



Making global initiatives local realities: carbon mitigation projects in Chiapas, Mexico

Kristen C. Nelson^{a,*}, Ben H.J. de Jong^b

^aDepartment of Forest Resource and Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota, 115 Green Hall, 1530 Cleveland Ave. No., St. Paul, Minnesota 55108, USA

^bEl Colegio de la Frontera Sur, Chiapas, Mexico

Abstract

Global, environmental initiatives create macro-level agreements, but the true test is how local communities respond. From 1995 to 2001, we investigated the evolution of *Fondo Bioclimatico*, a carbon mitigation project, using interviews and document review. Even under tremendous uncertainty the project grew seven-fold. Its social structure shifted from a development emphasis to a brokering relationship, from shared to concentrated power, from social fund to carbon bank. Social selection of systems with fewer tree species and single ecosystems is a concern for biodiversity. The challenge is to remain critical, monitor, and support indigenous communities in their endeavor to implement clean development mechanism projects.

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Introduction

Global, environmental initiatives and policy negotiations create macro-level agreements that may work in theory but the true test of these initiatives is how local communities and social actors respond to these policies. The Global Climate Agenda is one example of how macro-level initiatives can create new social actors and institutions. The 1992 United Nations Framework Convention on Climate Change, the 1997 Kyoto Protocol, and the Johannesburg Summit put forth clean development mechanisms (CDMs) which allow businesses in developed countries to invest in carbon reducing activities in developing countries through land-use change, agroforestry, and forestry options (CEC, 2001). One option creates a carbon market in which industries that need to meet their carbon budget buy carbon from farmers and other land managers. The industry makes payments to reward land managers for taking action to protect and plant trees or otherwise increase the carbon content of soils and vegetation on the land they manage. Though the merits of carbon

sinks have been widely debated in scientific circles and throughout the global climate negotiations (Jepma and Munasinghe, 1998; Dixon et al., 1993; Swisher and Masters, 1992), some form of land-use change, mainly carbon sinks, has been included in each successive negotiated document. Along with the global initiatives on carbon sinks come the questions: how will the various social entities organize themselves? What could a carbon mitigation project look like, and how would it function? What are some of the challenges to overcome and how can we avoid creating new problems as we attempt to solve current ones?

In tackling these issues scholars and practitioners have developed hypothetical models for clean development mechanisms (Dixon et al., 1993; Brown et al., 1995; Parks et al., 1997; among others). The majority of the work is the result of sound, desktop analysis or workshop discussions between researchers that pull the best minds together to answer, “What if?” Debate centers on who is likely to accept carbon contracts, which systems are true carbon sinks, or what new problems will be created. Some argue that farmers with fewer land holdings are more likely to enter the market than farmers with large landholdings (Castro et al., 2000; Watson et al., 2000). Analysts posit that there will

*Corresponding author. Tel.: +1-612-524-1277; fax: +1-612-625-5212.

be a tendency for the market to shift toward low cost, low organization, low verification carbon systems which may mean the domination of plantation systems (Smith et al., 2000). Others argue that for social, economic, and environmental reasons, it would be best to support community forestry systems (Klooster and Masera, 2000), reforestation, and forest conservation systems (Segura and Kindegard, 2001; Smith et al., 2000). Those involved with forestry projects point out that carbon projects in forest systems will have to confront the same problems current projects confront: avoiding corruption and mixed-use conflicts (Fearnside, 1996; Segura and Kindegard, 2001) as well as refrain from subsidizing unprofitable forestry businesses (Smith et al., 2000).

Recently, practitioners and researchers have had the opportunity to evaluate the first few years of key pilot projects around the globe. These early projects have supplied insights into how carbon markets have emerged even as the global climate negotiations are in progress. There is tremendous diversity in the form of new carbon market and new social actors (Watson et al., 2000)—from a state-run, environmental services package in Costa Rica (Castro et al., 2000; Chomitz et al., 1999), to large, eucalyptous plantations in Brazil (Fearnside, 1996), to individual carbon contracts brokered by *Fondo Bioclimatico* in Chiapas, Mexico. It appears that early carbon investors are interested in a combined package of social and environmental benefits (Newcombe in Smith et al., 2000). There is still demand for carbon and interest in supplying carbon systems in Costa Rica (Castro et al., 2000). Among researchers, there is some concern that with the growth of the market, carbon contracts could be an indirect means for controlling communal and state land use (Segura and Kindegard, 2001), reinforcing large landowner title claims (Smith et al., 2000), or usurping indigenous land rights.

The global climate agenda and policy negotiations continue, but now we have the advantage of insights from early pilot projects focused on carbon markets and land-use change options for reducing carbon emissions. These projects need to be evaluated (Smith et al., 2000; Watson et al., 2000) to gain insights into the emergence of new social actors, environmental institutions, and socioeconomic relationships. With this intent, the following study investigates the evolution of *Fondo Bioclimatico*, the carbon mitigation project in Chiapas, Mexico. It focuses on the social actors that have emerged, how their relationships have changed over time, and some of the challenges that need to be addressed if local communities will be able to make global, climate initiatives a reality.

This study contributes findings related to major issues in the carbon market debates. One debate centers on whether there will ever be a carbon market. This study documents that even prior to a formalized, international

agreement on greenhouse gases, farmers in Chiapas are interested in the carbon market and the number of carbon contracts is increasing. At stake in another segment of the debate is how market relationships will develop and the extent of decision making power various actors can have in the market. The Chiapas project has shifted from shared decision making incorporating farmer representatives to more centralized decision making by the carbon broker, despite everyone's intent to design shared governance.

