Participation dynamics and institutional change in the Scolel Té carbon forestry project, Chiapas, Mexico
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Abstract
Carbon forestry has become a cornerstone of attempted climate change mitigation in developing countries. As such, dozens of projects have been developed to supply carbon offsets to both voluntary and regulated carbon markets. In this paper we shed further light on the effects of such projects on communities and households by studying the implementation of a carbon forestry project in four communities in the state of Chiapas, Mexico. The project pays farmers to carry out a number of tree-planting activities depending on the local agro-ecological systems. We investigate how such activities have been promoted in and adopted by communities and we identify a series of community-based, institutional, resource management and asset-related factors that explain farmers’ willingness to participate in the projects. Our analysis highlights a number of shared motivations for joining the project but varied levels of understanding about the project rationale. We also show how community norms, access to land tenure, financial and physical assets differ among participants and non-participants which translates in increasing inequalities in access to income and to other development projects. However, we also demonstrate that project activities, as currently designed, motivate some farmers to participate because of the potential of the project to act as a mechanism to bridge existing social divides through cooperation in the project and therefore financially and politically benefit from participation. Overall, the paper demonstrates that the project contributes to transforming local livelihoods and institutions, unfortunately not always as originally designed.

Introduction
Payments for ecosystem services (PES) schemes offer financial support for the provision of environmental public goods such as biodiversity, the conservation of wetlands and carbon storage. Providers of ecosystem services are compensated with funds paid by governments, individuals, private companies or non-governmental organizations. Although PES schemes are treated as voluntary market transactions, they can also be seen as policy incentives that help induce a desired environmental, behavioral or social change (Skutsch et al., 2011). It has been claimed that PES payment schemes, like those for carbon storage, can efficiently motivate the adoption of proactive conservation practices and as a way of compensating owners for foregone benefits from alternative land uses (Engel et al., 2008; Ferraro and Kiss, 2002; Wunder, 2008, 2007, 2005).

The majority of carbon forestry activities have been implemented in Latin America and they have contributed to sequester or store over 106 Mt of carbon dioxide equivalent (CO₂e) (Peters-Stanley et al., 2012). The accumulated value of historical forest carbon transactions reached US$ 644 million in 2011 and has helped to support community development, poverty reduction and climate change mitigation in many developing countries (ibid). Carbon forestry projects pay communities or individuals to carry out activities such as reforestation or improved forest management (ibid). Carbon forestry projects pay communities or individuals to carry out activities such as reforestation or improved forest management (ibid).
In recent years, programs such as the United Nation’s Reducing Emissions from Deforestation and Forest Degradation (REDD+), have been driving carbon forestry programs in many developing countries. REDD+ attempts to channel financial incentives for developing countries to reduce emissions and create financial value for carbon that is stored in forests, including payments and investments in reducing deforestation and degradation as well as conservation and sustainable forest management efforts which enhance forest carbon stocks. However, issues have been raised regarding the amount of carbon that is truly stored in forests (e.g., see Asner et al., 2010), and surrounding the changes in local management to systems which can be considered less sustainable (Cabello and Gilbertson, 2012; Nigh and Diemont, 2013).

The active participation of the local population in carbon offset projects is crucial to the success of these projects and has been the object of many studies (see for example Grieg-Gran et al., 2005; Pagiola et al., 2005; Wunder, 2005; Kosoy et al., 2008; Vatn, 2010; Agrawal et al., 2011). In this study, we explore farmers' willingness to participate in a voluntary carbon forestry project operating since the late 1990s in the state of Chiapas, Mexico. We investigate how the project activities, as currently designed, translate into a mechanism for transforming local livelihoods. Our research question is how is farmers’ participation in forest-based carbon offset projects influenced by: community-based, institutional, resource management and asset-related factors?

We begin by briefly reviewing the literature on participation drivers in PES schemes, identifying key factors that explain willingness to participate especially in projects dealing with the storage of forest carbon. We explore how participation is mediated by group dynamics and how this can reinforce or enable local institutions. In Section ‘Research design and methods’, we outline the analytical framework used to investigate how such activities have been promoted in and adopted by the communities being analyzed. This framework is then applied in Section ‘Results’ to assess the factors motivating participation in four communities in Chiapas where forest-based carbon offset activities take place: Josefa Ortiz de Dominguez, Nuevo Rodulfo Figueroa, San Felipe Jataté and Alan’kantajal-Samaria’kantajal.

Carbon forestry and participation in PES Schemes

According to Wunder (2005), PES schemes are voluntary transactions involving a buyer and provider of an environmental service for which the provider is paid contingent on the provision of that service whether by direct provision or by ensuring a land use which will provide the service. Most PES projects to date can be categorized as a payment to cover the cost of inputs which are required to carry out the management practices necessary for the provision of the service, including any foregone income or benefits from alternative uses of the land. The success of PES schemes is generally measured by whether the payments provided within the projects are effective in ensuring the provision of the service and in terms of the distribution of social benefits to the providers (Skutsch et al., 2011). In the case of carbon forestry projects, the services provided are the storage and sequestration of carbon in forests.

Farmers’ willingness to participate, however, is not dependent exclusively on the level of payments, although this circumstance is often undervalued within those accounts that tend to interpret PES only in terms of economic incentives and disincentives. The extent to which PES payments motivate individuals or communities to enrol is varied across different geographical and institutional contexts. Determining the motivations for participation in carbon forestry projects is useful for explaining project performance and to learn from the interactions of carbon forestry activities with the local social and institutional context, in order to understand how both influence each other. By social context we refer to the unique social, economic and political organization of communities and their members, and the historical dynamics which are important in forging local institutions. In turn, we understand institutions as the formal and informal norms that underpin and mediate social relations at community level, in particular around the access to and use of natural resources, and that incorporate provisions on who has rights to do what, why, how, and under which authority. As shown further below, a key institution in understanding participation dynamics in carbon offset projects is the land tenure system.

