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## The role of multilateral institutions

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In line with its mission of alleviating poverty through support for environmentally and socially sustainable economic development, The World Bank (along with some other multilateral development banks) is working to help developing countries capture a share of the emerging global market in greenhouse-gas-emissions reductions ('carbon trading'). Under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the Joint Implementation instrument and the Clean Development Mechanism now provide an opening for substantial international resource transfers and potential for supporting sustainable development through the transfer of cleaner technologies or sustainable forestry and agroforestry practices. For example, carbon sequestration represents a non-extractive non-consumptive sustainable use of living natural resources that can be incorporated within a multiple-use 'integrated ecosystem management' approach. The World Bank initiated the Prototype Carbon Fund (PCF) in April 2000, to help spur the development of a global carbon market and to 'learn by doing' how to use carbon-purchase transactions across a range of energy-sector technologies (and some forestry applications) to achieve environmentally credible and cost-effective emissions reductions that benefit developing countries and economies in transition. Building on the success of the PCF (\$145 million raised from public and private-sector investors), The World Bank expects to launch two new funds in 2002: the Biocarbon Fund and the Community Development Carbon Fund. These funds will target synergies between carbon markets and objectives such as biodiversity conservation, combating desertification and small-scale community-driven development. Experience from the PCF shows that developing countries can have a comparative advantage in supplying this global market, as emissions reductions can be achieved in developing countries in the range of \$3–\$5 per ton of CO<sub>2</sub> equivalent, compared with a marginal abatement cost of \$10–\$15 per ton of CO<sub>2</sub> equivalent in most countries within the Organization for Economic Cooperation and Development. However, realizing this economic potential over the next decade, and targeting the market to the rural poor, will require substantial assistance with project development and government legal and institutional capacity building. Specific needs include raising awareness of the potential of carbon markets at all levels (particularly in energy and land-use sectors), clarifying property rights, particularly in the case of communally held land and resources, ensuring the existence of an attractive investment climate, eliminating policies that create perverse incentives and constraints, and mitigating logistical, political and 'reputational' risks that could deter private-sector investors. It will also be necessary to find

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ways to reconcile the short-term needs of the rural poor and the typically long-term revenue stream associated with carbon sequestration.

**Keywords:** Prototype Carbon Fund; carbon trading; World Bank; multilateral development banks; Clean Development Mechanism; Biocarbon Fund

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## 1. Why are The World Bank and other multilateral development banks becoming involved in carbon markets?

The World Bank and other multilateral development banks (MDBs) are international organizations whose mission is to alleviate poverty by supporting and spurring economic development. In the past few decades, environmental and other aspects of sustainability have become important explicit development goals. This is reflected, for example, in the mission statement of The World Bank: 'to fight poverty with passion and professionalism. . . to help people help themselves and their environment, with lasting results'.

MDBs function mainly by lending money to developing country governments on concessional terms and by providing technical assistance to help their clients identify and implement needed policy and institutional reforms, investments and projects. Sometimes funds are provided on a grant basis, such as grants from the Global Environment Facility (GEF) implemented by The World Bank or other GEF-implementing agencies. GEF funds may be given to government institutions or to non-government organizations (NGOs), through the 'medium-sized-grant' window, which provides grants up to \$1 million to NGOs, corporations, etc. Eligible recipients under this window include private-sector corporations in principle, although the recipients of these funds to date have mainly been non-profit NGOs. One member of The World Bank Group, the International Finance Corporation (IFC), provides financing directly to the private sector as a means of catalysing investment in developing countries.

Environmental issues have been on the agenda of the MDBs for several decades, with an emphasis on reducing and mitigating the potential negative environmental (and social) impacts of the development activities they finance. In recent years, this 'safeguard' approach has been complemented by efforts to 'mainstream' environment in development programmes, based on a growing appreciation of the direct linkage between good environmental management, sustainable economic development and long-term poverty alleviation.

