



## Exploring equity and sustainable development in the new carbon economy

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### Abstract

Ambitious claims have been made about the development benefits of market-based policy instruments for climate mitigation. We examine the implications of forest carbon projects for different aspects of equity and sustainable development. We apply a stakeholder multi-criteria assessment to explore the range of stakeholders, their roles, interests and perspectives, to a case study in Mexico. Two elements of equity, access to markets and forests, and legitimacy in decision-making and institutions, are discussed. Robust cross-scale institutional frameworks are necessary to ensure that objectives for equity and sustainable development are met and that already marginalised sectors of society are not excluded. These institutions are still developing and their establishment brings together many different stakeholders from government, private sector and civil society. However, the ability of the “new carbon economy” to provide real benefits for sustainable development may ultimately be constrained by the nature of the market itself.

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### 1. Introduction: a new carbon economy?

The “new carbon economy” represents the emerging trade in carbon emissions, along with the series of market-based policy instruments designed to reduce global greenhouse gas (GHG) emissions through the creation of markets for carbon such as the flexibility mechanisms of the Kyoto Protocol. These mechanisms are viewed by market advocates as being economically efficient and as providing incentives for a wide range of resource managers, from local to international level, to comply with environmental agreements such as the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol.

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We investigate the sustainable development and equity dimensions emerging from the implementation of pilot phases of these instruments. Insights from political ecology analyses of global environmental policy in diverse areas indicate that this new carbon economy, based on a discourse of global managerialism, has difficulties in incorporating local ecological and social realities, particularly in terms of losers and winners at the local scale (Adger et al., 2001). This is partly because carbon markets do not spontaneously emerge; they are created by global and national institutions. Their creation may involve changing property rights, often overturning long-established traditional management and property rights regimes. In the case of forest carbon projects this change may impact on local peoples' access to valuable resources, including environmental services, subsistence and marketed products. This is important for both local livelihoods and sustainable development.

A critical challenge in the new carbon economy is establishing robust cross-scale institutional frameworks to enable an equitable interaction among stakeholders and, more importantly to deliver sustainable development to local communities. Competing interests over forestry carbon projects have to be acknowledged and accommodated, and local needs have to coalesce with the interests of investors, brokers, national governments and local NGOs. We suggest that most of the studies so far carried out of forest carbon projects have focused on technical issues such as additionality, transaction and opportunity costs, permanence and enforcement, and verification. From an institutional perspective, the emphasis has been on the international and national level rather than the interface between national actors, project developers and local communities. Less emphasis has been on equity in access to markets, forests and decision-making. We develop these arguments in this paper with reference to observations of the development of the carbon economy and a land use related carbon sequestration project in Mexico. Our findings are based on empirical research and analysis of stakeholders and institutions using qualitative techniques. The following section of the paper outlines the policy context and role of land use and forestry in climate mitigation. The next section then discusses how equity and sustainable development are defined in the context of climate mitigation. We review the development of the carbon economy in Mexico and present a stakeholder analysis of the *Fondo Bioclimatico* carbon project in Chiapas. We analyse stakeholders' perspectives and evaluation of criteria and indicators for carbon forestry projects. We conclude by discussing the implications for equity and sustainable development and the evolution of cross-scale institutions within the new carbon economy.

## 2. Climate mitigation and forestry

Early political negotiations under the UNFCCC made clear that meeting GHG emission targets would require cost-effective strategies to provide incentives to private sector actors to lower their emissions and comply with national and international policies and targets. Involving the private sector potentially mobilises capital and provides a means of channelling it towards environmentally beneficial activities. In the case of the forestry sector, this funding could be used to support forestry development activities and bring direct benefits to poor people in poor countries, diversifying peoples' income and promoting sustainable forest management. These opportunities are highlighted in studies by environmental economists that find carbon sequestration the most economically valuable ecological service provided by forests, which in turn have inspired widespread optimism about the possibility of mitigating climate change through market-based mechanisms for carbon sequestration and storage in forestry (Pearce, 2000, 2001).

The Activities Implemented Jointly (AIJ) pilot phase was launched at the first Conference of the Parties of the UNFCCC in Berlin in 1995 (Decision 5/CP.1). This was conceived as a learning through practice approach, in which investors from developed countries and organisations from developing countries could jointly implement bilateral projects to offset GHG emissions, including energy-oriented projects such as renewable energy, energy efficiency, fugitive gas capture or fuel switching projects, and, relevant for this paper, *land use and forestry* projects, comprising agriculture, afforestation, forest conservation and restoration projects. All projects should be “compatible with and supportive of national environment and development priorities and strategies” (Decision 5/CP.1). To date, forest projects under the AIJ have been in the minority (20) compared to energy (137). Thirteen of these 20 are located in Latin America. Forest conservation is the most preferred option, accounting for nine of the 20 projects (UNFCCC, 2001, 2002). Some examples of these projects are shown in Table 1.