Another issue in the debate is the influence carbon markets will have on additional benefits from land-use systems such as rural development and biodiversity conservation? In Chiapas, the carbon project shifted from a development emphasis with broad goals to improve the well-being of community members to a sole focus on carbon sales by individual farmers. Maintaining a diversity of social goals was beyond the financial means of the carbon project. In addition, the farmer's selection of systems changed from using a variety of systems and species to a concentration on two systems and two tree species in some regions. Despite this apparent reduction in potential biodiversity, the carbon project has some institutional mechanism for minimizing the build up of carbon monoculture systems.

Finally, an additional issue in the debate focuses on the best design for accountability and administration of carbon projects. In the Chiapas case, administration and monitoring of carbon plots has improved with time. Bookkeeping and monitoring is becoming more rigorous and still involves all the social actors—farmer self-monitoring as well as external review. The debate over these issues will guide future policy formation and shape the new carbon market institutions. The following article documents these findings and how the Chiapan carbon mitigation experience evolved.

1. Study site, land-use systems, and initial organization

The state of Chiapas, in southern Mexico, has a natural resource base rich in forests, agricultural lands, water, and biodiversity. Farmers involved with the carbon project come from a range of agroecological systems. Some farmers live in the tropical lowlands, while others farm in the temperate forests of the Chiapan Highlands (Fig. 1). Tropical rain forests, pine-oak forests, and montane rain forests are among the important vegetative types. The majority of the carbon contracts are with subsistence or semi-subsistence farmers who rely heavily on corn/bean production, coffee, and some cattle production in the lowlands.

The carbon project began with *Union de Credito Pajal Ya Kac-tic (Pajal)*, a local, producers' coffee



Fig. 1. Location of the carbon project *Fondo Bioclimatico*, Chiapas, Mexico, 2001.

cooperative, primarily focused on credit, improved technology, production, and marketing. In 1995, *Pajal* members in eight communities,¹ from two ethnic zones, agreed to work with four scientists from *El Colegio de la Frontera Sur* (ECOSUR) a federal research institution located in Chiapas.² A research grant provided funding for *Pajal* to hire a carbon technician to coordinate the feasibility study as well as support for field expenses and workshops. Using participatory methods, farmers and scientists set out to evaluate the carbon sequestration potential in the farmers' agroforestry and forestry systems and the feasibility of carbon projects. Two delegates were appointed for each community by the *Pajal* members to represent them during the study. In a series of workshops, these representatives gathered information and designed the agroforestry and forestry options together with members in their communities. ECOSUR scientists and the *Pajal* technician provided technical assistance, research techniques, agroforestry system review, carbon estimates, and training.

¹The five Tzeltal communities—*Chapullil*, *Segundo Cololteel*, *Alan Kantajal*, *Muquenal*, and *Jol-Cacualha*—are situated in the municipality of *Chilón* and belong to two large ejidos—*San Sebastián Bachajón* and *San Jerónimo Bachajón*. The total area of the five communities is 2387 ha. In 1995, there were a total of 907 inhabitants, of whom 170 were members of *Pajal*. The three Tojolobal communities—*Jusnabaj*, *Yaluma*, and *Palma Real*—are situated in the municipalities of *Comitán* and *Las Margaritas*. *Jusnabaj* and *Palma Real* are ejidos and *Yaluma* is part of the ejido *Villahermosa*. The total area of the three communities is 7704 ha. In 1995, there were 2946 inhabitants, of whom 439 were members of *Pajal*.

²This interdisciplinary team included a forest ecologist, agroforester, economist, and sociologist. Their salaries came from ECOSUR. The carbon project funding was a separate research grant.

1.1. Carbon land use options

These initial studies indicated that in regions such as Chiapas, the most appropriate methods to enhance carbon storage on land managed in small holdings was the introduction of trees within agricultural systems as crop-tree combinations or the development of small-to-medium-scale plantations (Montoya et al., 1995; De Jong et al., 1997). Five agroforestry or forestry systems were considered to be technically, socially, and economically viable for the Tzeltal and Tojolobal zones (Table 1). All of the land-use systems increase biomass and carbon content while providing for other essential needs. The living fence option maintains the land for crop production or grazing but adds trees along the borders of the plot to increase carbon sequestration. In the coffee plots, farmers decided to actively manage the shade by planting timber species that would capture more carbon while still providing shade for coffee production. The *taungya* land-use system allows for planting seedlings within an existing corn plot. The farmers gain the corn harvest for 3–4 years, until the trees shade out the corn. The enriched fallow is an option for farmers that still have parcels of land they are not actively cultivating. In this case, rather than let vegetation emerge from the soil seed bank, they plant trees among the volunteer grasses and bushes.

