Community forest management for timber extraction in the Amazon frontier

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SUMMARY

Amazonian communities have the potential for improving their livelihoods by efficiently managing their forest resources. However, there is limited understanding of how communities are managing their forests in the dynamic Amazon frontier. This issue was studied in four areas in Bolivia, Brazil and Peru. The most common approach to forest management was found to be informal timber rights negotiations between communities and logging companies. Much less common was community forest management (CFM) for timber extraction supported by NGOs. Case studies revealed that stocks of commercial timber species were depleted by logging companies in only a few years in the logged areas, while CFM initiatives planned rotational cycles but were abandoned when external support ceased. Families received limited financial benefits from both loggers (cash income US$ 1.18/m3 and US$ 28.14/day) and CFM initiatives (cash income US$ 12.57/m3 and US$ 8.69/day). A critical debate on the real potential of these approaches to timber extraction needs to take place.

Keywords: Community-company partnerships, community forest management (CFM), timber extraction, Amazonian frontier, externally-driven development

Gestion forestière de communauté pour l'extraction du bois dans la frontière amazonienne

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Les communautés de l'Amazonie peuvent potentiellement améliorer leurs revenus en gérant leurs ressources forestières efficacement. Cependant, la manière dont les communautés gèrent leurs forêts dans la frontière dynamique de l'Amazonie n'est comprise que d'une façon limitée. Cette question a été étudiée dans quatre zones, en Bolivie, au Brésil et au Pérou. L'approche la plus commune à une gestion forestière s'est révélée sous la forme de négotiations informelles quant au droits sur le bois, entre les communautés et les compagnies de coupe du bois. La gestion forestière communautaire (CFM) pour l'extraction du bois, soutenue par des organisations non gouvernementales, était bien moins courante. Des études-cas on révélé que les stocks d'espèces de bois commercialisables étaient fortement réduites par les compagnies de coupe, en quelques années seulement; alors que les initiatives de CFM prévoyaient des cycles de rotation, mais étaient abandonnées quand le soutien extérieur disparaissait. Les familles recevaient des bénéfices financiers limités , qu'ils soient provenus des bûcherons (revenus en liquide de 1.18 $ US/m3 et de 28.14$US/jour) ou des initiatives de CFM (revenus liquides de 12.57%US/m3 et de 8.69$US/jour). Il faut qu'un débat critique sur le potentiel réel de ces approches à l'extraction du bois prenne place.

La gestión forestal comunitaria y la extracción de madera en las zonas limítrofes del Amazonas

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Las comunidades amazónicas tienen el potencial para lograr mejorar su nivel de vida mediante una gestión eficiente de sus recursos forestales. No se comprende bien, sin embargo, la forma en que las comunidades locales manejan sus bosques en las zonas limítrofes del Amazonas, sujetas al cambio constante. Se estudió este tema en cuatro zonas de Bolivia, Brasil y Perú, y se descubrió que el modelo de gestión forestal más común se basa en negociaciones informales sobre los derechos madereros entre las comunidades locales y las empresas de aprovechamiento maderero. La gestión forestal comunitaria (MFC) con el apoyo de ONGs es mucho menos común al tratarse de la extracción de madera. Los estudios específicos revelaron que las empresas de aprovechamiento maderero reducían los recursos de especies madereras comerciables dentro de muy pocos años en las zonas taladas, mientras que las iniciativas de MFC planeaban ciclos de rotación, pero que estos fueron abandonados cuando se acabó el apoyo externo. Las familias recibían beneficios financieros limitados de las empresas madereras (ingresos en efectivo US$ 1.18/m3 y US$ 28.14 al día) y de las iniciativas de MFC (ingresos en efectivo US$ 12.57/m3 y US$ 8.69 al día). Hace falta un debate crítico sobre el verdadero potencial de estos modelos de extracción de madera.

INTRODUCTION

There is general agreement about the promise of forest management by traditional Amazonian communities as a pathway to sustainable development in the region. This assumption is based on the fact that many Amazonian communities hold considerable areas of continuous forests which have the potential to improve their livelihoods. These communities include indigenous groups living on their ancestral land and traditional *caboclo* communities (of mixed African, European and Indigenous descent) that have long lived in a particular forest area.

The advance of the Amazon frontier and the associated emergence of new markets for forest products, in particular timber, offer opportunities for communities to utilise forests as an important source of income. The expansion of the frontier is often led by private sector actors migrating from other areas or promoted by the governments building infrastructure for integrating the region with the national economy. In the past decades the logging sector has led the expansion of the Amazon frontier by opening roads in both public and private areas that later become key channels for further colonisation.

Two main conceptual models are promoted for communities to transform forests into concrete benefits for their livelihoods. Under the community-company partnerships (CCP) model, communities in remote areas can negotiate their timber rights with logging companies so that these companies can access the timber in return for cash and other goods and services. Under the community forest management (CFM) model, communities implement their own forest management initiatives for timber extraction, supported by NGOs and government agencies.

Although there is general agreement on the potential of these two models, there is no clear understanding of under what conditions communities can actually benefit from them. Existing assessments often focus on specific case studies and do not provide a general overview (e.g. Oliveira and Braz 2006, Koziell and Inoue 2006, Lima *et al*. 2006). In addition, they do not analyse in depth the opportunities and constraints faced by communities in their attempts to make use of the different options (e.g. Pacheco and Cronkleton 2005, Sousa and Gomes 2005, Amaral and Amaral 2005).
The study aims to contribute to a better understanding on how Amazonian communities are using their forest resources either in community-company partnerships or in community forest management initiatives in the Amazon frontier. In particular, the study assesses:

1. The main approaches to timber extraction by communities;
2. The timber harvesting systems and the implications of such systems; and
3. The direct and indirect benefits derived by communities from the different approaches.

In the first section (below) the different expectations under the two conceptual models of forest use by Amazonian communities are outlined. The study areas and research methodology are then described. In the following section the research findings are presented: the observed approaches to timber extraction by communities, the timber harvesting systems, and the benefits derived by communities. Finally, the implications of the limited benefits derived by communities in both negotiations with logging companies and initiatives of CFM are discussed.

CONCEPTUAL MODELS

Policy makers, logging companies, NGOs and scientists promote two main conceptual models for Amazonian communities to benefit from the financial potential of their forests: (1) Community-company partnerships in which communities negotiate their timber rights with logging companies, and (2) initiatives of community forest management supported by NGOs and government agencies.

Community-company partnerships

Under the community-company partnerships model, logging companies are assumed to be the most suitable player to ensure professional and rational use of forest resources held by communities living in remote areas. A good number of these communities do not have full ownership over their areas with land titles but most of them are considered as legitimate holders of their lands (except in some areas where there are serious conflicts). This model assumes that communities have neither the technology nor the organisational skills required for competitive harvesting and selling of timber resources. For communities, the most suitable option would be to negotiate their timber rights with logging companies.

