be developed. Such a strengthening will be best achieved through interdisciplinary research and through sustained interactions between scientists and policymakers. Forest Days—co-hosted by CIFOR and other CPF members—provide an excellent forum for such interactions (Box 1).

The setting of national baselines and accountability measures for REDD is a prime candidate for further scientific research. There is ample room for improvement, for example, in methods for estimating forest loss and forest degradation in different forest biomes and for carbon accounting in all types of forests. Research is also needed into the socioeconomic implications of broadening the concept of SFM to include the management of forest carbon pools, and into the potential ecological and carbon impacts of resultant changes to forest management. At the international level, research along these lines and others is being undertaken or planned by CPF members CIFOR and the World Agroforestry Centre (ICRAF, Box 7). The Joint CPF Initiative on Forest Science and Technology (Box 1), led by IUFRO, aims to provide policymakers with up-to-date information on existing scientific findings related to forests, including on the impacts of climate change.

Box 7: International-level research: strategic approaches to forests and climate change

The CIFOR Strategy 2008–2012 lists 'enhancing the role of the forests in climate mitigation' as a priority research domain. Within this domain, CIFOR intends to carry out research into the following themes: 1) procedures and best practices for establishing and managing carbon stocks in tropical forest landscapes; 2) identification of policies, governance, conditions and payment mechanisms that lead to effective implementation of REDD schemes; and 3) political economy and barriers to the adaptation of policies for an efficient, effective and equitable REDD regime. Under the research domain of 'enhancing the role of forests in adaptation to climate change', CIFOR intends to carry out research pertaining to: 1) bringing climate change adaptation into forest management; and 2) mainstreaming forestry into climate change adaptation.⁸⁶

One of ICRAF's global research priorities for 2008–15 is 'improving the ability of farmers, ecosystems and governance to cope with climate change'. Specific areas to be considered for research include: vulnerability assessment; the impact of climate change on agroforestry systems; adaptation to climate change; and synergies in agroforestry systems between climate change adaptation and mitigation.

Robust methodologies for assessing the vulnerability of forest ecosystems to climate change are still limited. There is a need, for example, to scientifically assess the ways in which forest biomes will adapt to an increasing incidence of fire and attacks by pests and diseases and, above all, research is needed on the systems of forest management that will most increase the resilience of forest ecosystems to environmental change.

Much can be learned from research into synergies between climate change adaptation and mitigation, focusing on the development of best practices for promoting such synergies while also identifying tradeoffs. An important aspect of this would be socioeconomic research into adaptation options that help alleviate poverty in forest communities.

Areas in which research is needed include:

- Adaptation of forest-dwellers and forest-dependent communities to climate change and the potential effects on their livelihoods.
- Forest landscape restoration and livelihood support under different climate change scenarios.
- The potential impact of the food crisis on the further conversion of forests for agriculture within national and regional integrated natural resource management strategies.
- Analysis of national and international forest and climate change policies to identify the impact of policy and governance instruments.
- The impacts of the growing demand and production of biofuels on the supply of forest-based feedstock (fibre), not only as it might relate to deforestation but also as an opportunity for forest management to supply biomass and expand forest plantations while safeguarding the livelihoods of forest-dependent communities.
- Comprehensive scientific evaluation of payments for ecosystem services, including carbon credits, with a view to providing guidance to buyers and sellers and long-term projections of the future impacts of such schemes on forest management and forest communities.
- Rehabilitation of degraded forests, including afforestation and reforestation, as a means to improve the carbon balance of forests in addition to other economic, environmental and social benefits.

7. Finance and investment

Financing in UNFCCC negotiations

Over the next few decades, the successful implementation of forest-based climate change mitigation and adaptation measures will require substantial amounts of money not readily available in the developing countries in which such measures, particularly REDD, are most likely to take place. There is an urgent need, therefore, for pragmatic partnerships between developed and developing countries.⁸⁷

There is significant potential for forest-based climate change mitigation measures to help finance SFM and reductions in deforestation and forest degradation. According to one estimate, at a carbon price of €18 per tonne of carbon, non-Annex I countries could earn a gross annual income (i.e. excluding opportunity and other costs) of about €1.5 billion by reducing deforestation by 10% and €8.7 billion by reducing it by 50%.⁸⁸

Assuming that such significant amounts of money could be raised, a mechanism was in place to administer the funds, and national institutions could handle such amounts, an additional question can still be posed: 'would finance of that magnitude actually achieve its intended purpose of reducing deforestation?' Much work needs to be done to ensure that the answer to such a question is 'yes'.