From 1998 to 2000, additional land-use systems were evaluated for capturing carbon. Several contracts were given to farmers based on their use of a green manure planting of corn and *mucuna* instead of using the traditional slash and burn soil preparation during the spring planting. *Mucuna* is a ground cover that minimally captures carbon. The primary gain is the

Table 1
Forestry and agroforestry systems considered viable as carbon sinks in Chiapas, Mexico, 1995^a

Carbon land-use systems	Planting distance (m)	Estimated carbon (t/C)
<i>Tzeltal Zone</i>		
Live fence <i>Cedrela odorata</i>	3	50.5
Coffee with <i>Cordia alliodora</i> as shade	10 × 10	64.7
<i>Taungya</i> with <i>Cedrela odorata</i> : thin 8 and 16 years (25% of total stand)	10 × 3	111.3
Enriched fallow with <i>Cedrela</i> , <i>Cordia</i> , or <i>Calophyllum brasiliense</i> : thin 8 and 16 years (25% of total stand)	10 × 2	111.3
<i>Tojolabal Zone</i>		
Live fence <i>Pinus oocarpa</i> , <i>P. michoacana</i> or <i>Cypressus sp.</i>	3	8
Plantation of <i>Pinus oocarpa</i> , <i>P. michoacana</i> or <i>Cypressus sp.</i>	2 × 3	39
<i>Taungya</i> with <i>Pinus oocarpa</i> , <i>P. michoacana</i> or <i>Cypressus sp.</i> : thin after 8 and 16 years (25% of total stand)	4 × 4	40
Enriched fallow with <i>Pinus oocarpa</i> , <i>P. michoacana</i> or <i>Cypressus sp.</i> : thin after 8 and 16 years (25% of total stand)	7 × 2	40
<i>Land uses for other zones added in 1998–2000</i>		
Reforestation sub-tropical forests		44.7
Forest regeneration		137
Corn/ <i>mucuna</i> -no burn soil preparation		45
Forest conservation		100

^a Modified from Montoya et al. (1995) and de Jong et al. (1997).

elimination of carbon emissions during the spring burning period. Other contracts were designed to support communities in the regeneration of degraded forests or the conservation of existing forests. Carbon is captured in these systems by the new tree growth and in the biomass of standing forests that are not converted to cropland. Using a variety of land-use systems maintained biodiversity at the same time as meeting multiple family needs.

1.2. Organizational design

After the feasibility study, interested Pajal members created *Scolet Té*,³ as a new institution within Pajal (Fig. 2). This project provided technical, organizational, and marketing support to farmers that wanted to develop carbon agroforestry systems. A forest economist, from the University of Edinburgh, had the leadership role in setting up the initial feasibility study, fund raising, and promoting the work at an international level. ECOSUR scientists agreed to advise and evaluate the project as it progressed.

To begin marketing carbon *Scolet Té* established a local trust fund for carbon contracts. Companies wishing to offset greenhouse gas emissions would be able to purchase “proto-carbon credits” from the local trust fund or carbon bank. Buyers deposited carbon payments and farmers were able to withdraw money

based on the amount of carbon sequestered in their carbon plots. A technical committee composed of farmer representatives, ECOSUR scientists, the Pajal carbon technician, and the University of Edinburgh scientist, representing the buyers, managed the fund and all carbon contracts with the individual farmers. The project continues to be supervised by the Mexican Government’s National Institute of Ecology and is registered with both the Mexican and US initiatives for “joint implementation”.

2. Methods

The research that contributes to this article was conducted in two periods from 1995 to 1997 with participant observation and open-ended interviews and during the summer of 2001 using open-ended interviews, participant observation, organizational data evaluation, and document review. During the participant observation period of the study, researchers attended training workshops, farmer meetings, planning sessions with carbon technicians, project evaluation workshops, and research analysis sessions with scientists. In addition, we visited farmers in their homes. There were a total of 34 meetings, numerous conversations with individual farmers at the workshops, and 20 visits with farmers in their homes. A field notebook was the principle form of documentation. Between 1996 and 2001, semi-structured interviews were conducted with all of the carbon project technicians, all of the scientists, all of the farmer zone

³ *Scolet Té* means “the growing tree” in Tzeltal, Tojolabal, Cho’l, and Tsotzil.

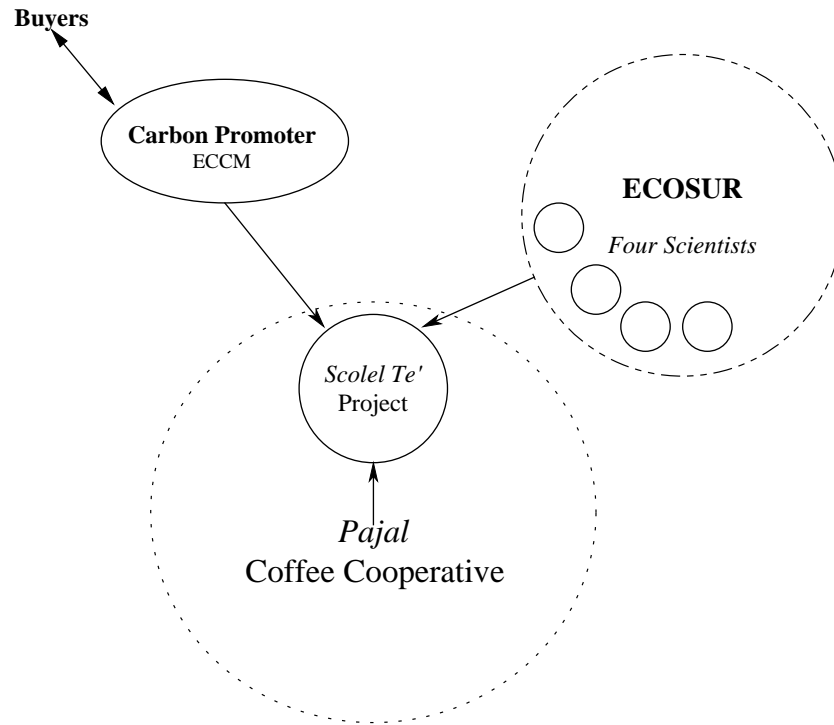


Fig. 2. Organization of *Scolel Té* and Carbon Actors, Chiapas, Mexico, 1997.