The scholarly literature on participation in PES schemes has focused on a number of non-economic issues that are crucial in determining providers’ willingness to participate. Sommerville et al. (2010) emphasize the importance of economic considerations in decisions to participate in PES schemes but bring attention to the importance of perceptions of equitably distributed benefits and fairness within communities in shaping individuals’ decisions. They found that success in community-based PES appears to be related to high perceived levels of equity both in the community as well as individual levels, in line with previous literature on conservation and development (Adams et al., 2004; Persha et al., 2011). Wunder (2005) emphasizes the importance of payments in terms of household income but acknowledges that interest in participation is also influenced by co-benefits provided by the projects, but not necessarily. Here co-benefits can include increases in land tenure security, increases in social capital such as the internal organization of participants and learning-by-doing, forest management training, and higher visibility among donors, public agencies and external investors (2005: 18–19).

According to Pagiola et al. (2005), three types of factors influence participation: those that affect eligibility; those that affect desire; and those that affect one’s ability to enrol in the program. In line with Wunder (2005), they highlight the role economic incentives play in influencing all three decision factors, especially in terms of the profitability of participation and, since PES payments are typically made per hectare of land enrolled, the expected impact in terms of opportunity costs varies depending on the size and type of providers’ land holdings. Those with more land may find participation more attractive while those with higher productivity land are less likely to enrol as the opportunity cost will be higher than for those with less productive lands (2005: 243). Kosoy et al. (2008) echo these categories and add that perceptions of local institutions and community dimensions affect land-managers’ willingness and desire to join PES schemes as well as income and other household characteristics and that flexibility in policy rules affect one’s ability to participate. Kerr et al. (2012) suggest that while payments may help to elicit interest in participating in PES schemes, in a communal context social norms or traditions may favor participation regardless of the financial incentives.

Pattanayak et al. (2010) investigate whether or not payments deliver more environmental services and observe that payments can induce conservation and find that PES programs may not be capable of delivering the innovations in funding and provision of ecosystem services they promise. Other research has also questioned the functioning of PES programs which may act more as hidden subsidies and fundamentally rely on state regulation than as market-based mechanisms to deliver environmental services (Vatn, 2010; Fletcher and Breitling, 2012).

Work in experimental and behavioral economic literature has shown that the effectiveness of incentives varies among social groups and cultures, the framing and interpretation of the information channelled through the economic incentive is mediated by social norms and group dynamics and that the mechanism through which the incentives are channelled can influence whether the incentives are interpreted as social or economic transactions.
The assumption that land users will respond positively to incentives has been questioned by others who have shown economic incentives may lead to less pro-social behavior, such as inducing decision-making rationalities which are more driven by selfish rather than inclusive rationalities (Kerr et al., 2012), and that people's responses to financial incentives may vary greatly and be unexpected when not aligned with social norms driving collective action (Vatn, 2009).

A growing literature studying the potential shortcomings of PES programs has emerged (see for example Grieg-Gran et al., 2005; Landell-Mills and Porras, 2002; Pagliola, 2007; Corbera et al., 2009), however, few studies have related the findings on equity or inequitable distribution of benefits from PES schemes to the motivations and perceptions of potential participants in these projects (Corbera et al., 2007; Kosoy et al., 2008; Rico García-Amado et al., 2011). Some of these shortcomings relate to the functioning of many PES projects and the recognition of different perceptions and interpretations of the project rationale and potential for additional benefits while balancing objectives for cost-effectiveness in order to be attractive to investors (Smith and Scherr, 2003). In a study of Clean Development Mechanism (CDM) projects, for example, Olsen (2007a,b) discusses how the tension between the cost-effectiveness and development objectives often results in trade-offs which tend to favor the former at a cost of significant contributions to the latter. Osborne (2011) shows that while carbon offset producers benefit from participation in carbon forestry as a means of maintaining their claim to land rights and through short-term income, they lose some short-term benefits of land because of labor requirements.

In an attempt to minimize or account for trade-offs between social benefits and investor attractiveness a number of initiatives and certification standards for carbon offset projects have been developed. These seek to provide information and assurance that adequate measures are accounted for in the project design and implementation to ensure that negative impacts are addressed and co-benefits delivered (Kollmuss et al., 2008; Schneider, 2007; Haya, 2007). For the provision of carbon storage services, there are 22 different standards for voluntary carbon forestry projects, some of which focus on carbon accounting alone or other standards which place a greater emphasis on additional benefits such as diversifying local income sources or reducing poverty (Peters- Stanley et al., 2012). Depending on the requirements and scope of the standard, different structures and mechanisms for community involvement are designed in the verification and implementation processes at project level. These types of measures help to reduce the risks to communities by encouraging the collaboration of community households (Smith and Scherr, 2003) while ensuring the potential for synergies of carbon storage with local livelihoods benefits (Chhatre and Agrawal, 2009).

