

Volume 36, Number 10, October 2008 ISSN 0305-750X



**WORLD DEVELOPMENT**  
The multi-disciplinary international journal devoted to the study and promotion of world development

*This issue includes a Special Section on The Volatility of Overseas Aid (pp. 2045-2102)*

**CONTENTS**

C.A. Holz	1665	China's Economic Growth 1978-2025: What We Know Today About China's Economic Growth Tomorrow
M. Agostino	1692	World Bank Conditional Loans and Private Investment in Recipient Countries
J. Jongwanich and A. Kohpaiboon	1709	Private Investment: Trends and Determinants in Thailand
A.M. Fernandes	1725	Firm Productivity in Bangladesh Manufacturing Industries
D. Hauner	1745	Explaining Differences in Public Sector Efficiency: Evidence from Russia's Regions
B.J. Barnett, C.B. Barrett and J.R. Skees	1766	Poverty Traps and Index-Based Risk Transfer Products
K. Deininger, D.A. Ali, S. Holden and J. Zevenbergen	1786	Rural Land Certification in Ethiopia: Process, Initial Impact, and Implications for Other African Countries

*(continued on outside back cover)*

Indexed/Abstracted in: British Humanities Index, CAB International, Current Contents, Geographical Abstracts, International Development Abstracts, Journal of Economic Literature, Management Contents, PAIS Bulletin, Sociological Abstracts, Social & Behavioral Sciences, Social Science Citation Index. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.

This article appeared in a journal published by Elsevier. The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

<http://www.elsevier.com/copyright>



# Building Institutions to Trade Ecosystem Services: Marketing Forest Carbon in Mexico

ESTEVE CORBERA and KATRINA BROWN<sup>\*</sup>  
*University of East Anglia, Norwich, UK*

**Summary.** — This paper analyzes institutional design, organizational capacity, and interplay in markets for ecosystem services. It examines the development of a market-based mechanism to commercialize forest carbon in Mexico through the Clean Development Mechanism (CDM). This is compared with a State-run carbon forestry program aiming to provide emission rights to voluntary, retail-based, carbon markets. Marketing forest carbon is hampered by lack of organizational capacity in government and civil society, uncertainties in the international policy process, and the interplay with existing common property institutions in rural Mexico. The paper identifies theoretical and practical barriers to implementing institutional arrangements for forest carbon trading. © 2008 Elsevier Ltd. All rights reserved.

*Key words* — Latin America, Mexico, ecosystem services, institutions, carbon, forests

## 1. INTRODUCTION

Markets for ecosystem services have been advocated in international policy and development practice as a means to enhance environmental conservation and to improve human well-being. Proponents argue that the benefits provided by ecosystem services or the costs of degradation are not captured in conventional markets and thus no economic incentives exist for their conservation (Costanza *et al.*, 1997). Pricing nature's services and assigning property rights to them will provide conservation incentives to resource users and ecosystem managers (Swingland, 2002).

This assumption has translated into the development of projects marketing ecosystem services or an equivalent proxy in both industrialized and developing countries (Landell-Mills & Porras, 2002; Robertson, 2004). In these projects, users of an ecosystem service, such as carbon dioxide fixation, watershed protection, biodiversity conservation, or landscape beauty, reward resource managers for the conservation of such service. Individuals, companies, and the public sector play important but differentiated roles, either as service providers, buyers, intermediaries, or regulators. Service providers often include farmers, rural communities, and

NGOs, while buyers are private companies, state agencies, and individual citizens. Private consultancies provide ancillary services, such as investment risk assessments, monitoring, and certification services, while the public sector sets up the legal, financial, and institutional means to allow for project development.

*Markets commercializing emission rights generated through carbon dioxide fixation by forest ecosystems* (hereafter referred as forest carbon markets) stem primarily from international efforts to regulate global carbon dioxide emissions in the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. These agreements

<sup>\*</sup> This research was funded by the Tyndall Centre for Climate Change Research. The authors would like to thank Mexico's National Institute of Ecology (INE), the Environment Secretariat (SEMARNAT) and the National Forestry Commission (CONAFOR) for their support during periods of fieldwork. We would also like to thank all the NGOs and academics who participated in the research, and three anonymous reviewers who provided comments to an early draft of this paper. The views expressed, and any errors, remain the authors' sole responsibility. Final revision accepted: September 5, 2007.

highlight the role played by land-use activities in regulating the global carbon cycle, in particular the potential of forest management and conservation to store carbon dioxide and ameliorate climate change. However, markets for forest carbon are problematic. Firstly, there may be competing perceptions among social actors regarding the certainty and scale of the climate change problem. Secondly, these actors may challenge the rationale behind the idea of planting trees to offset emissions produced elsewhere. Thirdly, there may be competing views regarding the resource management practices which should be allowed in marketing frameworks. Finally, setting a price for carbon may be controversial.

This paper aims to advance understanding of how markets for forest carbon are designed, how institutional linkages are formed, and how forest carbon projects interact with existing institutions for resource management. We adopt an institutional approach, similar to Elinor Ostrom's Institutional Analysis and Development Framework (Ostrom, 2005), focusing on questions of institutional design, organizational capacity, and interplay as conceptualized by Young (2002) to analyze actors' perceptions of the implementation of forestry projects developed under the Clean Development Mechanism (CDM) of the Kyoto Protocol and other voluntary initiatives for marketing forest carbon. Our analysis contributes to emerging debates on cross-scale institutions for sustainable resource management as articulated by scholars such as Berkes (2002).

In the next section, we examine the institutional dimensions of markets for forest carbon. We highlight the importance that institutional design, organizational capacity, and institutional interplay play in shaping the likely outcomes of these arrangements. In Section 3, we justify why we chose Mexico as a case study, present the research questions, and the data collection techniques. In Section 4, we describe the present status of markets for forest carbon in Mexico and we analyze stakeholders' interests and perceptions on the future development of CDM forestry projects. We do not undertake an evaluation of these projects because at the time of the research there was only one voluntary offset project located in the state of Chiapas and neither the CDM nor the State-based program had generated any project. Section 5 discusses our findings in the light of our institutional theoretical framework before drawing conclusions in Section 6.

## 2. AN INSTITUTIONAL APPROACH TO MARKETS FOR ECOSYSTEM SERVICES

Institutions shape the way in which humans relate to their environment. Some institutions exist or are created to mediate this relationship, and they constitute social practices in relation to the environment, assign roles to participants in these practices, and guide interactions among the actors (Dietz, Ostrom, & Stern, 2003; Young *et al.*, 1999). Institutions for environmental change can be designed and implemented at distinct levels of social organization, ranging from international regimes to national policies, or local rules of community resource management. They interact with other existing institutions, which in turn can be either formal (e.g., national laws) or informal (e.g., social habits and traditions), and such interaction can impinge on the institution in question.

We argue that markets for ecosystem services are evolving institutions which attempt to enhance or change natural resource managers' behavior in relation to ecosystem management through the provision of economic incentives. In theory, at least, these incentives should be generated by a self-sustained market in which consumers of ecosystem services channel financial resources to ecosystem managers. In reality, however, most projects trading ecosystem services have so far been negotiated on a bilateral basis, with no competition between service buyers, and the commodity has not been further exchanged or transacted. Landell-Mills and Porras (2002) emphasize that the creation of a well-functioning market-based institution for an ecosystem service requires of a well-defined trading commodity for the service in question; the existence of both demand and supply flows for the service; and an enabling legislative and institutional framework which outlines the rules for commodity trading and for the contractual relationship between supply and demand.

### (a) *Organizational capacity and institutional interplay*

We suggest that Landell-Mills and Porras' (2002) recommendations are not sufficient to guarantee that markets for ecosystem services are implemented on the ground. Their actual implementation will also be influenced by *organizational capacity levels* (Murdiyarso, 2005) and *interactions with other existing formal and informal institutions* (Agrawal, 2002; Barrett,

Lee, & McPeak, 2005). These two factors are crucial to reflect local ecological and social realities and to guarantee equitable decision-making processes and outcomes across scales (Brown & Corbera, 2003).

Following Young (2002), we define *capacity* as the availability of social, institutional, and material capital to market forest carbon in a way that achieves climate mitigation and sustainable development objectives. We differentiate between organizations that do not effectively implement institutional arrangements and the effectiveness of institutions, which explains our distinction between institutional design and organizational capacity. We show that both factors are critical for carbon forestry projects to be considered legitimate and to understand stakeholder participation in emerging markets (Beg *et al.*, 2002).

We use Young's analytical frontier of *institutional interplay* (Young, 2002) to highlight the importance of institutional interactions in understanding the development of markets for forest carbon. The principal assumption behind this concept is that the interaction between two or more institutions can influence their outcomes. In this paper we draw attention to the critical role exercised by property rights and community-based institutions in influencing the establishment of markets for forest carbon in Mexico.

(b) *Institutional arrangements for marketing forest carbon*

There exist three main types of institutional schemes through which carbon forestry offsets are commercialized in developed and developing countries. First, forest carbon trading can take place through the CDM, through which investors can gain *Certified Emission Reductions (CERs)* to meet greenhouse gas emission reduction targets. These CERs are temporary and should be replaced with permanent emission reductions within a specified time period. The initial framework for CDM projects, finalized in 2001, limited the type of forestry activities allowed to afforestation and reforestation activities. It was not until 2003 that the procedures for afforestation and reforestation projects were agreed. Since then a number of forestry projects have been prepared to apply for registration under the Kyoto Protocol, although no forestry CERs have been processed through the CDM. The World Bank set up the BioCarbon Fund to invest in carbon

forestry projects across the developing world, and eleven forestry projects are under development or being validated as CDM projects and enter Kyoto markets (World Bank, 2007). Compared to the CDM overall, the low demand for these projects can be explained by the drawn-out negotiation of CDM, and by the controversies characterizing their implementation, such as baseline design, permanence, and leakage (Boyd, Corbera, Gutierrez, & Estrada, 2004). The price of CERs from forestry projects will be influenced by the opportunities in other investment sectors, such as renewable energy, hydropower, or biomass projects; and the price of already traded CERs.

