

CAN FOREST-PROTECTION CARBON PROJECTS IMPROVE RURAL LIVELIHOODS? ANALYSIS OF THE NOEL KEMPPF MERCADO CLIMATE ACTION PROJECT, BOLIVIA

NIGEL M. ASQUITH^{1,*}, MARÍA TERESA VARGAS RÍOS² and JOYOTEE SMITH¹

¹*Center for International Forestry Research, PO Box 6596 JKPWB, Jakarta 10065, Indonesia*

²*Fundación Natura Bolivia, Calle Campero 247, Santa Cruz, Bolivia*

(* author for correspondence: *Fundación Natura Bolivia, Calle Campero 247, Santa Cruz, Bolivia; E-mail: nigelasquith@yahoo.com*)

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Abstract. We studied the Noel Kempff Mercado Climate Action Project (NKMCAP), Bolivia, to assess whether forest protection carbon (C) projects can significantly benefit local people. We hypothesized that forest protection can only securely deliver C if significant stakeholders are meaningfully and transparently involved, traditional or customary rights are recognized and their loss compensated for, and there are direct linkages between conservation and development objective. Our research focused on 53 members of the communities of Florida, Porvenir and Piso Firme and 36 secondary stakeholders. In each of the villages we held half-day meetings with community leaders, complemented by semi-structured one-hour interviews with 5, 10, and 7 families, representing 20%, 10% and 8% of each community. The long-term impact of the NKMCAP on the local communities may well be positive. However, in the short run, certain sections of the local communities are financially poorer. Forest protection projects clearly have the potential to sequester C, protect biodiversity and simultaneously contribute to sustainable rural development, but if they really are to improve rural livelihoods, they must be designed and implemented carefully and participatively.

Keywords: carbon and development links, clean development mechanism, forest carbon conservation, integrated conservation and development projects, rapid rural appraisal, stakeholder participation, sustainable rural development

1. Introduction

The United National Framework Convention of Climate Change Kyoto Protocol, if ratified, will commit developed countries to a net reduction in greenhouse gas (GHG) emissions to 5% below 1990 levels by 2008–2012 (UNFCCC 1997). Central to the Protocol are the flexible mechanisms by which these net reductions can be achieved. Article 12 of the Protocol describes a Clean Development Mechanism (CDM) that will allow developed countries to gain carbon (C) credits through financing emissions reductions in the developing world. Article 12 also stipulates that CDM financing should assist countries to achieve sustainable development (UNFCCC 1997). Under the agreement reached in 2001 at Marrakesh, forest protection projects in developing countries will not be eligible for C credit for the first commitment period of 2008–2012, but they could be considered for future commit-



ment periods (UNFCCC 2001; COP Decision 17/CP.7: 2001). Financing for forest protection projects may also be made available from a Special Climate Change Fund which will include activities such as forest protection, that help developing countries adapt to climate change (Pronk 2001).

There are many unresolved questions about the role of forests as sinks (IFAD/FAO 2000; IPCC 2000; Toman 2001; Sedjo et al. 2001). For example, some types of forest protection C projects will likely impact local peoples' access to natural resources (IPCC 2000). Projects involving large-scale land-use change may restrict access to land that previously made an important contribution to local livelihoods. If use-rights to such land are unclear, informal or overlapping, local communities may fail to win compensation, in favor of more visible and vocal stakeholders (Smith and Scherr in press; Smith et al. 2000). In trying to ensure that C projects contribute to rural livelihoods, Bass et al. (2000) assert that 'there is much to be learnt from the experience of "people and parks", participatory forest management and agroforestry development initiatives.'

Particularly useful may be the lessons learned from Integrated Conservation and Development Projects (ICDPs) (Wells and Brandon 1992; Brandon et al. 1998). A number of ICDPs and other projects have tried to link conservation, local communities, and the private sector (Child 1995; Metcalfe 1995; Biodiversity Conservation Network 1996; Salafsky and Margolius 1998). Major lessons from these initiatives are that the people living close to a project must have a voice in its design and implementation, and that there must be direct links between a project's conservation and development goals. Such direct linkages may be particularly important for carbon sequestration projects, because it is critical that developers ensure that their C benefits do not disappear because of unsustainable use of forest resources outside the project area (through leakage, or 'improvements [abatement achieved] in one location that are offset by worsening conditions [increased emissions] in unregulated locations' [Toman, 2001]).