Our intent is to build on earlier research on participation in PES programs and to consider these factors within the local context of community norms, land tenure and financial and physical assets among participants and non-participants. We contribute to this literature by exploring how participation is encouraged within the local context of community-based, institutional, resource management and asset-related factors including community norms, land tenure and financial and physical assets in four communities in Chiapas, Mexico. Contributing to analyses of participation in carbon forestry and PES, this paper presents empirical data on how the effectiveness of economic incentives are mediated by diverse social and institutional contexts, such as group dynamics, and influenced by their interpretation as social or economic transactions.

**Research design and methods**

To assess participation dynamics in carbon forestry projects it is important to consider the ways activities have been promoted in and adopted by communities. Therefore, and building on what has been suggested by the literature reviewed above, we considered three main categories of drivers for participation as important to understanding participation dynamics: (1) resource-based and individual asset factors; (2) factors based on the institutional and social context; and (3) understanding by beneficiaries of the requirements of project participation and the project rationale. It is crucial to understand what the impacts of participation are in terms of livelihoods and see how communities involved in carbon forestry projects perceive these outcomes. As part of this assessment, we investigated which values were associated with participation in order to assess the participants' understanding of the project assumptions and design.

We examine the Scolé Té carbon forestry project located in the state of Chiapas, Mexico which is supported by the Plan Vivo Foundation and standardized accordingly. The Plan Vivo standard focuses specifically on delivering socio-economic benefits in addition to carbon storage and sequestration and works directly with communities in project design. The Plan Vivo, or “living plan” in Spanish, is developed with providers (individual farmers or rural communities) who adapt their current land use activities to a number of eligible activities for which Plan Vivo certificates can be issued. These activities are afforestation and agroforestry, forest conservation and restoration and avoided deforestation, and participation is open to individuals or communities that can demonstrate ownership, tenancy or recognized user rights over the land. A Plan Vivo is developed in coordination with a local project leading organization that is also responsible for marketing and sales, annual reporting, coordinating project activities with local government policies and authorities, community outreach, training and capacity building and monitoring activities. Overall, 60% of the sale price of carbon offsets goes to participants and 40% is used to cover administrative and technical costs. Farmers or communities receive five payments of 18% in years 1, 2, 3, 5 and 8 while a minimum 10% is deducted from the sale agreement as a contingent fund to cover the risk or uncertainty in delivering carbon credits, e.g. fires or producer non-compliance (Ruíz-De-Oña-Plaza et al., 2011). Total payments vary depending on the type of agroforestry system implemented and the number of hectares enrolled.

The Plan Vivo System has been recognized as a pioneer in carbon offsetting projects (Abebe et al., 2011); as one of the best practices in pro-poor carbon forestry (Chappel, 2008), and highlighted by various international organizations for the promotion of sustainable rural livelihoods and focus on community governance and environmental outcomes (FAO, 2010; Abebe et al., 2011). The Plan Vivo System is differentiated from other carbon standards by an approach based on reflexive learning, evaluation, and the ability and flexibility to continuously adapt to arising challenges while working within the local, social context (Ruíz-De-Oña-Plaza et al., 2011). According to the Plan Vivo Foundation (2012), “projects will only succeed if land-use practices implemented are viable over the long-term and provide sustainable economic benefits to communities over and above carbon payments” and associated co-benefits include improving social capital, e.g. through participatory planning, and capacity building, e.g. participant involvement in the monitoring of carbon storage, poverty reduction and sustainable livelihoods, e.g. improved agricultural productivity, and income from non-timber forest products, nuts...
or fruit harvested from the trees (Carter, 2009). In addition, the Plan Vivo System “empowers communities to take control of their own resources and work to break negative cycles of poverty and degradation of natural resources” by addressing the link between forests, natural resource management and rural poverty through the encouragement of Community Based Forest Management (ibid). This is achieved by promoting a sustainable development process that requires grass-roots involvement directly with smallholders and communities and partnering with local, technically capable organizations (Plan Vivo Foundation, 2012).

Overview of the project and the research area

In this study we analyze four communities participating in the Scolel Té project. It began in the mid 1990s as a pilot carbon forestry project in Chiapas, a state in southern Mexico, to assist smallholder farmers in the development of family managed forest systems of sustainable community development which engages smallholder farmers in the development of family managed forest systems of carbon sequestration for which they receive carbon payments (Osborne, 2010).

In this paper we thus focus on the motivations to participate and the perceptions of stakeholders in four communities with varied experience with the Scolel Té project. The communities are found in three different areas of Chiapas, each with a unique political and topographical setting: one in the Municipality of Villaflores in the southwest Sierra Madre region (Josefa Ortiz de Dominguez); two in the Municipality of Maravilla Tenejapa in the Lacandon rainforest (Nuevo Rodulfo Figueroa and San Felipe Jataté) and one in the highlands of Chiapas in the Municipality of Chilón (Alan'kantajal-Samaria'kantajal). More detailed descriptions of each community’s socio-economic context can be found in Section ‘The case studies’ below and in the results section.

Although AMBIO has also established community-level agreements for carbon forestry activities in some locations, in the case study areas all Plan Vivo contracts are established individually and payments are made directly to participants. There are currently 2437 producers participating in Scolel Té covering a total of 9645 ha, (1439 ha of which are under communal arrangements for avoided emissions projects) and a total of 470,103 tCO2e offsets which have been issued as Plan Vivo certificates. As noted above, activities are carried out in individual parcels, on average covering 1 ha, or in community-managed forests ranging from 20 to 800 ha. The annual average potential of total forest carbon offset generation is estimated at 50,000 tCO2e. Each community selected for this study represents a historical period of expansion of the Scolel Té program beginning in 1997 with the first communities where Scolel Té was originally piloted, an expansion in the early 2000s into communities near the Lacandon rainforest and most recently, beginning in 2010, in the western Sierra Madre region. However, demographically as well as politically and economically, the study sites are extremely diverse and thus many of the findings reflect the different social context of each community.