Secondly, carbon forestry offsets can be generated in the context of non-Kyoto voluntary markets, including the Climate Chicago Exchange (CCX) and the voluntary retail market. These markets provide investors with Verified Emission Reductions (VERs) which are used to meet corporate social responsibility standards and cannot be traded in Kyoto-compliant markets. The CCX involves major greenhouse gas emitters from Canada, the United States, Brazil, and Mexico who have voluntarily committed to reduce carbon emissions by 4% during the period 2003–06, and by 6% during the period 2007–10. No trading of forestry offsets has occurred yet under this framework. In contrast, the retail market involves companies which are not bound to Kyoto and voluntarily decide to offset their greenhouse gas emissions. It relies on offset projects which may or may not adhere to CDM standards. Thus, to guarantee the credibility of VERs, offset sellers rely on third party verifiers. To date, the price of VERs from forestry projects has oscillated between US\$5 and US\$12 per ton of CO<sub>2</sub>eq (Katoomba Group, 2006). Taking into account VERs from other offset sectors, such as renewable energy, the price has oscillated between US\$5 and US\$35 (Taiyab, 2006).

Thirdly, there are state-based schemes for the commercialization of carbon forestry offsets alongside other ecosystem services. These are not actual markets but rather economic transfers through which governments in developing countries aim to increase the capacity of local project developers and enable their participation in international markets. These State-based schemes aim to establish an enabling policy framework which will progressively involve national civil society and investors in trading ecosystem services. The price of carbon offsets in this context is dependent on the instrument's

Table 1. *Instruments marketing forest carbon: design, procedures, and implementation characteristics*

Institutional arrangement	Broader institutional framework of reference	Scale of institutional design	Design actors	Procedural rules	Actors involved in implementation <sup>a</sup>
Kyoto Markets-Joint Implementation and Clean Development Mechanism	UNFCCC - Kyoto Protocol	Global	Governments (Parties to the UNFCCC)	<p>CDM eligible forestry projects only afforestation and reforestation in areas deforested prior to 1990</p> <p>Provision of Certified Emission Reductions (CERs) which can be used against compliance with the Kyoto Protocol targets</p> <p>A share of project proceeds is allocated to the UNFCCC Adaptation Fund</p> <p>Designated Operational Entities should endorse project proposals and monitor activities</p> <p>The CDM Executive Board should evaluate project methodologies and documentation before registration under the Kyoto Protocol</p> <p>The host country government should endorse the project and evaluate its contribution to sustainable development</p>	<p>Government or private company (CER buyers)</p> <p>NGOs, Community-based organizations, Farmers (Project management and implementation)</p> <p>Host country government (Project approval and sometimes implementation in case of unilateral CDM projects)</p> <p>Research and Consultancy organizations (Project design and management)</p> <p>Private company (Project implementation)</p> <p>Designated Operational Entities (Project registration and verification)</p>
Non-Kyoto Markets: Chicago Climate Exchange <sup>a</sup>	UNFCCC - Kyoto Protocol	Regional (Canada, US, Costa Rica, Brazil, Mexico)	Private company dedicated to develop and trade in environmental, financial and commodity markets	<p>Eligible forestry projects include forest management and conservation activities</p> <p>Emission reductions to be achieved by purchasing offsets from verified emission reduction projects</p>	<p>Private companies and other entities, such as energy utilities, municipalities, universities (carbon offsets buyers)</p> <p>Consultancy organizations and international verifiers (offset projects verification)</p> <p>Private entity (Trading platform management)</p>

(continued on next page)

Table 1—(continued)

Institutional arrangement	Broader institutional framework of reference	Scale of institutional design	Design actors	Procedural rules	Actors involved in implementation <sup>a</sup>
Non-Kyoto Markets: Retail Market	UNFCCC – Kyoto Protocol	Global	Private companies interested in developing the voluntary carbon offset market	Eligible forestry projects include CDM afforestation and reforestation activities, forest management, conservation and agroforestry initiatives Project managers sell carbon forestry offsets to individual retailers, who ensure the credibility of the offset through third party verification. Offset value is negotiated on a project basis, depending on quality and location Retailers sell to individuals or companies at a marked-up price	Individual, company, government (carbon offset buyers) Private company (offset retailer) NGOs, Community-based organizations, Farmers, Technical organizations (carbon offset providers) Consultancy organizations and international verifiers (offset projects verification)
Payments for carbon dioxide fixation by forests	National system of payments for ecosystem services	National	National government, host country research institutions, civil society	Rules are country-specific but clearly informed by the CDM procedural rules Resources are drawn nationally either through taxation or direct partnerships with the national private sector	Host government (carbon offset investor) Community-based organizations, farmers (carbon offset providers) NGOs and research organizations (project design and management jointly with offset providers)

<sup>a</sup> All these actors are by no means simultaneously involved in each project. The typology is based on a review of projects marketing forest carbon through the AIJ phase and national systems of payments for ecosystem services (Landell-Mills & Porras, 2002; May *et al.*, 2004), as well as information on the Chicago Climate Exchange website [www.chicagoclimatex.com](http://www.chicagoclimatex.com). In the case of the CDM, the likely participating actors have been based on information available about potential CDM forestry projects in the World Bank Bio-Carbon Fund website ([www.biocarbonfund.org](http://www.biocarbonfund.org)).

own procedural rules and it is the State and other financial contributors who become entitled to emission reductions, which cannot be traded in Kyoto markets. Costa Rica, Mexico, Ecuador, and Brazil have put into place institutional structures for ecosystem service management, with prices oscillating between US\$4 and US\$9 per ton of CO<sub>2</sub>eq (Pagiola, Arcenas, & Platais, 2005).

Table 1 characterizes the three evolving instruments according to their scale, the actors involved, and key design rules. Kyoto markets have been defined at international negotiations by governments and other actors, influenced by scientific information and subject to lobbying pressures. These rules define which projects are eligible to trade forest carbon, and who is responsible for their implementation. The CDM makes the host country government responsible for deciding whether a project is likely to contribute to national and local sustainable development. The CDM also assigns private auditing firms the responsibility of monitoring and validating a project, and creates a new organization within the governance structure of the Protocol to approve carbon mitigation methodologies and revise project

documentation (the CDM Executive Board). CDM projects can be developed unilaterally—when a host country funds the project and then attempts to sell CERs to international interested parties—or through bilateral and multilateral investment pathways—when an international investor or a multilateral investment fund finances the project and buys CERs directly from the service supplier (UNFCCC, 2001). The rules concerning voluntary markets have been derived from the CDM experience. Generally, these markets are structured around a service provider, which can involve rural communities, NGOs, private entities, or a combination of these, and a broker, which secures investment from service buyers and oversees project development. Carbon offsets are verified by third parties. Project developers and brokers are increasingly adopting standards for project design and evaluation in order to increase the transparency, consistency, and effectiveness of their projects (Bayon, Hawn, & Hamilton, 2007). In contrast, the rules concerning forest carbon trading through national systems of payments for ecosystem services are country-specific, and often government and civil society actors participate in their design. In turn,

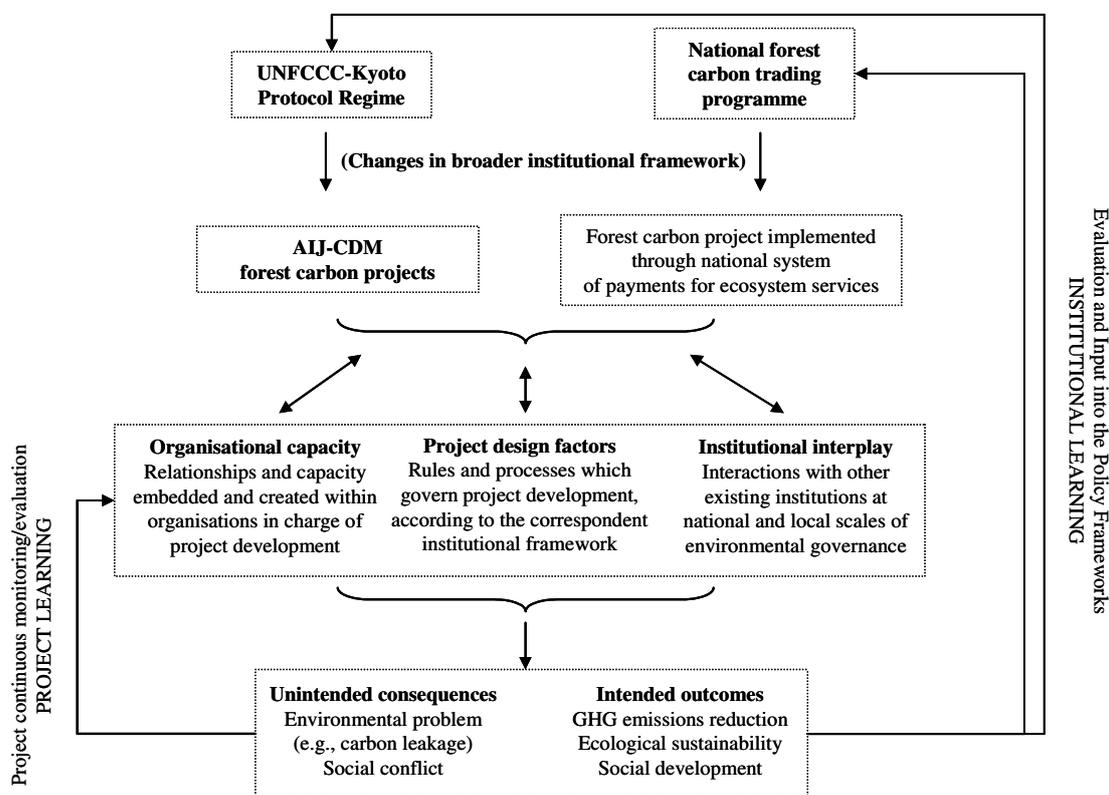


Figure 1. Institutional interplay, organizational capacity, and project outcomes in marketing forest carbon.

project implementation tends to be more simplistic regarding the number of participating actors and monitoring mechanisms, with the State financing the total or a substantial share of project activities.