Experiences from similar types of natural resource management systems suggest that to ensure sustainability of forest C sequestration projects:

1. all significant stakeholders, including local communities, must be meaningfully and transparently involved (Ostrom 1990);
2. traditional or customary rights must be recognized and their loss compensated for (Ostrom 1990);
3. there must be direct linkages between conservation and development objectives (Brandon et al. 1998).

This paper examines the case of the Noel Kempff Mercado Climate Action Project (NKMCA) (Brown et al. 2000) to discuss the contention that forest C protection projects can significantly benefit local people provided that the relevant stakeholders are involved, their rights are recognized, and there are direct linkages between the C protection and development activities.

1.1. PROJECT AND STUDY AREA

The Noel Kempff Mercado National Park, in north-eastern Bolivia, is bounded by the Paragua/Tarvo and Itenez rivers to the west and north, and Bolivia's international frontier with Brazil to the east (Killeen and Schulenberg 1998). The park now comprises 1 523 446 ha of diverse lowland and upland forests (NKMCAPI USIJI Project Proposal 1996). As part of the Climate Action Project, the Park was almost doubled in size in 1996 under Government Decree No. 24457, protecting an additional 634 000 ha of biologically diverse lowland forest. By avoiding and reducing GHG emissions from logging and agriculture, the project developers expect to protect between 6 and 8 Tg C over 30 years (Brown et al. 2000). The volume of C protected by the project will be measured by comparing stocks of C within the project area (i.e. inside the expansion area of the park) with stocks in the forests outside the park that are still subject to harvesting (the 'baseline'). The difference between these stocks will be the amount of C sequestered by the project.

The total cost of the Climate Action Project was \$9.5 million (plus \$0.32 million in development costs) (N.B. in 2001 project investors contributed another \$1.25 million) The major cost components were monitoring and verification (\$1.72 million), compensation to the previous concessionaires (\$1.6 million) and the creation of a park protection endowment fund (\$1.5 million). The total C production costs comprise a short-term (\$3.55 million) and a long-term component (\$5.95 million). The short-term component comprises actions required in the first ten years to ensure that C benefits are not lost through leakage. The long-term component includes funds management, monitoring, capitalization of the trust fund, and investments in ecotourism and bioprospecting that will ideally provide a long-term income stream.

Our research focused on the western side of Noel Kempff Mercado, where the new park boundaries have been expanded into the Bajo Paragua river basin, just across the Rio Paragua from the communities of Florida, Porvenir and Piso Firme, in the municipality of San Ignacio de Velasco. The dispersed communities of the Bajo Paragua (currently ~2000 people) have long used the forest that is now part of the expanded National Park. Europeans arrived in Bajo Paragua in the late 1800s to exploit rubber, and as commercial exploitation expanded, Chiquitanos from the south began displace the native Guarasug'we and Saraveka inhabitants of the region. The rubber era declined in the 1940s and the region's populations switched to commercial exploitation of other wildlife resources. Timber and heart-of-palm (palmito, *Euterpe precatoria*) concessions have been the most recent major economic activity in the region. Logging activities peaked in the 1980s when the government established the Bajo Paragua Production Forest Reserve, and granted large timber concessions, which allowed selective logging of species such as mahogany (*Swietenia macrophylla*), cedar (*Cedrela fissilis*) and oak (*Amburana cearensis*) for periods of 20–25 years (NKMCAPI USIJI Project Proposal 1996).

Partially within what is now the National Park expansion area, 774 057 ha of state-owned Bajo Paragua Production Forest Reserve concessions were selectively logged from 1984–1996. The Moira and San Martin concessionaires had significant investments in infrastructure and equipment in the area, including 641 km of roads, three milling operations and bridges across the river. These operations also provided income-generating opportunities for the Bajo Paragua, most notably for the people of Florida, though most of the workforce migrated in from towns such as Santa Cruz de la Sierra. The extensive logging infrastructure also facilitated commercial exploitation of palmito in the Bajo Paragua, with an estimated 200 000 plants extracted from within the expansion area in 1994 alone. While this may well have been unsustainable for the species, exploitation of the slender *Euterpe* palm probably had a minimal impact on the volume of C stored in the forest.