Research methods

We shed further light on the effects of the Scolel Té project on communities and households by discussing its implementation and investigate how carbon forestry activities have been promoted in and adopted by the communities. We carried out a survey involving 114 people and 55 semi-structured interviews with participants, non-participants and former participants in the four communities from August to December 2012 with two local research assistants. All communication was conducted in Spanish (except in one community where Tzeltal -a Mayan language- was translated to Spanish by a local AMBIO technician). In all four communities we held workshops and meetings/focus groups open to the entire community. The limited amount of time spent in each community (approximately four-five weeks) influenced the level of trust and depth gained with the interviewees and we recognize that there may have been some bias in terms of the information provided (e.g. strategic response) due to the primary investigators being foreign and potentially -and mistakenly- associated to AMBIO, the project developer.

Detailed information about agricultural activities, socio-economic conditions and income were gathered from a questionnaire developed using the sustainable livelihoods framework to collect information on the dimensions and factors affecting willingness and ability to participate. This information includes: social networks and membership (e.g. familial; religious); access to financial resources (e.g. off-farm income); access to natural resources (e.g. size of land endowment); participation in other government or NGO programs or projects; education; on-farm income; household size; and cultivated crops. We conducted questionnaires with all participants in each community. Selection of former and non-participants was dependent on their willingness to speak with us. Interviewees were questionnaire respondents who were willing to speak with us afterwards. Focus group members consisted of a mix of participants and non-participants, both those who had officially registered titles for their land (ejiditarios in Spanish) and those who lacked any formal titling (pobladores in Spanish), again determined by their willingness to attend. We synthesized the data and used descriptive statistics gathered from participants, former and non-participants to make comparisons within each community (e.g. to see if land holdings differed greatly among participants and non-participants) (see Table 1).

Table 1

Basic characteristics of the case study communities.

<table>
<thead>
<tr>
<th>Community</th>
<th>Year Started</th>
<th>Average plot size (ha per family)</th>
<th>Total number of households</th>
<th>Total population</th>
<th>Number of household participants in Scolel Té</th>
<th>Number of surveys conducted</th>
<th>Number of interviews</th>
<th>Number of workshops/focus groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alan'kantajal/Samaria'kantajal</td>
<td>1997</td>
<td>0.75</td>
<td>30</td>
<td>160</td>
<td>29</td>
<td>27</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>Nuevo Rodulfo Figueroa</td>
<td>2003</td>
<td>1.5</td>
<td>102</td>
<td>547</td>
<td>12</td>
<td>42</td>
<td>46</td>
<td>3</td>
</tr>
<tr>
<td>San Felipe Jataté</td>
<td>2003</td>
<td>1.40</td>
<td>55</td>
<td>285</td>
<td>4</td>
<td>10</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Josefa Ortiz de Dominguez</td>
<td>2010</td>
<td>12</td>
<td>44</td>
<td>258</td>
<td>32</td>
<td>42</td>
<td>39</td>
<td>4</td>
</tr>
</tbody>
</table>
Additionally, and in order to investigate the understanding of the project rationale we reviewed official documents, previous studies and other gray literature on the project. We conducted 18 semi-structured, in-depth interviews with community members, government officials, local scientists who have worked with AMBIO and Scolel Té and AMBIO staff. We focused on views regarding the importance of conservation or agroforestry activities, participant selection and the view/role of participants within the community, project design and support, perceived costs and benefits of participation and expectations of participants (e.g. activities, time and inputs required, technical support and payments). Opinions on conservation and carbon offsetting activities were gathered during semi-structured interviews and field visits in all four communities. Interviews were recorded (later transcribed as qualitative data transcripts), field notebooks documented participant observation at community meetings and focus groups and technical workshops were held in each community as well as at AMBIO headquarters. Qualitative information gathered during these events was coded, categorized based on generalized types of responses (e.g. income-related, social factors) and analyzed for critical themes on the project.

The case studies

Josefa Ortiz de Dominguez was established during the 1970s and is a community of 258 inhabitants with 384 ha of land at an altitude of 930 m. The population has slowly increased in recent years but almost no new families have relocated to the community. The average participants’ land holding is approximately 30 ha. The area is surrounded by the nature reserve of La Sepultura and the primary livelihoods activities include the cultivation of corn, beans, cacao and coffee (organic and traditional); small-scale cattle raising; and the production of ornamental palms for export. There is also a government-sponsored PES scheme for hydrological services which began in 2005. The Scolel Té program was initiated in 2010 and there are currently 32 participants, accounting for nearly all the households in the community, each with an average size of 12 ha registered in the project. The main agroforestry activity for which carbon payments are given is the planting of live fences with either Pinus oocarpa (pine) or Juniperus luminiciana (cypress).

Nuevo Rodulfo Figueroa is a community of 547 people, 102 households, and most of the land has been divided into individual plots (which are often internally sold) as the community has been recently expanding due to a large-flow of migrants coming from neighboring communities. The size of land holdings varies greatly from 0.5 ha to 150 ha. The altitude is 200 m and borders the Montes Azules Biosphere Reserve. Cultivation is diversified in a bi-annual harvest for corn and beans while peppers, cacao, coffee, fruit are also grown. Many inhabitants engage in small-scale cattle raising and there are multiple government and NGO sponsored conservation and PES schemes in the area. The Scolel Té program began in 2003 with 12 participants with an average of 1.5 ha enrolled in either forest restoration, live fences or Taungya, a system of mixed agricultural crops and forestry species.