leaders, and some of the farmers with contracts. The interview topics focused on plans for the carbon project, personal evaluation of technical/social/economic changes over time, and problems/challenges in building a carbon project. The interviews were recorded as qualitative data transcripts. Document and spreadsheet review involved analysis of the variables associated with the carbon contracts over time: payments, amount of carbon contracted, systems, organization, zones, communities, etc. The contract data was tabulated. The qualitative data was coded and analyzed for critical themes in the evolution of the carbon project.

4. Growth of *Scolel Té* into *Fondo Bioclimatico*

The carbon mitigation project that began as a feasibility study in 1995 (de Jong et al., 1997) in the Highlands of Chiapas, Mexico, has grown and evolved (Table 2) into an active carbon project. It has grown from contracts with 43 farmers in the *Scolel Té* project (1997) to contracts with 450 individual farmers and four communal land holdings (2001) under the umbrella program, *Fondo Bioclimatico*. Where once there was one farmers' organization involved, now there are five. In 2001, farmers with contracts come from 25 communities in the Highlands, the Lowland Forest, and the Northern Regions of Chiapas. (There is one contract with a community in the state of Oaxaca, Mexico.)

The total number of new contracts each year has varied as the project grew. The first spurt of contracts was with farmers from *Pajal*, a coffee cooperative composed of individual members from many communities in the Chiapas Highlands. These farmers organized themselves as the *Scolel Té* project. After a period of retrenchment and organizational change from 1998 to 1999, a new umbrella program was called *Fondo Bioclimatico*. (For a description of *Fondo Bioclimatico* see Sections 5.1–5.4) It provided 36 new contracts in 2000 and 150 in 2001 to farmers from other member organizations and communities. With this growth, the number of total hectares under contract expanded seven-fold, with each farmer maintaining an average of one hectare in a carbon system plot.

The estimated total carbon captured from the new contracts is based on a series of carbon models established during the feasibility study (de Jong et al., 1997) and modified later. Each year the total amount of carbon contracted has varied from a low of 2657.5 t/C in 2000, to a high of 14,025.2 t/C in 1998. Total carbon contracted was 30,585.6 t/C over the 5-year period. The amount of carbon captured depends on the number of new contracts, the agroforestry systems selected by the farmer, the number of trees planted, and the physical and ecological conditions of the zone. In preparation for all the contracts, AMBIO technicians visit the proposed plots and estimate the baseline carbon of the existing system, with an average of 15 t/C per plot as a baseline.

Table 2
Evolution of *Scolec Té* to *Fondo Bioclimatico*: 1997–2001

	1997	1998–1999	2000	2001
# Communities	5	17	20	25
# Organizations	1	1	2	5
# New contracts/yr	43	225	36	150
# Total contracts	43	268 ^a	304 ^a	454 ^a
# Hectares ^b	77.5	375	391	569
Estimated total carbon new contracts(t/C) ^c	5392.8	14025.2	2657.5	8510.1 ^d

^aFour communal land contracts were given from 1998–01, noted here as single contracts.

^bAverage 1 ha/person, a few have 0.5–2.0 ha.

^cEstimated tons of carbon is based on carbon models for the zone (de Jong et al., 1997): taungya and fallow capture 111.3 t/C, in one temperate zone only 40 t/C in another; coffee 64.7 t/C; reforestation-subtropical 44.7 t/C; regeneration 34.1 t/C; corn/mucuna and conservation undefined as yet. Baseline carbon is calculated by subtracting an average of 15 t/C but may vary between plots. All are estimated for 25 years.

^d121 ha still need to be assigned systems types. These are not included in the totals.

This carbon is not included in the total carbon credits because it is the carbon in the existing vegetation without an enhanced agroforestry system.

5. Evolution of the organizational relationships

As global climate change agreements are negotiated, nation states, market entities, and civic society have begun the first stages of carbon market formation and experimented with a variety of social relationships for carbon sales (Castro et al., 1999). Over the 5 years the carbon program has been active in Chiapas, Mexico, the social entities and organizational relationships have certainly evolved. During the early years of the feasibility study (1996–1997) no one knew how a carbon project should be designed. Social actors had different images of how a market could work and how they could position themselves in such a market.

5.1. From community development project to focused carbon project

In the initial feasibility study and the first years of *Scolec Té* (1995–1998) the academic advisors, farmers, and *Pajal* carbon technician viewed the project as an option for community development. It was one of several projects that the member organization, *Pajal*, promoted to improve the production of its members' fields and the well-being of families. By 2001, *Fondo Bioclimatico* was an umbrella carbon project brokering carbon, with market relationships similar to coffee brokers as middle agents between coffee producers in Chiapas and buyers in Europe (Fig. 3). *Fondo Bioclimatico* Trust Fund to promote carbon sequestration in southern Mexico⁴. The forest economist, from the

⁴Fondo Bioclimatico is a trust fund agreement between the buyer who pays for carbon capture services and the farmer sellers who receive payments for capturing carbon. Farmer representatives and

Edinburgh Center for Carbon Management (ECCM), fills the role of carbon broker, arranging with AMBIO,⁵ a Chiapas nongovernment organization (NGO), to administer the project and provide monitoring services of the carbon contracts. Any group of farmers can present a proposal for carbon sales. The original *Scolec Té* project from *Pajal* is one farmer cooperative that represents 43 farmers with contracts. Contracts with individual farmers and communities have been organized through other coffee cooperatives, ejido assemblies,⁶ local production NGOs, and other forms of farmer organization. Much has changed from since the original formation of *Scolec Té*.