Most recently, MDBs have begun to assume a major role in protecting 'global public goods,' including the global environment. Most developing country governments have committed themselves to the objectives of a variety of international environmental treaties and conventions. Presently, the greatest focus is on the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the Convention on Combating Desertification (CCD). The MDBs have a responsibility to support their clients in fulfilling these commitments and have developed policies and operational programmes for this purpose. The Global Environment Facility (GEF) was established in 1989 as a mechanism for channelling financial and technical assistance to developing countries to help them participate in the worldwide effort to preserve global environmental values. The funds are provided by the 150-plus GEF member governments. The World Bank serves as the Trustee of

the GEF Trust Fund and as one of its three Implementing Agencies (together with the United Nations Development Programme and the United Nations Environment Programme).

Given their core mission of poverty alleviation through economic development, MDBs have a strong interest in the potential of the emerging global carbon market as a new tool to yield economic development benefits, particularly for the poor in developing countries. In this context, standing ('sequestered') carbon is seen as a potentially marketable new product from the rural landscape. It is a growing market with great potential, and one in which developing countries may have a significant comparative advantage.

The Kyoto Protocol of the UNFCCC provides an opening for global resource transfers through two market-based mechanisms that enable financial transactions between industrialized and developing countries for the purchase of greenhouse-gas-emissions (GHG-emissions) reductions.

- (i) *Article 6* provides for the 'Joint Implementation' (JI) of projects by industrialized countries, including those with economies in transition. It allows an entity in one such country to finance or purchase 'emissions-reduction units' (ERUs) from a project in another industrialized country. Eligible projects include, for example, emissions reductions in energy, industry and transport sector activities, as well as carbon sequestration through land-use change, agriculture and forestry activities.
- (ii) *Article 12* provides for the 'Clean Development Mechanism' (CDM), under which an entity in an industrialized country may purchase 'Certified Emissions Reductions' (CERs) from a project in a developing country, or 'removal units' (RMUs) if the project concerns carbon sequestration (long-term removal from the atmosphere) through afforestation and reforestation activities. The CDM has two purposes: to assist developing countries achieve sustainable development through the transfer of cleaner technologies or sustainable forestry and agro-forestry practices, and financial resources for specific projects; and simultaneously to contribute to the reduction of global carbon emissions.

Under the right circumstances, developing countries may have a comparative advantage to supply the 'product' of emissions reductions/sequestration (or 'carbon' for short) to the global market. Experience from The World Bank's Prototype Carbon Fund (PCF) shows that environmentally credible emissions reductions can be achieved in developing countries in the range of \$3–\$5 per ton of CO<sub>2</sub> equivalent, compared with a marginal abatement cost of \$10–\$15 per ton of CO<sub>2</sub> equivalent in most countries within the Organization for Economic Cooperation and Development. However, without substantial assistance with project development and government legal and institutional capacity building, only a small part of this potential will be realized over the next decade.

By engaging in the emerging carbon market, developing countries can obtain financial benefits in the short term. They will also contribute to the reduction of atmospheric GHGs, and thus to the mitigation of climate change in the longer term. This in itself is a significant development benefit given that many developing countries are extremely vulnerable to the expected impacts of climate change, including sea-level rise, decreased rainfall in already arid regions, expansion of certain vector-borne diseases, etc. Similarly, there is the potential for considerable synergy between the

carbon market and biodiversity conservation. Biodiversity is an important economic asset of many developing countries and of their rural populations in particular, and much of that biodiversity occurs in natural ecosystems that also serve as significant carbon stores.

## 2. Targeting rural poverty: carbon sequestration as a sustainable natural-resource use

The livelihoods of rural people are highly dependent upon the value that they can extract from the ecosystem, particularly from renewable natural resources such as soil, grasslands, forests, wildlife and fish. Usually these resources are extracted and consumed, either directly or as marketed products. With the continuing growth of rural populations in many parts of the world, these already tenuous consumption-based livelihoods are increasingly threatened. More and more, demand exceeds supply and extraction rates exceed regeneration rates, leading to unsustainable 'mining' of these theoretically renewable resources.

As a result, 'sustainable use' of natural resources has become a Holy Grail of the development community—much sought after but highly elusive. Despite countless initiatives, however, there are few convincing examples of ecologically sustainable consumptive use of natural resources anywhere in the world. Even in the classic case of extractive reserves in Brazil, often cited as a model, many of the rubber trees are dying due to over tapping and newcomers are undermining the livelihoods of the original indigenous rubber-tappers.