REDD financial instruments

Currently, no regulatory instrument exists under the UNFCCC to compensate REDD or other forest-based climate change mitigation measures in the form of carbon payments. However, it was discussed at COP 13 and the creation of such an instrument remains under consideration.

In the intergovernmental discussions leading to COP 15, two approaches are being considered: to make cash payments bilaterally through aid programmes between governments; and allowing REDD measures to earn carbon credits that can be sold in a global carbon market.

The nature of the mechanism that will finally be adopted is unclear, as is how it will be paid for. Both approaches would pose challenges, including how to ensure: adequate on-the-ground capacity to handle funds and implement measures; secure tenure and clear property and carbon rights; political commitment at the various levels of government; transparency and equitable governance; the provision of up-front payments to cover transaction costs; and a steady flow of funds to meet the costs of SFM and compensate forest/carbon owners. In certain localities, and perhaps up to the national level, the integration or bundling of payments for carbon with existing payments for ecosystem services would be a challenge, since the sources (buyers) would be different.⁸⁹

Cost of REDD

There have been many attempts to estimate the costs of REDD, especially in tropical countries. The financial flows needed are usually estimated as the opportunity costs of converting forests to other land uses. Some of the latest estimates are given in a UNFCCC report on investment and financial flows to address climate change. According to it, based on the average annual deforestation rate in 2000–2005 of 13 million hectares, the estimated cost in 2030 of reducing deforestation and forest degradation in non-Annex I Parties to zero would be US\$12 billion⁹⁰ and the additional cost of



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achieving SFM, which would reduce emissions from production forests in developing countries, would be US\$8 billion annually.⁹¹

Research carried out for the Stern Review⁹² indicated that the opportunity costs of forest protection (avoided deforestation) in eight tropical countries responsible for 70% of emissions from land use change could be around US\$5 billion per year initially, although marginal costs would rise over time.

Impacts on countries

Finance of this magnitude to reduce deforestation could have a significant impact on poor nations. Establishing and enforcing clear property rights to forested land, and determining the rights and responsibilities of landowners, communities and the private sector, are particularly important in ensuring that appropriate incentives to reduce deforestation are delivered effectively.⁹³ But this is a complex area: increasing security of tenure, for example, could lead to increased deforestation by reducing the risk for investors of agricultural conversion.

Until now, developing countries have received insufficient funding from the international community on a scale sufficient to address the drivers of deforestation. Current global climate change arrangements provide no incentives for reducing deforestation and only very limited incentives for reforestation and afforestation. One reason for this is that funding proposals have not been of a sufficient scale to deal with the concerns that have been raised about leakage, in which the protection of one forest area merely displaces deforestation activities to other areas that are unprotected. Other factors such as baselines, additionality and permanence are being addressed in intergovernmental negotiations.

While developing countries are likely to welcome the proliferation of new funding mechanisms they are also aware that, if funds materialize, they would lead to fundamental changes in the existing architecture of global environmental finance and could lead to parallel structures for mobilization and disbursement at the national level. They could also divert existing or likely official development assistance funds.

An overarching strategy framework is needed to help guide, prioritize and harmonize the various potential mechanisms for funding forests and climate change. National governments should also ensure coherence with other dimensions of sustainable development and comply with accepted international principles on aid effectiveness.