Investors in forest AIJ projects have generally transferred funds to a project developer, usually a non-governmental organisation (NGO) or similar organisation, which is responsible for the definition of forest carbon management activities and for delivering payments to local producers and communities. Commonly, producers have received their payments from a trust fund created and administered by project developers, who may include international research institutions and international NGOs. These international organisations have often played a catalytic role by brokering the agreements between the investors and the local on-site organisations. The so-called voluntary character of the AIJ implies that investors have not received carbon credits but have benefited from good publicity and, in some cases, tax reductions in their home country (Michaelowa, 2000; Pagiola et al., 2002).

The 1997 Kyoto Protocol to the UNFCCC defines three market-based mechanisms to promote carbon trading. The Clean Development Mechanism (CDM), as defined in Article 12 of the Protocol, allows investors to receive carbon credits in exchange for the GHG emission reductions, whilst the host country receives investment, which aims to be in line with the sustainable development principles of the host country. Sustainability becomes then a central tenet of CDM projects and implies that projects should be additional in both environmental and social terms, exceeding the benefits that may have occurred in the absence of the project. Sustainability under the CDM means that projects should avoid the skewed regional distribution characterising earlier AIJ projects if global equity is to be promoted (Pearce, 2000; Mitchell and Parson, 2001).

Modalities and procedures for the CDM were finally agreed in Decision 17/CP.7 to the Marrakesh Accords during the seventh Conference of the Parties in November 2001. The CDM framework is complex in terms of technical procedures but also in terms of participating actors. The host country government plays a more significant role than in the AIJ phase and may act as ‘regulatory actors by offering intermediary services linking buyers with sellers’ (Pagiola et al., 2002, p. 275). Private companies from developed countries are likely to be carbon buyers and international NGOs may help to kick-start CDM forestry projects by providing technical and economic advice to local organisations. Local NGOs may provide technical assistance to land users and also act as intermediaries between investors, governments and the community groups or land users (see Pagiola et al., 2002). Lastly, the UNFCCC governing bodies of the CDM are responsible for determining if projects are acceptable based on specific criteria, including host country acceptance, and delivering carbon credits to the investors.

The Marrakesh Accords allow only limited development of forestry carbon projects. These have included which types of sequestration if any should be counted towards emission reduction targets, and the extent to which national obligations can be met by financing sequestration or sink enhancement in other countries. Decision 17/CP.7 defines the amount of carbon sinks which can be credited, and states that “for

Table 1  
Examples of AIJ forest carbon projects in Latin America

Project name, country	Activities	Area	CDM compliance	Project risks
Rio Bravo Conservation and Management Area Carbon Sequestration Pilot project, Belize	Protection and sustainable forest management of endangered land	49,985 ha in a private nature reserve	No compliance; carbon is sequestered through conservation of existing stocks; perhaps some reforestation activities are likely to be credited	Duration of funding endowment; illegal timber poaching; leakage along some project boundaries due to induced forest fires by surrounding communities
The Noel Kempff Climate Action Project, Bolivia	Protection and forest management	634,286 ha	No compliance; carbon sequestration through conservation of existing stocks	Funding lifetime for project's development component, fires, leakage (logging companies shift to other areas and local communities extend cattle grazing areas)
Peugeot rehabilitation of degraded lands, Brazil	Reforestation of degraded land with native and exotic species	5000 ha of reforestation and 8000 ha of conservation	Potential compliance in reforestation area	Funding lifetime, forest fires, encroachment, and difficulties in seedlings regeneration
<i>Fondo Bioclimatico</i> Carbon Project, Mexico	Improved forest management and reforestation on individual and community managed forestlands	450 ha in different communities on individual and communal holdings	Potential compliance in reforestation areas; voluntary carbon reductions through agroforestry or conservation activities	Increasing population and pressure over natural resources; low payments to local producers and high transaction costs

the first commitment period, the total of additions to and subtractions from the assigned amount of a party resulting from eligible land use, land-use change and forestry (LULUCF) activities under Article 12, shall not exceed 1% of base-year emissions of that party, times five” (for activities started after 2000). Not only is the amount of credits limited, but the type of activities is also constrained, and in the CDM eligible sink activities are limited to afforestation and reforestation projects during the first commitment period (2008–2012). Negotiations on rules governing these projects are expected to be finalised at the ninth Conference of the Parties to be held in December 2003 in Milan (Italy). The definition of modalities and methodologies for CDM projects is becoming established and the first CDM projects could be registered towards the end of 2003.