Uses that do not require extraction and actual consumption of the resources in question are therefore of particular interest from a sustainability standpoint. 'Ecotourism' has become a very popular model for generating income through non-consumptive use of wildlife and the natural habitats they live in. The concept behind ecotourism is that visitors are willing to pay to see wildlife and/or local communities in their natural and traditional environments, thereby providing a direct incentive to preserve those environments. In many cases, ecotourism is part of a 'multiple-use' approach, which does not preclude other uses of these resources. For example a protected area reserved for tourism may be surrounded by a 'buffer zone', where hunting or tree cutting are allowed, or these activities may be permitted only for certain species or outside the main tourist season.

As a basis for economic development, however, ecotourism has some important limitations. Many natural areas that are critical for poverty alleviation and/or biodiversity do not lend themselves to tourism due to difficult access, insecurity, endemic diseases or other constraints. To be truly environmentally friendly, tourism must also be on a relatively small scale, which limits the economic returns and the number of people who can benefit from it. The solution of 'low-volume, high-price' tourism works only where there is an exceptional attraction, such as the mountain gorillas of central Africa and the giant pandas of Sichuan Province in China. A limited number of 'luxury operators' can follow this model in areas such as the East African savannah or prime coral reefs, but their success is undermined if too many 'high-volume' outfits operate in the same area. Tourism is a highly competitive field that requires more up-front and ongoing investment in time, capital, training and marketing than its proponents and prospective beneficiaries may be prepared for. There is also a significant issue of 'leakage,' in that a substantial portion of tourism revenues never reaches the destination country, much less the local rural community.

Overall, while there are many more or less successful 'community-based tourism enterprises' around the world (which do provide some incentive for conservation), there are very few places where tourism alone currently represents a viable economic alternative to extractive uses or to conversion of natural areas to other uses. A limited number of external or local entrepreneurs may profit substantially, and a larger number of people may derive some income (e.g. through employment or sale of crafts), but the majority of the local rural community continue to earn their livelihood primarily through some form of farming. Most funding for biodiversity conservation and rural economic development in and around important natural habitats still comes from multilateral and bilateral donors and international conservation organizations, not self-financing tourism operations.

A global carbon market represents an important potential for another form of non-extractive non-consumptive use. Like ecotourism, it can give direct value to standing trees and unplowed grasslands. In addition, relatively intact natural forests and grasslands combine significant carbon storage with retaining biodiversity that is essential to the welfare of the rural poor, as sources of food (including famine reserves), medicines, building materials, etc. As in the case of ecotourism, the key question is whether or not the income generated can be sufficient, and sufficiently well distributed, to make standing forest or rangeland an economically viable land-use alternative in the eyes of the ultimate land users. In many cases the solution will be a multiple-use approach, where a package of environmentally friendly and sustainable land uses compete successfully with more destructive ones. Such a package will usually include agriculture, which remains the economic base of rural communities, but agricultural practices will emphasize compatibility with the additional land uses as well as sustainability and higher incomes.

### **3. World Bank activities relating to biodiversity and carbon**

The World Bank has been supporting projects to conserve natural ecosystems since the 1970s, with substantial growth in both volume and breadth in the 1990s. Between 1990 and 1999, The World Bank supported 226 biodiversity projects in 85 countries, with a combined total value of \$2.7 billion. The World Bank supports biodiversity objectives through four main windows: loans from the International Bank for Reconstruction and Development (IBRD), concessional loans from the International Development Association (IDA), GEF grants and grants made available to Brazil through the World-Bank-administered Rainforest Trust Fund, which is funded by the G-7 countries. In addition, most projects attract co-financing from bilateral agencies and government counterparts.

The World Bank's biodiversity portfolio is linked to the objectives of The World Bank's Environment Strategy through its contribution to enhancing rural livelihoods. There is a broad understanding that the maintenance of biodiversity (broadly defined to include the conservation of functioning ecological systems) is a necessary ingredient to achieve sustainable poverty alleviation in rural landscapes. The nature of The World Bank's biodiversity portfolio provides important opportunities and entry points to link carbon sequestration and biodiversity. Preserving natural habitats is an essential element of biodiversity conservation, and the same habitats (primarily forests, grasslands and wetlands) play an important role in absorbing and sequestering carbon. The World Bank and its clients are and will be exploring many such 'win-win' opportunities.