5.2. From shared control, to farmer dominant, to broker dominant

The initial decision-making structure of *Scolec Té* involved an oversight committee with representatives from the farmer zones, the academic advisers, and the carbon promoter, as the buyer representative. Decision-making began as time-intensive, shared control of the process. The oversight committee reviewed contracts with individual farmers, made policy decisions, and signed all payments. As the years progressed the academic advisers moved on to other projects, paying less attention to *Scolec Té* after the feasibility study was completed. Farmer representatives became more

(footnote continued)

AMBIO technicians meet to discuss trust fund contracts in periodic community and bi-annual regional meetings.

⁵Since 1998, AMBIO has been involved in many regional development projects such as sustainable coffee production, local coffee commercialization, forest management, and agricultural diversification, to name a few projects.

⁶After the 1917 revolution, *ejido* was a term used for a productive grouping of people with land given by the government for common ownership. In Chiapas, many *ejidos* have been formed since the 1930s, and even into the 1970s, as farmers struggled for control over land for production.

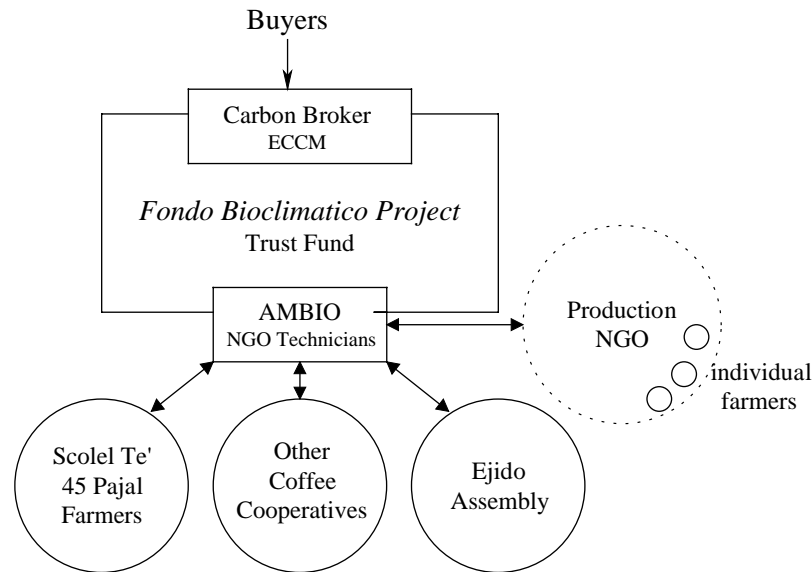


Fig. 3. Organization of *Fondo Bioclimatico* and carbon actors, Chiapas, Mexico, 2001.

powerful on the oversight committee and dominated many financial decisions concerning the timing of payments. They were pressured by the very urgent needs of poor farmers living in their zones, with the result that contracts were fully paid out in a short time period (approximately 3 years) rather than the original plan of approximately 10 years. To avoid this farmer domination and in an effort to expand the project, the carbon promoter from the University of Edinburgh withdrew the project from *Pajal* and established the new institution, *Fondo Bioclimatico*. The former *Pajal* carbon technicians and three of the academic advisors from ECOSUR formed AMBIO (a nongovernment organization) to service these carbon projects as well as expand their consulting work to other sustainable development and environmental projects.

Now *Scolel Té* is one of many carbon projects supported by *Fondo Bioclimatico*. The *Pajal* farmers still have total control over *Scolel Té*, but the carbon broker, has de facto decision-making power over *Fondo Bioclimatico*. In 2001, the broker selected carbon contracts proposed by farmers and oversaw financial responsibilities. Once the carbon broker made decisions about acceptable contracts. A Mexican bank official has the official fiscal responsibility to manage the trust fund for carbon payments over time. AMBIO receives two dollars out of the ten-dollar per ton carbon payments and the farmer receives eight dollars equivalent in pesos. The AMBIO technician salaries are paid from this technical service fee as well as travel costs for visiting communities and carbon plots.

In 2001, the carbon broker was the only link between the Chiapan farmers and buyers. This concentrated decision making weakens the ability of the farmers to take more control over project decisions. This is not

perceived as an optimal situation by any of the stakeholders involved in *Fondo Bioclimatico*, the carbon broker included, but there are still many barriers to shared decision making. Local farmers do not have access to information, buyers, and marketing skills necessary to organize market relationships beyond their own region. Until these barriers are removed, national and international exchanges will be done through external advisors.