During the negotiations, some parties feared that the inclusion of forestry under the CDM could result in a reduction of technological and financial transfers to developing countries (Mwandosya, 2000; Ramakrishna, 2000) or increase the spread of commercial plantations (FERN, 2000; Dutschke, 2001). Others, however, claimed that these investments could lower the costs of reaching emissions targets, and that synergistic effects were likely. Many scholars supported this view, emphasising the “win–win” opportunities that forest carbon projects could provide to biodiversity conservation and rural development (Fearnside, 1997; Klooster and Masera, 2000). Furthermore, there were critical South–North dimensions to debates about the architecture and implementation of the CDM and the role of sinks (Mitchell and Parson, 2001; Newell, 2000; Sokona and Huq, 2002) although forest interests were not necessarily divided along these same lines (Brown, 2001).

Although the limitations introduced in Marrakesh make most of the early AIJ forestry projects non-eligible under the UNFCCC trading framework, it has been suggested that their status could change in the second commitment period of the Kyoto Protocol, once these projects have demonstrated their environmental integrity and development potential and can be verified and evaluated according to CDM guidelines (Nelson and de Jong, 2003). As new funding windows and new market-based mechanisms, such as the World Bank Bio-Carbon and Community Development funds or the Chicago Climate Exchange are proposed, the carbon economy develops in both Kyoto and non-Kyoto compliant areas.

### **3. Equity and sustainable development in the context of climate mitigation**

The Kyoto Protocol’s market mechanisms also claim to contribute to sustainable development. We focus on equity as a key component of sustainable development. It concerns fairness of outcomes both now and in the future—who benefits and who is included in development actions. Equity is also about inclusion in the processes of decision-making for development. Thus equity is both instrumental and a right, concerned with both distributional and procedural justice. In line with emerging pluralist ideas in decision-making (Adger et al., 2003), we propose that equity in the context of the new carbon economy comprises three elements: equity in access, equity and legitimacy in institutions and decision-making at all scales, and equity in outcome. These three elements need to be addressed if instruments such as the Kyoto trading mechanisms can make any claim to sustainability. At a minimum, such initiatives require robust and equitable institutions at the local level and means of distributing financial benefits to the stakeholders who may forego immediate and short-term gains in lieu of longer-term benefits of sustainable development (Brown and Adger, 1994).

Equity in access to carbon markets relates to the ways in which different actors in society are able to engage with and participate in the emerging carbon market through these types of projects and

initiatives. This access will depend on a range of factors including information, communication and knowledge, and the way institutions operate at different scales. Institutions in this instance means both formal organisations and also ‘rules in use’. The ease of access to carbon markets will determine the way in which different stakeholders can participate and benefit from the project outcomes. Equity in access to forest resources is important, particularly for poor people in developing countries who depend on forest resources for basic subsistence (Byron and Arnold, 1999, p. 789). A complex set of property rights and access rules govern different forest services and goods, enabling multiple actors or stakeholders to use and benefit from them. These systems of governance have often evolved over long periods of time and may be customary or de facto, rather than de jure recognised. Rights to access forests are often contested between stakeholders across different scales (Humphreys, 1996). Forest carbon projects may involve changes to sets of property rights. In the AIJ pilot phase some projects implied a change in de jure land rights, as carbon investment funds were used to buy land for expanding either national or private protected areas to promote carbon sequestration whilst enhancing biodiversity conservation.

Equity in institutions and decision-making concerns the way in which projects and rules operate and whether all stakeholders are able to have a voice in the project. Equity will not only be about participation but about inclusion and negotiation of competing views. At each part of the decision-making process, such as designing, starting or managing a forest carbon project, there will be alternatives to consider as well as uncertainty, for example, concerning the success of tree planting, or security of funding. Stakeholders will have different perspectives on these alternatives.

The third element of equity concerns the outcomes of projects and the way they impact the different stakeholders. The impacts will be conditioned and partially determined by access and decision-making, but are primarily about who gains and who loses in terms of the distribution of project costs and benefits. It concerns the post hoc evaluation of the project.

In the following sections, we investigate the first two of these three elements of equity; access and property rights, and institutions and decision-making, within the context of a forest carbon project in Mexico. We undertake a stakeholder multi-criteria analysis which enables the roles and interests and priorities of different stakeholders to be analysed by adapting conventional decision-analysis techniques in a constructivist approach (Brown et al., 2002). The methods are outlined in Section 5 whilst the next section describes the context of the project.

