The equity and legitimacy of markets for ecosystem services: Carbon forestry activities in Chiapas, Mexico

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Abstract

Markets for ecosystem services are increasingly being designed and implemented across the developing world. They have been promoted by national governments and global institutions based on a faith in their ability to promote sustainable development, without a critical engagement in the implications of these markets on elements of sustainability. In this paper we argue that equity and legitimacy constitute key aspects of sustainable development and are critical to the success or failure of markets for ecosystem services. We argue that equitable procedural and distributive mechanisms built into the design and implementation of these markets could potentially challenge local and project-based power relations and hence provide a potential for transformative action. Yet most markets for ecosystem services are more likely to reinforce existing power structures and inequalities in access to resources. We examine these issues through two communities engaged in a carbon forestry project in the state of Chiapas, Mexico. These communities differ on the way in which they engage in the project, either through individually or collectively owned land, and we investigate the relations between local property regimes, legitimacy processes and the implicit distribution of benefits in the selection of participants and project-related information. Our analysis indicates that, in both cases, markets do not represent legitimate and equitable mechanisms for sustainable development and override local socio-political and property dynamics. We therefore cast doubt over the capacity for transformative action towards sustainable development of market-based mechanisms that reinforce existing inequities and vulnerabilities.

1. Introduction

Advocates for the creation of markets for ecosystem services argue that these would constitute an effective strategy for the efficient use of natural resources and a way to make explicit the linkages between nature and human development to decision-makers (Daily 1997). But in economic terms, the benefits provided by ecosystem services[1] are public goods. In effect then, they are external to the actors involved in markets and their public benefits are not captured in prices and those who benefit from the market exchange are not necessarily the direct resource users. Since the 1990s, however, numerous pilot projects and marketing frameworks for ecosystem services have been designed and are starting to be implemented across the developing world, with considerable attention being put into forest services, particularly into watershed regulation, biodiversity conservation and carbon management (Myers 1997; Pagiola et al. 2002; Swingland 2002).

So far, the nature of the created markets and the actors involved have been contingent upon the type of service, the context, and the scale in which pilot projects and marketing frameworks have been established. Nevertheless all markets and incentive schemes aim to increase the economic benefits of resource managers and enhance resource conservation. It is argued that enhancing direct use and commercialisation of the goods and services provided by ecosystems promotes the sustainable development of rural populations, the livelihoods of which depend directly or indirectly on the resources, particularly in the developing world. In addition, these markets aim to become more economically efficient and environmentally effective than previous government-led conservation strategies, and are expected to provide an equitable distribution of their economic and social benefits (Bawa and Gadgil 1997; Pagiola et al. 2002).

However, it is worth noting that, unlike current commodity markets, markets for ecosystem services are not autonomously evolving institutional arrangements with a long evolution and maturation (Vatn 2000). Rather, they have been created in a relative short time and their establishment has been promoted by a set of national and international parties which share common interests in the protection of the global environment through market-related strategies. This fact has raised concerns about the ability of these frameworks to incorporate local ecological and social realities in their design and practice and to consolidate equitable decision-making processes and outcomes across

scales (Adger et al. 2001; Brown and Corbera 2003). Despite this context of uncertain outcomes, there are potential benefits to the construction of new institutions for resource management. If legitimate and equitable mechanisms are built into the design and implementation of markets for ecosystem services, these markets could effectively challenge local and project-based power relations and hence provide a possibility for transformative action towards sustainable development. But we argue that this emphasis on legitimacy and equity is a pre-requisite which is not apparent in the design or outcome of markets to date.

The following sections discuss the importance of bringing equity and legitimacy into environmental decisions and highlight how these concepts can be explored in the practice of market-based ecosystem services initiatives. A brief sketch of a carbon forestry project in the state of Chiapas, Mexico, is offered and the level of project's legitimacy and the perceived equity in the selection of participants and the distribution of project-related information in two of the participant communities are examined. The final section presents evidence on how context specific, particularly property regimes, and project related factors undermine legitimate and equitable outcomes in the creation of a carbon management market.