Carbon markets and other PES

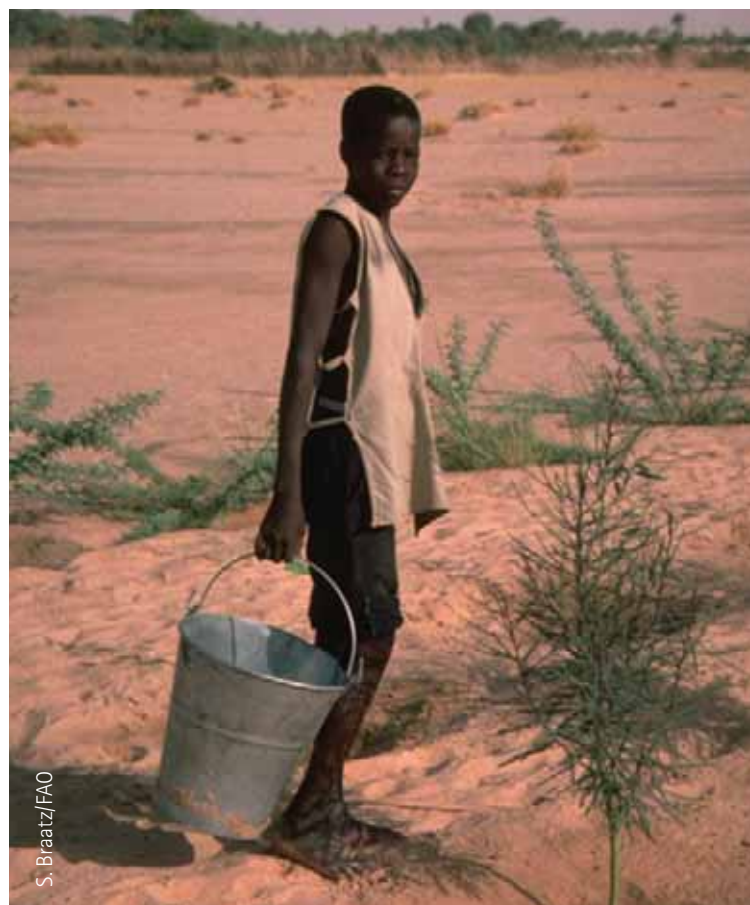
Voluntary carbon markets

In addition to the compliance carbon market, which operates under the provisions of the Kyoto Protocol, a voluntary carbon market has emerged. In this latter market, a rapidly increasing number of players is targeting project-based offsets from forestry, including through SFM and reduced deforestation and forest degradation.

Five trading centres in Europe and one (the Chicago Climate Exchange) in the United States currently trade in certified emissions reductions (CERs), temporary CERs, and derivatives (futures and options). In addition, many smaller carbon project developers and consultancies buy and sell emissions reductions. The total size of the global voluntary carbon market was worth an estimated US\$91 million in 2006.⁹⁴

Carbon emissions trade creates carbon market mechanisms to pay forest owners, mostly forest communities in developing forest-rich countries, to protect their forests and not to deforest or degrade them, and as an alternative source of income to logging or forest conversion (presumably including shifting cultivation). The payer/investor/trader assumes that communities will 'lock up' the forests in order to receive payments. It is also assumed that, on the one hand, national and local authorities will back up such deals by prohibiting logging and clearing and, on the other, that good forest governance is in place.

The global voluntary carbon market has attracted funds on the premise that a regulated market would be instituted in post-2012 climate change arrangements and that the trading of such credits would be financially profitable. Some investment banks and reinsurance companies predict that carbon will become the single largest commodity in the global commodity market, growing to a \$1 trillion industry by 2020; hundreds of retailers, brokers and other traders are entering the market.⁹⁵ It has also been predicted, however, that voluntary carbon markets are unlikely to reach poorer and smaller communities in developing countries.