#### **4. The Mexican carbon economy and the *Fondo Bioclimatico* carbon project**

Since the start of climate change negotiations in the late 1980s, Mexico has actively engaged in developing policy on climate change. Mexico ratified the Kyoto Protocol in April 2000, and was the first (and to date only) developing country to submit its Second National Communication on Climate Change to the UNFCCC, presenting a national emissions inventory and the main activities undertaken to reduce GHG emissions in each sector of the economy. These activities include programmes on reforestation, energy efficiency and renewables (CICCM, 2001). Mexico has four projects registered under the AIJ pilot phase, one of which we analyse here.

The Mexican Government has been supportive of including all types of forestry activities under the CDM or related carbon trading schemes. The Mexican forestry sector consists of small landholders who practice agriculture and forest management on family plots or communally owned land. About 80% of

Mexican forests is legally titled to local communities. Mexico has promoted the need to expand the set of viable funding opportunities under the CDM or voluntary emergent markets.

Currently, the National Secretariat for the Environment and Natural Resources (SEMARNAT) and the Energy Secretariat (SENER) are leading the process to establish the CDM National Authority, which will be responsible for approving and assessing CDM forestry projects. The participation and roles of the different government agencies has not yet been agreed and setting up the Authority has proved slow and difficult. SENER has started to promote the development of CDM-energy projects under the Prototype Carbon Fund of the World Bank and SEMARNAT is working on defining operational functions and membership of the Authority. The National Forestry Commission (CONAFOR) recently launched the Mexican Forestry Fund, operational by June 2003 and will initially support projects for water conservation through forest management. The operational rules for projects are being developed and it is still unknown whether the Fund will incorporate carbon projects and whether they will adopt the procedures for evaluation and assessment as the National Authority.

Government capacity to deal with climate change policy has been enhanced in recent years. There is increasing involvement of Mexican academic institutions in climate change issues, as demonstrated by a growing number of specialists and studies (see [Burstein et al., 2002](#)). However, civil society engagement is less active. Limited numbers of NGOs have participated in international negotiations on climate change, for example there are no Mexican NGOs designated as observers to the UNFCCC negotiations, and relatively few regularly and consistently participate at national level. Mexico has a considerable number of local organisations working in forestry and who therefore have an interest in forest carbon projects.

The *Fondo Bioclimatico* carbon project is located in the Mexican state of Chiapas. The region has experienced considerable political and social unrest and in the past 20 years there has been rapid population growth rate and widespread degradation of forest resources. It is a biologically diverse and natural resource rich area but farmers are poorer than national average, with livelihoods based on subsistence or near-subsistence production of maize and beans, coffee and in some cases, cattle. Conserving forest cover and associated biological diversity was seen as a priority for the region. The project originated during 1994 and 1995 when researchers from the Edinburgh Centre for Carbon Management (ECCM, University of Edinburgh), El Colegio de la Frontera Sur (ECOSUR, Mexico) and assessors from the local Credit Union “Unión de Crédito Pajal Ya kac’tic” (PAJAL) conducted economic and social feasibility studies in eight indigenous and *mestizo* communities of the Chiapas central highlands. The Mexican National Ecology Institute (INE) and the UK Overseas Development Administration Forestry Research Programme funded these early feasibility studies. Through participatory workshops and interviews they explored the interest of producers affiliated to PAJAL in a project that would provide technical assistance and financial incentives to shift from agriculture to agroforestry, convert pastures to plantations, restore degraded forest, and manage natural forests. The carbon sequestration potential of the agroforestry activities preferred by local farmers, and the potential to sell carbon was also investigated ([de Jong and Montoya, 1994](#); [de Jong et al., 1995](#); [Montoya et al., 1995](#)).

In 1997, the project was registered under the United States Initiative for Joint Implementation (USIIJ) under the name of “Scolel Te”, meaning “growing trees” in the Tzeltal language, involving an array of individuals and organisations. The International Automobile Federation (IAF) committed to purchase 5500 t of carbon per year at a price of US\$ 12–10 t<sup>-1</sup> over the next 30 years. The price paid per ton of carbon sequestered aims to cover the costs incurred by producers and to generate funds for project management, and varies according to whether the carbon sequestered derives from agroforestry-reforestation activities (higher) or conservation and management of existing forest stocks (lower). This is so because investors

consider that, if at some point the project is validated under the CDM, carbon from reforestation may be eligible for trading. The other important project investor has been Future Forests, a UK-based institution, which purchases carbon derived from reforestation activities also at a price of US\$ 12 t<sup>-1</sup> of carbon. In order to manage and administer carbon investments, a trust fund named “Fondo Bioclimatico” was created. In early 1998, some of the original researchers established a professional organisation, AMBIO, to promote the project across the region, train community technicians, and deal with administrative and monitoring procedures.