2. Equity and legitimacy in markets for ecosystem services

Markets for ecosystem services have to date been designed for attaining environmental effectiveness at the lowest cost whilst promoting an equitable distribution of benefits across sets of different institutions, actors and scales. By doing so, these markets attempt to become legitimate at local, national and international political domains. But insights into institutional dynamics of decision-making show that all environmental decisions implicitly or explicitly involve questions 'economic efficiency, environmental effectiveness, equity and political legitimacy' (Adger et al. 2003). All decisions allow different sets of potential institutional forms with different outcomes, different degrees of uncertainty, and different trade-offs for each particular management alternative and derived outcome. Hence, environmental decision-making is likely to involve a plurality of stakeholders holding divergent views over these implementation alternatives and outcomes. The stakeholders' competing views are likely to be a product of their diverse socio-cultural contexts and their interests at stake, which stresses the importance of being sensitive to this pluralism in the design and implementation of environmental decisions.

Thus, issues of efficiency and effectiveness cannot be separated from those of equity and legitimacy in the creation of markets for ecosystem services, which have implications across scales and actors. Within these processes, this paper offers a preliminary contribution by analysing questions of equity and legitimacy in the practice of markets for carbon management. Unsurprisingly, such analysis has been absent in the discourse around land use change and its role in greenhouse gas emissions, or more broadly in the discussions of marketed ecosystem services (Adger and Brown 1994; IPCC 2000). Only recently, equity has gained a more central role in analyses of carbon management initiatives, which have paid closer attention to the role of globally-driven economic flows, governmental policies and programmes, project-based power relations and local property rights in shaping the potential of these initiatives for poverty reduction and local development (Landell-Mills 2002; Brown and Corbera 2003). This paper also attempts to bring equity back at the centre stage of debates on sustainable development, which some argued became blurred within wider calls for stakeholder participation in processes of economic development and ecological management (Lélé 1991; Adams 1993; Pepper 1993).

Equity, as we use the term here, encompasses both distributive and procedural justice. The philosophical roots of these concepts and their use in modern political discourse and policy shows that these ideas have diverse interpretations (Goodwin 2003; Schlosberg 2003). Equity as *distributive justice* concerns the distribution of socio-economic factors and goods in a society. The concept involves fair distribution of goods under an agreed set of principles or criteria. While there may be a single universal criterion for fairness, the complexity of the topic has led some philosophers to argue that the criteria for distribution will vary according to historical and cultural contexts –see (Rawls 1971; Walzer 1983) for competing perspectives.

Equity as *procedural justice* in this context refers to the fair participation of individuals and groups in decision-making. It has been argued that, in practice, procedural justice constitutes a preliminary step in any attempt to fairly negotiate and distribute economic, social and environmental outcomes. But procedures are not blind to social characteristics of class, ethnicity or prior injustice. Therefore, Young (1990) and others argue for a third dimension of justice, that of *recognition*, which deals with the need for recognising group differences and processes of social oppression against these groups.

In this paper, we argue for a pluralist framework that recognises two elements of equity, namely *distributive* and *procedural*, and we situate equity as *recognition* as a sub-category under *procedural* justice. We suggest that an equitable representation of individuals and marginalised groups in processes of decision-making for the creation and implementation of markets for ecosystem services will only be realised if there is a prior recognition and inclusion of these groups. Moreover, we highlight the importance of a critical examination of the internal politics of 'non-recognition' that these groups can also sustain and the identification of heterogeneity and prior vulnerability of certain individuals within them.

Legitimacy is the extent to which decisions are acceptable to participants on the basis of who makes and implements decisions (the process of recognition and inclusion) and how outcomes are distributed (the process of distribution). Rules and practices that regulate both recognition and distribution are intimately tied to specific socio-cultural settings and the distribution of power. One can make a distinction, therefore, between political and social legitimacy.

The empirical observations in the following section make explicit the linkages between equity and legitimacy, as well as their dynamic process of realisation. An environmental decision, such as the creation and implementation of markets for ecosystem services, can have political legitimacy across scales but it may not deliver the expected equitable outcomes and be sustained on an inequitable decision-making process. At the same time, equitable outcomes and processes in the creation of these markets may not necessarily imply that it is regarded as legitimate by all political and social institutions across scales. Thus, we argue there are inevitable trade-offs in the realisation of these outcomes of market creation and we examine how trade-offs impact upon different stakeholders and compromise the potential of markets for ecosystem services to contribute to local sustainable development.

3. Case study synopsis

Forest ecosystem services have received more attention at the international level than virtually any other ecosystem. Forests regulate watersheds, act as wildlife refuges, are diverse ecosystems themselves, and represent significant carbon stores, as well as perform numerous other ecological functions. The carbon storage function is of key

importance for the regulation of the global climate system (IPCC, 2000) and led the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol to encourage investors from developed countries to invest in carbon forestry projects across the rural developing world, in exchange of carbon credits to be traded against their greenhouse gas emission reduction commitments under the Protocol. In 1995, the UNFCCC promoted a voluntary pilot phase of these projects with no accrual of carbon credits involved and, as a result, 20 pilot projects were set up between 1997 and 2002, mainly in Latin America and Asia (UNFCCC, 2002).

