

# Developing Markets for Forest Carbon



## Introduction

Interest and investments in markets for sequestration of carbon in forests are rapidly growing. A recent [review by the International Institute for Environment and Development \(IIED\)](#) identified 75 payment arrangements for carbon offsets in 27 countries. Demand is driven by international concern for global warming caused by the build-up of greenhouse gases (GHGs) in the atmosphere. Supply is motivated by those who are seeking additional income for the ecosystem services supplied by their forests. Forest carbon trading has been a controversial field, because of fears it could reduce land use options of developing countries, while allowing developed countries to buy their way out of responsibilities at a much lower cost than reducing domestic emissions. However, with the adoption of appropriate strategies, the development of markets for forest carbon can have multiple benefits while addressing these concerns.

Forest vegetation and soils store about two-thirds of terrestrial carbon, most of which is found in tropical and boreal forests. Together, deforestation, forest degradation, burning and soil erosion are estimated to have contributed approximately 25 percent of the current increase in atmospheric GHGs. The rest is derived from fossil fuels. Therefore, forests can make a significant, though partial, contribution to emission reductions.

## Market mechanisms created by international agreements

The Kyoto Protocol of 1997, negotiated under the 1992 [United Nations Framework Convention on Climate Change](#) (UNFCCC), requires Annex I (industrialized) countries, which are responsible for most of the historic carbon emissions, to reduce their emissions to 5 percent below 1990 levels by 2008-2012. These obligations can, in part, be met through three mechanisms, which could create a global market for approximately one billion tons of carbon over the next decade by allowing various kinds of trading in credits for emission reductions:

- [Activities Implemented Jointly](#) (AIJ) – allows Annex I countries to earn emission reduction units through projects implemented in other Annex I countries;
- [Clean Development Mechanism](#) (CDM) – allows emissions reduction obligations of Annex I countries to be met through projects that both reduce or offset emissions in non-Annex I (developing) countries through energy or forestry projects, and help them to achieve sustainable development;
- [International Emissions Trading](#) (IET) – allows Annex I countries that can reduce emissions at a lower cost, to trade credits for emission reductions with other Annex I countries.

Under AIJ and CDM, emissions reductions can be done through [Land Use, Land Use Change and Forestry](#) (LULUCF) projects in developing countries. CDM projects are restricted to afforestation and reforestation activities, while AIJ projects may also include forest management activities. However, the amount of emissions reduction that may be achieved through these mechanisms is capped so that these mechanisms cannot be used with regard to emissions from fossil fuel and domestic sources.

## Issues in market development

For the most part, carbon trading has been experimental due to uncertainties and unresolved issues regarding the “rules of the game,” which will only be finalized for the first commitment period (2008-2012) at the Conference of the Parties in November 2003. Key challenges inherent in the development of markets for forest carbon offset credits include:

- measurement and verification of carbon storage, which includes the duration of time over which carbon is stored, whether or not it is in addition to baseline storage, and the amount of “leakage” – i.e., carbon emitted elsewhere through displaced forest activities;
- adjusting for uncertainty and for risks that carbon will be released sooner than the contractual period, either intentionally or by accident or neglect, and assignment of liability when this occurs;
- development of compatible regulatory frameworks at local, national and international levels that include agreement on what activities are eligible for credits, and who will receive the credits;
- establishment of institutional arrangements that reduce transaction costs; and
- achievement of verifiable socio-economic as well as environmental benefits that strengthen community livelihoods and support sustainable development objectives.

Many of these issues are individually addressed in greater detail in a separate series of [briefs](#) by Forest Trends. In general, the measurement and verification of carbon sequestration over a particular period of time is a prerequisite for any form of carbon trading, as this is the basis for determining the tradeable value of sequestration activities. Although there are inherent technical issues, the problem is primarily one of reaching agreement on the “rules of the game.”

## What should a global carbon market look like?

A number of independent initiatives are springing up at national and international levels that use various approaches. Although this diversity can lead to innovation and provide lessons, it may also reflect conflicting interests that need to be reconciled. Ultimately, a global carbon market requires the support of an institutional infrastructure that can increase investor confidence and reduce transaction costs in international trading. This infrastructure may include national offices, regulatory agencies, and establishment of trust funds, trading platforms such as exchanges, brokers, certifiers and insurers. For example, establishing a national carbon registry can help to prevent double selling of carbon credits and also provide transparency for prices that are critical to fair negotiations. Preventing leakage requires an institutional capacity to enforce laws. This capacity also creates greater incentive to invest in sustainable forestry practices such as Reduced Impact Logging that result in higher carbon retention. However, much of the economic benefit from this is in higher future yields – provided that access to forests can be controlled over the full rotation period.

## Getting local support

Effective markets for carbon sequestration ultimately require benefits for forest communities, for without communities’ cooperation on enforcement, these markets may be ineffective or expensive. Communities’ participation can lead to higher transaction costs, such projects will not always provide the lowest-cost opportunity for offsetting carbon emissions, but this participation is consistent with the Kyoto Protocol’s requirement that CDM projects promote sustainable development.

- For example, a case study of a pilot CDM project called [PROFAFOR](#) helped small-scale farmers establish 23,000 hectares of pine, eucalyptus and indigenous species in a deforested

region of Ecuador. The plantations have been targeted in areas where they help control erosion and prevent landslides. Communities have been able to cover establishment costs from project funding, and have used surplus funds for food, credit schemes and livestock. Establishment of plantations or restoration of natural forest resources can have multiple benefits that include soil preservation, protection of water quality and availability, and biodiversity protection, and may be able to draw simultaneously from other sources of financing such as water use fees or biodiversity concessions.