Communities would benefit from a cash income as well as services provided by the companies, such as the opening and maintenance of roads. Experts therefore recommend that strategies for conserving the Amazon forest must include supporting logging companies in adopting sustainable management practices, subsumed under the concept of reduced impact logging (Holmes *et al*. 2001). They also recommend independent third-party certification to ensure the quality of commercial forest operations (Veríssimo *et al*. 2005). The increasing number of forest management plans for timber harvesting made by logging companies in community areas shows that this conceptual model is already a reality in the Amazon (Lima *et al.* 2006, Pacheco 2006, Benneker *et al*. 2005,) as well as in other tropical frontier regions (Palmer and Engel 2007).

In fact, it is predicted that with mounting pressure on remaining land and forest resources, relationships between the private sector and local actors will become increasingly common (Mayers 2000). In this context, CCP are expected to deliver attractive benefits to communities, as well as to companies, while contributing to the conservation of forests. Case studies report promising experiences of ongoing formal partnerships in the Amazon (Bolfor II 2007, Merry *et al.* 2006, Vidal 2005, Lima *et al.* 2006),. Mayers and Vermeulen (2002) summarised some of the main positive aspects of

these partnerships for local communities, including clear economic benefits, new market and funding opportunities, development of infrastructure and job opportunities. However, they also pointed out some negative effects, including bad working conditions, limited development of communities' bargaining power and high transaction costs on both sides.

First experiences indicate that the quality of these partnerships depends on a number of factors. According to Morsello (2006), company–community deals work best when contracts and mechanisms that allow fair negotiation are a legal requirement, capacity building begins early and includes managerial duties, companies avoid interfering in local community affairs, and governments and third parties (such as NGOs) act as brokers, intervening when necessary.

Community forestry

To avoid ongoing predatory logging and boom-and-bust economic cycles (Schneider *et al.* 2005) in Amazonian frontier regions, various environmental government and non-governmental organisations suggest that forests held by communities should be managed by those communities themselves. Under the promoted framework for community forest management, communities are intensively trained and accompanied by NGOs and government agencies to manage their forests according to legal and technical requirements established by experts. Various CFM pilot initiatives have been established in the Amazonian frontier during the last decade (ITTO 2007, Amaral and Amaral 2005).

Community forestry is viewed as an alternative for the development of communities inhabiting "areas of sustainable use by smallholders" (Sikor 2006, Edmunds and Wollenberg 2003). In Bolivia, a substantial portion of Amazonian forest has been transferred to communities as a result of reforms to the legal framework in the 1990s (de Jong *et al*. 2006). Similarly, in Brazil 63% of the protected areas is designated as indigenous land and another 6,3% corresponds to Sustainable Use Conservation Unities inhabited by traditional communities (Lentini *et al.* 2005). In the Peruvian Amazon, over 90% of the 1265 registered indigenous communities own legal land titles, totalling more than 10 million hectares (GEF/PNUD/UNOPS 1997).

In accordance with the CFM conceptual model, communities are supported in the formation of enterprises to harvest, process and sell timber from their forests in markets (Donovan *et al.* 2006, Scherr *et al.* 2003), preferably in market niches as high-value certified timber (Macqueen 2008). Studies report promising experiences in Brazil (Amaral and Amaral 2005, Sousa and Gomes 2005), Bolivia (Benneker *et al*. 2005) and other countries such as Mexico (Taylor 2001). In expectation of attractive financial returns from investments in local capacity to manage forests (Nino-Murcia 2006), it is assumed that CFM, supported by further projects to generate uptake of successful pilots (Recoftc, 2007), will spread to become one of the principal options for rural development in the region (ITTO 2007, Sikor 2006, Bray *et al*. 2006).

Nevertheless, a number of studies reveal that the success of CFM depends on several conditions (Pagdee *et al.* 2006), including tenure security, the existence of supporting organisations (Pacheco and Cronkleton 2005), improved and coherent outcome-based regulations (Bennett 1998), low-level bureaucracy (Sunderlin *et al*. 2005), as well as effective measures against illegal logging (Sunderlin 2006), without aggravating the negative impacts on communities (Kaimowitz 2003). There is also general agreement that successful CFM requires the direct involvement of communities in forest management and decision making (Reed and Mcllveen 2006). In this sense CFM initiatives should build on local peoples' priority and capacities (Medina and Pokorny 2008) and avoid an overemphasis on forest protection (Alia *et al.* 2007, Koziell and Inoue, 2006).

Challenges

In the Amazonian frontier, however, the necessary conditions for both effective community-company partnerships and community forest management often do not occur. The initiatives currently assumed to be successful are actually initial pilot initiatives strongly driven and subsidised by loggers or NGOs. Governments simply lack the required resources for implementing intensive supportive policies and support from international organisations is usually restricted to pilot projects. With regard to logging companies, experiences demonstrate that radical change in logging practices is difficult (Smith *et al.* 2006), even in those cases where there has been substantial adjustment at the political level (de Jong 2004). Relationships between logging companies and communities are commonly still informal and based on paternalistic relationships which reduce communities' bargaining power (Medina 2004). Related to community forestry initiatives, studies indicate numerous factors which make it difficult for external players to implement complex management and commercialisation systems by communities (Frost *et al*. 2007, Campbell *et al.* 2001).

In view of the difficulties and challenges related to both options, it is fundamental to better understand how Amazonian communities are actually using their timber resources in the current institutional context of the Amazon frontier. Such an understanding can serve as a basis for a more realistic evaluation of existing options and the design of proper support strategies.

STUDY SITES AND METHODOLOGY

Research was carried out between 2005 and 2007 in four study areas, all located in typical frontier regions characterised by rapidly increasing timber markets (Figure 1). In each study area, the number of communities was identified and a typology of their approaches to timber extraction was carried out through interviews with local experts (Table 1). Based on this typology, two representative communities were selected from each study area as case studies: one community

negotiating their timber rights with logging companies and one neighbouring community receiving support from a development organisation (NGOs or government agency) to adopt Community Forest Management. A total of eight case studies were therefore examined all located in upland (*terra firme*) areas.

Each selected community was visited three or four times between 2005 and 2007, with visits lasting three to six days. During these visits, four to six families were interviewed about their relationship with loggers and development organisations. Families were asked open questions on their current approaches to forest management, and the historical emergence of these strategies. Families were also interviewed about the characteristics of their harvesting systems, such as product, area, species exploited and the management practices used. Finally, families were asked about the benefits they derived from the current approaches, including cash incomes and in kind benefits. The forest area was also visited to verify the exploited area and species and to characterize the management practices being carried out.

Logging companies and representatives of NGOs and government agencies involved in the promotion of CFM were also interviewed about their projects. Regional offices of forestry agencies in the different countries were visited to collect official information about the forestry activities in the study areas. Such information was contrasted with the empirical data collected in the field as a basis for this study. Communities, logging companies and development organisations have been promised confidentiality.

In Bolivia, Vaca Diez province in the Department of Beni was selected because it is one of the principal zones of expansion by loggers migrating from the economic centre of Santa Cruz (de Jong 2004). In this region about 13 hard wood timber species correspond to 90% of the volume commercially exploited. In the case studies 12 species were exploited by the logging company and 10 species were exploited by the CFM initiative. The most exploited species were *Cedrelinga catenaeformis* (Mara Macho), *Cariniana decandra* (Enchoque), *Couratari guianensis* (Bitumbo), *Astronim* sp. (Cuta), *Dipteryx odorata* (Amendrillo), and *Hymenaea courbaril* (Paquió). *Cedrela odorata* (Cedro) has been intensively logged in the last decades and most of the stocks were already depleted.