5.3. Changing the image from a social fund to a bank

In the early years, the technicians and academic advisors viewed the carbon project as one way to advance community development and provide an environmental service. In all the proposals and community information sessions, the idea of community well-being and sound environmental practices were discussed as the principle merits of the project. Carbon contracts were sold as one piece in a potential package of sustainable development projects that would lead to vibrant production systems, sound environmental management, and social well-being. This was early in the global climate debates and the “image” of carbon mitigation projects was just forming. At the same time, the forest economist promoting carbon sales in Europe (who was the main impetus behind the *Scolel Té* project and eventually *Fondo Bioclimatico*) always talked about carbon markets as economic entities that would respond to an evolving supply and demand.

Today, the AMBIO technicians present the image of the *Fondo Bioclimatico* as a bank. The language and philosophy about social and community benefits still helps to sell the program but the concept of the entity itself has changed from a community development

project to a Carbon Bank with which farmers can contract to deposit carbon and withdraw payments. Thus contractual and market relationships are much more evident. The *Fondo Bioclimatico* has evolved in response to the new possibilities of the carbon market and the interests of the buyers. The goal of forming a farmer-run economic entity that supports community development and represents farmers in the global market has been difficult to achieve. In the current image, “carbon bank” activities may support these loftier goals but they are indirect benefits from a primary goal to market carbon. In cooperation with farmer organizations, AMBIO continues to pursue other sustainable development projects but these initiatives are not directly linked with the carbon project.

6. Evolution within Fondo Bioclimatico

Within *Fondo Bioclimatico* there have been changes as well: the program experiments with new systems, concentrates on only a few systems in some areas, becomes more rigorous in its administration, and accepts the limits of its ability to serve farmers with carbon contracts.

6.1. Experimenting with systems but concentrating on only a few in some areas

Since the beginning of the project, farmers have been experimenting with various agroforestry and forestry systems that will foster carbon mitigation. Initially, the farmers and academic teams designed living fence, coffee shade, enriched fallow, *taungya*, and plantation systems. But within two years, in the Tzeltal and Tojolobal regions, most farmers choose to switch to the *taungya* system or enriched fallow because they provided higher carbon payments and the farmers could get some corn production in the first 3 years of the *taungya* systems. This shift emphasizes the additional benefits of food production in the system but reduces the possibilities for biodiversity built into using multiple systems. In addition, the vast majority of the new contracts are in these systems.

In some regions the carbon broker has been experimenting with contracts for various “carbon products” for possible sale under future global climate agreements such as a 3-year cycle of corn/mucuna planting. The argument is that a subsistence corn system that does not burn residuals before the new planting cycle would reduce carbon emissions. In another community, the carbon broker sold carbon contracts for conservation of existing forest, a land-use system that was not part of the Kyoto negotiations at the time of sale but a possibility in a evolving market. In

addition, the broker has sold some contracts for forest regeneration systems and reforestation systems. All of these systems may be acceptable under the Clean Development section of the Global Climate Agreement

6.2. From weak administration to improved administration

Gradually the AMBIO technical staff is improving their ability to track the carbon contracts and assure transparency in payments and monitoring. Initially, the field technician knew the 43 farmers that were part of the project and managed most of the monitoring on a personal basis. This technician kept files on the farmer contracts, site visits and the first round of monitoring but when the technician left much of this unwritten, common sense knowledge also left.

In 1998, the two new AMBIO technicians felt the *Fondo Bioclimatico* administration was very weak. They worked for several years to establish a good tracking system for all the contracts. As the project grew it became impossible for the technicians to know all the farmers and their plots personally. It was only in 2001 that the technicians began to have confidence that their database reflected the reality of the carbon projects in various communities. To some extent they can track farmer payments, and problems, as well as planting and monitoring activities. In 2001, they planned to initiate an accounting system with a “carbon bank book” that reflects all the relevant information about each farmer’s contract: system plan, monitoring reports, carbon deposit amounts, payments, etc. AMBIO technicians would have a copy of all the “bank books” and each farmer would have a copy of their own “carbon bank book”. With this technique AMBIO hopes to have a more accurate, timely reporting system.

In addition, *Fondo Bioclimatico* has worked to develop a transparent and reliable monitoring system that supports internal checks with external review. As a group the farmers in each community monitor the carbon plots on a yearly basis. The technicians select 10% of the plots in each community to review as a check on the self-monitoring system. Once the technicians have reviewed this 10% the carbon deposits and payments can be entered in a farmer’s “carbon bank book.” If the technician’s assessment does not match the community farmer assessment, there is another round of monitoring and reporting.

6.3. From a technical emphasis to a monitoring emphasis

In the early years, the carbon project technician provided advice about nursery preparation, possible agroforestry systems, tree planting, etc. The farmers with contracts in 1997 appreciated this technical support and felt it was a necessary component of the project. As

the years progressed and the number of contracts grew, it was impossible for the new technicians to do anything more than administer *Fondo Bioclimatico* and monitor the carbon plots. There was a conscious decision to limit technical support because the carbon payments did not provide enough overhead financing to support numerous field visits. One of the main critiques from farmers with earlier contracts is their continued need for more technical support and less administration. As one farmer said, “More time with your feet muddy and less time strengthening your fingers,” implying that the AMBIO technicians spend too much time typing numbers into a computer or filling out forms and not enough visiting the carbon plots and advising farmers about how to resolve problems.