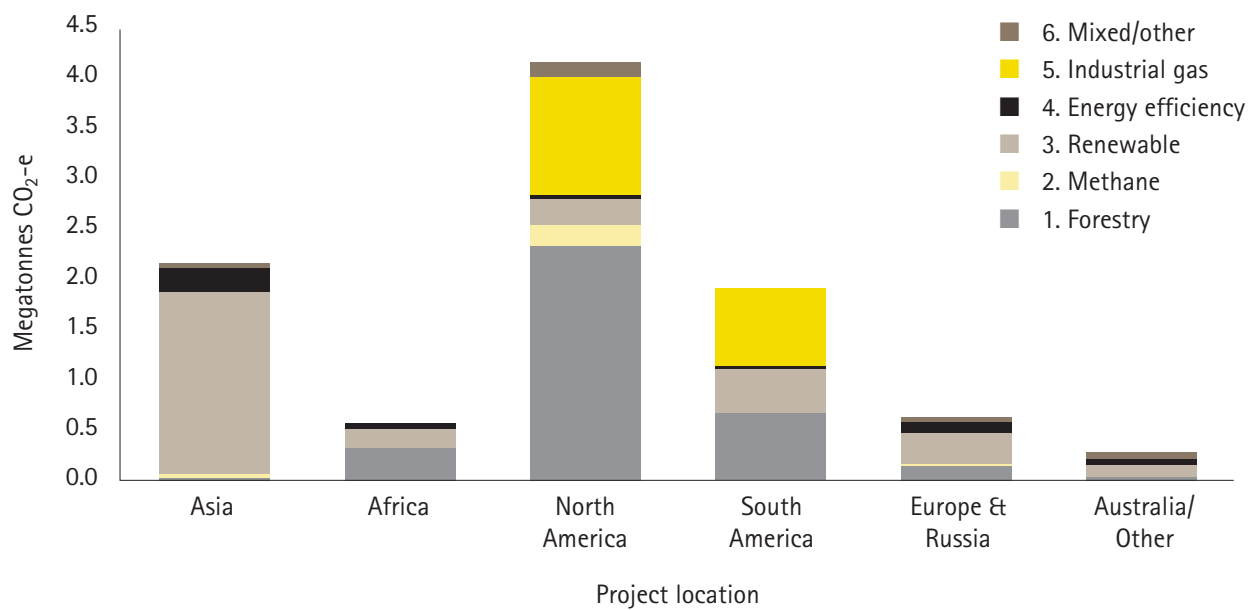
The over-the-counter carbon market is dominated by three types of project: forestry (36%), renewable energy (33%), and industrial gases (30%); Figure 6 shows the regional distribution of these. In contrast, land use, land use change and forestry was the source of only 1% of the volume of carbon traded in the regulated market (the CDM and joint implementation) under the Kyoto Protocol.⁹⁶

Investment in SFM

Schemes to offset the opportunity costs of forest conversion are not, in themselves, sufficient to prevent carbon emissions from forests: those forests 'saved' by REDD will still need to be managed. Moreover, expanding the area of forest and restoring degraded forests can add significantly to carbon sequestration and should also be the subject of incentives schemes.

Under any new climate change finance scheme, especially REDD, care must be taken to prevent perverse effects, such as rewarding unscrupulous behaviour and disadvantaging those countries and communities that are already conserving, sustainably managing and expanding their forests. Climate change mitigation funds will be most

Figure 6: Voluntary carbon market transactions, by project type and location



Source: Hamilton, K. Bayon, R. Turner, G and Higgins, D. (2007). *State of the Voluntary Carbon Market 2007: Picking up Steam*. Ecosystem Marketplace, Washington, DC, United States, and New Carbon Finance, London, United Kingdom.

effective when they encourage SFM, including forest conservation, rehabilitation and restoration.

The design of programmes to promote payments for ecosystem services (PES), such as carbon sequestration, can be improved by explicitly defining baselines, calculating conservation opportunity costs, customizing payment modalities, and targeting those agents with credible land claims that, in the absence of payments, are highly likely to clear their forests. The expansion of PES will occur when schemes can demonstrate clear additionality (i.e. improvements in the ecosystem service *vis a vis* clearly defined baselines). Consideration should also be given to the impacts of PES on livelihood dynamics and equity. Arguably, PES are best-suited to scenarios of moderate conservation opportunity costs on marginal lands and in settings with emerging, as-yet-unrealized threats. Actors who present a significant threat to the environment are more likely to receive PES than those living in harmony with nature. PES schemes, therefore, can benefit both buyers and sellers while improving the resource base but are unlikely to fully replace other conservation instruments.⁹⁷

Private investment

The private sector could play a lead role in financing SFM. According to one estimate, private investment in the forest sector in developing countries and countries in transition already amounts to US\$15 billion per year,

which is up to nine times more than official development assistance in the sector.⁹⁸

Private investment in SFM in developing countries needs to be encouraged. While foreign direct investment is increasing, the bulk of private investment remains domestic across all sectors.⁹⁹ With an annual global production of about US\$750 billion¹⁰⁰, the forest products industry supplies a wide range of essential products from a renewable resource and generates millions of jobs. While considerable potential exists for these investments to deliver co-benefits, their primary objective is financial profit.