One of these early carbon forestry projects is the 'Fondo Bioclimatico' project in the state of Chiapas, Mexico. This project has been acknowledged as one of the most successful examples in sequestering carbon and promoting sustainable development. It has also led to widespread enthusiasm about the possibility of replicating its endeavour elsewhere, increasing the number of projects and rural people that supply the carbon being stored in their forests to an international carbon market (Tipper 2002). The project origins can be traced back to 1994 and 1995 when some Mexican and international research institutions explored the interest of a farmers' organisation in Chiapas named "Unión de Crédito Pajal Ya'kactic" (PAJAL) in participating from a project that had to provide technical assistance and financial incentives to shift from agriculture to agroforestry, convert pastures to plantations, restore degraded forest, and manage natural forests. Between 1994 and 1995, the carbon fixation potential of the forestry activities preferred by PAJAL affiliated farmers, together with the potential to sell carbon, were thoroughly investigated (de Jong and Montoya 1994; de Jong et al. 1995; Montoya et al. 1995).

In 1997, the project was registered under the UNFCCC. The International Automobile Federation committed to purchase 5.500 tons of carbon per year at a price of US$12-10 dollars per ton of carbon over the next 30 years, along with the UK-based organisation Future Forests. In order to manage and administer the carbon investment, a trust fund was created, accompanied by the establishment of a professional organisation that would promote the project across the region, train community technicians, and deal with administrative and monitoring procedures. From its origins to the present, it has grown from an initial group of 47 PAJAL affiliated farmers in six local communities, to more than 450 farmers affiliated to five rural organisations and representing more than 20 communities across the region. All of them are subsistence or semi-subsistence farmers

relying upon maize and bean cultivation, coffee, and some cattle production and they all have designed their own forest-management strategy, which defines a number of agroforestry, reforestation and conservation activities to be carried out in either individual or communal holdings, and designed according to the specific physical, ecological and geographical conditions of the area (Soto-Pinto et al. 2001; Tipper 2002).

Farmers receive an up-front payment as a source of initial working capital which represents about 20 per cent of the carbon expected to accrue from individual or community management plans. They receive the 60 percent of the sale price per ton of carbon sequestered, and the remaining 40 percent is set aside to cover the costs of technical support for farmers, administrative costs, monitoring and reporting. The income has been variable according to the level of compliance and the characteristics of the management area, with some farmers experiencing higher planting mortality rates than others or lower growth rates than expected. Therefore, producers' income gain oscillates, but its maximum has been estimated at around US$700 over 10 years (Tipper 2002).

The research reported here is based on social survey and participant observation in two of the communities involved in the project during 2002 and 2003. The communities were selected on the basis of their longer involvement with the project and the fact that they responded to the project in two contrasting ways: one developing the project in individually-owned agricultural plots and the other developing it in communally-owned forests. Both communities were supportive of the research process and several discussion groups and interviews were held during more than eight months. What follows highlights and discusses our fieldwork observations.

4. Legitimacy and equity in practice

4.1. Legitimacy in its historical and property rights context

The historical departure point to understand our sites of study was their constitution as *ejidos*. After the 1910-17 Mexican Revolution, the *ejido* was the legal term to define a productive group of people with land given by the government for common ownership. These people abide to certain norms and procedures which determine the way in which *ejido* land rights and socio-political institutions are established. Selected members of the group (called *ejidatarios*) receive access to an individual parcel of land, which remains under communal ownership, with no rental or sales of land allowed. *Ejidatarios* can only

bequeath their rights of access to their parcel of land to a single descendant, which in practice implies that *ejidos* have several members with no formal land access rights. *Ejidos* have usually set apart an area of communally owned forests and pastures, to which all ejidatarios hold formal access. The majority of non-right holders have *de facto* access to the family land endowment and to the communally owned area. The *ejido* political and social life is regulated through the *ejido* assembly, in which *ejidatarios* and community members meet to discuss the management of collective resources and other issues concerning the social and political life within the *ejido*. At present, a great number of *ejidos* across the country are changing their socio-political and property configuration as a result of a 1992 constitutional reform which gave *ejidos* the freedom of reallocating land between common property and individual parcels, as well as of incorporating new members (Muñoz-Piña et al. 2003: 131).