Figure 1 shows the importance of institutional interactions and organizational capacity in shaping the outcomes of these three instruments. The upper part of the figure shows how changes in the governing institutional regime can influence project design and implementation. For example, future changes in the UNFCCC and the Kyoto Protocol can either broaden the type of projects eligible under the CDM or exclude forestry projects as CERs sources altogether. Changes in national environmental policy can translate into the elimination of a national system of payments for ecosystem services, thus compromising the financial viability of existing projects. The lower part of the figure shows how the implementation of these instruments is dependent on institutional interactions, organizational capacity, and their own design, which affects *how* projects are developed and *who* benefits at local level. As a result, marketing forest carbon can lead to intended or unintended outcomes. These outcomes are monitored by project managers who then act to increase capacity, to modify project design rules as permitted by the governing institutional framework or to minimize negative impacts as a result of interplay. This is what we identify in the figure as the project *learning process*. There can be a parallel process of *institutional learning* by which either project managers or external organizations reflect on the outcomes, the causes of success and/or failure, and provide inputs to the actors in charge of (re)designing the broader institutional framework. In the next section we present in more detail our case study, the research questions, and the methods employed for data collection.

### 3. CASE STUDY, QUESTIONS, AND METHODS

Mexico was chosen as a case study for three reasons. First, Mexico has demonstrated an interest in promoting forest carbon trading as a means to mitigate climate change under the UNFCCC and the Kyoto Protocol, and it hosted a number of pilot carbon trading projects through the UNFCCC Activities Implemented Jointly (AIJ) pilot phase, including

one in the forestry sector (*Comité Intersecretarial sobre Cambio Climático, 2001*). The AIJ was launched in 1995 by the UNFCCC to encourage voluntary investment—without crediting—in greenhouse gas emission reduction projects in developing countries.

Second, in 2003, the Mexican government established a national program of payments for ecosystem services (PSA-CABSA), which includes payments for forest carbon, and aims to mitigate climate change, promote sustainable forest management and halt forest cover and biodiversity loss. Mexico's current advocacy for market-based instruments for forest conservation can be explained by the need to create new instruments which can reduce the country's rate of deforestation, estimated at around 700,000 ha per year (*Masera, Ordóñez, & Dirzo, 1997, p. 275*). Deforestation has been considered a consequence of the State's failure to regulate the activities of private and state-led logging companies (*de Vos, 2002*), to address the problem of dispossessed peasants migrating into areas of high biodiversity value (*O'Brien, 1998*), and rural communities' failure to establish sustainable forestry management plans and arrest clandestine logging (*Klooster, 1999*).

Third, about 80% of Mexico's forests are legally titled to local communities—known as *ejidos*—who practice agriculture and forest management on family plots or common forests (*Klooster & Masera, 2000; World Bank, 1995*). *Ejidors* are a common property regime which involves a group of people who hold usufruct rights over a territory and hold in common an area of pastures and forests (*Muñoz-Piña, de Janvry, & Sadoulet, 2003*). Consequently, any effort to implement forest carbon projects requires establishing partnerships with local communities, and setting up arrangements which deal with social rules of resource governance, local property rights and socio-political dynamics at local and regional levels. This involves important institutional interactions across scales of environmental governance. As *Klooster* notes, “the establishment and structuring of markets for environmental services will be the next great challenge facing forest conservation in Mexico” (2003, p. 119).

In this context, the paper addresses four questions: (1) How have Mexican stakeholders responded to the idea of marketing forest carbon, particularly through the CDM? (2) What are the challenges involved in designing and

implementing carbon forestry projects through the CDM? (3) How do these challenges relate to questions of institutional design, organizational capacity and interplay? and (4) How does the Mexican case study contribute to understanding emerging forms of market-based environmental governance?

To investigate these issues, we employed a qualitative and reflexive research approach, based on in-depth stakeholder interviews. This is just one of the many existing methodological approaches to investigate the institutional dimensions of environmental governance (Biermann, 2007). We conducted 40 interviews with Mexican government officials and civil organizations, including former and present AIJ project developers, legislators, and research advisors involved in the design of the national system of payments for ecosystem services. To identify these interviewees we used a snowballing process, commonly applied in stakeholder analysis research (Grimble & Chan, 1995). We originally identified a set of knowledgeable individuals through policy and project documents and interviewed them during the first fieldwork period (March–April 2002). These individuals were asked to identify other individuals and organizations with a stake in the development of carbon forestry activities, either because they played a role in UNFCCC negotiations or because they played a role in public consultations on climate change and had a vested interest in a wider implementation of carbon forestry activities. These other individuals and organizations were then contacted and interviewed during September 2002–January 2003. In turn, these respondents identified new organizations involved in climate policy, climate mitigation projects, and in the development of the emerging framework of payments for ecosystem services. These new organizations were interviewed at the end of the third fieldwork period (March–July 2003). For analytical purposes, interviewees were classified in four categories—government, NGOs, academia, and multilateral organizations—to identify interests in the implementation of instruments marketing forest carbon. They were further sub-grouped as either primary or secondary stakeholders depending on their degree of participation in the definition and implementation of these instruments. In the section below, we contextualize the evolution of instruments marketing forest carbon in Mexico and discuss stakeholder interests in their implementation.

#### 4. MARKETING FOREST CARBON IN MEXICO

Mexico's interest in marketing forest carbon is related to the country's active involvement in the UNFCCC and the Kyoto Protocol, ratified in March 1993 and September 2000, respectively. Growing expertise in climate change across the government and research sectors during the early 1990s translated into the development of several greenhouse gas emissions reduction programs and specific investment projects (Liverman & O'Brien, 2001). These included eight projects under the AIJ phase, which involved private, governmental, and civil organizations, and were granted formal support from the National Institute of Ecology (INE) and the Ministry of Environment (SEMARNAT) (*Comité Intersecretarial sobre Cambio Climático, 2001, pp. 307–321*). However, only four of these received funding for implementation and were registered under the AIJ phase, including a two-year energy-efficiency project, which completed in 1998; a 30-year renewable-energy project; a 60-year agriculture-based project; and a 30-year project marketing forest carbon. The fact that Mexico hosted only one project marketing forest carbon is not extraordinary, as there were only another 19 AIJ forestry projects funded across the developing world (UNFCCC, 2002c). This project, located in the state of Chiapas, provides VERs to the retail market and, until 2005, it had marketed a total of 56,832 tons of CO<sub>2</sub>eq at an average price of US\$3 per ton (Corbera, 2005). The voluntary character of the AIJ pilot phase and the fact that few governments provided investors with incentives other than funding project transaction costs or reducing tax levies explains why the overall number of activities was less than expected by international policy makers (Michaellowa, 2000).

Since 2002, no other AIJ project has been developed in Mexico or elsewhere. The finalization of the CDM rules under the Kyoto Protocol in late 2001 (UNFCCC, 2001) implied that CDM projects could start to be implemented. Consequently, developing countries' interest in these projects grew and governments initiated the process to comply with the rules to host CDM projects. Up to March 2007, there have been 547 projects registered with the CDM Executive Board, 78 of which are located in Mexico (UNEP-Risoe, 2007).

(a) *Stakeholder perceptions of the development of CDM forestry projects in Mexico*

An analysis of stakeholder interviews identifies three main themes which may affect the future implementation of CDM projects in Mexico. The first concerns the types of eligible land use activities under the CDM, considered too restrictive. The second concerns the level of organizational capacity across civil organizations, which impacts upon organizations' ability to get involved in project design and implementation. Finally, the common property regime underlying most of Mexican rural property is seen as a potential constraint for project development due to its impact on transaction costs and investment risk.

(i) *Limited forestry activities under the CDM*

The Mexican government has long been a strong supporter of marketing forest carbon as a means to comply with emission reduction targets under the Kyoto Protocol. In the period leading up to the Protocol's negotiations, the Mexican government formed a negotiation coalition with Norway, Korea, and Switzerland, the Environmental Integrity Group. This group took a position midway between the Umbrella Group, which was supportive of maximizing climate mitigation options, and other UNFCCC parties, such as the European Union, India, and China, who wished to limit the type of forestry activities permitted for climate mitigation in developing countries.

After the Kyoto Protocol was approved, Mexico advocated a "progressive approach to the CDM that could foster immediate and simple actions without artificial limits" (*Earth Negotiation Bulletin*, 1998, p. 11), thus restating its interest in maximizing investment options for the country's energy and forestry sectors. Later, jointly with Bolivia, the Mexican delegation to the UNFCCC argued that deforestation avoidance should be included under the CDM (*Earth Negotiation Bulletin*, 1999, p. 8). More recently the Mexican government, in co-operation with other Latin American and African countries, urged other countries to approve fast-track guidelines and modalities for small-scale CDM reforestation projects (*UNFCCC*, 2002b). The recent approval of these modalities can be seen as a very satisfactory negotiation outcome for its proponents, and may increase the participation of rural communities in future CDM projects (*Boyd et al.*, 2004).