Adaptation measures will put considerable strain on the resources of government. Faced with either operational or financial constraints, or both, governments often look to development assistance and the private sector to enhance their ability to provide public services. Public-private partnerships are essentially about the efficient and fair allocation of risks and rewards between public and private partners. Well designed, they can help overcome operational constraints, enhance performance and accelerate investment.¹⁰¹

Some climate-related investments can promote partnerships between private companies and forest-dependent communities, particularly through the establishment or encouragement of small and medium-sized enterprises. To date, most such partnerships have

formed around the production of industrial pulpwood by out-growers, joint ventures and lease schemes.¹⁰² A niche is also growing for partnerships around the provision of forest ecosystem services.

Trade

Several trade-related policy options and mechanisms for meeting climate change objectives are under discussion. These include: the management of carbon footprints; reducing or eliminating barriers for environmental goods that mitigate and facilitate adaptation to climate change; the critical role of technology transfer for developing countries in mitigating and adapting to climate change; the accessibility and affordability of technology transfer for developing countries; reducing or eliminating subsidies that have adverse impacts on climate change; and developing an efficient market-based carbon trading regime.

Many countries also emphasize the importance of opening up markets for environmental goods and services of interest to developing countries, such as sustainable forest products and biofuels. More analysis is needed to improve understanding of these options.

Instruments for financing forest-based climate change mitigation and adaptation

The new political urgency on climate change has given rise to a multiplicity of new funds—both bilateral and multilateral—to reduce the contribution that deforestation makes to global carbon emissions.¹⁰³ The multiple potential mechanisms for forest-based climate change mitigation seems impractical and there must eventually be some rationalization.¹⁰⁴ Most bilateral funds are not advancing their own solutions but, rather, appear to be oriented toward contributing to one or more of the multilateral funds established to deal with the problem.

Funds negotiated under the UNFCCC

Further to the financial mechanism defined under Article 11 of the UNFCCC, paragraph 11(5) stipulates that “developed country Parties may also provide and developing country Parties avail themselves of financial resources related to the implementation of the Convention through bilateral, regional and other multilateral channels”

As the financial mechanism of the UNFCCC, the Global Environment Facility (GEF, see also below) manages two funds established by the COP: the Special Climate Change Fund and the Least Developed Countries Fund. In addition, the Adaptation Fund has been established by the Parties

to the Kyoto Protocol to finance adaptation projects and programmes in developing countries that are Parties to the Kyoto Protocol. The Adaptation Fund is to be financed by a share of proceeds (2% of CERs) from CDM project activities and is able to receive funds from other sources. The Adaptation Fund is expected to eventually become the largest financing vehicle for adaptation under the UNFCCC.

There are no clear estimates of the magnitude of annual adaptation funds needed by developing countries, but indications are that they could be in the tens of billions of dollars. Many developing countries lack the ‘absorptive capacity’—the capacity to carry out the adaptation measures needed—even if funding were available.¹⁰⁵

