Biodiversity IN Development

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Forests and biodiversity

Tropical rainforests contain an estimated 50% of all species on earth. They provide livelihoods to some 400 million people, and ecosystem services that are important at local, national and global levels. Forests also contain species of high commercial value, and 31% of tropical rainforests are currently allocated for commercial timber production. However, unsustainable practices commonly disrupt forest biodiversity and degrade or eliminate forest habitats. Furthermore, the land that forests occupy is under pressure from agricultural expansion, mining and other developments.

Based on FAO definitions (which define forests as 10% crown cover or above), forests cover 1,900 million hectares in developing countries, of which around 720 million are tropical rainforests. The latter are found in 85 countries, but 50% of tropical rainforest are found in Brazil, Indonesia and Democratic Republic of Congo alone.

Around half of all the world's species, and 80% of tree species, are thought to occur in tropical rainforests. The species richness, constant evolution and radiation of new species, and long life of trees give a dynamic ecosystem with myriad species' interactions and long cycles of change and growth: a mosaic of gap, growth and mature phase forest patches. Dry zone woodlands are prone to dramatic changes as a result of fires and droughts.

Despite their apparent vigour, which allows rapid recovery from low-impact changes, tropical rainforests are sensitive to large scale changes in structure or compositon. Only 20% of the nutrients found in rainforests are in the soil, the rest being within the living biomass. This makes many of them prone to 'nutrient erosion' if degraded. They also contain 'old growth' species which are vulnerable to habitat change.

Forest values

Humans and forests have a long history and there are few, if any forests that are entirely untouched by human hand. This means that humans and their environment have adapted together resulting in a multi-functional resource, and many of the benefits of forest goods and services cannot be provided by other forms of land-use.

Commercial exploitation of forest products

The global forest industry is worth around US$330 billion in annual timber sales. 122 million cubic metres of wood are produced annually by tropical countries, which accounts for one quarter of the world's traded timber. Demand for roundwood is expected to increase by 1.7%/year until 2010. It has been estimated that traded forest goods provide up to 10% of GDP in some African countries. However, many traded products do not enter formal markets, and are not included in these figures. In addition, most timber is consumed domesti-

European Commission

DFID Department for International Development

IUCN The World Conservation Union

Forests as carbon sinks

Forests act as reservoirs by storing carbon in biomass and soil. They are sinks of carbon when their area or productivity is increased, resulting in the uptake of atmospheric CO_2. They can become a source of CO_2 when the burning and decay of biomass and disturbance of soil result in emissions of CO_2. Net CO_2 emissions from changes in land use (primarily deforestation occurring mainly in tropical areas) currently contribute about 20% of global anthropogenic CO_2 emissions.

Forest-based carbon offset trading is a mechanism which may allow tropical countries to provide an environmental service to industrial countries: promoting actions which absorb carbon (conservation, reforestation) or avoiding actions which release carbon (e.g. felling, burning), in exchange for payments by the purchaser of the carbon offset.

There are doubts, however, that reducing forests to just one value (their carbon value) will address the underlying causes of forest loss. It is also feared that trading in carbon 'sink' credits may open the way for conversion of natural forests to quick-growing, carbon-absorbing, commercial monocultures, which serve neither conservation nor poverty-reduction aims.

cally and therefore not included in the figures for international trade: over 80% of timber felled in Brazil, for example, is not exported.

Subsistence, barter and local trade

Forests yield a wide range of non-timber forest products (NTFPs) which support local peoples' livelihoods through subsistence, barter or trade, including food and feed; construction materials and fibres; medicines; and fuel. For example, in developing countries some 80% of energy requirements are met by wood products (much from on-farm sources), and developing countries produce and consume around 90% of the world's fuelwood and charcoal.

The use of gathered products from the forest form the basis of the livelihoods of 50 million indigenous peoples who live in tropical forests. Here a woman pounds wild palm kernels gathered to make oil for cooking.

WWF-CANON/PAUL S. SOCHACZEWSKI

Biodiversity-rich forests also provide a supplement to on-farm production, contributing to food security (e.g. bushmeat), and providing a fallback in times of need. World Bank figures for example show that 90% of people who earn less than US$1/day depend on forests for their livelihoods. Furthermore, biodiverse crop or tree systems are less prone to widespread disease and pest attacks.

Indirect benefits

Forests provide a range of services which have been estimated to be worth 4.7 trillion US$/year worldwide (global annual GNP is around 18 trillion US$). These services are often ignored because they are not easy to measure, and are rarely traded in any market:

- **ecological processes**, such as carbon-cycling and hydrological regimes, which stabilise climatic systems, and provide clean air and water, and underpin functions such as soil and water conservation;
- **sense of identity** including cultural associations and existence values. These are values which give peoples' lives a sense of meaning, and can also confer autonomy and self-sufficiency;
- **keeping options alive** by avoiding the loss of genetic information and maintaining the conditions for adaptation and evolution. This is important to prevent narrowing of the genetic base which provides raw material for future breeding programmes, or biotechnology.

Forest loss and degradation

Nearly half the world's forest has been converted over the last 8,000 years. Between 1980 and 1995, there was a net loss of 200 million hectares of forest in developing countries. Both Brazil and Indonesia lost 1 million ha each/year, together equalling 45% of the global total.

In addition to outright habitat loss, forests are also being degraded – 28% of the 8,600 threatened tree species are declining because of unsustainable felling. Tropical forest loss and degradation will be the single greatest cause of all species extinctions in the next 50 years. At current rates, this means 13% of the world's species could be lost by 2015.

