



## Forests: the Green and REDD of Climate Change

### Forests are crucial to global sustainable development

Forests are crucial for rural development, access to water, agricultural productivity, energy, soil conservation, and flood control. Forests are also home to at least 80 per cent of terrestrial biodiversity, and are a major carbon sink for regulating global climate. Over 1.6 billion people depend on forest resources for their livelihoods and many rely on forests for food and water. Trade in forest products reached a total value of \$327 billion in 2004, which represents 3.7 per cent of global trade in all commodity products.

### The impact of forest on climate change

Carbon is the key component of the leading greenhouse gases contributing to global warming that is stored in trees, under-story vegetation, and forest soils. Globally, forest ecosystems contained 638 billion tons (Gt) of carbon in 2005, with half (321 Gt) in forest biomass and deadwood. The carbon in forests exceeds the amount of carbon now in the atmosphere. The estimated average global rate of forest carbon depletion is 1.6 Gt per year or about 0.25 per cent of total forest carbon.

Deforestation and forest degradation in developing countries are the primary sources of carbon emissions from these countries. Deforestation accounts for 35 per cent of carbon emissions in developing countries and 65 per cent in least developed countries. In 2004, the forest sector accounted for the release of approximately 8.5 Gt of CO<sub>2</sub>, mostly from deforestation, which contributes 17.4 per cent of all human-generated CO<sub>2</sub> emissions. According to FAO estimates, on average, 13 million hectares of forest were lost each year between 2000 and 2005. Over the same period, 5.7 million hectares were added to forest area annually, resulting in a net forest loss at a rate of 7.3 million hectares per year, a slowdown from the rate of deforestation experienced between 1990 and 2000.

### The impact of climate change on forests

Climate change is significantly affecting forests through changes in their physiology, structure, species composition

and health, largely due to changes in temperature and rainfall. Increased temperatures and drought result in more frequent outbreaks of pest infestations, more forest fires and increasing alterations in populations of plant and animal species, severely affecting forest health and productivity.

Forests in drylands or areas with lower precipitation rates, particularly in Africa and Asia that already suffer from increased temperatures and serious drops in rainfall, will be susceptible to the negative impacts of climate change. In some locations, however, climate change may have positive effects through increased forest productivity.

The Fourth Assessment Report of IPCC projects that by 2050 increases in temperature and associated decreases in soil water will lead to the gradual replacement of tropical forests by savannahs in the eastern Amazon. Many tropical forests in Latin America will experience losses in biodiversity. By 2030, forest productivity is projected to decline over much of southern and eastern Australia and in parts of eastern New Zealand as a result of droughts and fires.

By contributing to forest degradation and destruction, climate change is also exacerbating the release of carbon dioxide and further compounding global warming. During 2000-2020, the destruction of forests in western Canada caused by the mountain pine beetle as a result of warmer temperatures is expected to generate a cumulative increase of 270 megatons of carbon emissions, an amount equivalent to the reduction in GHG emissions which Canada has committed to achieve by 2012 committed under the Kyoto Protocol.

### The role of forests in addressing climate change

Forests provide great opportunities for adapting to climate change by increasing the resilience of people and ecosystems. Forests are also a major mitigation option over the next 30 to 40 years and can play a key role in the necessary transition towards a low-carbon economy. However, due to the wide range of goods and services provided by the forest sector, mitigation and adaptation options need to be understood and taken advantage of in the context of

promoting sustainable development. Moreover, for forests to effectively contribute to climate change solutions, countries and the international community will need to address several critical governance issues affecting forests such as land use rights and tenure, access to forests, land use planning, benefit sharing, institutional and cross-sectoral coordination and law enforcement.

Both mitigation and adaptation strategies would need to be developed and integrated into national forest programmes and, in turn, into national development strategies, with full participation of all relevant stakeholders. Innovative and emerging solutions are needed, supported by economic policy instruments as well as public and private sector investments in sustainable forest management technologies and carbon sequestration approaches- and many are already in use- are required. A number of promising mitigation measures are currently available for reducing emissions from deforestation and forest degradation in the forest sector which include:

- Afforestation,
- Reforestation,
- Forest management,
- Reduced deforestation,
- Harvested wood production management,
- Use of forest products for bio-energy and to replace fossil fuels,
- Tree species improvement to increase biomass production and carbon sequestration,
- Improved remote sensing technologies for analysis of vegetation/soil carbon sequestration potential.