San Felipe Jataté lies next to Nuevo Rodulfo Figueroa, and Scolel Té was initiated at the same time in both communities. Most of the land is divided into individual plots among the 55 households (285 people). Only two people have ever left the community and no new families have migrated to the area. Agricultural production includes corn, beans, cacao and coffee; small-scale cattle raising and there is also a government-sponsored PES scheme for biodiversity in place. Participants have implemented live fences, forest restoration and improved coffee systems as part of the Scolel Té program with an average size of 1.40 ha.

Alan’kantajal and Samaria’kantajal are in fact one community, one of the first in the world to participate in a carbon offset project. It is found at 820 m in the Municipality of Chilón, located in the highlands of Chiapas. The land is all divided into individual plots and the main crops cultivated are corn, beans, cacao and coffee. Scolel Té is the only project they have ever had and nearly all of the community members have implemented it through improved coffee systems, taunga systems or improved fallow systems. The population of 160 people is entirely Tzeltal, a Mayan indigenous group, only a few of whom speak Spanish. Although less than 60 km from a major urban market most farmers only sell crops to other farmers, except for coffee. All households but one participate in Scolel Té, with an average plot size of 0.75 ha enrolled, and all farmers in the community are ejiditarios except for one poblador who is employed outside the community.

Results

Motivating participation: resource-based and asset factors

Since the start of Scolel Té in 1997 with an initial 43 farmers and 77.5 ha, the program has grown in two generalized periods of expansion. New contracts varied by year but in 2000 and 2001, Scolel Té saw the largest expansion to date in adding 186 new contracts in 25 new communities covering an additional 491.5 ha (Nelson and de Jong, 2003). By 2001 Scolel Té had established agreements with a total of 450 individual farmers as well as four communal agreements (ibid). In the second period of expansion in 2008, another 8 communities and 288.5 ha were added (ibid). Part of the total increase in number of producers and hectares of expansion has been the introduction of Scolel Té in new communities while the rest has been achieved by enrolling new participants in communities where AMBIO already had a presence or expanding the number of hectares enrolled for past participants. Overall, the responses indicated that payments and technical support given were favorably considered by the participants and encouraged participation among their neighbors, relatives or others in their social networks.

In general, cultivated crops provide the main source of income for non-participants while for participants, the payments from Scolel Té are much lower than the government sponsored PES payments such as the PSA-CABSA program (Program of Payments for Carbon, Biodiversity and Agro-forestry Services) and the ProÁrbol Communitarian Forestry program (Program for development and forest production) that promotes community participation in forest management and conservation, with the exception of Alan’kantajal and Samaria’kantajal in the highlands of Chiapas where only Scolel Té is present. In almost all cases, the majority of total household income comes from the sale of excess corn, beans, coffee and cacao and only one respondent held a full-time off-farm job while a few had seasonally worked off-farm in the past. The total income reported varied from community to community and in communities which are still within the payment period (all those except for Alan’kantajal and Samaria’kantajal), respondents viewed payments as a small proportion of the total source of income. This is similar to previous research on Scolel Té that while payments are sufficient in covering the startup costs in establishing the carbon forestry practices, they are insufficient for enabling changes in livelihoods or practices which have the potential of substantially increasing household income, accounting for 1–25% of overall household income (Paladino, 2008; Ruiz-De-Oña-Plaza et al., 2011). Furthermore, estimates showed that average payments for a 1 ha plot only cover 20–25% of the foregone net income that could have been gained from planting maize (ibid).

General observations of the farmers and their plots indicated that the land use, general characteristics of the land and physical assets do not greatly differ between participants, non-participants
and former participants within each community. Only in Nuevo Rodulfo Figueroa was there a noticeable difference in the asset factors among households where those with assets of greater economic value, such as cars or domestic appliances, corresponded to households who had at least one family member that had temporarily migrated to the United States.

In Josefa Ortiz de Dominguez, payments reinforced existing income inequalities between ejiditarios and pobladores. Ejiditarios hold much larger tracts of land than the pobladores and thus participate with many more hectares of land, in some cases more than ten times as many hectares, and receive higher total payments. Participants often expressed that they considered payments a form of employment and compensation for work they carried out in the enrolled parcels of land. In Nuevo Rodulfo Figueroa and San Felipe Jateté, participation was much lower and respondents said that they felt that the payments were too low in comparison with the perceived value they believed they could receive from other land uses. Competition for land use in other PES or conservation schemes was frequently mentioned as a deciding factor for not participating. Nuevo Rodulfo Figueroa and San Felipe Jateté both host other, multiple PES and conservation projects such as PES schemes for hydrological services or biodiversity conservation, which have been implemented in the past by both NGOs and government agencies. Participants who also raised cattle noted additional benefits of the project as reinforcing fencing of their parcels and the trees providing shade for the cattle. Those who have received Scolel Té payments, both current and former participants, generally viewed them as subsidies for land use conversion but felt they were insufficient to cover the costs and time required to participate in the project.

In contrast to these communities and although no longer in the period of receiving payments, financial incentives were reported as sufficient and were often the first motivating factor mentioned in the interviews in Alan’kantajal and Samaria’kantajal. All participants also noted an increase in coffee production in the parcels which had implemented the improved coffee system (shade-grown coffee) in the earlier years of participating.