The World Bank's biodiversity portfolio initially focused largely on Protected Areas (PAs). While PAs are still considered important conservation tools, the portfolio has evolved and expanded over the past decade and increasingly emphasizes sustainable natural-resources management in the context of ecological sustainability, direct participation of local communities and indigenous people in the benefits of conservation, and the development of markets for environmental services. New projects also tend to emphasize ecosystem approaches in which biodiversity is addressed holistically within PAs, in their surrounding areas and in the productive landscapes that are an integral part of any given ecosystem. They also emphasize local-level priority setting, planning, action and monitoring to ensure that both local and global objectives are addressed. This 'integrated ecosystem management approach' also represents the newest Operational Programme of the GEF (Operational Programme 12), and is an explicit priority of the CBD.

The development of markets for environmental services provides a vital prospect for ensuring environmental management in the long term, with less dependence on short-term unreliable external funding. Projects of this kind are designed to capture the economic value that natural ecosystems provide to society, by establishing mechanisms to enable financial transactions between the providers and consumers of these services. The simplest and most familiar example of a market for environmental services involves the 'water-capture' function of forests upstream of water plants or supply systems. Recognizing the importance of these forests for ensuring a predictable flow of clean water, the water utility pays for the 'water-capture' service to an institution (either government or private) that applies the payment to maintain the forests intact. To be sustainable, the water utility normally recovers the cost of the payments from its customers.

The Catskills watershed in New York state is a well-known example, in which the city of New York has paid for land purchases, concessions and maintenance in order to maintain its famously clean water supply, thus avoiding the need to billions of dollars in a water-treatment plant (see Chichilnisky & Heal 1998). In Colombia and in Ecuador, water user groups and municipal authorities are paying for water-capture services, sometimes by purchasing substantial areas of the watersheds and placing them under conservation. In fact, in Colombia, power companies must by law pay a percentage of their revenues to regional corporations that are responsible for watershed management (although it is not clear whether these funds are then actually used for watershed management). In El Salvador, municipalities downstream of El Imposible National Park have agreed to make a financial contribution to park management as payment for watershed services (for further information on these Latin America examples, see WBG (2000)). In the West Cape Province of South Africa, the 'Working for Water' programme receives a budgetary allocation from the water Ministry and from a water tax on plantations to conserve water by clearing the watershed of invasive plant species that evapotranspire at much higher rates than the native *fynbos* vegetation. Further information on initiatives to create markets and generate payment for environmental services can be found at the website of the Katoomba Group ([www.katoombagroup.com](http://www.katoombagroup.com)).

More sophisticated approaches seek to capture not just one environmental service (such as water capture), but the multiple benefits generated by natural ecosystems. This requires innovative approaches and the development of markets for services that traditionally have not entered financial markets or national accounts and thus have

been considered 'free'. It also creates opportunities for synergy between resources available for reducing atmospheric GHGs (such as the CER market) and those available for conservation of biodiversity (such as the GEF and the substantial funding provided each year by governments, multilateral and bilateral donors, and international and national conservation organizations).

Costa Rica is currently implementing one such project with the support of The World Bank. Under Costa Rica's 'Ecomarkets' project, landowners in rural areas receive a payment (provided for in Costa Rica's forestry law) for conserving and managing forests that provide four key services: water capture, biodiversity protection, scenic beauty and carbon sequestration. The payment is currently set at \$40.00 ha<sup>-1</sup> yr<sup>-1</sup>. Initially, these payments were financed through a tax on gasoline. The Ecomarkets project aims at developing a true market in which consumers of these four environmental services pay for them through a government intermediary (FONAFIFO). As in the examples above, the water-capture function will be paid by a recovery mechanism from water utilities. It is envisioned that the tourism industry will contribute a share of the total payments, given that this industry benefits directly from the scenic beauty of intact forests. The global environmental services of biodiversity conservation and carbon sequestration will be paid through instruments that serve as 'proxy consumers' for the international community. The innovative aspect of this project is that the various benefits are all generated from the same hectare of land, thus creating the opportunity to develop and draw synergistically upon multiple consumers for multiple environmental services. This diversification increases the chances of achieving financial sustainability and being economically competitive with alternative land uses that could otherwise involve clearing the forest. Similar projects are currently under development in El Salvador, Guatemala and Ecuador.