Our first case study, the *mestizo*[2] *ejido* of *Yalumá-Villahermosa*, is located in the south eastern part of the state. It was constituted in 1954 by families who bought their land from local *finqueros*[3]. Before the *ejido* constitution, those who had more economic power were able to acquire more land and fence it to legitimate their property and exclude others from access it. Even after the *ejido* constitution, land was not internally redistributed, fenced property remained, and only an area of communally owned forest was established to meet timber and fuel wood for inhabitants' needs. At present, the community has 2170 inhabitants, 556 families, and further parcelling of family properties seems non-viable. The latter has made the community assembly to agree on the division of communal forests in the near future, which will be distributed in the benefit of landless families. These circumstances, together with other context specific facts that are analysed below, explain why the carbon project developed on individually owned agricultural plots[4].

Our second case study, the *Tzotzil*[5] community of *Rincón Chamula* is located in the north western part of the state and holds a different pattern of creation and distribution of land resources. The *ejido* was not created by individual families working for *finqueros* but by indigenous migrants establishing themselves over state-owned property and unexploited *fincas*. According to local testimonies, the community was founded between 1915 and 1920, when groups of indigenous families from the state central highlands migrated to the northern region due to political conflicts and land scarcity in their communities of origin. The *ejido* was legally constituted in 1952 and land was distributed across four

neighbourhoods but neither these areas nor the family allocations were or are currently fenced. According to people interviewed, this had to do with lack of financial resources and the ethnic origin of the inhabitants, which limits internal family properties through historical, socially and natural recognised boundaries. At present, the community has 5525 inhabitants, 1141 families, and productive land is scarce. Nonetheless, the community still maintains its forest commons, which are governed by strong rules of access and management, despite social population dynamics may threaten their future existence. The stability of the common institutions explains why the carbon project could develop in communally owned land.

However, we suggest that, in order to grasp the carbon project level of legitimacy in these two communities, awareness of the historical context and local property regimes should be accompanied by an analysis of the way in which carbon project managers approached the communities. In the project's individually-led community, such engagement took place through a regional rural organisation named "Unión de Ejidos Lucha Campesina" (UELC), which was receiving political guidance and financial support from PAJAL, its umbrella organisation, which aimed to finance rural development activities in the state and, as noted earlier, resulted the first organisation approached by project managers in the mid 1990s. As a result of these linkages between project managers and UELC-PAJAL, the community assembly was reluctant to develop the carbon project in the community.

The conflict between several *ejidatarios* and UELC affiliated families evolved during the 1970s, when these families and other UELC-affiliated neighbouring communities organised themselves to promote local development initiatives, particularly in the area of public transport and agricultural production. In those years, UELC development initiatives were carried out under the supervision of external agents who, according to some of the interviewed, aimed to collectivise *ejido* lands. Therefore, when the carbon project was introduced to the community through UELC-PAJAL members, the majority of *ejidatarios* still saw UELC-PAJAL and their associated projects as hostile to the community interests. Overall, UELC-PAJAL counted with a limited membership support in the community. In 1997, only 22 out of the 45 UELC affiliated families engaged in the carbon project regardless of the community assembly stance against the project.

In this community, local doubts over the project's local legitimacy manifested in two different ways. By one hand, project participants felt the need for a continuous reassurance that they were not implicitly selling their land to carbon investors. On the other hand, non-participants made discursive connections between the carbon project and wider regional discourses of resistance to privately led development projects, which owed their existence to the neighbouring Zapatistas struggle and other discourses permeating the community's catholic religious meetings, which were ideologically sympathetic with liberation theology. Certainly, there has been a recent increase in the social acceptance of the project, which relates to the fact that the project's community representative dropped out from UELC in 1999 and, automatically, the project became slightly more accepted by other community members[6]. At this regard, the representative noted that 'there is *now* total freedom for us to work apart from the general interest of the community assembly' (*pers.com.*, 2003; emphasis added). Still, this has not seemed sufficient to counteract the lack of local political commitment and to eradicate internal conflicts.