Nonetheless, nearly all former and current government officials from SEMARNAT are not satisfied with the current CDM framework. They believe that the exclusion of conservation activities has marginalized the interests of the Mexican government and the majority of developing countries. This decision, together with the administrative and technical complexities accompanying the CDM process, is seen to reflect the international community's mistrust of civil organizations and rural communities in the developing world.

NGOs hold divergent views regarding the legitimacy and likely performance of forestry CDM projects. Those involved in forest protection and community-based forest management, such as PRONATURA, the Nature Conservancy (TNC)-Mexico and Conservation International (CI)-Mexico, believe that any option to market forest carbon represents an opportunity to expand their portfolio of activities and secure long-term funding for their organizations. Other organizations suggest that marketing forest carbon through the CDM is a strategy designed by industrialized countries to buy their way out of mitigating climate change through domestic actions and avoid changing their unsustainable lifestyle patterns. These divergences also generate a debate *within* organizations over whether to be involved in these projects:

"Some of us consider that these projects are unethical. They are established through unequal power relations, as project developers are attracted by small economic benefits... Others, on the contrary, welcome any mechanism that is useful to invest in forest conservation and agroforestry, as far as such investment is made according to a set of multiple criteria" (NGO member, pers. comm., October 22, 2002).

In line with government officials, PRONATURA and CI-Mexico consider the exclusion of conservation activities from the CDM a drawback which goes against their objective of finding additional funds for ongoing conservation efforts. For these organizations, marketing forest carbon through a forest conservation-oriented CDM could become an important source of long-term funding. Other organizations, such as the *Consejo Civil Mexicano para la Silvicultura Sostenible* (CCMSS) and GEA, remain cautious or are opposed to such inclusion. GEA suggests that the higher the number of available options for forest conservation the better, although "conservation activities should always involve the local

people, who should be the ultimate decision-makers” (GEA member, pers. comm., March 17, 2003). CCMSS in contrast, opposes forest conservation activities in the Kyoto Protocol and the CDM:

“We are against conservation as a source of carbon credits and we are satisfied that this option was not approved under the CDM. We have doubts regarding methodological questions. In principle, we are also against conservation projects because we cannot defend proposals which consist of leaving the forest untouched. We know that this type of forest conservation strategy does not work. As conservation projects have increased in number, deforestation rates have also increased” (CCMSS member, pers. comm., December 2, 2002).

Academics generally do not consider it desirable to include conservation activities as a means to gain emission reduction credits in a future framework of the Kyoto Protocol. An academic emphasizes that “nobody can be paid to do no harm, as this is something to be done anyway” (COLMEX lecturer, pers. comm., November 14, 2002). Similarly, another individual states that “you should only pay people to do things and reward them in exchange for an effort” (UIA lecturer, pers. comm., October 31, 2002). Others are opposed to the use of markets for forest carbon to promote large-scale forest plantations on the basis that there are already sources of funding and subsidy programs for this type of activity. Hence, they advocate that these instruments should concentrate on managing carbon stocks and preserving biodiversity in poor rural areas (Klooster & Masera, 2000).

#### (ii) *Organizational capacity*

Government capacity to deal with the implementation of climate mitigation projects has

grown in the last decade, with expertise created in government departments, particularly the National Institute of Ecology (INE), SEMARNAT, SENER, and CONAFOR. In response to CDM procedural rules, which oblige countries to create a Designated National Authority (DNA) for the evaluation of CDM projects according to sustainable development priorities of that country (UNFCCC, 2002a, p. 20), the Mexican government established its DNA in 2003. Its functional structure was presented at the eighth Conference of the Parties (COPs) to the UNFCCC in December 2003 (Figure 2) and the authority was legally formalized as the Mexican Committee for Emission Reduction and Capture of Greenhouse Gas Emission projects (COMEGEI).

In line with other developing countries, COMEGEI defined a set of evaluation criteria covering three dimensions of project implementation (i.e., environmental, economic, and social), which did not differentiate between carbon forestry and energy projects (Table 2). These criteria were defined through an internal government process, without participation by civil society groups. It is not clear whether every project should fulfill the criteria, and it is more likely that they will be used as a guide for project endorsement. Potential CDM projects should submit their Project Design Document to the DNA which, in turn, should submit project documentation to the ministries involved in the DNA Technical Committee. The ministries should then provide their views and recommendations to the DNA which must produce a letter of approval or rejection to project developers within a period of ten days (Cervantes, 2004).

Table 2 compares the Mexican DNA process with other developing countries that have

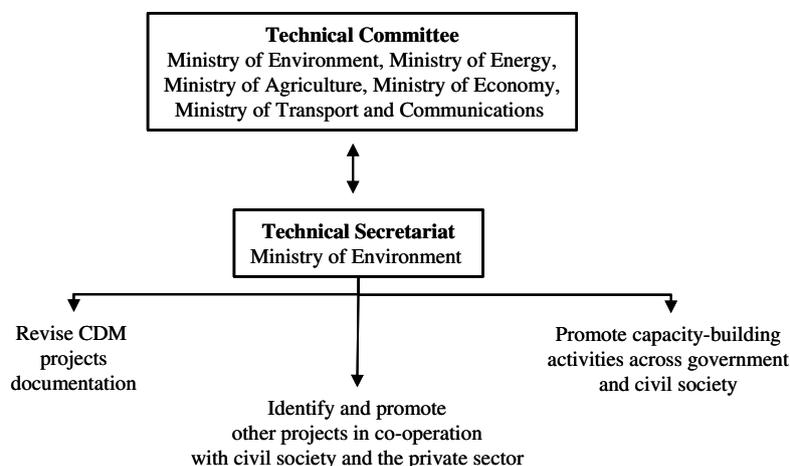


Figure 2. *Organization of the Mexican CDM Designated National Authority.*

Table 2. *National authorities and sustainable development criteria*

Sustainable development criteria	Criteria definition and project evaluation process	Projects endorsed as of August 2007
<p>Mexico<sup>a</sup></p> <p><i>Environmental criteria:</i> protection of water sources; promotion of sustainable land use; existence of environmental impact assessment if required by national legislation</p> <p><i>Economic criteria:</i> increase in investment and employment levels; promotion of technology transfer</p> <p><i>Social criteria:</i> promote racial and gender equality; improve local health conditions and create or improve local infrastructure</p>	<p>Criteria defined through an internal government process</p> <p>The authority is represented by a specific government official who is responsible for delivering submitted projects to key members of the ICCC. The evaluation process should last less than 10 days</p>	<p>100 projects endorsed: 90 registered under the CDM, 2 rejected and 8 under review, being corrected or seeking registration</p>
<p>India<sup>b</sup></p> <p><i>Social well being:</i> poverty alleviation, reduction of social inequities</p> <p><i>Economic well being:</i> additional investment compatible with the need of the local people</p> <p><i>Environmental well being:</i> impacts on resource sustainability, biodiversity, human health and pollution levels</p> <p><i>Technological well being:</i> transfer of environmentally safe and sound technologies</p>	<p>Criteria defined through an internal government process</p> <p>The authority is represented by nine members of six ministries who are in charge of endorsing projects within a period of 60 days after project documentation has been submitted</p>	<p>315 projects endorsed: 265 registered under the CDM, 14 rejected, 1 withdrawn, and 35 under review, being corrected or seeking registration</p>
<p>Brazil<sup>c, f</sup></p> <p>Impacts on natural resources and pollution</p> <p>Generation of employment</p> <p>Improvement of economic conditions, particularly in poor populations</p> <p>Technological development, in particular the possibility for know-how and capability transfer</p> <p>Integration of the project in other regional development programs</p>	<p>Criteria defined through an internal process within the Brazilian Inter-Ministerial Commission on Climate Change</p> <p>The authority is part of the Commission, it has 10 members from 10 ministries and endorses projects within a period of 60 days after project documentation has been submitted</p>	<p>136 projects endorsed: 105 registered under the CDM, 5 rejected, and 26 under review, being corrected or seeking registration</p>

Table 2—continued

Sustainable development criteria	Criteria definition and project evaluation process	Projects endorsed as of August 2007
Bolivia <sup>d</sup> <i>Environmental criteria:</i> pollution reduction and enhancement of soil and water services; sustainable resource management and ecosystems conservation; reduction of environmental pressures and increased capacities to adapt to climate change <i>Social criteria:</i> improvement of health, education, housing, and employment conditions; reduction of poverty levels; increase of equity levels, including gender equity, and respect for local technologies in the adoption of management practices and technologies <i>Economic criteria:</i> increase in local income levels; generation of new investment and effective transfer of technology	Criteria defined through an internal process The authority is formed by key members of the Ministry for Sustainable Development, who are in charge of endorsing project proposals	3 projects endorsed: 2 registered under the CDM and 1 rejected
Uruguay <sup>e</sup> <i>Social criteria:</i> employment generation; increase the income of poor populations; improvement of local capabilities; technological self-sufficiency and impacts on local populations <i>Environmental criteria:</i> use of renewable energies, air, and water quality; protection of biodiversity; energy efficiency and risk of environmental emergencies <i>Economic criteria:</i> microeconomic efficiency, sustainability of payments, and fiscal sustainability <i>Political criteria:</i> citizen participation and participation of local authorities	Criteria defined through a series of workshops conducted with key members from government, industry, NGOs, and the academic sector	1 project endorsed: 1 project being corrected after review

Source: <sup>a</sup>Cervantes (2004); <sup>b</sup>The Energy and Resources Institute (2005) and <http://envfor.nic.in/cc/cdm/criteria.htm>; <sup>c</sup>Miguez (2005) and <http://www.mct.gov.br/clima/cigmc/procedimentos.htm>; <sup>d</sup>Peres (2003) and <http://www.odl.gov.bo/background.htm>; <sup>e</sup>Sutter (2003); <sup>f</sup>Brazil has not divided the criteria into categories.

defined criteria for project evaluation. The countries include India and Brazil as the largest recipients of CDM investments (Lecocq & Capoor, 2005, p. 3), and Uruguay and Bolivia, examples from Latin America. As in Mexico, the criteria chosen in these other countries are generic and cover key areas of concern, such as impacts on employment levels, local resource sustainability, and technology transfer. However, criteria are more

numerous and their description is more accurate. Except for the government of Uruguay which conducted a process of stakeholder consultation to define DNA criteria (Sutter, 2003), the others did not involve civil society members in the definition of these criteria or in consultations prior to the endorsement of CDM projects.