In Brazil, the municipality of Xapuri in the state of Acre represents an area with a long history of economic expansion and a relatively high level of governmental control (Allegretti 1990, Sousa and Gomes 2005). Local communities mostly comprise former rubber-tappers currently making their living gathering Brazil-nuts and doing small-scale agriculture for local markets. In Xapuri, most former rubber-tappers also raise cattle as an additional source of income. *Ocotea megaphylla* (Itaúba), and *Minquartia guianensis* (Quariquara) are hard wood species traditionally logged and sold to neighbour cattle ranchers for building farm fences. The studied CFM initiative included the extraction of 16 species of hard and soft wood including *Amburana acreana* (Cerejeira), *Protium* spp (Breu), *Pouteria* spp. (Abiu), *Cedrela odorata* (Cedro), *Couratari oblongifolia* (Tauari) and *Ocotea megaphylla* (Itaúba).

In contrast, the third study area, in the municipality of Porto de Moz in the state of Pará, Brazil, is a recent and extremely dynamic logging frontier (Salgado and Kaimowitz 2003). Rural communities comprise riparian families making their living through fishing and small-scale agriculture. In the past mainly three species have been logged from the community areas: *Caryocar villosum* (Piquiá) and *Ocotea megaphylla* (Itaúba) for building boats and *Pterodon emarginatus* (Sucupira) for building cattle pens. Also the most valuable hard wood timber species have already been logged in the last decade such as *Hymenaea courbaril* (Jatobá), *Tabebuia impertiginosa* (Ipê-roxo), *Dipteryx odorata* (Cumaru), *Andira* spp. (Angelim), and *Manilkara* spp. (Maçaranduba). Currently around seven middle-price species are being logged in the study area including *Roupala* spp. (Louro Faia), *Trattinnickia burserifolia* (Sucuruba) and *Vouacapoua americana* (Acapu). The CFM initiative exploits seven species for producing furniture; the most demanded ones are *Astronium lecointei* (Moiracatiara), *Vochysia* spp. (Quaruba) and *Cedrela odorata* (Cedro).

Finally, the fourth study area is the district of Masisea in Peru, which maintains intense economic relationships with the city of Pucallpa, one of the most important timber markets in the Peruvian Amazon (Smith *et al.* 2006). The local population in Masisea is composed of indigenous Shipibo-Conibo as well as mixed communities of settler families living from hunting and subsistence agriculture. The Pucallpa timber market process a diversity of hard and soft wood. Some of the most demanded species are *Manilkara* spp. (Quinilla), *Dipteryx micrantha* (Shihuanhuaco) and *Myroxilon balsamun* (Estoraque). In the studied CFM initiative, the management plan was made for an up land (*terra firme*) area of 436 ha with a potential volume of 45 m^3 per ha per year including 21 species. The species occurring with greatest volumes were *Ocotea* sp. (Palta Moena), *Iryanthera juruensis* (Cumala Roja) and *Simarouba amara* (Marupa). However, the species with greatest market value and better access is *Manilkara* spp. (Quinilla) which occur in the low land near to the river bank. For this reason, once the CFM project ended, families preferred to exploit *Manilkara* spp. and also *Ceiba pentandra* (Lupuna) and *Calycophyllum spruceanum* (Capirona) in the low land area.

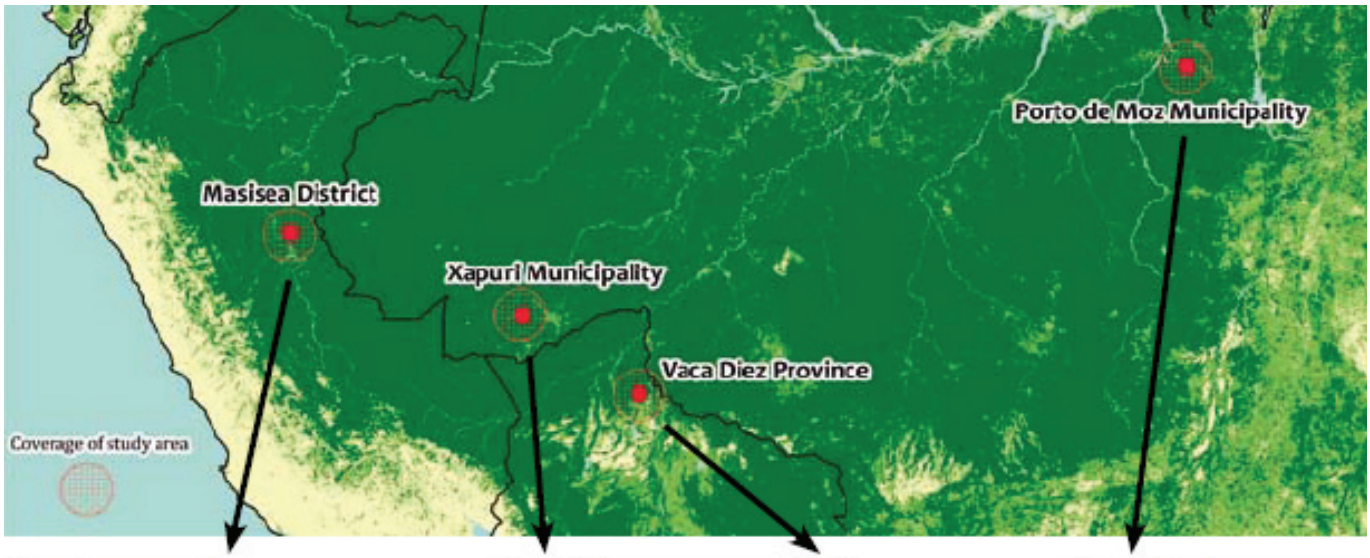
RESULTS

Approaches to timber extraction

Current situation

Between 94 and 140 communities were identified in each of the four study areas (Table 1). In all study areas the most common approach to timber extraction by communities was to negotiate timber harvesting rights with logging companies. Over the last 10 years, on average 96% of the communities in each area have negotiated timber rights with loggers at least once. During the study period approximately 20% of

FIGURE 1 *General characteristics of the study areas*



Country	Peru	Brazil, Acre	Bolivia	Brazil, Pará
Study area	Masisea District, Ucayali Department	Municipality of Xapuri, state of Acre	Vaca Diez province, Beni Department	Municipality of Porto de Moz, state of Pará
Area (km²)	12 756	5 251	19 383	17 500
Population	20 000	12 357	84 651	28 091
Collaborating organisation	District Representative Organisation of Masisea (ORDIM)	Rural Workers Union of the Municipality of Xapuri	Peasant Federation of the Vaca Diez province	Committee for Sustainable Development of Porto de Moz

communities were involved in such negotiations. While communities were also involved in initiatives of Community Forest Management, these were all pilot initiatives, restricted to 1.6% of communities, and all were supported by NGOs or government agencies. Furthermore, none of the communities adjacent to these pilot projects showed any indication of adopting CFM harvesting practices and procedures, and the number of communities involved in CFM has remained static over the last 10 years.