The World Bank

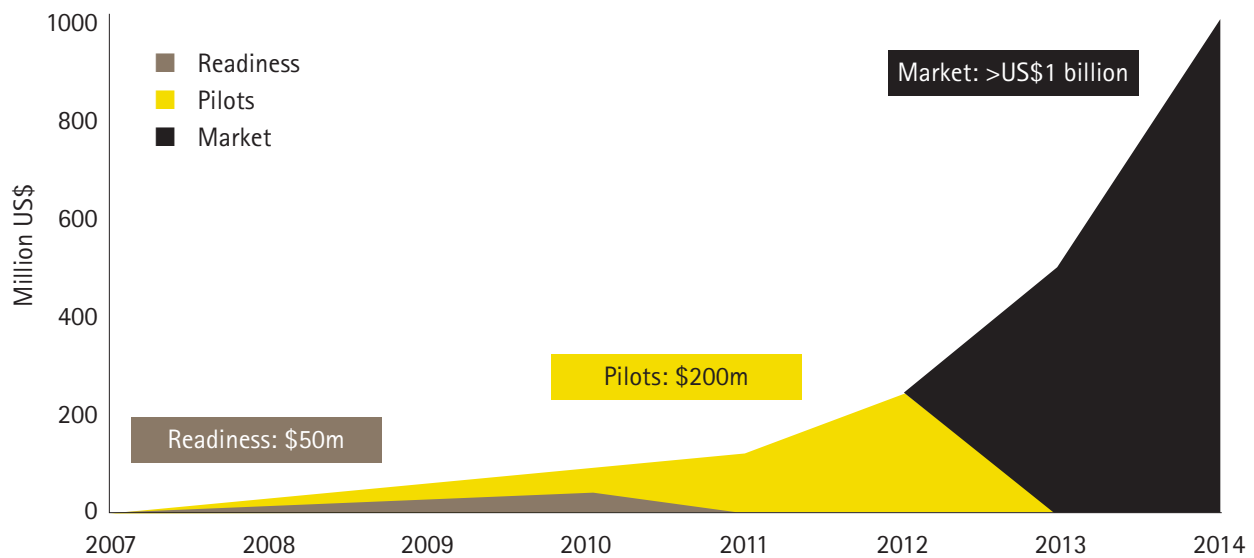
The World Bank is in the process of establishing climate investment funds (CIFs) as a collaborative effort among the multilateral development banks and countries to help bridge the financing and learning gaps before post-2012 global climate change arrangements come into effect.

CIFs would provide a comprehensive structure through which concessional financing could be made available quickly and flexibly for both low-carbon economic growth and climate resilience activities. The CIFs comprises two distinct funds: the Clean Technology Fund, which is intended to accelerate economic transformation to low-carbon growth paths through the cost-effective mitigation of GHG emissions; and the Strategic Climate Fund, which is intended to comprise targeted programmes with dedicated funding for pilot approaches with the potential to be scaled up.

The Forest Investment Program (FIP) is being established by the World Bank within the framework of the Strategic Climate Fund to mobilize significantly increased funds to reduce deforestation and forest degradation and to promote SFM, leading to emissions reductions and the protection of carbon reservoirs. The FIP will be based on a broad and transparent consultative process, taking into account national priority strategies for the containment of deforestation and degradation and building on complementarities between existing forest initiatives.¹⁰⁶

The objectives of the Bank’s Forest Carbon Partnership Facility (FCPF) are to build capacity for REDD activities in developing countries and to test—on a relatively small scale—a programme of performance-based incentives payments in pilot countries.¹⁰⁷ Figure 7 shows indicative figures for the costs of such activities.

Figure 7: The FCPF’s proposed approach to prepare for post-2012 climate change arrangements that include REDD



Source: Ian Noble, World Bank, Powerpoint presentation, pers. comm. 2007.

Global Environment Facility

Since its inception, the GEF has been financing projects dealing with the management of natural resources, many of which have reported benefits in terms of protection and/or increases in carbon stocks and the reduction of carbon emissions from land use activities and/or land cover changes. The GEF is developing a methodology to estimate the carbon benefits of its natural resources projects in a reliable, standardized and comparable way.

The GEF has developed a programme framework for projects falling under the GEF Strategy for SFM.¹⁰⁸ The purpose of this is to identify priority areas for GEF investment in SFM that are consistent with the GEF mandate to generate global environmental benefits and are aligned with strategic programmes already identified for biodiversity, climate change and land degradation. It aims to identify where progress towards SFM would make the greatest contribution to achieving the objectives in these three focal areas.

Other relevant GEF financing projects include: assessment of the carbon benefits of GEF natural resource activities; and sustainability criteria for sustainable biomass production.

The GEF Sustainable Forest Management Program's Tropical Forest Account, adopted by the GEF Council in 2007, is intended to focus GEF forest-related investments in the tropical regions and in countries with the highest carbon stocks and biodiversity.

UNFF

The 8th session of the UNFF in 2009 will consider 'means of implementation for SFM' as a separate agenda item and, inter alia, a decision on a voluntary global financial mechanism/portfolio approach/forest financing framework for SFM. The aim of such a voluntary financing arrangement would be to mobilize significantly increased new and additional resources from all sources, based on existing and emerging innovative approaches, to support the implementation of SFM, the achievement of global objectives on forests, and the implementation of the NLBI.