Mexican NGOs have displayed differing capacities to participate in forest carbon

markets. Some organizations participated in the design of AIJ projects during the late 1990s and others participated only in consultations for the design of the PSA-CABSA program. For instance, CCMSS participated in the design of a forestry project encompassing 40,000 ha of forests and agricultural land in the state of Oaxaca, which involved several rural communities represented by three indigenous organizations. The project had the support of the Mexican government but it did not receive approval for implementation due to "its technical complexity and the sense of insecurity that was given to investors by intending to manage the project funds through community-based indigenous organizations" (CCMSS member, pers. comm., December 2, 2002). PRONATURA also designed an unsuccessful carbon forestry project in the southern Mexican state of Yucatán. Carbon emission baselines were developed and local communities were approached to explore their willingness to participate in the project. Yet the project was not funded because it involved several communities, had complex forms of decision-making and was perceived as too risky by international investors.

The ability of Mexican NGOs to fully participate in the design and implementation of carbon forestry activities has been restricted by their lack of resources to identify, design, and develop projects directed toward forest management and climate mitigation. The organizations which designed carbon forestry projects during the AIJ pilot phase did so in co-operation with an international organization such as TNC, which provided the expertise to calculate project emission baselines and environmental additionality. In the case of CCMSS, this expertise was accompanied by a transfer of know-how to a specific individual. For PRONATURA, "the most complex issue in the development of carbon forestry projects is the creation of certain capabilities at individual and organizational levels which we currently do not have" (PRONATURA member, pers. comm., March 28, 2003).

### (iii) *Common property, investment risk and development benefits*

The common property regime governing Mexican *ejidos* is considered a key factor in the development of carbon offset projects through CDM or voluntary projects. Government officials, for instance, perceive *ejidos* as a system of property rights which may lead to higher investment uncertainty and higher pro-

ject management costs because of common property institutions and multiple co-owners. Notwithstanding, government interviewees stress that the risks associated with investing in common property and small-scale activities may be counterbalanced by social and environmental benefits, particularly if communities are well organized and have a history of successful development projects. They believe that carbon forestry projects and other payments for the conservation of ecosystem services can strengthen community organizations, promote better forestry practices, and provide farmers with new economic opportunities. As summarized by a government officer:

"If you want a project with higher social benefits, you should involve local farmers and rural communities. If you go for a project encompassing thousands of hectares, you are unlikely to benefit those who have less, as you would benefit whoever has a vast tract of land to achieve lower management costs. I am aware that without finding the means to reduce transaction costs, small-scale community-based projects may fall outside the CDM market. The reality is that putting together thousands of subsistence farmers to develop a 2,000-hectare carbon project and maintain the project for 20 or 30 years can be very difficult" (SEMARNAT official, pers. comm., November 14, 2002).

The view that marketing forest carbon through *ejidos* can effectively promote sustainable forest management, strengthen community-based institutions, but also imply higher transaction costs is shared by the majority of NGOs. They stress the importance of taking into account the cultural and political context of rural communities, and emphasize the importance of incorporating farmers in decision-making at project and national levels. Although uncommon among the NGOs interviewed, there are also less optimistic voices regarding the implications of common property for carbon forestry activities:

"The Mexican countryside is a forbidden territory for the promotion of foreign direct investment, as the majority of land is in the hands of local communities, transactions costs are huge and the levels of uncertainty in project implementation are also high... The common property regime will not be competitive in the CDM market, and there will always be potential problems regarding project decision-making issues" (CESPEDES member, pers. comm., March 25, 2003).

Mexican academics argue that context-specific factors may help to guarantee that carbon forestry projects are locally accepted and imple-

mented with minimum transaction costs. These factors include the existence of respected forms of communal decision-making, clear rules regarding the use and conservation of natural resources, the lack of land-related conflicts, and the maintenance of historical forms of communal forest management and conservation, as well as clear local leadership. As one of these academics stresses, “the degree of confidence among resource users and the existence of local systems for social control can explain different responses of local communities to projects that imply in an imaginary or real way the compromising of their property rights” (UNAM lecturer, pers. comm., March 18, 2003). In this sense, academics emphasize that the lack of formal private property rights should not be regarded as an impediment for rural communities and farmers’ involvement in marketing forest carbon, although they recognize that it might make the establishment of formal binding contracts among the involved parties more difficult.

Representatives from USAID and UNDP also recognize that common property may hinder international investors from trading forest carbon in Mexico through the CDM:

“The problem in the Mexican forestry sector is the land-tenure system. An investor willing to develop a project on thousands of hectares in Mexico would need to negotiate with multiple *ejidos* or with multiple individual owners. Obtaining consensus would be difficult... One must wait until consensus is there and then nobody can ensure that such a consensus will disappear when local community-based authorities change” (USAID official, pers. comm., March 28, 2003).

In contrast, the World Bank’s representative stresses that the problems of carbon forestry activities have been magnified both in Mexico and in other developing countries. Their problems are likely to be the same as those of other development projects, including issues such as the legitimacy of organizational and management arrangements, and the distribution of project outcomes:

“There will be some carbon forestry projects with a better design, some with a weaker or stronger consultative process, some with a more or less extensive distribution of project benefits. I do not think that these characteristics are exclusive of carbon forestry activities, and project design and implementation characteristics are only going to reflect the deficiencies of any other type of development project” (World Bank Environment Officer, pers. comm., January 31, 2003).

Table 3 summarizes stakeholder views and the perceived challenges for the effective implementation of instruments marketing forest carbon. In the following section, we review the early implementation of the PSA-CABSA program in order to draw comparative insights between these mechanisms to promote carbon forestry activities in Section 5.

#### (b) *National carbon forestry program*

Mexico’s National Carbon Forestry Program (CFP) is part of the country’s program of Payments for Biodiversity, Carbon Fixation, and Agroforestry activities (PSA-CABSA), established in 2004. PSA-CABSA follows the earlier program of Payments for Hydrological Services (PSAH). The origins of both programs are found in the country’s General Law for Sustainable Forest Development, passed in February 2003, and a modification of Article 223 in Mexico’s Law of Rights. This established the Mexican Forestry Fund as a financial instrument to promote incentive and market-based systems for the conservation of forest ecosystems. The Forestry Fund was supported by a small levy on national water tax payments in order to promote PSAH, while funds for PSA-CABSA are annually negotiated in congress. The National Forestry Commission (CONAFOR), a decentralized agency of SEMARNAT, manages the Fund and administers the PSAH and PSA-CABSA programs.

PSA-CABSA is a 5-year program with three main components: carbon sequestration, biodiversity conservation, and the conversion of agriculture and pasture to agroforestry systems. The carbon component aims to create capacity in rural communities so that they can access international markets for carbon emission reductions. It aims to promote skills to identify, formulate, monitor, and verify carbon forestry projects. In order to join the program, rural communities and farmers should not be receiving support from other government forestry programs, including PSAH. The carbon component finances project design up to a maximum of two years and implementation for a five-year period. The program rules ambiguously note that project proposals must follow the small-scale modalities established by the World Bank Prototype Carbon Fund (without clarifying the type of eligible activities) and demonstrate an annual sequestration potential between 4,000 and 8,000 tons of CO<sub>2</sub>eq. Projects approved for implementation receive four

Table 3. Stakeholder interests in marketing forest carbon

Stakeholder (category)	Organization (individuals interviewed)	Influence in carbon forestry activities through policy-making or project implementation	Interest in the development of carbon forestry activities	Challenges to the development of carbon forestry activities in Mexico
Government (primary)	SEMARNAT (7), CONAFOR (5), INE (3)	Leading institutions in UNFCCC negotiations, drafting national policies on climate change and establishing a national system of payments for ecosystem services, which includes payments for carbon sequestration	<p>Maximize in-country investment opportunities and expand the portfolio of GHG emission reduction projects</p> <p>Ensure the inclusion of conservation and reforestation activities in climate change policy frameworks, with a particular interest in small-scale initiatives</p> <p>Offer new economic opportunities to the rural poor in order to reduce poverty and strengthen community-based organizations</p> <p>In the particular case of INE, benefit from new lines of research in the context of markets for ecosystem services</p>	<p>High transaction costs of projects as a result of common property rights, small-scale plantations and working with community-based organizations</p> <p>Guarantee to foreign investors that developing projects on common property can maximize social benefits.</p> <p>Minimize the participation of the government in the CDM process</p> <p>Reduction of potential investment flows due to the US withdrawal from the Kyoto Protocol</p>
NGOs (primary)	ERA (1); CCMSS (3); PRONATURA (1); TNC-Mexico (1)	Leading role in the design and implementation of carbon forestry projects during the AIJ phase Participation in discussions to establish the national system of payments for ecosystem services	<p>Expand the organization's portfolio of activities and maximize the number of economic sources to strengthen conservation and forest management community-based initiatives</p> <p>Gain skills to develop future carbon projects and transfer knowledge to rural organizations</p>	<p>High technical complexity and high transaction costs of projects</p> <p>Lack of skilled personnel and economic resources to kick-start new projects</p> <p>Ensure that local contexts are well understood and local communities participate in project decision-making</p>