Interviews with the local government agencies in the study regions revealed that the number of CFM observed corresponded with their own official assessments. Official assessments of community-company partnerships, however, were considerably lower than those observed due to the generally informal nature of negotiations between communities and loggers. In fact, the *Superintendencia Forestal* in the region of Vaca Diez in Bolivia registered the submission of only one CFM initiativeand 13 annual harvesting permissions prepared and carried out by logging companies for community areas in 2006. In Brazil, a report by the governmental agency responsible for environment (IBAMA) indicated that until 2005 there were 46 CFM initiatives formally acknowledged in the whole country (5 in the State of Acre, and 11 in the State of Pará) (Costa 2005). In Peru, the office of INRENA in Ucayali recognised 34 management plans in community areas, of which 10 were supported by NGOs, while the remainder were partnerships with logging companies.

Community members pointed out that negotiating timber extraction with either logging companies or development organisations did not necessarily encompass their own interests and perspectives. However, in none of the study areas were communities found to be harvesting and selling timber through their own self-governed systems. Furthermore, community representatives could not suggest any alternative approaches as to how they might more effectively use their

TABLE 1 *Number of communities involved in community-company partnerships and CFM in the different study areas*

		Vaca Diez	Xapuri	Porto de Moz	Masisea
Number of communities in the study area		94	100	140	96
Community-company partnerships	In the last 10 years	93	90	135	96
	During the study (2006-07)	30	20	25	10
CFM	In the last 10 years	1	3	2	1
	During the study (2006-07)	1	3	2	1

timber in accordance with their interests and capacities.

Historical emergence of current approaches

The institutional context in all study areas has changed significantly in the last two decades. Until the 1980s, timber harvesting was restricted to a few communities located along rivers banks selling small quantities of timber in local markets. After the 1990s, when medium- and large-scale logging companies entered the scene, the situation changed dramatically as these companies started to systematically negotiate timber rights with local communities as an important source of timber for their saw mills. It was also during this period, particularly after the Rio Summit in 1992, that internationally-funded organisations started to promote CFM initiatives. Although these were general trends, specific conditions were observed in each study area.

In Vaca Diez, Bolivia, the new forest law approved in 1996 emphasised that commercial timber extraction must be based on management plans and communities were given preference in managing their forests. However, in general, large-scale logging companies, operating with skidders and trucks, started to negotiate communities' timber rights, in some cases based on legal management plans. A local NGO also initiated a CFM project offering training and technical support for communities to prepare management plans and facilitating the selling of harvested timber to saw mills.

As a result of the active social movement in the late 1980s, the state of Acre in Brazil, including the Xapuri study area, started in the 1990s to more effectively control the expansion of large-scale cattle ranchers and illegally operating logging companies. As a consequence, ranchers and loggers started to negotiate land and timber rights informally with neighbouring communities. Attracted by this new institutional setting, a number of CFM initiatives were initiated by local NGOs, and after 2004 these were coordinated by a newly established state agency. This agency promoted the creation of co-operatives to support communities in preparing management plans, as well as exploiting, sawing, certifying and selling timber to external markets.

In Porto de Moz, Pará, Brazil, the late 1980s were also characterised by a great expansion in local small- and medium-sized logging companies negotiating timber from individual areas held by riparian families. Only in the 1990s did large-scale logging companies, migrating from old frontiers, start to exploit forests at the back of communities' territories without previous negotiation. Also in the 1990s a governmental program offered financial support for two communities to hire a forest engineer and adopt CFM practices for timber extraction.

Finally, in Masisea, Peru, large-scale logging companies became more active in the 1990s as timber stocks were depleted from the forests of settlers situated along the road connecting Pucallpa to Lima. They intensified informal negotiations with indigenous communities along the rivers, normally operating without a management plan or governmental authorisation. In 2000 one local NGO started to promote CFM in indigenous communities, offering intensive technical and organisational support for harvesting, processing, and selling timber in the local market.

Timber harvesting systems

In the case studies analysed, the community-company partnerships were based on logging companies buying timber rights from local communities and also defining the tree species and the number of trees to be harvested. Companies also determined logging practices and used their own employees for most of the work, as well as their own machinery for felling and transporting logs. With the exception of one case in Bolivia, logging activities did not have a management plan authorised by the responsible government agency. In none of the cases did the communities interfere in the management scheme defined by the loggers. They also all accepted the conditions of agreement from the loggers without negotiation. The participation of community members in logging operations was generally restricted to the period of negotiation, although small-scale loggers would hire local people when additional unskilled labour was required.

Logging companies concentrated on areas with good access and harvested trees of a commercially viable size of those species with a market value. Areas negotiated with communities were harvested in only one to three years, with two thirds of the negotiated area already exploited in the first year (Table 2). In contrast to CFM, logging companies did not wait very long to start harvesting the negotiated timber and harvested as much as possible right at the beginning of their operations. Due to the intensity of logging operations, future possibilities for harvesting depend on newly arising market demand for species other than those harvested. As a result, when an area has been logged, companies either migrated to other areas within the same community (when available) or started new negotiations with neighbouring communities.

In Vaca Diez, 9,5 m^3 per ha were harvested from the 100 ha of collectively-owned forest during the study and loggers had already started to negotiate with families over individually-owned areas. In Xapuri, local families decided to sell part of their individually-owned areas to neighbour cattle ranchers expanding their area of pasture and also negotiated the timber from these areas. On average each family negotiated 80 ha from where they extracted 7,8 m^3 per ha. In Porto de Moz, as in Vaca Diez, the complete area was harvested and loggers had begun to contact more distant communities located up river. The extraction in Porto de Moz was intensive, with loggers exploiting around 25 m^3 per ha. In Masisea, harvesting operations were limited to species with a high market value accounting for an average volume of 12 m^3 exploited per ha. Here the community is expecting to negotiate a new harvesting contract with loggers for the remaining species in the same area.

In the observed CFM initiatives development organisations such as NGOs and government agencies supported communities in drawing up forest management plans. Forest management operations were defined by the supporting

TABLE 2 *Characteristics of the timber harvesting systems of communities negotiating with logging companies and adopting CFM*

	Negotiation with loggers					CFM				
Study areas	Vaca Diez	Xapuri	Porto de Moz	Masisea	Average	Vaca Diez	Xapuri	Porto de Moz	Masisea	Average
Total community area (ha)	15 870	14 700	15 000	1 350	11 730	16 378	7 757	3 889	863	7 222
Area negotiated or under management (ha)	200	800	1700	600	825	3 600	1000	750	436	1 446
Area exploited in the study year (2006-07)	100	800	1700	300	725	180	100	30	23	83
Number of cubic meters exploited per ha (m^3)	9.50	7.88	25.29	12.00	13.67	8.33	6.18	15.00	1.09	7.65
% of the area exploited	50	100	100	50	75	5	10	4	5.28	6.07
Number of species exploited	12	3	7	4	7	10	16	7	4	9

organisation in accordance with the norms designed to regulate reduced impact logging by large-scale companies, including inventories, mapping, and a management plan supervised by a forest engineer. The management plan also defined the rotation cycle and the yearly management units by dividing the management area into small units, each one exploited in one year, in cycles ranging from 10 years in Xapuri to 25 years in Porto de Moz. The planning included selective logging of the eligible mature trees, leaving the juvenile trees for further extraction.