Factors influencing participation: institutional and social context

Each of the four communities has a distinct social and institutional context including different population pressure dynamics, membership configurations, land tenure – particularly access to land – resource availability and land use constraints. As we suggest below, at least one of these factors or a combination of them were mentioned by surveyed individuals and interviewees as key processes that influence individual and collective responses to the project.

In Josefa Ortiz de Dominguez, participation in the government-sponsored PES scheme and the existence of agricultural production cooperatives were limited to ejiditarios only. All ejiditarios participate in the PES scheme and a majority of them belong to at least one of the agricultural production cooperatives but Scolel Té is the only program for which pobladores are eligible. All pobladores interviewed expressed a motivation to participate which was related to their desire to participate in a working group with the ejiditarios. Although they generally held fewer parcels of land and should therefore be less inclined to participate (Southgate et al., 2007; Wunder, 2008), their decision to participate with Scolel Té was highly motivated by their sense of inclusion with the others. Pobladores often referred to the fact that as pobladores they are currently unable to participate in other cooperatives and that it is important for the pobladores to demonstrate their ability to successfully participate in a project to the ejiditarios so that they may be included in the activities of PES and/or conservation projects in the future. Payments have been shown to strengthen community relations and to depend on motivation structures which rely on community engagement (Vatn, 2010). This synergy among Scolel Té, PES and agricultural production cooperatives acted as a reinforcing mechanism for strengthening cooperative action as well as acting as some sort of social monitoring of participants.

In Nuevo Rodulfo Figueroa the rapidly increasing population influenced by an influx of displaced indigenous people from neighboring communities over the last 20 years is a major concern. All participants interviewed were ejiditarios and despite the presence of many pobladores in the community, very few had participated in Scolel Té. Both participants and non-participants discussed the lack of fuelwood availability and the high cost of purchasing both fuelwood and timber. Access to fuelwood was frequently mentioned as a motivating factor for participants as well as non-participants who expressed a desire to join the project in the future and mirrors findings in other carbon forestry projects in China as well as Mexico (Corbera and Brown, 2010). Since there are three agricultural production cooperatives (for coffee, cacao and chili peppers), a bi-annual harvest as well as multiple PES and conservation projects in the area, farmers have many more off-farm responsibilities and project resources available for the use of their time and enrolment of their land. Some of the responses about reasons not to participate from all respondents, whether participating or not, were: the project competed in terms of time availability with other more lucrative projects; the maintenance costs outweighed the payments in terms of time and money which would have to be invested; the return on investment for Scolel Té was lower than with other programs, at least in the short-term; and the lack of available land to participate in it. This supports previous research which has shown how labor relationships and availability of time play a key role in participants’ decision to enrol in the project, in accessing benefits from the carbon offset project (Corbera and Brown, 2010; Corbera, 2005) and how labor requirements may act as a constraint mechanism preventing some from enrolling in the project (Osborne, 2011).

A similar attitude toward a lack of time was reflected in San Felipe Jateté but respondents speculated that non-participation in the area had more to do with a past conflict with the AMBIO technician and a general lack of technical support. Of the original 12 participants only four remain (all of whom are ejiditarios), and we were unable to speak with any of the former participants. However, although very few people currently participate in the community many farmers have begun to implement some of the agroforestry systems promoted by AMBIO. The non-participants interviewed expressed their motivation for doing so based on their positive impression of their neighbors’ results and a desire to replicate these practices. The benefits demonstrated by participants in PES and carbon forestry schemes elsewhere have also shown learning-by-doing and replication by non-participants (Rosa et al., 2003; Grieg-Gran et al., 2005; Robertson and Wunder, 2005; Wunder, 2008). In both San Felipe Jateté and Nuevo Rodulfo Figueroa the shortage of fuelwood and timber was mentioned as a driving factor for deciding to plant trees, whether as part of the Scolel Té program or not, and in the former, respondents reported that even former participants were continuing to maintain the agroforestry practices on their parcels. In Nuevo Rodulfo Figueroa this was also confirmed.

Emphasizing community engagement and the potential for PES projects to strengthen community relations has been shown to be crucial for PES projects (Vatn, 2010). Alan’kantajal and Samaria’kantajal have a high level of participation, strong sense of commitment of the community to continue the agroforestry practices and understanding of the environmental benefits of participation. When the Scolel Té project began in Alan’kantajal and Samaria’kantajal in 1997, only three farmers participated. These initial
participants were able to demonstrate to their neighbors the positive impacts of the introduced agroforestry practices and expand the project to the rest of the community (all but one participant continue to maintain their parcels). This was later developed as part of the approach AMBIO took in each new community: identifying one or two members who would demonstrate the positive impact of participation and over time gaining interest and participation from their neighbors. Respondents reported a positive experience with Scolel Té and most saw themselves as partners with AMBIO. A strong commitment and understanding of the rules existed, including how the agroforestry systems had benefitted them in increasing coffee yields and in reducing the risk of landslides. It should also be noted that the local AMBIO technicians in the area are both from this community and have worked with AMBIO since its inception. These technicians are responsible for the monitoring and implementation of Scolel Té in other parts of Chiapas.