NGOs (secondary)	GEA (2); CTCSM (1); FORO (1); CESPEDES (1); BIO-PLANETA (1); CI-Mexico (1); UGAM (1)	Participation in public consultations on climate- change policy Some have been involved in the implementation of energy-based mitigation projects (e.g., CTCSM) and others in the evaluation of pilot forestry projects (e.g., FORO)	Support the development of climate mitigation activities in the country, providing adequate information to local stakeholders and rural communities so that they can decide whether to participate in these activities or not	Likelihood of conflict among project stakeholders and within non-governmental organizations as a result of divergent views regarding the underlying trading and mitigation principles of the CDM and market environmentalism in general Property rights and community-based institutions are regarded as critical impediments by some organizations (e.g., CESPEDES; CI-Mexico)
Academics (secondary)	UNAM (4); UIA (1); COLMEX (1); CIDE (1); UAM (1)	Leading role in the production of research studies on carbon sequestration potential and GHG emission inventories	Development of new research projects in the field of mitigation policy and projects	Reduced level of international investment Likely difficulties of projects to be able to understand the local context and identify suitable conditions for projects' long-term financial and social sustainability
Multilateral agencies (primary)	The World Bank (1)	Establishment of the Bio-Carbon Fund for the promotion of carbon forestry activities worldwide	Increase the number of carbon forestry projects worldwide and maximize the potential synergies between carbon marketing schemes and poverty reduction strategies	Challenges are the same as those involved in any other development activity (i.e., investors' financial commitment, project methods and implementation issues, such as benefits distribution and participation) <i>(continued on next page)</i>

Table 3—(continued)

Stakeholder (category)	Organization (individuals interviewed)	Influence in carbon forestry activities through policy-making or project implementation	Interest in the development of carbon forestry activities	Challenges to the development of carbon forestry activities in Mexico
Multilateral agencies (secondary)	USAID (1); UNDP (1)	Leading role in the financing of early studies on climate mitigation projects and GHG emission inventories	Provide for capacity- and institutional-building programs Maximize inter-governmental co-operation and maximize opportunities for the arrival of direct foreign investment	High transaction costs and complex methodologies in comparison to energy-based projects Lack of investment in the forestry sector due to the US withdrawal from the Kyoto Protocol

annual payments equivalent to 20% of the additional carbon storage estimated for the first five years of the project lifetime, plus a final payment in the fifth year adjusted to the actual amount of carbon dioxide sequestered in the five-year period. The price paid per ton of CO<sub>2</sub>eq oscillates between a minimum guaranteed price of approximately US\$4.70 to a maximum of US\$9.40 per ton CO<sub>2</sub>eq, compared to the market average of US\$5.63 per ton CO<sub>2</sub>eq for CERs in present Kyoto-compliant carbon markets (Lecocq & Capoor, 2005, p. 4). Obtaining a higher price than the guaranteed baseline is dependent on a project's performance in relation to a set of 17 criteria defined in the program operational rules.

The operational rules of PSA-CABSA were developed through extensive consultation with civil society organizations, including NGOs and rural organizations. CONAFOR involved representatives of multilateral organizations, such as the World Bank, NGOs, and academics, to define the criteria for the evaluation of project contribution to environmental conservation and poverty reduction. These criteria characterize projects according to their contribution to the conservation of natural resources, their location in existing protected areas, the establishment of forest management plans, and their ability to involve poor communities and women's groups in their implementation, among other factors. The program has generated a positive response from civil society, rural organizations, and rural communities. As of December 2005, there have been 832 applications to PSA-CABSA, 219 of them for marketing forest carbon. But of these 219, only 71 proposals have received funding for the project design phase, each having been granted approximately US\$31,000 to prepare the project and submit it for evaluation to CONAFOR prior to implementation. The reasons for rejections include, in order of importance, their lack of additionality in terms of carbon fixation (98 rejections), missing documentation (18), their participation in other government-based forestry programs (16), their location outside the municipal and geographical areas selected for the program (7), and others (4) (Comisión Nacional Forestal, 2004).

Our enquiries to government officials in charge of the CFP program revealed that none of the projects selected for implementation meet either the land-use baseline conditions which are necessary to become eligible as CDM projects in the future (areas which had

been deforested prior to 1990), or support eligible forestry activities under the CDM (reforestation and afforestation activities). Most project areas had some degree of forest cover before 1990 and promote conservation rather than afforestation activities. A researcher who participated in the process of constituting the PSA-CABSA admits that

“In the process of creating the program, people who knew about carbon sequestration and international rules were absent, and the rules were made without knowing whether the projects would be compatible with the rules for unilateral CDM projects. The program responds much more to the political pressure of civil organizations which believe that planting some trees can make them rich rather than to a real willingness on behalf of the government to support this type of activities and link them to international carbon markets... Nowadays, the program is just a subsidy” (INE Researcher, email communication, May 19, 2005).

These views are shared by an international consultant who was involved in the early implementation of the PSA-CABSA. He argues that CONAFOR officials realized at a late stage that the eligible areas for the program and the criteria chosen to evaluate project proposals made constrained future funding for the projects to non-Kyoto carbon markets (Climate Change Consultant, email communication, May 20, 2005). The incompatibility of PSA-CABSA with the CDM framework can be explained, on one hand, by CONAFOR's lack of expertise in international climate change policy and mechanisms, and the inability to incorporate more knowledgeable individuals in drafting the program's procedural rules. On the other hand, it is also a consequence of CONAFOR's interest in accommodating a diversity of interests in the design of the program, as well as its mandate to benefit as many rural communities and farmers as possible through public finance.

## 5. DISCUSSION

### (a) *Institutional complexity and organizational capacity*

The previous section reveals the existence of competing views regarding which rules should govern the design and implementation of instruments marketing forest carbon. Particularly contested is the CDM, the rules of which have been agreed at the international level

and do not necessarily satisfy all Mexican stakeholders. Our results also indicate that the evolution of international negotiations can severely influence the deployment of an institutional arrangement such as the CDM. Together with the temporary character of the CERs generated by CDM forestry projects, the exclusion of conservation activities from the CDM has surely diminished potential investment flows to the developing world. Several developing countries, including Mexico, research think-tanks, and conservation organizations are now working together to define a coherent framework to incorporate avoided deforestation activities in the CDM sometime in the near future or at the end of the Protocol's first commitment period in 2012 (UNFCCC, 2006). Seemingly important may be the US withdrawal from the Kyoto Protocol, which has influenced the levels of CDM investment in Mexico and other parts of the developing world, reducing the potential carbon market and the demand for carbon credits from the United States. Yet, there is manifest interest in Mexican civil society to engage in forest carbon marketing, shown by the response of rural communities and NGOs to the national CFP and the large number of proposals submitted for evaluation.

The fact that the majority of the stakeholders interviewed feel that CDM carbon forestry projects are extremely complex reveals a trade-off between ensuring the credibility of Kyoto CERs and engaging civil organizations in projects. Local project actors lack technical and financial capacities, and collaboration with national and international organizations appears crucial for the future implementation of environmentally and socially-sound projects. To address capacity issues, resources are necessary to disseminate the capabilities of government officials and academics to NGOs, peasant organizations, and communities. The lack of effective capacity of stakeholders in developing countries is often associated with a limited capacity to negotiate, participate in, and influence international climate change negotiations (Richards, 2001), but it is also related to the poor integration of climate change matters into sectoral policies (Beg *et al.*, 2002).

Our results also show that the majority of NGOs interviewed identify their lack of expertise as a cause of their limited involvement in marketing forest carbon, and in climate change policy in general. As increasing climate change expertise in Mexican academic institutions has

translated into more research projects and advice for policy-makers and negotiators, generating expertise across NGOs may result in more carbon forestry projects, most likely for the provision of VERs in the retail market. This will be dependent on what resources become available to civil organizations to acquire the relevant knowledge about the CDM and to participate in the design of Kyoto-compliant and voluntary projects. In this sense, multilateral agencies such as the UNDP, FAO, and the World Bank could play an active role in supporting a CDM capacity-building program for Mexican organizations, as they have already done for other countries in Latin America (Brown, Adger, Boyd, Corbera, & Shackley, 2004, pp. 40–41).

The experience to date of the CFP program also indicates the lack of capacity among rural *ejidos* and organizations to prepare carbon forestry projects which meet the program's operational rules. Those projects which receive funding for implementation may create local capacity but it is unclear how this helps to attract national or international investors. The internal demand for carbon offsets from forests in Mexico cannot be guaranteed unless the country sets up emission caps, either through an internal program or the international climate change regime.

(b) *Negotiation of institutional rules and outcomes*

Each instrument marketing forest carbon in Mexico has a different level of civil society involvement in the definition of its procedural rules. In the CDM context, no member of civil society has been involved in the definition of the DNA criteria or in the administrative structure for project evaluation. However, a workshop conducted in Mexico City in 2003, which involved representatives of the Mexican government, NGOs, and international development agencies to discuss a number of criteria for the evaluation of CDM afforestation and reforestation activities, stressed the need to "promote local and national discussion forums to discuss with other stakeholders the level of a project sustainable development compliance" (Corbera & Zepeda, 2003, p. 12).