The commercial timber trade and conversion to agricultural land outweigh all other causes of forest loss. Almost all current logging practices significantly reduce biodiversity, and sustainable operations are rare. Some 90 million hectares of land will need to be brought under

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Forest fires have been a major cause of forest loss in recent years, due to a combination of climatic changes and human activity.

agriculture by the year 2010 to achieve global food security, probably half of which will be from forested lands. These processes are compounded by the removal of vegetation for fuelwood, building materials and livestock feed, insect pests and disease, fire, extreme climatic events, resettlement, and infrastructure, and invasion of forests along logging roads by commercial hunters.

These direct causes of loss are usually triggered by other, underlying causes which often lie outside the forestry sector. The low price of unprocessed timber, for example, takes no account of the true costs of forest management and biodiversity losses. Many national policies also provide disincentives for sustainable management, such as land tenure or resource access legislation which encourages clearance, subsidising unsustainable livestock and agriculture programmes, and failure to integrate biodiversity values into other sectors. In addition, the lack of coherence at the international level between trade and environment debates is a significant factor affecting the sustainable use of forest resources.

The challenge

The way ahead is to plan productive landscapes so that:

- key forest areas are protected (e.g. for public good benefits, such as watershed protection);
- local people can continue to rely on NTFPs which are sustainably managed, which could be enhanced through establishing market-links with fair returns, based on sustainable harvesting practices (see BB1);
- production forests are properly managed, sustainably harvested and as much biodiversity maintained as possible;
- areas that are destined to be deforested (e.g. for agricultural expansion) are those that are most suitable for other purposes (i.e. suitable soils/climate, low biodiversity and few dependent populations).

Such approaches require good governance, transparency and participation of all stakeholders. The development of community-based approaches to forest management and use, and the use of indigenous and local knowledge, often provide the most effective means for ensuring success of long-term approaches.

However, such approaches are not enough by themselves. Forests are lost because the timber trade (legal and illegal) is profitable, and

Sustainable Forest Management

'The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regenerating capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local national and global levels, and that does not cause damage to other ecosystems' (pan-European Ministerial Conference 1993).

Although investments in SFM are costly and complex, they can yield acceptable returns, especially when coupled to certification schemes aimed at environmentally-conscious European and North American markets. However, it should be noted that such markets are small, and only 10% of roundwood is traded internationally. Moreover, it can be costly for small operators to comply with strict certification procedures, calling attention to the need for systems of "verification" which cost small-operators less.

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International framework

There is no binding global treaty specifically dealing with forests. The proposal to draw up a forest convention has been under discussion since UNCED (1992), but deep divisions between countries have meant that no convention has yet been adopted; the non-legally binding forest principles were adopted in its place. There have been numerous bodies leading the international negotiations. The United Nations Forum on Forests (UNFF) was created in 2000, which now takes the lead in international forest policy discussions. *http://www.un.org/esa/sustdev/forests.htm*

Under the Convention on Biological Diversity, an *ad hoc* Technical Expert Group on Forest Biological Diversity has recently been formed. Forests will be a major agenda item at the 6th Conference of the Parties in 2002, and parties are expected to adopt a work programme on forest biodiversity for 2002–2010. *http://www.biodiv.org/areas/forest/default.asp*

Members of the ITTO, a commodity organisation, represent 95% of world trade in tropical timber, and 75% of the world's tropical forests. One of the ITTO's objectives commitment is to move *as rapidly as possible towards achieving exports of tropical timber and timber products from sustainably managed sources. http://www.itto.or.jp/*

Discussions on the Kyoto Protocol to the Climate Change Convention may have wide-reaching implications for forests. However, the latest talks, in the Hague, November 2000, were suspended and no agreement has yet been reached on the rules governing forests as carbon sinks. *http://www.unfccc.int*

because forest production systems are undervalued compared to other activities. Therefore, the challenge is to create the conditions (supportive policies, effective implementation) that encourage the recognition and management of forest assets with multiple values, and to ensure that those who reap the benefits also foot the costs. To bring private returns into line with social returns, and to make sustainable forestry more profitable, requires incentive measures (see BB4), such as:

- **Transfer payments**: market based incentives and subsidies (e.g. 'polluter and beneficiary pay' taxes; debt-for-nature swaps); innovative forest pricing (e.g. performance bonds);
- **Market approaches based on public good benefits**: protection rights; ecotourism charges (see BB9); carbon offset trading; certification; bioprospecting (see BB3);
- **Property rights**: community usufruct rights; intellectual property rights.

In addition, development cooperation should support the removal of perverse incentives such as subsidies which encourage agricultural clearance. Social and environmental costs and benefits need to be regulated by government policy and law enforcement, as market forces alone may not bring about socially or environmentally desired outcomes.

Further information

- EC 1996. *Guidelines for Forest Sector Development Cooperation.* EC, Brussels. http://europa.eu.int/comm/development/forests/en/entc.htm
- FAO 1999 *State of the world's forests.* Rome. *http://www.fao.org/forestry/*
- Forests for Life Campaign. *http://www.panda.org/forests4life/*
- Mayers, J. 1996. *Forests and EC Aid: an agenda for sustaining both trees and people.* EC/IIED Briefing Paper.
- Richards, M. and P. Moura Costa 1999. *Can tropical forestry be made profitable by 'internalising the externalities'?* ODI, London.

- reference to other Biodiversity Briefs is denoted as (see BB#).

Website

All Biodiversity Development Project (BDP) documents can be found on the website: http://europa.eu.int/comm/development/sector/environment/index.htm