Adaptive capacity is a prerequisite for the design and implementation of effective adaptation strategies. Achieving successful adaptation to climate change is complex and can be difficult. Policy and planning processes need to take into account that capacities for adaptation and the processes by which they occur differ greatly within and across regions, countries, sectors and communities. For most developing countries, capacity-building and technology transfer will be required. Adaptation capacity can be limited by the extent and rate of climate change, as well as by technological limits, financial barriers, informational and cognitive barriers and social and cultural barriers. In most cases, adaptation is undertaken as part of broader social and development initiatives, such as season climate forecasting, as in the case of El Nino-Southern Oscillation (ENSO); disease surveillance systems; regulation and rationing of the us-

age of water provided by forests; strategies for drought and coastal management; strategies for preventing and combating forest fires, including construction of fire lines and controlled burning; reforestation of mangroves; utilization of drought and fire-resistant tree species, such as teak, in tropical forest plantations; establishment of biological reserves and ecological corridors for protecting ecosystems from the impacts of climate change; and compensation paid to forest owners for environmental services provided by forests to society.

## Reducing emissions from deforestation and forest degradation (REDD)

According to one account, sustainable management of existing forests through reducing emissions from deforestation and forest degradation (REDD) and silviculture could result in the capture of as much as 83.6 Gt of CO<sub>2</sub> from the atmosphere from now until 2030. Further carbon sequestration from plantation and agro-forestry could mitigate an additional 18.7 Gt of CO<sub>2</sub> by 2030; and forest restoration, although not yet clearly considered a mitigation option, could remove an estimated 117 Gt of CO<sub>2</sub> equivalent up to 2030. While a tremendous challenge, this also gives an historic opportunity to tip the balance of incentives in the direction of sustainable forest management. It is estimated that the opportunity costs for reducing deforestation and forest degradation via REDD is \$12.2 billion per year. This would result in a reduction of emissions by 5.8 Gt CO<sub>2</sub> in 2030.

In 2007, at the Climate Change Conference in Bali, forests received greater attention in climate change deliberations not only because of their role in mitigating and adapting to climate change, but also due to growing concerns over carbon emissions, resulting from deforestation and forest degradation in developing countries where emissions are considerable and increasing. The Bali Action Plan addressed mitigation action including through policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

Decision 2/CP.13 adopted in Bali acknowledged that deforestation and forest degradation result in global anthropogenic GHG emissions and need to be urgently addressed. The reduction of emissions due to deforestation and forest degradation in developing countries would require stable and predictable resources. The decision also requested the Subsidiary Body for Scientific and Techno-

logical Advice (SBSTA) of the United Nations Framework Convention on Climate Change (UNFCCC) to work on the relevant methodological issues.

To avoid repeating the experience of the CDM on afforestation and reforestation projects, which resulted in a negligible number of projects, there are some important methodological issues that have to be resolved. These relate in particular to:

- reference emission levels for deforestation and degradation
- the relationship between the reference emission levels and the relevant reference levels
- the role and contribution of conservation and sustainable management of forests
- changes in forest cover and associated carbon stocks and greenhouse gas emissions
- the enhancement of forest carbon stocks to enhance mitigation of climate change
- the cost of implementing methodologies and monitoring systems
- the possibility of benefiting from the Revised 1996 IPCC Guidelines, and the Good Practice Guidance for Land Use, Land-Use Change and Forestry (LULUCF).

Development of a REDD mechanism must be based on sound methodologies for estimating and monitoring changes in forest cover and associated carbon stocks and GHG emissions, incremental changes due to sustainable management of forests, and reduction of emissions due to deforestation and forest degradation. Such a methodological challenge has proven to be much more difficult for emissions due to forest degradation than for emissions due to deforestation. This is partly due to the fact that there are different types of forest degradation and some may be easier to measure than others.

Apart from these technical and methodological issues, there are policy issues that have to be taken into account in the REDD negotiations such as the rights of stakeholders, in particular Indigenous Peoples, and the opportunity costs of other land uses and forest management systems. REDD negotiators should also make sure that the final outcome does not put those countries in disadvantage that have already taken steps to eliminate or reduce deforestation and to manage their forests sustainably, or where forests are sustainably managed. The final outcome on REDD should ensure that forest-related climate change options support

sustainable development in both forest-rich and forest-poor countries. It should tackle drivers of deforestation that lie outside the forest sector, and support transparent, inclusive and accountable forest governance.