As well as the management practices, the development agents also defined the entire production chain, including what product to sell (logs, sawn timber or furniture), what market to reach (local, regional or even national), the organization structure (cooperatives or associations) and the marketing strategy (whether or not to certify the product). Additionally, in Masisea and Xapuri logging operations were adapted to comply with the requirements for third-part certification. In all cases, some community members were trained to take part in field activities such as inventories, tree felling, transporting and processing, under the supervision of the forest engineer. Communities were also supervised when negotiating the sale of their product and collecting the payment. In summary, although community members participated in some activities, the conception and definition of the management scheme was basically controlled by the development agent according to established practices.

The available forest area was divided into annual units to facilitate management cycles. Consequently, on average 6% of the demarcated forest area was harvested every year (Table 2). The initiatives of Vaca Diez and Xapuri adopted industrial logging, skidding and transporting practices and exploited respectively 8 m^3 per ha and 6 m^3 per ha. In Porto de Moz families planned to exploit 15 m^3 per ha in the study year, when the initiative was still intensively supported by the project. In Masisea the work was mostly manual and inconstant with families exploiting 1 m^3 per ha.

However, despite all the investment, when external support ceased communities abandoned the CFM scheme and associated management practices. In some cases, communities re-started informal negotiations over their timber rights with local logging companies. In Masisea and Porto de Moz, local communities named limited financial attractiveness as the most important reason for withdrawing from CFM, while in Vaca Diez and Xapuri the costs for technical support was emphasised as prohibitively high for the relatively small scale initiatives.

Aside from these general trends, the individual case studies highlighted interesting specific conditions. In Vaca Diez, the management area was split into 25 annual units, assuming a rotation cycle of 25 years. The first three units had been harvested prior to 2006 and the timber was sold to local loggers. However, families abandoned the CFM initiative once external support ceased. Local leaders considered the activity to be too time consuming and were unsatisfied with the long delays before they received payment. They also pointed out that the community would not be able to meet the cost of a forest engineer, required to develop the annual harvesting plans (about US$ 600 per year). Families preferred investing their time in collecting Brazil-nuts, for which they receive part payment in advance (US$ 250 per family) and are paid the equivalent of US$ 12.5 per box of Brazil-nuts delivered.

In Xapuri, the 10 families involved in the CFM initiative have individually-owned areas ranging from 400 to 600 ha. From the total area, each family designated 100 ha for forest management for timber extraction. A rotation cycle of 10 years was planned, with each family harvesting 10 ha per year. In the first year of the initiative, harvesting costs were covered by the State government, and families seriously doubted that they would be able to cover these costs in the next year when support ends. Among the difficulties reported were the number of meetings families had to attend, the fact that in the first harvesting in 2005 all harvested soft-wood timber was lost, and that they had to wait more than one year before being paid for the delivered timber. Families were also concerned that the timber harvesting operations made access to traditional areas for Brazil-nut collection more difficult.

In Porto de Moz, the annual area planned for exploitation was 30 ha. The management plan took a long time to be approved and, as a consequence, timber harvesting finally started when external support was ceasing. The families involved therefore began to look for other opportunities

for external support to continue the activities. Difficulties reported included the length of time it took to carry out the inventory, particularly as this was considered useless because most of the inventoried trees would not be harvested. Families also complained about the cost of the forest engineer who has to sign the annual management plans. Another criticism was the market disadvantage caused by their high production costs compared to locally-produced cheap timber. This situation was made worse as the controlling government agency generally did not allow harvesting of the most useful and valuable species for furniture making, such as moiracatiara (*Astronium lecointei*), quaruba (*Vochysia* spp.) and cedro (*Cedrela odorata*).

Finally, in Masisea, an area of 436 ha was selected and split into annual units with a median size of 23 ha. As after harvesting the first area families discovered that the market prices for most of the inventoried species did not compensate their costs, they decided to concentrate harvesting on a single valuable species from a more accessible area without a management plan. Families considered the forest management project to be too time-consuming and costly compared to conventional logging. They also had serious difficulty repaying the credit of 70 000 Soles (US$ 10 000) received to buy and maintain the machinery for processing and transporting timber. Although a business plan was prepared by the supporting NGO, most of the exploited species did not reach the expected market prices.

Benefits derived by communities

Among communities negotiating their timber rights with logging companies, in all cases loggers negotiated with specific community members, never with the whole community. In the cases of commonly-owned forests, negotiations were mostly held only with the community's leader. In cases of individually-owned forests, negotiations were held with the head of the family. In all the cases observed, prior relationships existed between the logging companies and particular families or neighbouring communities. In the informal agreements studied, loggers offered part payment in cash in advance, with the remainder to be paid after transporting the timber. During negotiations communities often accepted the loggers' offers without bargaining for better terms. Beyond these general trends, specific conditions were observed in the study areas. For example, in Vaca Diez, besides negotiating the harvesting rights of their communal area, families sold logs from individually-owned areas, while in Xapuri families even sold timber from their agriculture fields. In Porto de Moz some families, besides negotiating with logging companies, were also supported by middlemen in harvesting and pre-processing their timber.

In Masisea, local small-scale loggers (*cuartoneros*) exploited community areas in agreements with individual families.

From these partnerships with logging companies, communities received only a relatively small payment for each cubic meter of timber harvested, on average US$ 1.18. Given the limited time invested, however, this resulted in a cash income of on average US$ 28.14 per person per working day. This is extremely attractive to the families involved when compared to wages of US$ 3.43 per day paid for local labour in the few employment opportunities available (Table 3). Negotiations between communities and loggers were undertaken in one to three meetings. The major effort for families was the need to chase up loggers to receive the balance of payment after the timber was transported. In fact, working input by families is limited to the negotiation process as all field activities are normally assumed by the loggers. Thus another important advantage of these transactions is the absence of investment or other costs to be financed.

With regard to the CFM initiatives, NGOs and government agencies often financially supported by international donors, have been the external partners for communities. Once a project had been approved by the donor, the development organisation started to negotiate its implementation with the communities. While these negotiations were successful in all the case studies, and the communities accepted participation, in the end only a small number of families became actively involved. The development organisations generally offered training and organisational support to communities to enable them to collectively manage their forests. The initial investment for hiring engineers, technical assistance, training, buying machinery and administration was significant. Estimates of the costs to development organisations for each community ranged from US$ 25 000 in Vaca Diez (36 people benefited) and US$ 60 000 in Masisea (5 people benefited) to US$ 218 000 in Porto de Moz (10 people benefited) and US$ 377 000 in Xapuri (10 people benefited).