#### **4. World Bank activities relating to developing carbon markets: the PCF**

The existence of a global market for stored (sequestered) carbon does not necessarily translate to improved income or other benefits for the rural poor. A positive development outcome depends on how the market is structured and how it operates, at international, national and local levels. Key factors include investors' reactions to economic and political risks, rules governing ownership of the assets and institutional systems for distributing benefits and mitigating any negative impacts.

In April 2000, with shareholding from 17 private corporations and six governments, The World Bank began implementation of the PCF (for further details, see PCF 2001). Its objective is to help spur the development of a global carbon market and to 'learn by doing' how to use carbon purchase transactions to achieve environmentally credible and cost-effective emissions reductions benefiting developing countries and economies in transition. Through the PCF, The World Bank has pioneered JI and CDM transactions ahead of all other market players. The fund has helped to buy down entry barriers for private investment and to encourage and assist developing-country governments to open their marketplaces for carbon-purchase transactions. PCF transactions have served to benchmark the processes of achieving high-quality emissions reductions across a range of energy-sector technologies and some forestry applications.

*Phil. Trans. R. Soc. Lond. A* (2002)

The World Bank is well suited to playing this catalytic role. First, it has the international credibility and 'convening power' to attract substantial 'buy in' (including financial contributions) from both governments and the private sector. It also has access and influence at the highest levels of government in its borrowing member countries, which is important to reduce both real and perceived political and other risks to investors. Furthermore, The World Bank is recognized to have some of the most comprehensive and stringent environmental and social 'safeguard policies' of all multilateral and bilateral development institutions.

The PCF has three primary strategic objectives.

- (1) To show how project-based GHG-emissions-reduction transactions can promote and contribute to sustainable development and lower the cost of compliance with the Kyoto Protocol.
- (2) To provide the Parties to the FCCC, the private sector and other interested parties with an opportunity to learn by doing in the development of policies, rules and business processes for the achievement of ERs under JI and the CDM.
- (3) To demonstrate how The World Bank can work in partnership with the public and private sector to mobilize new resources for its borrowing member countries while addressing global environmental problems through market-based mechanisms.

The PCF contributors (participants) currently include six governments (Canada, Finland, Japan, the Netherlands, Norway, Sweden) and 17 corporations, and its assets total *ca.* \$145 million. These funds will be used to purchase CERs, guided by the provisions of the Kyoto Protocol. The PCF serves as a mechanism to spread risk and responsibilities. Rather than making individual investments and deals, participants invest collectively and receive a pro rata share of the emissions reductions, verified and certified in accordance with carbon-purchase agreements reached with the respective project sponsors in developing countries. The World Bank is actively engaged in assisting the participants and project sponsors to define and negotiate these agreements and in building the local capacity to implement them.

To date, the PCF has focused mainly on projects involving renewable energy and energy efficiency, as these are the best-accepted mechanisms for reducing GHG emissions. Presently, the scope for carbon-offset projects in developing countries involving 'land use, land-use change and forestry' (LULUCF) is limited by the provisions of the Kyoto Protocol. During the first commitment period (2008–2012), the 'Bonn Agreement' allows industrialized countries to sponsor only a limited amount of reforestation and afforestation projects in developing countries, and does not allow for any JI or CDM projects involving carbon sequestration through improved agricultural practices or protecting/maintaining existing forests or other natural vegetation (see Niles *et al.* 2002).

However, the relation between land-use changes and carbon emissions represents an important area as far as The World Bank is concerned, because of the potential to involve and benefit developing countries whose economies and populations are primarily rural. The PCF has therefore taken a leadership role in pioneering initiatives involving LULUCF, two examples of which are described below.