In contrast, the project's communally-led community was approached through a rural organisation that had wider social support in the community and the region itself. The "Unión Regional de Ejidatarios Agropecuarios, Forestales y de Agroindustria de los pueblos Zoque y Tzotzil del Estado de Chiapas" (UREAFA) was created in 1992 with the objective to develop productive projects in local communities, as well as to participate in the struggle for reclaiming land that was still in private or state hands, a task that was being led in the state by a national political organisation named "Central Independiente Obrera y de Acción Campesina" (CIOAC). Even if not all community members were affiliated to UREAFA or CIOAC, it could be argued that the community assembly legitimised the carbon project because of general sympathy towards these organisations' work in the region. In fact, such legitimisation allowed project managers to deal progressively with local authorities and bypass UREAFA, which was favoured by the fact that the linkage between project managers, UREAFA and community authorities debilitated between 1998-2000 as a result of the UREAFA's community representative temporarily leave.

By no means, however, the current level of project's local legitimacy is guaranteed in the long-term. At present, landless members of the community are engaged in a struggle for acquiring land from neighbouring private properties. According to several testimonies,

these families had already asked the community assembly to distribute the forest commons and select new *ejidatarios* from within those who are not formal right holders. Current authorities have not accepted such proposal but there is no reason to expect otherwise if future authorities, which change every three years, are less supportive of collective management or more land is not secured from neighbouring properties and the pressure of the landless over the commons increases.

In both communities, wider property-related claims accompanied the legitimisation of the carbon project and also helped to legitimise the individual or the group's position within these property relations, a phenomenon that has been well acknowledged in the literature (Vatn 2001; Vira 2001). For instance, in the project's individually-led community, participants envisioned the carbon project not only as a strategy to pursue the project economic expected benefits but also as a way to defend their family bestowed land rights, which we noted were not distributed equally across *ejidatarios* when the *ejido* was formed. In addition, the participants' emphasis on the fact that the project was being developed on their family land endowments was also helping them to portray the community assembly's stance against the project as illegitimate. Their engagement in the project resulted an effective way to incorporate short-term (in terms of cash) and long-term (in terms of the forest growing stands) productive value to areas which were rarely agriculturally exploited and that they were exclusively fenced to demonstrate the existence of property. These property-related claims were strategically important in a context where land scarcity was severe and landless families had started to challenge the legitimacy of those large properties held by some.

In addition to the linkages between land rights and the engagement in the carbon project, participants in the individually-led community also claimed that the project was a vehicle for ensuring higher future rainfall rates that would then enhance agricultural productivity and ultimately benefit all the community and its future generations. Such claims were also a common feature in the project's communally-led community, whose participants' discourse included appeals to the future benefits associated with short-term collective income[7], long-term use-values, such as local building construction, agricultural purposes, timber commercialisation, and future environmental benefits. In this sense, Vira (2001: 639) has noted that it is common for claim-making strategies to appeal to some wider social process which confers legitimacy on the claims and offers some protection to the claimants.

4.2. Equity challenges

After looking at how locally property rights and dynamic institutional contexts have shaped the processes through which the carbon project has been politically and socially legitimised, we now turn to examine whether the establishment and development of the carbon project has affected distributive outcomes. In both communities, independently of the stability or the conflicting nature of property regimes, we argue that the project has lacked of sensitivity to the plurality of formal and informal resource users, whose access to the carbon benefits shall be guaranteed but might not be necessarily recognised by the community assembly.

The recognition that different productive spaces may have different resource users and different effective managers over the resources and the benefit streams associated with these resources is crucial. For example, there is strong evidence in the literature about women's important role in managing forest resources and contributing to their sustainability (Rocheleau and Edmunds 1997). Therefore, if forests are recognisable spaces in which women conduct a set of important productive activities for household and community development, it seemed compelling to pay at least attention to women's needs in relation to carbon forestry and identify, not only which tree species would better accommodate their interests, but also which other productive spaces, such as home gardens, would favour the women's development expectation or those of other marginalised groups, such as the landless[8]. In doing so, the project could effectively contribute to ameliorate processes of wealth accumulation by individual families and minimise the risk of exacerbating inequalities across and within households (Vatn 2001).

In the project's individually-led community, it became evident that women played neither a direct nor indirect role in the management of the family or the communal forest resources. These were essentially male-dominated productive spaces. However, most women played an effective role in the management of their home gardens. In fact, when the carbon project had a more development-related orientation in its early years, women were involved in several discussions and raised their interest in improving the local climate by planting fruit trees in their home gardens or by improving their cooking stoves. However, as the project moved from a development orientation towards a more narrow focus on extensive tree planting in agricultural lands or pastures, women's

suggestions were not prioritised and they dropped out from project meetings –see a review of this transition in (Nelson and de Jong 2003).