Communities involved in CFM projects received on average a cash income of US$ 12.57 per cubic meter of timber produced and processed, considerably more than the cash income derived from the price paid by logging companies for the communities' timber rights. However, individuals had a relatively high input in field activities, including inventories and timber processing for producing planks and furniture, as well as attending planning and permanent training workshops. As a result, the average cash income was US$ 8.69 per person per working day, considerably lower than that received through negotiation with loggers and in some cases under the level of locally paid per diems (Table 3). Doubtlessly, participating in CFM projects involves significant investments for communities. Given that the figures presented here refer to periods when communities were supported by development organisations, the high costs involved suggest that communities face considerable financial constraints and difficulties to compete with timber from other sources once external support ceases. As CFM has to comply with the logic developed for commercial logging operations, its financial attractiveness depends on economies of scale. Operating at small to medium scales, the promoted concept of CFM resulted in relatively high costs of technical support, maintenance of machinery, administrative and marketing costs. Low productivity means that such operations often require continuous financial subsidies as

TABLE 3 *Income derived by communities from timber rights negotiations with logging companies and CFM initiatives supported by development organisations in the study year*

	Negotiation with loggers					CFM				
	Vaca Diez	Xapuri	Porto de Moz	Masisea	Average	Vaca Diez	Xapuri	Porto de Moz	Masisea	Average
Total cash income received (US$)	1 392	14 280	9 520	720	6 478	2 750	7 416	8 977	120	4 815
Volume exploited (m³)	950	6 300	43 000	3 600	13 462	1 500	618	450	25	648
Volume sold (m³)*	693	6 300	42 000	3 300	13 073	550	618	450	9	406
Income actually received per m³ (US$)	2.01	2.27	0.23	0.22	1.18	5.00	12.00	19.95	13.33	12.57
Number of persons participating	20	15	20	76	33	36	10	10	5	15
Working days per person per year	4	25	10	1	10	35	30	135	20	55
Income per working day per person (US$)	17.40	38.08	47.60	9.47	28.14	2.18	24.72	6.65	1.2	8.69
Local wage per day	2	5	5.2	1.5	3.43	2	5	5.2	1.5	3.43

* Part of the exploited timber was lost in the forest and not sold; therefore the exploited volume does not correspond necessarily to the sold volume

the anticipated profit does not materialize.

In both community-company partnerships and CFM the indirect benefits derived from the presence of loggers or development organisations working in their area were more important to community members than payments received for timber. The most important benefit perceived by communities in partnerships with loggers was improved transport through the construction, repair and maintenance of roads, or boats given as payment for the timber. Logging activities also opened up job opportunities and facilitated further possibilities such as access to personal loans (Table 4).

Community members involved in CFM supported by development organisations primarily appreciated the professional training received on practical issues related to timber felling, as well as facilitated interchange with other community initiatives. They also acknowledged as important benefits the improved access to roads and the receipt of boats provided by the development organisations through their projects. Furthermore, they pointed out the advantage of being legally recognised through their collaboration with a development organisation, which strengthened their position with authorities and commercial partners (Table 4). As in the case of collaboration with loggers, CFM projects also provided sporadic sources of employment.

Difficulties related to the negotiation schemes

Communities that negotiated timber rights with loggers often experienced difficulty receiving the full payment (Table 5). In Vaca Diez, the community leader signed a contract with the logging company including an advance payment of 50% of the total value in cash. In trying to obtain the second half of the payment, however, the community leader had been to the company's office twice without success. In Xapuri, the logger negotiated buying the timber and offered additional payment to hire families to work in logging the area. The payment was made part in cash in advance and part in kind as herds of cattle after the timber was transported.

In Porto de Moz, families contacted the logger themselves and invited him to harvest trees from their individual areas.

TABLE 4 *Indirect benefits derived by communities negotiating with loggers and involved in CFM initiatives supported by development organisations*

	Negotiation with loggers				CFM			
Study areas	Vaca Diez	Xapuri	Porto de Moz	Masisea	Vaca Diez	Xapuri	Porto de Moz	Masisea
Transport	Roads maintained	Bridges maintained	Boat with motor	Rides	Road build	Roads build & maintained	Boat & house	Small adapted vehicle
Jobs	10 people identifying trees	5 people processing timber	20 people opening roads	2 people identifying trees	Per diem for leaders	5 people working in a co-operative	Per diem for leaders	Per diem for leaders
Further possibilities	Families sell timber individually	Market for cattle	Credits in the local market	Building a meeting room	Land tenure and legal status	Legal status, support by other projects	Legal status	Local acknowledgement
Others	Documents for land tenure	Opportunity for selling land	Opportunity for renting chainsaw	Left felled trees	Training on management & tree felling	Training on administration	Training on furniture-making	Credit and training on timber processing

The logger accepted and, in an informal agreement, proposed giving part of the payment in cash and the remainder in kind as a motor boat. However, after transporting the timber the logger did not provide the boat and paid only part of the agreed amount in small instalments of US$ 20 each. In addition, he offered credits to buy food in his store in the city. In Masisea, the logger started to harvest timber without prior consent from the community that did not know their area was being exploited. When the community realized, the logger agreed to negotiate. The logger offered to pay 20% of the income generated from the timber in cash and also to build a meeting room for the community. This agreement was accepted by the community leader and a contract was signed. The logger paid for the first and second loads of timber transported but not for the third load, and he did not build the meeting room. As a consequence, the community stopped harvesting activities and began to negotiate with another logger over the remaining felled timber.

Communities involved in CFM initiatives also reported difficulties receiving payment for the harvested timber (Table 5). In Vaca Diez, the first three management units had been harvested prior to 2007 and the logs sold to different local saw mills. Generally, families received part payment in advance but, as in the case of partnerships with loggers, they often had difficulty obtaining the balance of payment after the logs were transported from the community. In Xapuri, a co-operative was created to co-ordinate operations for the associated communities, including subcontracts for the preparation of management plans, harvesting, transport, processing and selling the timber. The first management unit was harvested in 2005 but because of serious difficulties in establishing effective market chains communities only received payment in June 2007.

In Porto de Moz, the project offered financial support for the community to establish a furniture factory and to facilitate selling the timber in the local market. However, these funds were only received after a considerable delay. Furthermore, despite the financial input the community had difficulty selling their timber at a competitive price because of relatively high production costs. In Masisea, the CFM initiative supported communities in managing their communal forests, processing the timber into planks in a small factory installed in the community and selling the planks in the local market. Although a market study had indicated the potential for commercialisation, most of the harvested species could not be sold in local markets and the community stopped harvesting operations in 2005.

CONCLUSIONS

In the Amazon, two main conceptual models are being promoted for traditional communities using their forests. Under the community-company partnerships model, communities would benefit from negotiating their timber rights with logging companies. The community forest management model for timber extraction is promoted by NGOs and government agencies as the best possibility for communities to add value to their forests.

This study aimed to contribute for a better understanding on the actual benefits communities in the Amazon frontier are having from exploiting their forests in partnerships with logging companies as well as in supported CFM initiatives. The study revealed that the most common approach to forest management by communities in the studied areas, was informal negotiation of timber rights with logging companies, representing 96% of the sample. Community Forest Management initiatives for timber extraction were found as isolated pilot cases, restricted to less than 2% of the sample, and were externally supported and not adopted by neighbouring communities. In none of the study areas were communities found to be harvesting and selling timber on their own through self-governed systems.