AMBIO technicians are caught in a bind. The carbon payment contracts do not supply enough support for the expensive extension services needed. To prevent this problem in the future *Fondo Bioclimatico* will form new contracts with organized farmers who already have some level of technical support. Farmer cooperative or NGO technicians will supply agroforestry training/follow-up, and AMBIO technicians will monitor the carbon contracts. Contracts formed earlier with *Pajal* farmers do not have this arrangement: *Pajal* went bankrupt in 1998 and all their technical advisors left the organization. *Pajal* farmers miss the previous extension support they received from the carbon project. This is a risk any of the 2000/2001 farmers could face in the future should their member organization lose technical support.

7. Discussion

The evolution of *Fondo Bioclimatico* provides a wealth of insight into how climate change agreements—in particular land-use carbon mitigation projects—may develop from hypothetical policy negotiations and pilot projects to established carbon exchange networks composed of unique social actors. This study’s findings suggest that parties to the debate on carbon markets must address the themes of power in evolving market relationships, the influence of carbon markets on other land-use benefits, and the best designs for administration and accountability.

At one level it is simply amazing that this carbon mitigation project has survived, much less grown. In 1995 a betting person would not have given it very good odds for success. Its challenges have ranged from the global to the local. Over the past 10 years global climate change negotiations have provided only a glimmer of hope that an agreement might be reached among the nation states. Though the European Union and other nations have reached some level of consensus, at some points it appeared ‘land use, land-use change and

forestry’ would not be part of any signed agreement. Within Chiapas itself, the struggle between the Zapatistas, other indigenous groups, and the Mexican State has ranged from armed conflict to parallel, separatist governing zones. Despite uncertainty and conflict that have surrounded this evaluation of carbon mitigation, farmers continue to be interested in the project and member organizations continue to seek ways to incorporate carbon mitigation into their agroforestry and forestry systems. *Fondo Bioclimatico* continues to exist as a social actor in the formation of carbon markets and land-use change options.

Many Chiapan farmers appear to be interested in learning about the carbon market and respond well to designing carbon systems that fit their land management objectives. At this point there is more interest in joining *Fondo Bioclimatico* than there are contracts available. As one farmer commented, “I want to be planting trees anyway. This just makes it possible to get started.” Individual farmers may not be aware of how these decisions fit plans for global carbon mitigation, but the leaders and technicians in their organizations are very involved in following the global negotiations. The farmers are interested in being involved in a new market; the organizations are interested in diversifying their member projects. Both entities still believe carbon systems can meet multiple needs for production and conservation.

In its evolution the Chiapan experience differs significantly from the Costa Rican approach to carbon mitigation. The Chiapan experience represents the possibilities for small, private actors to emerge as brokers and providers of a carbon product in the global market. Individual farmers or communities provide a single environmental service by planting specific agroforestry systems, a form of land-use change supported by many studies (Segura and Kindergard, 2001). The private broker represents buyers from industries interested in offsetting their carbon emissions by providing payment for carbon captured in the farmer’s agroforestry system. In Costa Rica, however, the federal government serves as the broker for a complete package of environmental services including carbon mitigation, watershed protection, and biodiversity among others (Castro et al., 2000). By selling Carbon Tradable Offset bonds on the Chicago Board of Trade, the Costa Rican government pays for environmental services provided by government parks, large tracts of forested land in corporate ownership, as well as community forests. One concern in the Costa Rican case is whether committing state land or community forests to environmental service contracts will be an indirect way to control land use (Segura and Kindergard, 2001). In Costa Rica environmental service contracts will need to accommodate multiple-use forestry management including ecotourism, sustainable logging, or non-timber

forest product extraction and not be exclusively managed for environmental services.

In Chiapas these previously mentioned concerns are being addressed at the individual level. Farmers have a limited land base to meet numerous economic and social needs. At this point the *Fondo Bioclimatico* agroforestry systems are designed by the farmers and guided by their particular needs for timber, shade, and/or soil stability. Eventually, an individual farmer's land could be saturated with carbon contracts. To date, *Fondo Bioclimatico* has addressed this issue by only contracting 1 ha per farmer, which reduces the chance that leakage may happen due to farmers shifting their intensive agriculture use to other forested areas. Right now the demand for carbon is less than the supply of farmers who are interested in offering carbon services, which reduces the pressure on the resource. If demand increases, the Chiapan carbon projects will have to continue to ensure that these agroforestry systems address multiple needs and are distributed among many farmers to reduce leakage. Internationally and/or nationally, specific policy could be designed to reduce the risk that carbon demand can overwhelm other benefits land-use systems provide for family well-being.

Given the global interest in carbon systems, what can we learn from the evolution of *Fondo Bioclimatico* about changing power and decision making in market relationships that will inform future projects? In 2001, the structure of carbon relationships reflected a more traditional, commodity brokering relationships. Much of the decision making power and responsibility was in the hands of the *Fondo Bioclimatico* broker. The AMBIO technicians, funded by *Fondo Bioclimatico*, were involved in an interactive negotiation with farmers about the particular carbon system that would be under contract. But this was the main point where an individual farmer had decision making power. In several cases, technicians from the farmer organization recommended which farmers should receive contracts but the buyer has the final say. This centralized organizational model may be efficient but it concentrates power in the hands of a few actors. The earlier model of shared control in *Scolet Té* struggled to form a new market entity that gave the farmer members more decision-making power in the development of the carbon market. *Fondo Bioclimatico* is still evolving, but in 2001, the de facto concentrated decision-making has created an unequal power. *Fondo Bioclimatico* stakeholders have not found a way to create a farmer organization that brokers its own contracts with buyers. What is lacking at this point in the carbon market debates is an organized voice for the farmers providing the carbon product. *Scolet Té* farmers were in the first stages of participation and decision making at the local level as well as learning about the national and international policy arenas on climate change. There was potential for

the beginnings of an organized farmers voice in the international debates about carbon markets and equitable exchange.