During the last 5 years the project has grown from an initial group of 47 *campesinos* from six of the surveyed communities to more than 450 carbon suppliers from 20 communities across the region, including some in the neighbouring state of Oaxaca. They belong to either PAJAL or four other local organisations that have joined the project in recent years.

Every producer or community involved has their own forest management strategy, a “Plan Vivo”, which defines a number of agroforestry, reforestation or conservation activities to be carried out in either individual or communal holdings, and designed according to the specific geographical, physical and ecological conditions of the area (Montoya et al., 1995; Soto-Pinto et al., 2001; Tipper, 2002). Producers’ participation in the project differs according to the organisation they belong to and their history of land tenure and community organisation. Where the majority of members of a community are involved in the organisation participating in the project or the community shows social cohesion independently from any organisational affiliation, then developing management plans in their communal forest land is possible. But the majority of producers are involved on an individual basis, developing carbon activities on private plots.

Once the *Plan Vivo*, either collective or individual, is established and approved by project developers, participants receive an up-front payment of about 20% of the carbon expected to accrue from the plan, as a source of initial working capital. They annually receive 60% of the sale price per tonne of carbon sequestered, and the remaining 40% is set aside to cover the costs of technical support for farmers, administrative costs, monitoring and reporting (Tipper, 2002). So far the extent of carbon land per capita has been restricted to 1–2 ha per producer in order to promote income equality across members and communities. However, the income has been variable according to the producer’s level of compliance, and to the characteristics of the management area, and some have experienced higher mortality rates or lower growth rates than expected. The maximum income gain for producers, which is dependent on the forestry management system and its carbon sequestration potential, has been estimated at around US\$ 700 over 10 years, a modest but significant amount relative to local incomes.

## 5. A stakeholder multi-criteria analysis

Stakeholder analysis has been increasingly applied in social science research and, particularly, in the field of natural resource management or conservation and development issues. A first step in the process is the identification of primary and secondary stakeholders. *Stakeholders* are all those who affect, and/or are affected by, the policies, decisions and actions of the system; they can be individuals, communities, social groups or institutions of any size, aggregation or level in society. The term thus includes policy makers, planners and administrators in government and other organisations, as well as commercial and subsistence user groups. We define *primary stakeholders* as those that directly participate in the *Fondo Bioclimatico* project, and *secondary stakeholders* those who lie outside project activities but have an

Table 2  
Stakeholders in the Mexican carbon economy and the *Fondo Bioclimatico* project

Primary stakeholders	Role in the project	Influence in project decision-making	Interest in project development
AMBIO	Project management (monitoring and accounting activities)	Increasingly HIGH in project management; LOWER in negotiating carbon price	Promote carbon sequestration and local development; consolidate the organisation as a key reference for environmental services management at both local and national levels
ECCM	Project broker	HIGH between 1996 and 2001 in both project management and project brokering (negotiation of carbon prices with investors); progressively LOWER in management aspects since 2002	International publicity and organisation consolidation
ECOSUR	Catalytic role in establishing and developing the project	HIGH between 1994 and 1998; progressively LOWER since 1998	Promote research in the field of ecological services; enhancement of existing linkages between ECOSUR researchers and some of project involved organisations
Project organisations (PAJAL, UREAFA, CODESSMAC, CEPCO, AMEXTRA) and representatives	Intermediate agents between project developers (AMBIO) and producers affiliated to the project	LOW influence in project decision-making when related to investment and administrative management; MODERATE–HIGH influence over management and monitoring activities	Interest differs according to the organisation. They generally aim to promote community-based projects whilst establishing themselves as the pioneers in the growing arena of ecological and carbon services
Community producers	“Carbon suppliers”	Influence over project decision-making and monitoring activities is dependent on the relationship between them and their organisation	They aim to increase their income from forestry-based activities as well as improve agroforestry and forestry management; other non-tangible benefits are also recognised such as improved organisation and technical capacity

Table 2 (Continued)