8. Meeting expectations

To date, interest in REDD has been driven largely by its apparent financial advantages. Finance, however, is not the only factor to be considered when it comes to the implementation of policies to reduce deforestation: social, technical and environmental considerations are also important. From a forestry perspective, therefore, it is plausible to consider policy approaches and practical plans to reduce deforestation and forest degradation coupled with measures to rehabilitate and restore degraded forests, including the establishment of planted forests on abandoned and degraded lands.

While SFM is a solid framework for the forest sector's response to global climate change, its implementation faces a number of challenges, including the need for good governance, increased financing, and greater inter-sectoral cooperation.

Relative to measures for reducing GHG emissions from other sources such as industry and transport, REDD and other forest-based climate change mitigation measures

are likely to be low-cost and effective in the short to medium term. They can make a significant contribution to a global transition to low-carbon technologies but they cannot substitute for substantive actions in other sectors, particularly the energy sector.

Expectations for REDD must also be tempered by an appreciation of the reality on the ground. Deforestation is driven by powerful forces that mostly originate outside the forest sector and the idea that payments alone can avert those forces is flawed. Such payments, for example, could be appropriated by intermediaries or powerful elites, limiting the ability of poor forest communities to reap the benefits of financial transfers and further marginalizing such people.¹⁰⁹ Many technical, socioeconomic and cultural challenges must be met, requiring the mobilization of considerable resources. Sound governance and forest law enforcement, and supportive and integrated natural resource management policies, are essential prerequisites.



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9. The role of the CPF

With their broad experience in the promotion of SFM, forest conservation, poverty alleviation and forest governance, the members of the CPF can greatly facilitate the role of forests in climate change mitigation and adaptation. Many CPF members specialize in priming the implementation of new policies. The CPF itself provides a mechanism for its members to coordinate their climate-related actions.

Post-2012 arrangements on climate change are likely to be set at the UNFCCC's COP 15 in Copenhagen in 2009. In the meantime, the forest community, assisted by the CPF and its members, can capitalize on current momentum to increase efforts to address deforestation, forest degradation and the implementation of SFM. COP 13's Bali Declaration highlighted the need for demonstration activities that will test financing approaches in a variety of contexts directly and indirectly related to deforestation. Between now and COP 15, demonstrating the success of national and sub-national pilots will be critical for building the confidence of governments and investors in the role of forests in post-2012 arrangements on climate change.

Strategy forward

Strategic CPF actions

The CPF envisions and works to promote a global forest estate that is well adapted to climate change and plays a significant role in mitigating the detrimental effects of climate change while maintaining and enhancing economic, environmental and social values.

Within their respective mandates, members of the CPF are committed individually and jointly to assist countries to achieve the goals and objectives of the UN multilateral agreements on the environment, the UNFF's NLBI, and other intergovernmental decisions related to forests and climate change, notably through the implementation of SFM.

Within this strategic framework, CPF members will cooperate to inform policy fora on issues relevant to forests in the context of climate change. Within their respective mandates, they will also work collaboratively to assist countries to:

- Incorporate adaptation and mitigation, including REDD and other climate change initiatives, into NFPs, and to integrate NFPs in national development strategies through multi-stakeholder consultations.
- Build capacity for SFM and forest-based climate change mitigation and adaptation.
- Enhance the biophysical adaptation of forests to climate change while safeguarding the livelihoods of forest-dependent communities and small forest owners and protecting forest biodiversity and other essential forest services.
- Reduce and eventually eliminate unsustainable forest activities, thus reducing GHG emissions and enhancing forest-based carbon sequestration and storage.
- Enhance capacity to design, monitor, verify and report on their climate change mitigation and adaptation efforts.



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- Improve the science-policy interface and ensure that decision-making at all levels is based on timely, reliable and scientifically sound information.
- Explore ways of securing international and national financing and private-sector investment to assist countries in achieving compliance with the provisions of arrangements on climate change and other conventions and instruments related to forests.
- Work in concert with other sectors such as agriculture, energy, transport, urban development and law enforcement towards realizing these elements.

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