**Participation and project design and rationale**

Over the past 16 years, the Scolel Té program and AMBIO’s development and implementation of it have evolved. Initially, Scolel Té was presented as a way for farmers to engage in entrepreneurial activities and to become “tree farmers” and selling future timber. This possibility was effectively removed with the passing of the Forest Law in 1997 that banned all commercial timber harvesting without approval by the State and which included a series of lengthy and costly processes including an environmental impact assessment and review by State officials. At the same time, the early voluntary carbon markets were beginning to take off and consumers’ preferences for offsetting their carbon dioxide emissions began to take shape and a number of standards and certification schemes developed (Benessiah, 2012). The Plan Vivo standard responds to a consumer preference for carbon offset projects which focuses more on generating socio-economic co-benefits than carbon storage and accounting. This gives AMBIO a rather nuanced flexibility for project design and implementation and allows them to be more responsive to communities’ needs and experience over them with the project development.

In recent years, a complaint often cited by participants was that planting certain species of trees for carbon storage was replacing the possibility of planting trees which would provide food, such as fruit trees (see also Nelson and de Jong, 2003; Corbera et al., 2007). AMBIO responded and began allowing farmers to select certain fruit tree species and plant them as 10% of the total planted in 2007). AMBIO responded and began allowing farmers to select certain fruit tree species and plant them as 10% of the total planted in certain agroforestry systems beginning in 2010 (Quechulpa Montalvo et al., 2011). This flexibility and responsiveness on AMBIO’s behalf was positively received in all four communities. In addition, AMBIO has collaborated with a number of national and foreign academics in carrying out field studies on the environmental, social and economic impacts of the Scolel Té project in communities. Many of the recommendations from such studies have guided the design of projects in areas of new expansion (see for example Osborne, 2010).

The marketing and sale of Plan Vivo Certificates are predicated on a collaborative planning system design developed with farmers. The initial phase of creating a Plan Vivo with farmers and subsequent capacity building, training and monitoring activities have transferred knowledge and skills directly to the participants. As part of the knowledge transfer and capacity building activities that are provided by participation in the Scolel Té program participants are given an accounts book to track carbon storage including the quantity and dates of payments received and they participate in carbon monitoring activities. In addition, the development of the Plan Vivo map helps encourage longer-term investment perspectives, such as for future benefits of timber or fuelwood harvests, and may enhance other on-farm investment or planning activities.

Despite the fact that each community has a different perception of what participation means in terms of collaboration with AMBIO (e.g. as partners), and what the payments are intended for (e.g. as subsidies or as employment), the motivating factors for deciding to participate and the continued care for the parcels enrolled in the project reflect a shared understanding of the potential economic benefits of participation (e.g. future timber sales and continued care even when no longer receiving payments) and environmental benefits of the activities (e.g. improved coffee yields).

In Josefia Ortiz de Dominguez respondents cited environmental benefits such as soil fertility and oxygen provision as reasons why conservation and agroforestry practices are important. Some respondents even referred to themselves as environmental stewards. This is similar to the language used by AMBIO during their initial workshops in the community and may be explained by the fact that these were held more recently than in the other communities, thus it is fresher in the farmers’ memory. The social inclusiveness provided by participation in Scolel Té and its project objectives are compatible with the other PES schemes operating in the community and it seems to mutually strengthen participation.

In Nuevo Rodulfo Figueroa and San Felipe Jatató, respondents complained of a lack of technical support from AMBIO that may explain why there were more former participants who no longer receive payments or are missing past payments. However, there has also been good replication of agroforestry activities by non-participants in the community despite not being directly involved in the project activities or receiving payments. When farmers have multiple options for conservation or agroforestry projects to choose from, a clear understanding of the project rationale is crucial to engaging and continuing the participation of the community (Reynolds, 2012). Instead in Alan’kantajal and Samaria’kantajal, where the presence of technical support and history of experience with Scolel Té was strongest, the understanding of project rationale and levels of participation were high. We observed that when the presence of the local coordinating organization is stronger (more frequent) and more visible, there is a better understanding of the activity requirements for farmers to receive payments as well as better rates of continued participation. However, the limiting factor in this case seems to be a lack of available land and the future division of parcels among the current participants’ children.

Of interest is that in all four communities, most of the former participants continue to maintain the agroforestry systems despite missing payments or not receiving them at all and there seems to be some confusion among those who should have received payments and have not. Indeed many respondents reported not receiving payments from Scolel Té though none cited this specifically as a motivation for leaving program. However, whether within the payment timeframe or not (i.e. having participated more or less than 10 years), they also considered themselves current participants regardless of receiving payments or not while from AMBIO’s perspective they were considered former participants even if beyond the 10-year payment time. Part of AMBIO’s strength in implementing a project designed to generate additional benefits and work directly with farmers is that they have some flexibility in the organization of local project activities and the monitoring of plots despite issues experienced with late or missing payments. AMBIO is willing to re-activate these former participants’ plots for which carbon credits have already been issued as Plan Vivo Certificates if farmers are willing to update their plots to meet the project requirements. The confusion between the two perspectives was explained by respondents as a technical assistance issue on the part of AMBIO more than a misunderstanding of the requirements for their payments to be received.
Discussion and conclusions

In general, the main motives for participating across the communities were a combination of social factors and relations such as desires to be included in collaborative working groups, as well as resource-based factors (perceptions of fuelwood and timber shortages). As seen in earlier studies on participation in PES programs (see for example Wunder, 2005), financial incentives did not greatly influence the motivation to participate in Scolel Té. While we were unable to interview all previous participants in one of the communities, some non-participants whom we spoke with mentioned that they had replicated their neighbours’ agro-forestry activities even without the monetary payments and technical support from the project. This brings into question the logic behind many PES schemes that payments can incentivize farmers to adopt new practices although we recognize that financial shortfalls could have played a role for some of the former participants whom we were unable to interview directly. In the case where people decided not to participate or to discontinue their activities according to the requirements of the project, motives given were related to competition for land use and limited time and labor availability. This ambivalence shown by most of the respondents toward economic incentives highlights the implications of conservation strategies which exclude different understandings of motivations for conservation such as ethical- or incentive based (see for example McCauley, 2006; DeCaro and Stokes, 2008; Fletcher, 2010; Waylen et al., 2010).