Secondary stakeholders	Role in the carbon economy	Influence in its development	Interest in its development
Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT)	Promote carbon sequestration projects to reduce GHG emissions and promote biodiversity conservation	HIGH. Key member of the CDM National Authority, currently under negotiation between SEMARNAT and other governmental agencies	Capture foreign direct investment through the CDM investment window
Comisión Nacional Forestal (CONAFOR)	Promote projects based upon payment of ecological services to complement its other development funding programmes	HIGH. It has recently established the Mexican Forestry Fund, which aims to combine private and public funds to finance environmental services projects, among others	Promotion of ecological services as a complement to other forestry development programmes; capture foreign direct investment
Instituto Nacional de Ecología (INE)	Promote and conduct research in environmental services; Assess government environmental public policy	HIGH. Advising government policy development in legal and economic issues for the promotion of ecological services	Develop innovative research policies
NGOs (Consejo Civil Mexicano para la Silvicultura Sostenible, Estudios Rurales y Asesoría Campesina, FORO para el Desarrollo Sustentable, Servicios Ambientales de Oaxaca)	Potential project and promote “carbon” capacity building activities at local level; Interested in future projects certification activities	MODERATE–LOW. Some have been key actors in forestry projects in Mexico, conducting certification and monitoring activities	Develop new investment programmes in their organisations
ACADEMIA (Universidad Nacional Autónoma de México, El Colegio de México, Universidad Autónoma del Estado de México, Universidad Iberoamericana, El Colegio de la Frontera Sur)	Academics are potential co-developers of carbon projects as ECOSUR researchers in the case of <i>Fondo Bioclimático</i> ; They can also participate in teams for projects evaluation	MODERATE–LOW. Influence as projects and government advisors will increase as this new economy develops	Capture funds for new research activities in ecological services valuation
Multilateral Or Development Lending Agencies and Investors (The World Bank, UNDP, USAID, Ford Foundation)	Support inter-governmental co-operation through private financial flows and new investment frameworks	HIGH. Investment levels will determine whether new carbon projects develop in Mexico during the next years	Promote environment and development sound investment
National Investment Sector	If Mexico adopts UNFCCC commitments or consolidates a national system for environmental services, they will progressively participate in carbon-trading schemes	LIMITED. An oil governmental corporation has started to support forestry projects and to experiment with emissions trading	Future carbon trading and/or environmental publicity

influential role in the new Mexican carbon economy and can thus directly or indirectly affect future project development.

During April and May 2002, key informants in the *Fondo Bioclimatico* project were interviewed and asked to identify other relevant individuals, organisations and interest groups within the project. Members of organisations and government officials were interviewed to identify organisations and groups with interests in the Mexican carbon economy. During October 2002 and March 2003, more than 50 in-depth interviews were conducted across national and local scales and issues such as the global climate change policy, the CDM and carbon markets, as well as project-related topics, such as decision-making procedures, social development, participation and property rights, were discussed. A preliminary analysis of these interviews inform this paper. Table 2 presents the stakeholders, classified according to their scale of influence in decision-making and their interests in project development and the carbon economy.

We used a multi-criteria analysis framework to assess the perspectives of different stakeholders and their preferences for ecological, carbon sequestration and social development criteria. Multi-criteria techniques have been applied in decision analysis, management systems and planning and have recently been applied in resource management and environmental decision-making (Brown et al., 2002; Bojorquez-Tapia et al., 1994; Strijker et al., 2000). Multi-criteria techniques have also been suggested to evaluate and appraise JI (Jackson et al., 2001) and CDM options (Markandya and Halsnaes, 2002) but they have not been tested in the context of the new carbon economy. This analytical framework was selected because it allows both quantitative and qualitative criteria to be incorporated and for different stakeholders to weight these criteria. The advantage over techniques such as extended cost-benefit analysis is that it does not require that all criteria be reduced to one unit of measure, but at the same time it provides a more structured framework within which to analyse different priorities and preferences than conventional qualitative approaches (Brown et al., 2002).

Sixteen of the 50 individuals participated in the multi-criteria exercise (five government officials, three NGO members, two academics and five project developers) and were asked to evaluate 16 qualitative and quantitative indicators reflecting carbon sequestration, ecological conservation and social development criteria using a set of qualitative techniques, ranking, qualitative scales and percentage weighting. The indicators and dimensions (see Table 3) were derived from workshops with specialists in forestry, development and climate change, and interviews with key informants in Mexico. Although other studies

Table 3  
Criteria and indicators to assess forest carbon projects

Carbon	Ecological	Social development
(1) Net carbon sequestered	(1) Regional ecological value	(1) Household income
(2) Internal rate of return	(2) Impact on habitat contiguity	(2) Clarification of property rights
(3) Risk of leakage and natural hazards	(3) Species richness	(3) Forest resources access to poorest households
(4) Eligibility for CDM	(4) Impact on hydrology	(4) Involvement of community-based formal and non-formal organisations in project design, management and decision-making
	(5) Erosion processes	(5) Number of local people participating in project activities and who perceive benefits
	(6) Soil fertility	(6) Investment in education, health services and capacity building

develop more complex lists of indicators and criteria, for example for CDM project evaluation (Kolshus et al., 2001), we suggest that fewer indicators facilitate evaluation by a range of stakeholders with diverse kinds of knowledge. By discussing these criteria and indicators with different stakeholders and seeking their priorities and preferences through scoring and ranking exercises, their interests, views and roles could be explored.