In addition, one could argue that an attempt by project developers to present and develop the project through formal political authorities would have opened the possibilities of non-UELC families to participate or, more critically, it would have opened the door to planting in communally owned land, which would have then enabled a more equitable distribution of project outcomes at community level. However, our enquiries in this direction indicated that the possibility to develop the carbon project in communal lands were unrealistic because, as we already noted, contextual dynamics of population growth and land scarcity were already affecting the way in which community authorities could enforce collective action in the forest commons. Field observations indicated that that the carbon project enabled some of the local richest families to plant in relatively larger extensions of agriculturally unproductive land, consolidating their economic and social position within the community. In a more positive tone though, there were participants who, despite being severely constrained in terms of historical land endowment and economic resources, considered the project an important development activity.

In the project's communally-led community, women effectively played a role in both the management of home gardens and the management of common forest resources, particularly for the collection of fuel wood and animals grazing, which is a key element of the social organisation of production of Mayan indigenous groups (Silva 2002). However, the carbon project did not address this condition of women as resource managers. When men attending discussion groups were prompted about women's participation in the selection of seedlings or in tree planting, they acknowledged that women had not participated. This was a clear symptom of the carbon project limited capacity to affect locally driven processes of non-recognition and gender exclusion, a fact that has also been remarked from other ongoing carbon projects in other locations (Boyd 2002).

The deficient recognition and inclusion of particular actors by the carbon project has come accompanied by a deficit in the distribution of information across participants. We acknowledge that the carbon project outputs encompass other set of material and knowledge-related issues, including economic revenues at household or community levels, information delivery on climate change, carbon forestry and project management

related issues, technical assistance for planting and monitoring, off-site training courses on forest management and capacity-building activities for strengthening local collective action. But we only give insights here on the distributional aspects of information delivery, a factor that became very important in local discussions due to its direct impact upon local power relations.

The interaction between project management and participants has so far been mediated by a set of specific community representatives, who attend monthly and biannual meetings at project headquarters. These representatives belong to either the political-organisations that engaged with the project in its early years or to the communities authorities, and they constitute the effective linkage between project managers and local communities. By one hand, local representatives report on the state of project development at local level and, on the other hand, managers inform about project development issues, such as payments frequency, seedlings delivery, or monitoring schemes, among other issues. For project managers then, the existence of these local representatives has become an effective way to maintain a clear leadership structure across participant communities, which has so far resulted very functional. At the local level, most interviewees tended to define local representatives as those who held more detailed information about the project, those who understood it the most and, as a result, those who were better positioning for making decisions on behalf of the group.

At the same time, however, both communities raised concerns about the need to reconfigure the existing systems of information delivery and decision-making between project managers and participants. In the project's individually-led community, some of the participants interviewed stressed that, now that the project had consolidated, there was a need to allow other members of the group to take up the leadership in the project management meetings. In the project's communally-led community, several people interviewed proposed to create a local committee responsible for the community's forestry practices in which authorities, agents and those who have decision-making power in the community could be periodically brought together to discuss issues related with the conservation of common resources and the carbon project.

We therefore suggest that a leadership rotation system and the creation of the committee could have positive implications for equity and legitimacy. These may help to condensate project knowledge across a reference body of people rather than concentrating it in few

individuals who already hold power and social recognition. Both mechanisms could help to reduce the lack of confidence that some of the interviewed in both communities manifested about the risk of project representatives mismanaging carbon funds. The mechanisms would both have to ensure that any decision regarding the carbon project is effectively transmitted to all participants and the community assembly, respectively. Particularly for the case of the committee, members would have to last longer than authorities but they would also have to rotate; we acknowledge though that its structure could become a platform for internal power politics in which the views of some may continuously over-represent those of others. This risk may be ultimately counteracted by potential equitable benefits, particularly in terms of information distribution, collective knowledge and decision-making and the balance of community power relations.

4.3. Do individual or collective carbon management enhance equity and legitimacy?

In the light of the evidence presented above, it seems clear that the potential of markets for ecosystem services to become locally legitimate and promote equitable outcomes is influenced by a set of factors, including historically and localised power struggles, context specific property regimes, and project management strategies, particularly those related to approaching local contexts and constructing informational and decision-making mechanisms (*see Table below*). Our two case studies show contrasting results but no clear-cut relation can be established between the property regime under which the carbon project operates and legitimacy and equity outcomes.