In terms of the importance of asset-based factors, payments play some role of importance in motivating participation (Skutsch et al., 2011) but as seen in Section ‘Motivating participation: resource-based and asset factors’, they were generally seen as insufficient. Earlier work on participation in PES schemes has also emphasized the importance of the distinction between payments presented as incentives or presented as fair compensation (Vatn, 2010), and emphasized the importance of aligning financial incentives with social norms (Vatn, 2009). In the case studies, the results in Nuevo Rodulfo Figueroa highlight the risk of abandoning the project where more market opportunities exist and the level of support from local institutions, such as the technical support from AMBIO, are perceived of as low or insufficient (Kosoy et al., 2008). Only in Alan’kantajal and Samaria’kantajal did we see a positive response to the incentive of payments for implementing the agro-forestry practices; the other three communities results were mixed and interpreted in different ways depending on the level of technical support provided by AMBIO, supporting arguments that group dynamics mediate the interpretation of economic incentives as social or economic transactions and influence their effectiveness in encouraging participation (Muradian et al., 2013).

Our results demonstrate the importance of land tenure in understanding exclusion processes operating at the community level and how social norms may play a more important role in motivating participation (Muradian et al., 2013). In some cases, the project is perceived by participants as a potential means of overcoming such inequalities. As seen in Josefa Ortiz de Domínguez, the Scolel Té project has provided a mechanism to bypass exclusion processes by providing an opportunity for those ineligible to participate in other PES schemes to become involved. This has been achieved through the strengthening of social relations beyond existing group divisions and facilitated through participation in the project. In Josefa Ortiz de Domínguez we also saw that participation was facilitated by a desire to demonstrate capabilities and be integrated with other activities, allowing for synergies among Scolel Té, PES and agricultural production cooperatives. Interaction and linkages among projects within the local context are crucial to project success and where AMBIO has been able to demonstrate and encourage a feeling of partnership or ownership with participants through its project design and implementation, such as in Alan’kantajal and Samaria’kantajal, we have seen a stronger commitment to continued participation and strengthening of strengthen local institutions (Roshetko et al., 2007; Shiferaw et al., 2009; Anderson and Zerriffi, 2012; Reynolds, 2012).

The motivation to participate can be encouraged when there is an opportunity to see results before enrolling (Roshetko et al., 2007; Anderson and Zerriffi, 2012), and additional benefits, such as the provision of timber and capacity building benefits gained by observations of learning-by-doing, the replication of agro-forestry activities by non-participants as well as sustained participation by formerly participating households, mirror earlier findings in other PES and carbon forestry schemes (Rosa et al., 2003; Grieg-Gran et al., 2005; Robertson and Wunder, 2005; Wunder, 2008). We have seen farmers in all four communities replicating agroforestry practices because they have seen demonstrated benefits by their neighbors and not because of the incentive of payments. This may raise questions about the effectiveness of PES programs to economically incentivize the participation of small-holders. Providing incentives based on rewarding local labor may be a more efficient use of funding for forest carbon offset projects to reduce emissions through forest conservation and reduced deforestation than relying on PES schemes which may in effect act as hidden subsidies and rely more on state regulation than market-based principles (Fletcher and Breitling, 2012; Bottazzi et al., 2013).

One of the key findings of this study has been the replication and continued care of carbon system plots, even after participants have left the program. We have seen that participation in the project is not necessarily dependent on payments since some actors follow AMBIO’s forestry protocol without formally participating and others continue to participate in carbon activities after the payments have ended. Non-economic factors play an important role in encouraging participation in forest carbon offset projects (Corbera and Brown, 2010; Osborne, 2011; Skutsch et al., 2011). In contextualizing our findings on motivating participation in light of the literature reviewed, we find confirmation that where strong cooperative action dynamics exist within the community, such as in Josefa Ortiz de Domínguez, synergies between participation in carbon forestry projects and other conservation programs are reinforced.

While this may be contrasted in cases where resource and asset-based factors are also found to be important in motivating participation, we emphasize here the interpretation of economic incentives as contextualized within the social and economic context of the community. We have seen that participation is perceived as not only an economic transaction but as a potential means to overcome social inequalities or as a way of the strengthening of an individual’s social relations beyond the confines of the existing group dynamics. Future research on motivating participation in carbon offset projects as stimulated by additional benefits rather than economic incentives and how the design and implementation of future projects can better respond to the needs and experiences of the communities’ involved is needed.

We have shown how opportunities to strengthen individuals’ social relations can be more influential in mobilizing participation than economic incentives alone. What is important is not the general institutional context in which the project was implemented but the concrete, specific and individual social relations in which they are embedded. The social context is important as much as it influences the structure of social relations, both before and throughout the project. The Scolel Té project has contributed to diversifying productive practices and has been able to build capacity for natural resource management, while being flexible so as to
avoid existing institutions that might marginalize non-rights holders. Understanding how participation is motivated beyond the provision of economic incentives and analyzing the extent to which participation can be encouraged through current practices would be beneficial for those interested in achieving better outcomes for forest carbon offset projects. Our findings suggest that future developments for voluntary carbon offset projects should consider, address or reinforce social and economic outcomes that may be somewhat unintentional.

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