## 6. Stakeholder perspectives on the carbon economy

Our interviews and analysis provide insights into the development of the carbon economy in Mexico. This is widely seen as a strategy to capture foreign investment, either from future CDM projects or other mechanisms such as the various World Bank funds or through voluntary investments. The expectation that marketing carbon sequestration and other ecological services has the potential to broaden the economic opportunities of the poor is tempered by scepticism about the current levels of investment in the forestry sector. Most interviewees recognise that investments so far have been disappointing, but they still expect the CDM and other voluntary markets to develop rapidly.

The stakeholder multi-criteria exercise reveals differing perspectives on the carbon, ecological and social development criteria. Most government officials gave the carbon criteria, particularly net carbon sequestered, investment rate of return, and eligibility under the CDM, the highest weightings. This wider consensus at government level contrasts with the different weightings attributed to the social development criteria by the non-government stakeholders. Opinions are mixed on ecological and social criteria although only one interviewee from an NGO ranked ecological considerations above social development. Project developers were more balanced in their weightings, although ecological and social development criteria were favoured over carbon. This reveals then that different stakeholders view the importance of development, and the priority it should be given in designing forest carbon projects, rather differently. But there are different aspects of development and the indicators reflect this. Of the different indicators of social development, change in income was seen as most important, then participation in project design, then access to forest resources by the poorest households. Participants cited unclear property rights, low investment levels, and the communities' ability to organise and participate in project decision-making as the most important factors for projects' contribution to poverty alleviation. There was a recognition that communities where clear property rights already exist, and where organisations for forest management and managerial capacity are present, are more likely to be beneficiaries of carbon projects.

Different perspectives clearly exist regarding the opportunities and constraints of the carbon economy. Such perspectives will have to be reconciled, particularly at national scale, where information dissemination and organisations' capacity building are still lacking. This will influence how the operational rules for the National Authority are established. NGOs and academics interviewed are able to find roles as project developers or project certifiers and the emerging carbon market is seen as a potential niche for action and accessing resources. But they have very divergent views of how the various mechanisms should work. The government favours internationally recognised firms as the most credible and experienced institutions to conduct certification of projects. NGOs expect to participate in the decisions and to provide advice to government institutions, but as yet such a role remains to be defined by SEMARNAT.

The evolution of these institutional frameworks in response to the carbon markets is continual and adaptive as shown by our analysis of the *Fondo Bioclimatico* project. Its early emphasis was on the

improvement of traditional productive systems, and the carbon sequestration added value to these systems. Interests were balanced between carbon, ecological and social aspects of management of forest and farming systems, reflected in early studies and assessments (Montoya et al., 1995; Soto-Pinto et al., 2001). Non-carbon related development activities, such as women's welfare and promotion of fruit trees, were central to the project framework. However, this early focus as a community-development project has shifted towards a carbon bank since 1998, in which the primary goal became to market carbon because the interests of the project broker prevailed over other stakeholders (Nelson and de Jong, 2003). The project broker still remains in control of negotiating carbon prices with international investors although increasingly AMBIO members have gained more control over project activities. They have put substantial efforts into developing accounting procedures and establishing clear collaborative agreements between producers, organisations and the trust fund *Fondo Bioclimatico*.

Knowledge transfer to local producers and equitable participation in project decision-making is still limited but it is being addressed. Some local producers, particularly those joining the project in recent years, lack a clear understanding of climate change and why international firms are interested in funding their forestry activities. AMBIO could strengthen communication by informing local participants about climate change and the framework of the carbon economy. The involvement of farmers in project decision-making may be strengthened in the future through an advisory farmers committee.

In terms of equity and access to forest resources, the carbon project in Chiapas has been successful in establishing collaborative agreements rather than binding contracts with producers. This gives farmers some degree of flexibility about participating in the project and balancing livelihood needs. But there is always the risk that, in working with individual farmers, the project will be biased in favour of farmers with larger holdings who can afford the risk of setting aside a portion of land for reforestation. In one of the participating communities, the project has exacerbated existing conflicts among farmers and between those who participate and those who do not. It is necessary for the future advisory committee of farmers to address conflict resolution. Finally, AMBIO has started also to play a relevant role as a link between the local and national scales. It has started to negotiate with the state government on the possibility to co-finance project activities such as tree nurseries and capacity building programmes across farmer organisations. In addition, it has networked with other NGOs throughout Mexico and exchanges information on carbon forestry projects.