- [Costa Rica](#) established a program of Payments for Environmental Services in 1995, under which the National Forestry Fund (FONAFIFO) provides payments to protected areas and private forest owners for environmental services by contracting them for 20-year periods for reforestation, sustainable forest management and forest preservation activities. The program is in part funded by selling Certified Tradable Carbon Offsets (CTOs) to international investors and donors through a Joint Implementation Office. Among the buyers, the government of Norway and a Norwegian consortium of private firms agreed to purchase CTOs for 249,242 tons of carbon over a 25-year period for US\$3.4 million, as part of a larger project. Transaction costs are in some cases reduced through intermediary organizations such as [FUNDECOR](#), which organizes farmers with small plots to submit group applications and helps to register land titles.

Developing projects that sequester carbon and promote the economic well being of forest communities requires local participation in project planning and social impact assessment to verify socio-economic benefits. Poorly designed projects may reduce poor communities' access to forest resources and tenure security as a result of increased competition for land. A joint report by the Center for International Forestry Research (CIFOR) and Forest Trends assesses the opportunities for forest trading by low-income forest producers and recommends CDM rules, national policy action and carbon project design that would encourage their participation ([Smith and Scherr 2002](#)).

Diverse institutions, such as [State Forest New South Wales of Australia](#), [Climate Care](#) Warranties in the U.K., and the [World Bank Prototype Carbon Fund](#) are already selling carbon offsets from forests internationally. State Forests New South Wales sells certified and guaranteed carbon offsets and also offers buyers returns from plantation timber sales. Climate Care Warranties, sold in the U.K., allow consumers to purchase carbon offsets with particular consumer goods, e.g., cars, airline tickets and gasoline. The warranties are guaranteed by Climate Care, which purchases offsets generated by carbon sequestration and renewable energy projects.

There are also private arrangements among companies. For example, Toyota Motor Corporation, Mitsui Co. Ltd., and Nippon Paper Industries Col Ltd. established a new company, [Australian Afforestation Pty. Ltd.](#), to plant and manage 5000 hectares (ha) of eucalyptus forests. Most of the investment funds are provided by Toyota, which keeps the carbon credits and sells the wood to Nippon paper. Profits are shared among all three businesses. The nonprofit [Face Foundation](#) has developed a portfolio of five projects in five countries, affecting 135,000 ha, which are sequestering 82 million tons of carbon.

Countries that wish to take advantage of the potential opportunities of the CDM to support sustainable development will need to be very proactive in establishing enabling conditions. By putting in place suitable legislation and institutions to attract investors and reduce transaction costs, and safeguarding local rights, competitive advantage in carbon sequestration projects can be created.

### ***Links and Resources:***

[BioCarbon Fund](#). 2002. The World Bank, Washington, D.C. A new fund to provide carbon finance to demonstrate projects that sequester or remove greenhouse gases in forest and agro-ecosystems. The BioCarbon Fund will aim to deliver cost-effective emission reductions, while promoting biodiversity conservation and sustainable development.

Chomitz K.M., Brenes E., and Constantino L. 1998. [Financing Environmental Services: The Costa Rican Experience](#). Working Paper 20014. The World Bank, Washington DC.

[Environmental Finance](#). Monthly magazine covering the ever-increasing impact of environmental issues on the financial sector and its corporate clients. It is the only global publication dedicated to this fast-growing area.

Forest Trends. 2000. [Forest Carbon: Technical Briefs of Major Issues Concerning LULUCF Projects](#).

G. Bull and Z. Harkin. 2002 [A Proposed National Framework for a Forest Carbon Market](#). April 22, 2002. Powerpoint presentation.

Landell-Mills, N. and Porras I. 2002. “[Silver Bullet or Fools’ Gold](#)” (Executive summary only - full report can be purchased from [www.Earthprint.com](http://www.Earthprint.com)) International Institute for Environment and Development (IIED), London. Reviews 75 payment arrangements for forest based carbon offsets in 27 countries.

[Pew Center on Global Climate Change](#) report on [The Emerging International Greenhouse Gas Market](#). [Resources for the Future](#), [Climate and Economics Policy Program](#) and [Weathervane](#) Digital Forum on Global Climate Policy.

Smith, J. and S.J.Scherr. 2002. [Forest Carbon and Local Livelihoods: Assessment of Opportunities and Policy Recommendations](#). CIFOR Occasional Paper No. 37. Center for International Forestry Research and Forest Trends, Bogor, Indonesia.

Totten, M. 2001. [Getting it Right: Emerging Markets for Storing Carbon in Forests](#). Forest Trends and World Resources Institute.

[United Nations Framework Convention on Climate Change](#) (UNFCCC) – provides the text of treaties, official documents, and an overview of the negotiation process for reducing climate change.

Watson, R.T., Noble, I.R., Bolin, B., Ravindranath, N.H., Verardo, D. J. and Doken, D.J. (eds.) 2000. [On Land Use, Land Use Change and Forestry](#). Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK.

World Resources Institute (WRI) [Climate and Energy Program](#) (contains CDM case studies).

### Other Initiatives

[Australian Emissions Trading Forum](#)

[Chicago Climate Exchange](#)

[Climate Care](#), UK

[Prototype Carbon Fund](#) – a public and private partnership established by the World Bank to pool investments emission reduction projects.