In *Fondo Bioclimatico*, the goals for community development and the image of a social fund were set aside, perhaps due to necessity, but also resulting in a much more limited project. Now they focus only on improving their accountability and administration of the carbon contracts. Sustainable development initiatives are addressed by AMBIO and farmer organizations through other projects. Scholars have cautioned that there might be this shift toward 'low cost/low organization...' projects in the carbon market (Smith et al., 2000). In a more focused approach, *Fondo Bioclimatico* has emphasized market relationships and streamlined its services. The concern with this move is that the carbon market could become isolated from its original intent to be an integrated, component of sustainable production and conservation.

Carbon projects that do not make a concerted effort to integrate their systems into broader community development plans will run the risk of creating new problems while trying to solving the very narrow problem of global gaseous carbon. *Fondo Bioclimatico* has addressed this concern by contracting with farmers through a local organization with a variety of sustainable development projects. The danger exists that as the carbon market grows, new carbon brokers will put economic concerns ahead of social or environmental concerns and make no effort to integrate carbon systems into a broader, just, and sustainable program. Programs and policies designed to promote carbon markets will need to find mechanisms to encourage the carbon sales within the context of a total rural development program.

Another issue to monitor is the environmental impact of the social and economic decisions in carbon markets. Since its early years, *Fondo Bioclimatico* has experimented with contracts for a variety of carbon systems: forest conservation, plantations, fallow, etc. But in some regions farmers have chosen predominantly two systems—fallow and *taungya*. Should this concentration become a trend as the carbon market grows, it could have far reaching implications for biodiversity, pest infestations, and other ecosystem services. As Fearnside (1997) observes, a variety of environmental services have to be addressed in forest systems as we work for viable sustainable development options. One way *Fondo Bioclimatico* is addressing this potential problem is by only contracting for 1 ha per farmer in a community. In these communities the mosaic of land holdings mitigates against the creation of a community-wide carbon monoculture. The other way to address this problem is to monitor the tree species selection for the fallow or *taungya* system and use selection methods that ensure diversity. Diversity will automatically occur along altitudinal differences but species diversity should be

part of the evaluation criteria in large areas with similar ecosystems.

8. Conclusions

Social, economic, and political contexts set limits as well as possibilities for future carbon market relationships. In Chiapas Mexico, these social actors and their relationships will continue to change as global climate agreements move from drafts to international agreements, and hypothetical carbon markets are tested against the reality of organizational possibilities and willingness to engage in environmental exchange.

Valid critiques have been made of the Chiapan carbon projects and carbon mitigation as a component of sustainable development in rural communities. Some organizers, researchers, and community leaders argue that what carbon mitigation contracts offer is insignificant compared to the obvious need in poor rural communities. Some think the time and effort spent organizing carbon projects would be better spent on improving production. More revolutionary critiques argue that all the effort spent on carbon mitigation would be better spent on land reform initiatives.

So far the Chiapan farmers with carbon contracts do not believe they are choosing between carbon mitigation, production, or land reform. They view involvement in carbon mitigation as a small component of their struggle for well-being, justice, and sustainability. It is one brick in the foundation that will help them reach their goals. In general, however, carbon project promoters would be wise to keep the critics' concern in mind, and not be distracted from broader goals or believe the carbon market will meet all farmer needs.

At a macro-level, critics argue that these carbon projects are only an excuse to pollute or that carbon contracts are akin to bio-piracy because businesses are buying rights that belong to local, indigenous communities. In the first case, critics are concerned that businesses in developed countries will never address emissions reduction if carbon sinks such as the agroforestry and forestry projects in Chiapas exist. This has merit and should be addressed in the Global Climate Agreement negotiations among nation states. The leaders in the farmer organizations that belong to *Fondo Bioclimatico* recognize this critique and view the carbon market as a short-term opportunity to initiate agroforestry and forestry projects. Some estimate that the carbon market will last no more than 15 or 20 years, until industries have invested in emission-reduction technologies.

The critique that carbon contracts condone the sale of communal, indigenous rights must be addressed as part of the broader struggle over globalization and indigenous right that will dominate natural resource and

environmental debates for the foreseeable future. The indigenous leaders from *Scolet Té* and *Fondo Bioclimatico* have attended international, indigenous congresses and global summits to present their case. They believe participating in the carbon market can be a viable option for indigenous communities. The debate on this issue is not over; hopefully, all parties will continue to discuss carbon markets in the context of globalization and work to understand the broader implications for indigenous peoples.

In summary, Chiapan farmers in the Mayan Highlands and lowlands have been evaluating carbon mitigation projects as a component of their sustainable agroforestry and forestry system. Policy makers, organizers, farmers, and scholars from around the world can learn from the *Fondo Bioclimatico* experience as they form policy to shape the emerging social actors and the organization of the land-use change alternatives for the mitigation of human-induced climate change. At this point, *Fondo Bioclimatico* provides one option. We should remain critical, continue to monitor, and support our Mayan colleagues in their local endeavor to respond to a global, environmental initiative.

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