In the individually-led project's community, the forthcoming division of the forest commons and the weakness of their governing rules have impacted negatively upon the project's potential to deliver equitable outcomes across community members, particularly over the landless or those who do not hold large family properties. Moreover, the project's individualised management strategy in this community may have served to reinforce the power of particular families and legitimise claims over property. In addition, the project managers' approach to the community through an organisation that did not count with wide local support became another disabling factor for the project's ability to promote carbon management widely across other community members.

In the project's communally-led community, legitimacy was more easily achieved thanks to establishing the carbon institutional arrangements through existing community-based

institutions. Thus, legitimacy was also favoured by the fact that the rural organisation channelling the project into the community was counting with wider local political support. Nevertheless we showed that such legitimacy might not be stable in the long-term, particularly in a context where claims over the commons by landless families are becoming prominent. Besides, the project has lacked of sensitivity to women's productive role in the forest commons. This is indicative of the project's inability to challenge the inequities that might already underlie communities' social organisation.

Table 1: Enabling and disabling factors for legitimacy and equity of carbon forestry projects in two communities in Chiapas

	Political and social legitimacy	
	Context driven	*Project design*
Individually-led community	▪ Commons management rules not in place plus existence of a historical socio-political conflict between the majority of the ejido assembly and participants in the carbon project (disabling)	▪ Unawareness of the internal socio-political conflicts associated with the regional rural organisation through which the project was presented (disabling)
Communally-led community	✓ Commons management rules in place plus wider support by the community assembly of the carbon project (enabling)	✓ Ability to promote the project through a rural organisation that counted with relatively wide community membership (enabling)
	Equity in process and outcome	
Individually-led community	▪ Historically rooted unequal land endowments (disabling) ▪ Future parcelling of the commons and weak enforcement of community based resource use rules (disabling)	▪ Inability to promote the project across families with smaller land endowments or the landless (disabling) ▪ Indirect enhancement of local social status through participants' use of the carbon project to reinforce local property relations (disabling) ▪ Inability to work on productive-spaces that can result more profitable for women or landless families (disabling) ▪ Inability to establish a more participatory framework for the sake of efficiency in information delivery (disabling)
Communally-led community	✓ Sustainability of the commons; strong rules in place (enabling) ▪ Only community authorities relate to external projects, bearing the risk of a future political change and decreasing support to carbon activities (disabling)	▪ Inability to recognise the totality of forest users, particularly women, participating in the management of the forest commons (disabling) ▪ Inability to establish a representative mechanism for information delivery and decision-making (disabling)

We acknowledge that local and project conditions are not stable but rather subject to change due to local social processes or changes in project management. As a result, internal conflicts may dilute as soon as soon as the communities' relations with external organisations change or community authorities are renewed. Existing property regimes may also change as processes of land redistribution take place or common property institutions approve new rules in relation to communally held resources. Even the productive pattern of individually owned land may also be affected by economic or kin reconfigurations within the household. However, the project has not yet been able to build more inclusionary mechanisms for project management and decision-making, which could facilitate grasping local dynamics and complexities and could promote more legitimate and equitable outcomes, counteracting the concentration of knowledge in either local representatives or community authorities. Continuous debate about how to increase political and social legitimacy and about how to promote a fairer recognition of actors and distribution of outcomes has to be promoted at local level.

In this sense, discussions held with project managers indicated that the project was severely impacted by the end of non-carbon additional funding programmes at the end of the 1990s. As a result, there was a progressive move towards accounting and monitoring procedures, an emphasis on increasing the number of communities (in order to meet the carbon demand) and a shift away from factors that had to do with better communication or more inclusionary dialogue in the communities. Nelson and de Jong (2003) have reviewed these changes in funding and mainstream activities and have noted that the project developers' early held view of the carbon project as a potential vehicle towards 'community well-being and sound environmental practices' had been transformed into a view of a contract-based project in which 'farmers can contract to deposit carbon and withdraw payments' (*ibid.*: 25-26). This transition at project management level may explain to a great extent the inability of project managers to match local dynamics and complexities with project's legitimate and equitable development. But, more importantly, we believe that the lack of funding that provoked such transition is an indicator of the risks entailed in constructing a cross-scale market in which the agendas of global and national stakeholders, potentially driven by an economic rationale, may serve their interests but may ultimately jeopardise the practice of its own rhetoric.