It is also crucial to recognize the comprehensiveness of sustainable forest management which goes beyond emission and carbon potentials of forests. When only one single good or service under sustainable forest management attracts significant financing, there is a risk that this can distort sustainable forest management to emphasize that activity to the detriment of other goods and services.

A successful REDD mechanism also depends on the action of governments to create institutional frameworks, forest legislation, regulations and incentives that reduce extensive conversion of land for large-scale agriculture production and illegal and unsustainable forest activities. Development of national strategies for reducing forest loss is also crucial for ensuring a coordinated and nationwide approach to sustainable forest management and mitigating climate change. These should also be mutually compatible with other government institutions, policies and planning processes, for example transportation, poverty reduction strategies and water conservation efforts.

## The role of the United Nations Forum on Forests

The significance of the intricate relationship between forests and climate change is reflected in the work of the United Nations Forum on Forests (UNFF). The non-legally binding instrument on all types of forests (forest instrument), agreed to by the UNFF and subsequently adopted by the General Assembly in 2007, is a solid framework to address the drivers of deforestation and forest degradation at the national and international levels. It also contributes extensively to the realization of the objectives of REDD, in particular, through its Global Objectives on Forests (GOFs). The first and third GOF aim to “reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation,” and to “increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, and increase the proportion of forest products from sustainably managed forests” respectively.

The eighth session of UNFF (20 April–May 2009) has the task of addressing the forests and climate change relationship under the theme of “Forests in a Changing Environment”. A report by the United Nations Secretary-

General examines the factors at play and opportunities presented by sustainable forest management in addressing climate change and broader development challenges.

Another major contribution to the intersection of climate change and forests is the “Strategic Framework for Forests and Climate Change”. The Strategic Framework was released in Poznan in December 2008 by the Collaborative Partnership on Forests (CPF) as a coordinated forest-sector response to climate change. The Framework provides a strong argument in support of the role that sustainable forest management can play in achieving long-term climate change mitigation and as a robust and flexible framework for effective adaptation to climate change. It also addresses monitoring and verification of carbon stock in forests and emissions from deforestation and forest degradation.

The Framework rests on six key premises: (i) sustainable forest management provides an effective framework for forest-based climate change mitigation and adaptation; (ii) forest-based climate change mitigation and adaptation measures should proceed concurrently; (iii) intersectoral collaboration, economic incentives and provision of alternative livelihoods are essential for reducing deforestation and forest degradation; (iv) capacity-building and governance reforms are urgently required; (v) accurate forest monitoring and assessment help informed decision-making, but require greater coordination at all levels; and (vi) CPF members are committed to a collaborative and comprehensive approach to forest-based climate change mitigation and adaptation.

## Conclusion

Sustainable forest management is a comprehensive framework that includes all sustainable development aspects and has huge potential in strategies and actions to address climate change. What is required however, are actions which ensure that climate change and sustainable forest management policies and programmes are mutually supportive. Care must be taken to consider the full range of forest functions and avoid seeing them in isolation and merely as a “carbon stock”. Rather they should be seen as forming a sector with significant social, economic and environmental assets which need to be considered integrally in the context of climate change responses.

Sustainable forest management is the appropriate framework through which forests can provide significant contributions to the global fight against climate change. An integrated approach to sustainable forest management and

climate change is also necessary to enhance coordination at the national and international levels and to address the institutional, financial and policy objectives of the forest sector in national decision making. In this regard, financial resources expected to be allocated to forests for climate change programs, including through REDD as eventually agreed to by the UNFCCC, should be mutually supportive of financing sustainable forest management.

Extensive capacity building and training activities are needed to enhance the capacity of developing countries for transparent, inclusive and accountable forest governance. Other necessary areas include monitoring, reporting and verification to enable countries to effectively apply methodologies for estimating and monitoring carbon emissions from deforestation and forest degradation under REDD.

At Copenhagen in December 2009, it is crucial that countries agree to include reducing emissions from deforestation and forest degradation in a post-2012 climate regime. However, an agreement on forests or, more specifically on REDD, will not be enough. The climate change and forest communities need to continue to work closely towards a mutually supportive and integrated approach, vital to ensuring that sustainable forest management not only addresses climate change, but also supports the sustainable harvest of goods and services, provides livelihoods, in particular for forest dependent communities, supports 60 per cent of world biodiversity living in forests, recognizes the contribution of water and soil provided by forests and permits the “lungs of the world” to breathe for all. ■

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