The existence of contrasting views regarding how participation should be used in the development of CDM projects can be explained by different interpretations of the CDM framework. Government officials' views of

participation reflect a strict application of what has been agreed at the international level, which does not impose an obligation to dedicate resources to the inclusion of civil society in DNA decisions. The government therefore considers it inappropriate to establish further provisions for social participation above those provided by the CDM itself through Internet consultation and annual negotiations at COPs. Civil organizations and academics, in contrast, are not aware of these provisions and articulate their view on the basis of what they believe is desirable. They tend to advocate democratic procedures, such as stakeholder forums, to evaluate and approve CDM and voluntary projects, in addition to third party verification. These actors are not keen to use international negotiations and Internet-based mechanisms to put forward their views.

This creates a contradiction between what type of participation is legible under international environmental regimes, such as the Kyoto Protocol, and what type of participation is visible to NGOs willing to participate in climate change policy through their own governmental institutions. For the case of the CFP, the situation is slightly different. The Technical Committee created to evaluate project proposals and development incorporates members of the Mexican Council for Rural Sustainable Development, which includes farmer organizations, as well as NGOs belonging to the National Forestry Council. Such structure should, at least in principle, permit civil society organizations to have a stronger voice in the selection of projects and the re-design of procedural rules when necessary.

Including stakeholders in the evaluation of CDM projects may be necessary to ensure a balance between the climate mitigation and development objectives of the mechanism (as outlined in Article 12 of the Kyoto Protocol). In his study of the CDM development in India, Uruguay, and South Africa, Sutter (2003) shows how civil society rates the sustainable development component of CDM projects higher than climate mitigation objectives. He argues that governments of these countries would only act in line with their citizens "if they ensure that CDM projects not only deliver cost-efficient GHG emission reductions, but also provide real benefits to the sustainable development of their country" (Sutter, 2003, p. 201). Integrating stakeholders in decision-making is an important step toward the construction of more equitable environmental governance.

There are good reasons to believe that environmental decisions are becoming more difficult to make in the globalizing world because "they involve a growing number of actors that are increasingly heterogeneous in terms of their interests, values, and notions of justice" (Paavola, 2005, p. 143). This, in turn, makes it necessary to find more imaginative ways of involving stakeholders in making decisions, dealing with conflict and coming to collective, negotiated outcomes.

#### (c) *Interplay across marketing frameworks*

As shown in Section 4, a lack of understanding on behalf of CONAFOR officials about what type of activities are eligible for a CDM project, and the exclusion of Mexican CDM experts when establishing the operational rules of the program, undermined the possibilities for institutional integration across the CDM and the CFP. The Mexican case is not unique. The Costa Rican PES program is also not compatible with CDM rules, as it funds projects which cover, often in a combined fashion, the reforestation of degraded lands, forest management, and conservation activities.

Beyond the harmonization of rules for the commercialization of carbon forestry offsets or the evaluation of carbon forestry projects, there is another consequence of the lack of institutional integration between the CFP and the CDM. This relates to the confusion that the existence of these two distinct institutional arrangements potentially generates among civil society organizations and rural communities. It may be necessary for CONAFOR to take a leading role in explaining to future project developers what differences exist between the CFP projects and CDM forestry projects. The extensive use of the word *market* in the CFP (30 times in its 24 pages of operational rules) could lead NGOs and rural organizations to think that a market for ecosystem services is actually functioning and that this market is mature enough to guarantee the long-term financial sustainability of any CFP project under implementation. This needs to be clarified, in particular to rural communities who may see their expectations hampered if they have difficulties in obtaining funding after the five-year program period ends.

The CFP also reveals that national interests in forest conservation and climate mitigation might conflict with those of international negotiators. This translates into poor integration of

national and international institutions for the governance of the atmospheric commons and it may also lead to the establishment of country-specific systems of carbon trading. Landell-Mills and Porras (2002, p. 94) stress that different carbon trading platforms will evolve, but they believe that these will tend to converge in the future if an international climate agreement remains in place. They suggest that it might be necessary to create exchange trading systems among existing frameworks and to account for different levels of risks and values attached to each type of carbon credit (Landell-Mills & Porras, 2002, p. 94). However, we argue that as more developing countries put distinct systems for valuing and marketing forest carbon into place, it will become more difficult to find common ground for making decisions. Each institutional framework will evaluate the process of carbon exchange in distinct ways and the means of participation of the public and project participants will also be different. The room for harmonization of rules across instruments and scales of governance may become increasingly difficult.

(d) *Interplay with local property rights*

Finally, we suggest that marketing forest carbon through voluntary and Kyoto markets will be influenced by the ability of project managers to craft resource management activities which take into account local institutions, particularly local property rights regimes. As noted in Section 3, 80% of the Mexican countryside is owned by rural communities, who often hold in common both pastures and forest lands. A process of formal individual and communal land titling (PROCEDE) has been implemented with great success across the country during the late 1990s (Registro Agrario Nacional, 2004) but individual private property remains rare. This explains why the majority of stakeholders considered common property a central element to account for in project design and implementation. It is likely that investors need to negotiate with community-based organizations to establish a formally binding collective contract, which may be more time consuming than working with an individual farmer holding a large tract of land. However, the added time may be counterbalanced by the positive spin-offs of investing in collective action and promoting forest management in communal areas. Voluntary experiences through the AIJ phase in Mexico and India have shown that community-

based organizations can become committed forest carbon traders (Smith & Scherr, 2002).

But voluntary contracts are unlikely to be the norm in future CDM forestry projects and other initiatives marketing forest carbon and ecosystem services. Investors need to secure their rights over a reliable production of an ecosystem service. Landell-Mills and Porras (2002, p. 218) highlight that the "formalisation of natural resource property rights is essential for giving poor households control over, and rights to, returns from sales. To attract business, land managers must be able to offer credible commitments for supply." In other words, land titles make right-holders visible to project managers, investors, and State institutions, which, in turn, can bring farmers to court and seize their assets if contract requirements are not met. In fact, several experiences to date have been reluctant to dissociate individual participation in these markets and the possession of formal land title, thereby increasing the risk of marginalizing a vast number of rural people in developing countries who do not hold formal private property—but may instead have formal rights in a common property context (Pagiola *et al.*, 2005; Swallow, Meinzen-Dick, & van Noordwijk, 2005).

We demonstrate elsewhere (Corbera, Brown, & Adger, 2007) that the interplay between carbon forestry projects and property rights, in both their formal and informal dimensions, determines procedural fairness and equitable outcomes in project implementation. Acknowledging local historical conditions and social relations is necessary to recognize a variety of resource users, who hold different rights over distinct productive spaces and, as a result, have competing interests over their forestry productive needs and divergent views over how the project should perform. Such recognition will illuminate the existing tensions between the fundamental objective of a marketing instrument (to deliver a commodity at the lower possible cost) and the interests and expectations of local people.

## 6. CONCLUSION

This paper analyzes the development of markets for forest carbon in Mexico. It shows how the government has been active in supporting these activities at the UNFCCC level through the AIJ and the CDM, and in recently establishing a national system of payments for

ecosystem services, which includes a Carbon Forestry Program (CFP). Even so, there is only one AIJ forestry project in the country trading in the retail market and there are no CDM forestry projects. The CFP has translated into the development of several carbon forestry projects, which have been designed to strengthen local capacities and increase the likelihood of resource managers participating in international carbon markets in the future.

It also shows that the interests and views of government officials, academics, NGOs, and multilateral agencies concerning institutional arrangements to market forest carbon do not necessarily coincide. While some view the CDM as an opportunity to increase the funding sources for forest rehabilitation, management and protection, and rural development, others see this instrument as a new form of environmental colonialism. In contrast, the CFP is better supported because of its State-led character and the flexibility of its procedural rules. Stakeholders also identify a number of issues which may limit the implementation of CDM forestry projects. These include the exclusion of conservation activities from the CDM and its procedural complexity, the lack of organizational capacities and expertise throughout Mexican

civil society, the relatively small investment window that CDM forestry represents to date, and the common property system underlying Mexican rural property, which may hinder international investors' willingness to invest in forestry projects in the country.

Our analysis exposes several challenges to be resolved before it is possible to guarantee effective management of the global atmospheric commons through market-based forest carbon trading. Firstly, this type of institutional arrangement does not yet have sufficient support from all civil society sectors, thus limiting widespread participation in these markets. Secondly, there is a general lack of capacity across civil society actors to implement these projects in a consistent manner. Thirdly, the lack of integration between the different institutions trading forest carbon undermines any attempt to establish a uniform framework under a set of internationally agreed and legitimate rules and principles. Critical to the effective implementation of markets for forest carbon will also be the ability to design projects taking into account local property rights, socio-political dynamics, and cultural perceptions of market-based instruments.