5. Conclusion

If markets for ecosystem services are to help rather than hinder sustainable development, they need to recognise the competing views and diversity of actors in environmental decision-making. Yet markets are blunt instruments with respect to issues such as equitable inclusion and distribution of environmental outcomes. In this paper we have examined the creation of markets for ecosystem services surrounding carbon that, through the climate change international regime, have made ambitious claims as to their potential to promote economic efficiency, environmental conservation and social equity, therefore enhancing sustainable development. This paper has focused on the legitimacy and equity issues at the local scale in communities implementing a project for carbon management in Mexico. These cases have illustrated the challenges that this type of projects face when attempting to attain local legitimacy and equity in diverse historical and socio-political contexts.

We have found that the carbon project has made explicit trade-offs in addressing questions of legitimacy and equity within local communities. Project implementation ignored the internal conflicts derived from the absence of social and political legitimacy of the market structure, which has been essentially contingent upon a set of existing and evolving political relations between rural organisations and local community institutions. We have found that landless families and women in particular became excluded because the carbon project could not match the nested complexity of property relations with its increasing orientation towards tree planting in male-dominated productive spaces. In addition, some explicit decisions were taken in project design that impacted on the fair distribution of information across participants. The development of more equitable forms of communication and knowledge-sharing across participants and project managers seem to be severely constrained by lack of financial resources at project management level, which inevitably puts into question how globally driven markets can generate local transformative action.

Clearly this study has highlighted the contextual dynamism over the meaning and practice of legitimacy and equity in markets for carbon management and the allocation of their potential outcomes. Thus, markets for ecosystem services will have diverse and often unexpected impacts on environmental governance and decision-making when parachuted into complex resource management situations. While markets for specific

ecosystem services can potentially generate external revenue and promote conservation and direct utilisation of those services and functions, this can easily be at the expense of non-utilitarian values for these resources and can "crowd out" stewardship and related behaviour on which social resilience depends. Markets for carbon management illustrate this dilemma.

The global scale disruption of the carbon cycle and the urgent requirement to reduce emissions of carbon to the atmosphere could result in an almost infinite demand for carbon management in every aspect of human resource use. Yet, in focusing markets in resource situations such as multiple use forests, the legitimacy and equity dimensions of sustainability become lost. This is particularly so when one considers that carbon offset activities reduce the need for emission reduction in the world's polluting nations. We have argued here, in the context of cases in Mexico, that the institutional design required to create markets for global services cannot deliver equitable and sustainable development and that this is fundamentally a problem of mismatch of scale.

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[1] In the past decades there has been growing awareness about the important role played by natural ecosystems in sustaining human life. Ecosystems provide humans with direct goods for consumption, which include seafood, forage, biomass fuels, timber, medicinal plants, organic soil, and wildlife, among others. Ecosystems also provide critical services for the functioning of natural and human systems, referring those to processes of cleansing, recycling, and renewal of biological resources. They can also play aesthetic and recreational functions and they might be of significant importance to some populations for cultural and spiritual reasons.

[2] *Mestizos* are descendents from indigenous ethnic groups and Spanish colons, and they constitute the majority of Mexican population.

[3] *Finqueros* used to have large tracks of land (*finca*) in which indigenous and *mestizo* people used to work in exchange of basic goods, the permission to build their houses in the *finca*, and the *finqueros*' military protection.

[4] Legally speaking, the community owns all ejido land and the ejidatarios hold only rights of access to their plots. Ejidatarios have de facto rights to utilise their plots as they please and, even if the ejido assembly has not agreed on undertaking the provisions of the 1992 constitutional reform due to internal land disputes,

ejidatarios have been historically selling and buying land amongst each other and to other community members.

[5] *Tzotziles* are an indigenous Mayan group in Chiapas. They have predominantly occupied the state highlands but, as their population has grown in number during the last century, land became scarce, and internal religious conflicts spread within *Tzotzil* communities, some groups migrated to the north of the state. Unfortunately, these migrations are not very well documented in the local literature and we have had to rely strongly on local testimonies and few written resources.

[6] Between 1999 and 2002 the project registered more than 40 new participant families in the community. UELC and PAJAL as regional and state-based rural development organisations, which have counted with several affiliated communities in the area of the Chiapas lowlands and the state, are debilitating for a set of economic and socio-political reasons that cannot be covered in this paper.

[7] Carbon planting revenues are delivered to community authorities that then discuss what to use them for. In 2002, carbon revenues were used to pay the *ejido* land tax and, in 2001, carbon revenues were distributed across the four neighbourhoods, which collectively decided what to do with them. They used it for a variety of things including the improvement of road pavements, the purchase of a speaker to announce community meetings, and the purchase of spades and wheelbarrows.

[8] For a classification of women's needs in both practical and strategic categories, see (Regmi and Fawcett 1999)

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