- (i) In Romania, the PCF is supporting afforestation of 6728 ha of degraded land in the southwest and southeast of the Romanian Plain and the ecological reconstruction of part of the Lower Danube floodplain, using invasive local tree and non-timber species that will be planted to increase biodiversity across the production landscape. Part of an island in the Danube is being reforested as a conservation area under a green-corridor programme already in place, and a biodiversity monitoring plan will be included in the design. Planting began in spring 2002.
- (ii) In Brazil, the Plantar project involves creation of both CERs and carbon sinks. The CERs arise from charcoal production (from sustainably harvested eucalyptus) displacing coal/coke in pig-iron reduction, and in reducing methane in carbonization. In addition to creation of a carbon sink of 23 000 ha, the native cerrado forest ecosystem will be restored both on a 470 ha parcel of pasture land and in the 4600 ha of reserve land required to be set aside under Minas Gerais law (20% of plantation area) whenever plantations are being established. In this project, benefits are 'bundled' with the GHG benefits, as the entire forest production landscape is integrated with restoration forestry as a conservation management landscape.

A particular effort is made to ensure that these projects restore/protect natural forests and yield biodiversity benefits, as well as CERs, going beyond the provisions of the Kyoto Protocol. This represents a good example of how The World Bank is using the PCF to bring environmental and social protections and global public goods into the carbon market, in keeping with its mandate and mission.

The PCF has primarily an energy-sector focus and can only spend up to 10% of its assets in LULUCF activities. Therefore, The World Bank is in the process of launching a 'Biocarbon Fund' and a Community Development Carbon Fund (CDCF), which will pioneer environmentally and socially credible carbon-asset creation across a range of common and replicable land-use and forestry initiatives. One of the key objectives of these funds will be to use carbon markets to achieve convergence between the Conventions on Biodiversity Conservation, Combating Desertification and the FCCC. The CDCF will also aim to demonstrate how transaction costs for small-scale projects that benefit rural populations can be reduced, making them competitive with larger-scale operations on the basis of dollars per ton of carbon. Each fund will have a 'for-credit' and a 'not-for-credit' window, with differentiated mandates from different shareholders. The 'for-credit' window will deal with afforestation/reforestation under the CDM during the first commitment period of the Kyoto Protocol. An 'over the horizon' window will deliver carbon-sequestration credits from activities that are not yet creditable under the Kyoto Protocol, but that offer high environmental, biodiversity and development benefits. It is anticipated that these new funds will support both projects involving creating or enhancing carbon sinks, and projects to prevent or reduce the release of carbon that is already fixed in the form of forests, other vegetation and organic material in soils. They will also support research and development on methods for establishing baselines and other key elements of implementing LULUCF carbon projects.

## 5. Challenges of capturing carbon markets for sustainable development

While there is clearly enormous potential for capturing the financial and other benefits of the emerging global carbon market to support the objectives of sustainable development, the process of doing so is far from simple. There are a number of obstacles to be overcome. As noted above, The World Bank has mobilized resources for the PCF as a mechanism to address some of these problems, both by creating favourable market conditions and by facilitating pilot projects that provide an opportunity for 'learning by doing'.

One important challenge is that the governments and citizens of developing countries do not yet recognize or perceive carbon markets as a viable and potentially significant source of resources for their own development objectives. The World Bank and other MDBs (among others) will need to help raise awareness at all levels about the concept and the mechanisms, including it in dialogue concerning energy and land-use sectors. The success of PCF and other projects will be one of the most important demonstrations.

Once the awareness and interest have been generated, there is the additional challenge of ensuring the existence of an attractive investment climate. The global carbon market is, and will continue to be, primarily a private-sector affair, and the private sector is interested in secure investments and guaranteed results. Issues such as political instability, fiscal mismanagement or opaqueness, weak judicial systems and a general lack of accountability in public service can all play a negative role in undermining potential investors' interest in engaging in some developing countries. Investors are also likely to be concerned about 'reputational risks' should they (knowingly or inadvertently) become associated with a project that has negative environmental or social impacts, such as displacing indigenous populations or vulnerable minorities. The World Bank and other MDBs are actively engaged in assisting borrowing member countries to address such issues, but the rate of progress is not sufficiently rapid to overcome these limitations in the short term. In order to attract private-sector carbon investment, it may be necessary to create 'islands' of reduced risk, that is, relatively self-contained projects where these factors can be investigated, identified and mitigated. Subsidization can be another option, particularly in a pilot phase, with The World Bank or other partners 'buying down' investors' risks either through grants or concessional loans or by providing risk guarantees.