Loggers generally depleted stocks of the species with

TABLE 5 *Characteristics of negotiations with logging companies and development organisations*

	Negotiation with logging companies				Development organisations			
	Vaca Diez	Xapuri	Porto de Moz	Masisea	Vaca Diez	Xapuri	Porto de Moz	Masisea
Period	2006 to 2007	2005 to 2006	2005 to 2006	2005 to 2007	2004 to 2006	2005 to 2007	2001 to 2007	2004 to 2007
Logger/ development organisation	Large-scale loggers	Neighbouring cattle ranchers	Medium-scale loggers	Large-scale loggers	Local NGO	Government agency	Governmental project	Local NGO
Offer (for payment)	50% in advance in cash and 50% after transport of timber	Part in advance in cash and part after transport of timber	Part in advance in cash and part in kind (a boat)	20% of the extracted timber in cash	Technical and organisational support	Support for exploiting, processing and selling timber	Financial support, a forest engineer and machinery	Technical and organisational support
Negotiation with	Community leader	Head of families	Head of families	Community leader	Community leaders	Community leaders	Community leaders	Community leaders
Formality	Signed contract	Informal agreement	Informal agreement	Signed contract	Informal agreement	Informal agreement	Informal agreement	Informal agreement
Compliance	Did not pay the remaining 50%	Part in kind (cattle)	Part in instalments and credit	Did not pay the third amount	Difficulties in being paid	Long time before being paid	Difficulties competing in market	Most species did not find market prices

commercial value in only one to three years. Due to the intensity of logging operations, future possibilities depend on new market demand for species other than those currently harvested. Community Forest Management initiatives intended to implement sustainable forest management based on Reduced Impact Logging. The available forest area was divided into annual units for management cycles. However such schemes were abandoned by the communities when external support ceased. In some cases, communities subsequently started informal negotiations of their timber rights with loggers.

Partnerships with loggers and community forestry initiatives generated only limited financial benefits for communities. From partnerships with loggers, communities received only a relatively small payment for each cubic meter of timber harvested. The negotiation was attractive mainly because communities had a limited input of invested time and consequently a high reward per working day. In CFM initiatives, communities received a higher reward per cubic meter of timber than the prices paid by loggers. However, the relatively high input in field activities resulted in a lower income per working day. Under both conceptual models communities mainly benefited indirectly through improved transport infrastructure and jobs offered by the presence of loggers, NGOs and government agencies.

The results of this study contrast with the general belief that communities can benefit significantly from the management of their timber resources under the current institutional framework found in Amazon frontiers. Neither the community-company partnerships nor the models of CFM supported by development organisations analysed in this study allowed communities to derive sound benefits from the use of their forests. The studied CCP were based on a poor balance of power and left limited possibilities for communities to bargain on the prices paid as well as on the management practices adopted. The studied CFM concepts were based on training communities for managing their forests according to externally defined models without taking into consideration the local interests and capacities. The study indicates that the ideal concepts of CCP as well as CFM are quite distant from the actual reality in the Amazon. The case studies on CFM revealed flawed concepts that once applied in real situations did not perform as conceived by the external support organizations.

But it is not the principle of forest use by communities that is in question, but the current framework. Before further promoting the implementation of either conceptual model, a critical debate on how to promote them and on their potential and limitations, needs to take place. With regard to community-company partnerships, communities in the Amazon frontier are not empowered to negotiate better deals with loggers. Under Community Forest Management, communities miss support programs to build on their local interests and capacities. Instead of training communities to manage their forests according to previously established concepts, it is necessary to build on their already existent practices.

If forest use by communities is to have a future in the Amazon region it is essential to allow communities to make use of their comparative advantages. It is necessary to explore possibilities for a third conceptual model where communities can develop self-governed management concepts based on their own interests and capacities. The conception and implementation of those self-governed concepts need to be supported by external development agencies.

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REFERENCES

ALIA, T., AHMADA, M., SHAHBAZA, B. and SULERIB, A. 2007. Impact of participatory forest management on financial assets of rural communities in Northwest Pakistan. *Ecological Economics* **63**: 588-593.

ALLEGRETTI, M. 1990. Extractive reserves: an alternative for reconciling development and environmental conservation in Amazonia. In: ANDERSON, A.B. (ed.) *Alternatives to deforestation: steps toward sustainable use of the Amazon rain forest*. Columbia University Press, New York, U.S.A. pp. 252-264.

AMARAL, P. and AMARAL, M. 2005. *Manejo florestal comunitário: processos e aprendizagens na Amazônia brasileira e na América Latina*. IEB and Imazon, Belém, Brazil. 82pp.

BENNEKER, C., BEJARANO, J. and VILLARROEL, M. 2005. *Experiencias de manejo forestal comunitario en Bolivia.* CEADES, SNV and Universidad de Wageningen, Santa Cruz de la Sierra, Bolivia. 202 pp.

BENNETT, C. 1998. Outcome-based policies for sustainable logging in community forests: reducing forest bureaucracy. In: WOLLEMBERG, E. and INGLES, A. (eds.) *Incomes from the forest: methods for the development and conservation of forest products for local communities*. CIFOR, Bogor, Indonesia. pp.203-220.

BOLFOR II. 2007. Grupo indígena obtiene más de 200 mil Bolivianos por aprovechamiento forestal. *Bosques Trabajando* **3**: 5-6

BRAY, D., ANTINORI, C. and TORRES-ROJO, J. 2006. The Mexican model of community forest management: the role of agrarian policy, forest policy and entrepreneurial organization. *Forest Policy and Economics* **8**: 470-484.

CAMPBELL, B., MANDONDO, A., NEMARUNDWE, N. and SITHOLE, B. 2001. Challenges to proponents of common property recource systems: despairing voices from the social forests of Zimbabwe. *World Development* **29** (4): 589-600.

COSTA, S. 2005. *Diagnóstico da situação dos planos de manejo florestal comunitário*. MMA-PNF – Relatório Final de Consultoria Técnica – Projeto FAO TCP-BRA, Brasília, Brazil. 32 pp.

DE JONG, W. 2004. *Retos y perspectivas del nuevo régimen forestal en el norte Amazónico Boliviano*. CIFOR, Bogor, Indonesia. 152 pp.

DE JONG, W., RUIZ, S. and BECKER, M. 2006. Conflicts and communal forest management in northern Bolivia. *Forest Policy and Economics* **8**: 447-457.

DONOVAN, J., STOIAN, D., MACQUEEN, D. and GROUWELS, S. 2006. The business side of sustainable forest management: small and medium forest enterprise development for poverty reduction. *Natural Resources Perspectives 104*. ODI, London, England. 6 pp.

EDMUNDS, D. and WOLLENBERG, E. (eds.). 2003. *Local forest management: the impacts of devolution policies*. Earthscan Publications, London, England. 208 pp.

FROST, P., CAMPBELL, B., LUCKERT, M., MUTAMBA, M., MANDONO, A. and KOZANAYI, W. 2007. In search of improved rural livelihoods in semi-arid regions through local management of natural resources: lessons from case studies in Zimbabwe. *World Development* **35** (11): 1961-1974.

GEF/PNUD/UNOPS. 1997. *Amazonía peruana, comunidades indígenas, conocimientos y tierras tituladas: Atlas y base de datos*. PNUD, Lima, Peru.

HOLMES, T., BLATE, G., ZWEED, J., PEREIRA JR. R., BARRETO, P., BOLTZ, F. and BAUCH, F. 2001. Financial and ecological indicators of reduced impact logging performance in the eastern Amazon. *Forest Ecology and Management* **163**: 93-110.