## REFERENCES

- Agrawal, A. (2002). Common resources and institutional sustainability. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, & E. U. Weber (Eds.), *The drama of the commons*. Washington, DC: National Academy Press.
- Barrett, C. B., Lee, D. R., & McPeak, J. G. (2005). Institutional arrangements for rural poverty reduction and resource conservation. *World Development*, 33(2), 197.
- Bayon, R., Hawn, A., & Hamilton, K. (2007). *Voluntary carbon markets. An international business guide to what they are and how they work*. London: Earthscan.
- Beg, N., Morlot, J. C., Davidson, O., Afrane-Okesse, Y., Tyani, L., Denton, F., et al. (2002). Linkages between climate change and sustainable development. *Climate Policy*, 2(2-3), 129-144.
- Berkes, F. (2002). Cross-scale institutional linkages: Perspectives from the bottom-up. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, & E. U. Weber (Eds.), *Drama of the commons*. Washington, DC: National Academy Press.
- Biermann, F. (2007). 'Earth system governance' as a cross-cutting theme of global change research. *Global Environmental Change*, 17, 326-337.
- Boyd, E., Corbera, E., Gutierrez, M., & Estrada, M. (2004). The politics of afforestation and reforestation activities at COP9. Briefing Note 12. Norwich: Tyndall Centre for Climate Change Research.
- Brown, K., Adger, W. N., Boyd, E., Corbera, E., & Shackley, S. (2004). Evaluating policy options for the clean development mechanism: A stakeholder multi-criteria approach. Technical Report 16. Norwich: Tyndall Centre for Climate Change Research.
- Brown, K., & Corbera, E. (2003). Exploring equity and sustainable development in the new carbon economy. *Climate Policy*, 3(S1), s41-s56.
- Cervantes, M. A. (2004). *Oportunidades del MDL en Mexico*. SEMARNAT, Government of Mexico.
- Comisión Nacional Forestal (2004). Programa para Desarrollar el Mercado de Servicios Ambientales por Captura de Carbono y los derivados de la Biodiversidad y para Fomentar el Establecimiento y Mejoramiento de Sistemas Agro-Forestales (PSA-CABSA). Asignación de Pagos 2004. Guadalajara: SEMARNAT, Government of Mexico.
- Comité Intersecretarial sobre Cambio Climático (2001). Second communication for the United Nations convention on climate change. Mexico City: Government of Mexico.
- Corbera, E. (2005). Bringing development into carbon forestry markets: Challenges and outcomes of small-scale carbon forestry activities in Mexico. In D. Murdiyarto, & H. Herawati (Eds.), *Carbon forestry:*

- Who will benefit?* Bogor: Center for International Forestry Research.
- Corbera, E., Brown, K., & Adger, W. N. (2007). The equity and legitimacy of markets for ecosystem services. *Development and Change*, 38(4), 587–613.
- Corbera, E., & Zepeda, Y. (2003). Sustainable development criteria for forestry projects operating under carbon markets. Workshop Report. Norwich: Tyndall Centre for Climate Change Research.
- Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., *et al.* (1997). The value of the world's ecosystem services and natural capital. *Nature*, 387(6630), 253–260.
- de Vos, J. (2002). *Una tierra para sembrar sueños. Historia reciente de la Selva Lacandona 1950–2000*. Mexico City: Centro de Investigaciones y Estudios Superiores en Antropología Social y Fondo de Cultura Económica.
- Dietz, T., Ostrom, E., & Stern, P. C. (2003). The struggle to govern the commons. *Science*, 302(5652), 1907–1912.
- Earth Negotiation Bulletin (1998). Report of the Fourth Conference of the Parties to the UN Framework Convention on Climate Change: November 2–13, 1998. New York: International Institute for Sustainable Development.
- Earth Negotiation Bulletin (1999). Summary of the Fifth Conference of the Parties to the Framework Convention on Climate Change: October 25–November 5, 1999. New York: International Institute for Sustainable Development.
- Grimble, R., & Chan, M. K. (1995). Stakeholder analysis for natural resource management in developing countries. *Natural Resources Forum*, 19(2), 113–124.
- Katoomba Group (2006). Market Watch: Carbon Markets. <[http://ecosystemmarketplace.com/pages/marketwatch.segment\\_landing.carbon.php?component\\_class\\_name\\_csv=carbon\\_market,carbon\\_aggregate\\_market](http://ecosystemmarketplace.com/pages/marketwatch.segment_landing.carbon.php?component_class_name_csv=carbon_market,carbon_aggregate_market)>. October 3, 2006.
- Klooster, D. (1999). Community-based forestry in Mexico: Can it reverse processes of degradation? *Land Degradation and Development*, 10, 365–381.
- Klooster, D. (2003). Campesinos and Mexican forest policy during the twentieth century. *Latin America Research Review*, 38(2), 94–126.
- Klooster, D., & Masera, O. (2000). Community forest management in Mexico: Carbon mitigation and biodiversity conservation through rural development. *Global Environmental Change—Human and Policy Dimensions*, 10(4), 259–272.
- Landell-Mills, N., & Porras, I. (2002). *Silver bullet or fools' gold? A global review of markets for forest environmental services and their impacts on the poor*. London: International Institute for Environment and Development.
- Lecocq, F., & Capoor, K. (2005). *State and trends of the carbon market*. Washington, DC: The World Bank.
- Liverman, D., & O'Brien, K. L. (2001). Southern skies: The perception and management of global environmental risks in Mexico. In T. S. L. Group (Eds.). *Learning to manage global environmental risks* (Vol. I). Cambridge: MIT Press.
- Masera, O. R., Ordóñez, M. J., & Dirzo, R. (1997). Carbon emissions from Mexican forests: Current situation and long-term scenarios. *Climatic Change*, 35, 265–295.
- May, P. H., Boyd, E., Veiga, F., & Chang, M. (2004). *Local sustainable development effects of forest carbon projects in Brazil and Bolivia: A view from the field*. London: International Institute for Environment and Development.
- Michaelowa, A. (2000). Flexible instruments of climate policy. In A. Michaelowa, & M. Dutschke (Eds.), *Climate policy and development. Flexible instruments and developing countries*. Cheltenham: Edward Elgar.
- Miguez, J. D. G. (2005). *Host country approval processes and project opportunities: The Brazilian DNA perspective*. Japan Carbon Investors Forum, Tokyo, March 24, 2005.
- Muñoz-Piña, C., de Janvry, A., & Sadoulet, E. (2003). Recrafting rights over common property resources in Mexico. *Economic Development and Cultural Change*, 52, 129–158.
- Murdiyarso, D. (2005). Sustaining local livelihoods through carbon sequestration activities: A search for practical and strategic approach. In D. Murdiyarso, & H. Herawati (Eds.), *Carbon forestry: Who will benefit?* Bogor: Center for International Forestry Research.
- O'Brien, K. L. (1998). *Sacrificing the forest. Environmental and social struggles in Chiapas*. Boulder, CO: Westview Press.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton/Oxford: Princeton Paperbacks.
- Paavola, J. (2005). Interdependence, pluralism and globalisation. In J. Paavola, & I. Lowe (Eds.), *Environmental values in a globalising world*. Routledge: Oxon.
- Pagiola, S., Arcenas, A., & Platais, G. (2005). Can payments for environmental services help reduce poverty? An exploration of the issues and evidence to date from Latin America. *World Development*, 33(2), 237–253.
- Peres, A., Jauregui, S., Lorini, N., & Gonzales, J. (2003). Guidelines for the presentation of clean development mechanism projects in Bolivia. La Paz: Ministry for Sustainable Development, Government of Bolivia.
- Registro Agrario Nacional (2004). *PROCEDE. Avance general operativo*. Mexico City: Government of Mexico.
- Richards, M. (2001). *A review of the effectiveness of developing country participation in the climate change convention negotiations*. London: Forest Policy and Environment Group, Overseas Development Institute.
- Robertson, M. M. (2004). The neoliberalization of ecosystem services: Wetland banking and problems in environmental governance. *Geoforum*, 35, 361–373.
- Smith, J., & Scherr, S. (2002). Forest carbon and local livelihood: Assessment of opportunities and policy recommendations. Occasional Paper 37. Bogor: Center for International Forestry Research.
- Sutter, C. (2003). *Sustainability check-up for CDM projects. How to assess the sustainability of interna-*

- tional projects under the Kyoto Protocol*. Berlin: Wissenschaftlicher Verlag.
- Swallow, B., Meinzen-Dick, R., & van Noordwijk, M. (2005). Localizing demand and supply of environmental services: Interactions with property rights, collective action and the welfare of the poor. Working Paper 42. CGIAR Systemwide Program on Collective Action and Property Rights, Washington, DC.
- Swingland, I. R. (2002). *Capturing carbon and conserving biodiversity: The market approach*. London: Earthscan.
- Taiyab, N. (2006). *Exploring the market for voluntary carbon offsets*. London: International Institute for Environment and Development.
- The Energy and Resources Institute (2005). *CDM in India. Periodical October 2004–March 2005*. New Delhi: The Energy and Resources Institute.
- UNEP-Risoe (2007). CDM pipeline overview.
- United Nations Framework Convention on Climate Change—UNFCCC (2001). The Marrakech accords.
- United Nations Framework Convention on Climate Change—UNFCCC (2002a). Decision 17/CP.7: Modalities and procedures for a clean development mechanism, as defined in Article 12 of the Kyoto Protocol.
- United Nations Framework Convention on Climate Change—UNFCCC (2002b). Options paper on modalities for addressing socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems.
- United Nations Framework Convention on Climate Change—UNFCCC (2002c). Sixth synthesis report on activities implemented jointly under the pilot phase.
- United Nations Framework Convention on Climate Change (2006). Report on a workshop on reducing emissions from deforestation in developing countries. Subsidiary Body for Scientific and Technological Advice, Nairobi.
- World Bank (1995). *Mexico resource conservation and forest sector review*. Latin America: Resources and Rural Poverty Operations Division/Washington, DC: The Caribbean Regional Office.
- World Bank (2007). BioCarbon Fund Project Portfolio. <<http://carbonfinance.org/Router.cfm?Page=BioCF&ft=Projects>>. June 18, 2007.
- Young, O. R. (2002). *The institutional dimensions of environmental change. Fit, interplay and scale*. London: MIT Press.
- Young, O. R., Agrawal, A., King, L. A., Sand, P. H., Underdal, A., & Wasson, M. (1999). Institutional dimensions of global environmental change. Report No. 9. International Human Dimensions Programme on Global Environmental Change, Bonn.

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