The Environmentally and Socially Sustainable Development family within The World Bank is particularly interested in the contribution that the emerging market in carbon-offset credits can make to sustainable rural development, particularly in the area of community-based natural-resource management efforts. Many communities in developing countries will, however, need assistance to position themselves and develop the organizational and other faculties to take advantage of this opportunity. In fact, without careful planning, the exploitation of carbon-market opportunities may have negative impacts on the rural poor. Whenever an asset increases in value, the poorest and politically least-empowered sectors of the population risk losing any access to or control over it (Landell-Mills 2002).

In most industrialized countries, the majority of land, including forest land, is either privately owned or in the public domain and under the management of national or local government agencies (including the semi-sovereign Native American reser-

vations in North America). By contrast, in many developing countries (particularly in Africa and southern Asia), a substantial proportion of land is held in some form of communal ownership, usually based on traditional rights that have been more or less recognized or formalized through the modern legal system. Formalized examples include the Maasai group ranches in Kenya, village leases in Tanzania and community conservancies in southern Africa. In many cases, these communal landholders are among the poorest sectors of society and are also both a principle source and the main victims of deforestation. As such, they are obvious targets to benefit from the significant financial assets—linked to forest protection and re-forestation—that are now becoming available in the form of international carbon-offset credits.

Communal ownership of land and land-based natural resources, on the other hand, present special challenges for the use of market-based mechanisms such as carbon-offset credits. These challenges can translate into higher barriers and risks for ‘carbon investors’, who may therefore prefer to work with private or state landowners rather than take on the uncertainties of working in community-based settings. The challenge therefore is to lower these barriers and risks, thereby enabling communal landholders to position and prepare themselves to become competitive in this market.

Key issues to be addressed include the need for

- (i) the ability to enter into legally binding contracts and agreement;
- (ii) effective mechanisms for making and enforcing decisions;
- (iii) transparent and acceptable mechanisms for distribution and use of the financial proceeds;
- (iv) monitoring and accountability; and
- (v) provisions to compensate or otherwise accommodate individuals who may suffer negative impacts of group decisions.

A particular challenge in mobilizing carbon markets at the community level is the disjunction between the short-term needs of the people and the longer-term nature of the carbon ‘product’. Poor rural communities in developing countries are typically faced with difficulties in meeting basic daily needs such as food, clothing, medicine, transportation and school fees. In order for a land use to be considered desirable, or even viable, it must generate direct benefits of food or income in the short term. Carbon sequestration, however, is a long-term process whose value is delivered over a period of decades. For example, Sustainable Forest Management recently paid the Confederated Salish and Kootenai Tribes \$50 000 for the rights to 47 974 tons of CO<sub>2</sub> equivalent to be sequestered over a period of 80 years, through the reforestation of 100 ha of fire-destroyed high-altitude pinelands on their reservation in Montana. As part of the agreement, carbon storage on the site is to be maintained for 100 years (the tribes will own the rights for the last 20 years).

In order to bridge the gap between short-term needs and long-term production, some form of ‘front-loading’ of payments is needed. The same challenge arises in other forms of payment for environmental services. For example, in Costa Rica, landholders commit themselves to continuing forest protection and management for a period of 20 years, but they receive the full payment for this service in the first five years. Similarly, one IFC-financed sustainable forest-management project buys the future

value of forest products 'up front'. Such front-loading inevitably creates a risk that the landholders may not continue to live up to commitments once the payments have been completed, and weak judicial systems in many developing countries mean that investors may have little recourse should their partners renege on their agreements. Therefore, the question will arise as to whether the market value of the sequestered carbon is sufficient to allow payments that are high enough to compete with alternative land uses (such as clearing a forest for agriculture), both initially and over a long period of time. There is clearly a need to develop and demonstrate innovative financing instruments to overcome this dilemma.

One important role for The World Bank and other MDBs is to assist developing country governments in overcoming the policies that constrain the emergence of functional carbon markets. Examples include energy or other price subsidies that reduce incentives for energy efficiency, a lack of legislation/judicial instruments enabling individuals or communities to enter into contractual business relationships, land-use policies that require people to clear land (deforestation) in order to claim it, forest-sector policies that require concessionaires to actively engage in logging or lose the concession, and land-tenure and natural-resource policies that prevent rural communities from controlling or capturing the benefits from land/resources other than conventional crops or livestock.

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