ITTO. 2007. Community-based forest enterprises: their status and potential in tropical countries. ITTO Technical series 28. ITTO, Rights and Resources Initiative and Forest Trends, Yokohama, Japan. 75 pp.

KAIMOWITZ, D. 2003. Forest law enforcement and rural livelihoods. *International Forestry Review* **5**(3): 199-210.

KOZIELL, I. and INOUE, C. 2006. *Mamirauá sustainable development reserve, Brazil: Lessons learnt in integrating conservation with poverty education*. Biodiversity and Livelihoods Issues No.7. International Institute for Environment and Development, London, England. 74 pp.

LENTINI, M., PEREIRA, D., CELENTANO, D. and PEREIRA, R. 2005. *Fatos florestais da Amazônia 2005*. Imazon, Belém, Brazil. 141 pp.

LIMA, E., MERRY, F., NEPSTAD, D., AMACHER, G., RAMOS, C., LEFEBVRE, P., and RESQUE, F. 2006. Searching for sustainability: forest policies, smallholders and the Trans-amazon highway. *Environment* **48** (1): 26-38

MACQUEEN, D., DUFEY, A., GOMES, A., NOUER, M, SUÁREZ, L, SUBENDRANATHAN, V., TRUJILLO, Z, VERMEULEN, S., VOIVODIC, M. and WILSON, E. 2008. *Distinguishing community forest products in the market: Industrial demand for a mechanism that brings together forest certification and fair trade*. IIED Small and Medium Forestry Enterprise Series No. 22. IIED, Edinburgh, UK.

MAYERS, J. and VERMEULEN, S. 2002. *Company-community forestry partnerships: from raw deals to mutual gains? An international review with proposals for improving forests, enterprise and livelihoods*. IIED, London, England. 154 pp.

MAYERS, J. 2000. Company-community forestry partnerships: a growing phenomenon. *Unasylva* **200** (51): 33-41.

MEDINA, G. 2004. Ocupação Cabocla e Extrativismo Madeireiro no Alto Capim: Estratégias de Reprodução Camponesa. *Acta Amazônica* **34** (2): 315-324.

MEDINA, G and POKORNY, B. 2008. *Avaliação financeira do manejo florestal comunitário*. IBAMA-ProManejo, Brasília, Brazil.6 pp.

MERRY, F., AMACHER, G., MACQUEEN, D., SANTOS, M., LIMA, E., NEPSTAD, D. 2006. Collective action without collective ownership: community associations and logging on the Amazon frontier. *International Forestry Review* **8** (2): 211-221

MORSELLO, C. 2006. Company-community non-timber forest product deals in the Brazilian Amazon: A review of opportunities and problems. *Forest Policy and Economics* **8**: 485– 494.

NINO-MURCIA, A. 2006. Investing in natural capital: a financial assessment of social forestry in northern India. *The Journal of Environment and Development* **15** (3): 317-331.

OLIVEIRA, M. and BRAZ, E. 2006. Estudo da dinâmica da floresta manejada no projeto de manejo florestal comunitário do PC Pedro Peixoto na Amazônia Ocidental. *Acta Amazônica* **36** (2): 177-182.

PACHECO, D. 2006. *Manejo forestal comercial comunitario en propiedades colectivas indígenas de las tierras tropicales de Bolivia.* Centro de Estudios para la Realidad Económica y Social (CERES), Cochabamba, Bolivia. 35 pp.

PACHECO, P. and CRONKLETON, P. 2005. *El futuro del manejo forestal comunitario en el norte amazónico boliviano*. CIFOR, SNV, Santa Cruz de la Sierra, Bolivia, 43 pp.

PAGDEE, A., KIM, Y. and DAUGHERTY, P. 2006. What makes community forest management successful: a meta-study from community forests throughout the world. Society and Natural Resources **19** (1): 33-52.

PALMER, C. and ENGEL, S. 2007. For better or for worse? Local impacts of the decentralization of Indonesia's forest sector. *World Developmen.* **35** (12): 2131-2149.

RECOFTC, 2007. *Sharing the Wealth, Improving the*

distribution of benefits and costs from Community Forestry: Policy and Legal Frameworks. Synthesis of discussions at the Second Community Forestry Forum, 21-22 March 2007, Bangkok, Thailand, RECOFTC, FAO and SNV, Bangkok.

REED, M. and MCLLVEEN, K. 2006. Towards a pluralistic civic science? Assessing community forestry. *Society and Natural Resources* **19**: 591-607.

SALGADO, I. and KAIMOWITZ, D. 2003. Porto de Moz: o prefeito, "dono do município". In: TONI, F. and KAIMOWITZ, D. (eds.). *Municípios e gestão florestal na Amazônia*. A.S. Editores, Natal, Brasil. pp.219-252.

SCHERR, S., WHITE, A. and KAIMOWITZ, D. 2003. *A new agenda for forest conservation and poverty reduction: making markets work for low-income producers.* Forest Trends and CIFOR, Washington, D.C., U.S.A. 91 pp.

SCHNEIDER, R., ARIMA, E., VERÍSSIMO, A., SOUZA JR., C. and BARRETO, P. 2002. *Sustainable Amazon: limitations and opportunities for rural development*. World Bank Technical Paper no. 515, Environment Series, World Bank, Washington D.C., U.S.A. 50 pp.

SHANLEY, P., LUZ, L. and SWINGLAND, I. 2002. The faint promise of a distant market: A survey of Belém's trade in non-timber forest. *Biodiversity and Conservation* **11**: 615-636.

SIKOR, T. 2006. Analyzing community-based forestry: local, political and agrarian perspectives. *Forest Policy and Economics* **340** (8): 339-349.

SMITH, J., COLAN, V., SABOGAL, C. and SNOOK, L. 2006. Why policy reforms fail to improve logging practices: the role of governance and norms in Peru. *Forest Policy and Economics* **460** (8): 458-469.

SOUSA, R. and GOMES, D. 2005. *Produção familiar rural: tendências e oportunidades da atividade madeireira no Acre e Pará*. GTNA, Forest Trends, IEB Belém, Brazil. 104 pp.

SUNDERLIN, W. 2006. Poverty alleviation through community forestry in Cambodia, Laos, and Vietnam: an assessment of the potential. *Forest Policy and Economics* **8**: 386-396.

SUNDERLIN, W., ANGELSEN, A., BELCHER, B., BURGERS, P., NASI, R., SANTOSO, L. and WUNDER, S. 2005. Livelihoods, forests, and conservation in developing countries: an overview. *World Development* **33**(9): 1383-1402.

TAYLOR, P. 2001. Community forestry as embedded process: two cases from Durango and Quintana Roo, Mexico. *International Journal of Sociology of Agriculture and Food* **9** (1): 59-81.

VERISSIMO, A., SMERALDI, R. and AZEVEDO, T. 2005. Forest certification in Brazil: advances, innovations and challenges. In: BURGER, D., HESS, J. and LANG, B. (eds.). *Forest certification: an innovative instrument in the service of sustainable development?* GTZ, Eschborn, Germany. pp. 207-218

VIDAL, N. 2005. *Forest company-community agreements in Brazil: current status and opportunities for action*. Forest Trends, Washington, D.C., U.S.A. 61 pp.