## **7. Can the new carbon economy support equitable and sustainable development?**

Our analysis has highlighted the diverse range of stakeholders and interests involved in forest carbon projects. The interviews and multi-criteria exercise served as a platform to engage experts, government officials, NGOs and communities in the discussion of indicators for assessing the contribution of projects to sustainable development. All stakeholders' interests have been made explicit and, particularly, those of the local poor that are usually neglected in project planning. Evidence suggests that, in the case of Mexico, establishing regulatory and management frameworks, and defining criteria for projects, has been slow and problematic. The process has exposed conflicts of interest between different institutions and sets of stakeholders. In this sense, the role of NGOs in negotiating and monitoring projects is potentially important.

Access to carbon markets and to their benefits depends on a variety of factors across scales, and at local level it critically depends on clear and well-defined property rights and on organisational responses. This

complexity of rights in forestry and their social embeddedness mean that only some rights are legible and fit into formal frameworks imposed by international global regimes and government. Some sectors of society depend on less formal rights to access forest resources. This is especially true of poor households and women-headed households. Access to carbon markets is thus socially differentiated in a number of ways. There are indications from Mexico that middle-income communities and producers may be favoured in setting up forest carbon markets.

Equity in institutional decision-making involves the ways in which different stakeholders can engage in, and influence, decision-making and the extent to which representative and inclusive institutions can be built. In the case of forest carbon projects negotiations take place between diverse stakeholders with different power, knowledge, information and even languages. [Edmunds and Wollenberg \(2001\)](#) maintain that it is unreasonable to expect consensus and synergy when the ‘partners’ are so unmatched in terms of power and access to resources. So far it has proved difficult to establish effective government institutions to mediate these relationships and development criteria and frameworks for negotiation and monitoring of projects. Thus, negotiation processes can easily be dominated by more powerful players. The diversity of interests and organisations makes negotiations cumbersome and potentially excludes less articulate and powerful stakeholders. NGOs could play a key role, but their participation is currently limited. Indications are that the institutional framework, in terms of project decision-making and evaluation, and the interfaces with the state and investors at non-local scales, are evolving. But these developments clearly take time. There are lessons in the literature about setting up robust cross-scale institutions to manage complex natural resources which ensure access and benefits are more equitably shared ([Berkes, 2002](#)). [Smith and Scherr \(2002, p. 7\)](#) propose a set of enabling conditions to enhance local livelihood benefits of forest carbon projects, but these still fundamentally depend on secure rights and access to markets, and equitable local social institutions and organisations being in place. In many cases concerning forests, as we have shown, these conditions do not apply, and the danger is that forest carbon projects, whilst seeking to bring development benefits that are poorly defined, may exacerbate existing societal inequalities.

Equity considerations on different scales are critical to the further development of CDM and other Kyoto mechanisms. A number of authors have suggested means by which these can be constructed to ensure anti-poverty and pro-poor development benefits. We have restated that there are disparities between countries, for example with only a handful of countries likely to gain most investments. [Rowlands \(2001\)](#) suggests that geographical quotas are necessary to ensure that CDM activities take place throughout the developing world which would enhance more equitable benefits for society and opportunities for facilitating adaptive management. There may be opportunities for creating niche markets for ethically motivated CDM investments, where sustainable development benefits are prioritised above carbon benefits ([Huq, 2002](#)). This is the thinking behind the Community Development Carbon Fund launched by the World Bank at WSSD in Johannesburg last year. However, even with these reforms to flexible mechanisms and particularly CDM, there is relatively limited scope for forest carbon projects. Demand is by no means assured. For example, many projects in Mexico and elsewhere established without a priori agreed investment are currently on hold or under funded. [Bernoux et al. \(2002, p. 385\)](#) have argued that the global market is limited and that “the LULUCF-CDM market may be most important as a statement of an emerging global partnership between developed and developing countries to address the global climate change issue rather than a windfall of money to the developing world”. It seems likely that the carbon economy will involve the development of markets outside the CDM, including those promoted by consumer-oriented organisations that will try to capture revenues from individuals or companies to finance carbon projects, perhaps channelled through new frameworks or the CDM non-compliant windows

of the World Bank Prototype or Biocarbon Fund, as well as the national institutions being established for environmental services, such as those in Mexico. Equity and sustainable development are critical challenges for these new institutions.

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