Prior to 1996 the timber operations within the proposed expansion area were thus the major threat to the forest's C stocks. A few families lived within what is now the National Park, involving for example, four families in Porvenir, who had cleared 17 ha for crops and pasture. A recent census shows that 131 families are cultivating a total of 224 ha in the entire Bajo Paragua, with an average of 1.6 hectares per family (Catari et al. 1998). The majority of the livelihood activities in the Bajo Paragua seem unlikely to have had a significant impact on C stocks or biodiversity in the expansion area.

2. Methods

The first stage of our analysis was to obtain documentation from the project developers, the Nature Conservancy (TNC) and the Fundación Amigos de la Naturaleza (FAN), to gain a basic understanding of the project design and implementation. We then undertook preliminary interviews in Santa Cruz de la Sierra from January 10th–13th 2000 (see Table I for sample questions). We interviewed secondary stakeholders (36 in total), including government officials, timber concessionaires and NGOs, in La Paz and San Ignacio de Velasco later in January, and again in Santa Cruz in June and July. From January 18th–23rd, we undertook a Rapid Rural Appraisal using key informant interviews and focal group discussions involving 53 men and women in the communities of Florida, Porvenir and Piso Firme.

Rapid Rural Appraisal (RRA) consists of 'short, intensive, informal field surveys that focus on consultation to define . . . problems and solutions' (Rocheleau et al. 1994). Key features of the approach are an emphasis on multidisciplinary, cumulative learning and a semi-structured and flexible research program (Cornwall et al. 1994). Rigor of RRA analyses is maximized by 'cross-checking and progressive learning . . . through plural investigation (triangulation)' and, further, by actively 'looking for and learning from exceptions, oddities and dissenters' (Chambers 1994). In each of the villages we held a half-day meeting with community leaders

TABLE I

Sample questions to stakeholders to assess impact of NKMCAP on local communities.

Human capital

Has the project provided new training? Have new skills been learned, or (good) jobs been created? Have jobs been lost, or training opportunities disappeared because of the project? Are people more or less healthy now? Have opportunities for education increased or decreased?

Physical capital

Has the project built/provided/created new infrastructure? Has the project resulted in the destruction/degradation of previously-used infrastructure?

Environmental capital

Have there been environmental benefits – watershed or biodiversity protection, erosion control? [Are there more animals than before, fewer floods?]

Have there been environmental costs – increased pollution, water contamination, deforestation?

Social capital

Have new organizations or institutions been initiated, or existing ones developed?

Have existing institutions lost their abilities/power?

Is the community more or less divided/do people work together more or less than before?

Overall, has the project effect been positive or negative?

Has one or other stakeholder invested time/money in the project and received nothing in return. Who gets the most from the project? The least? Is this 'fair'? Who has lost out because of the project?

Have those who lost out because of the project been compensated appropriately?

to discover what had been the major impacts of the project on the community. These meetings were complemented by semi-structured one-hour interviews with 5, 10, and 7 randomly-chosen families in the three respective villages, representing 20%, 10% and 8% of each community's population, during which we attempted to quantify the project's impacts.

We deliberately sought out the opinions of stakeholders who we expected to have been positively affected by the project, such as the compensated timber concessionaires, as well as those who we expected would have a negative perspective, such as local residents who lost their jobs. We further triangulated our results by involving three different investigators (specialists in policy, development and economics), by using two different field methodologies (focal group analysis and key informant interviews), by extensive cross-checking of data presented by the primary stakeholders in interviews with secondary stakeholders and by consulting project documents. Although we interviewed project personnel, they were absent from all other interviews, to prevent biased responses. Because much of the appraisal data relate primarily to people's perceptions, we have been careful only to draw conclusions based on data obtained from a variety of sources. The RRA and the villagers' perceptions – and misperceptions – about project development,

implementation and ramifications, served primarily to highlight to us what was important to local residents.

Following the fieldwork we undertook a partial financial impact analysis (IIED 1994) of the NKMCA. The partial analysis only attempted to quantify the aspects of the economic situation that have changed because of the project. For example, although palmito exploitation is a significant source of employment and income in Porvenir, it does not appear in our analysis because park expansion has not caused any significant changes in production. We did not attempt to value the biodiversity or C benefits of the NKMCA. Our analysis focused on the impact of the project on local communities. Given that sustainable development is one of the goals of the CDM, we focused on the four types of capital that are important for sustainable development (Pearce et al. 1998): human-, physical-, environmental- and social capital. We also considered equity, another important concept for sustainable development (Pearce et al. 1998).

We undertook a financial analysis rather than an economic analysis (IIED 1994) and did not correct for subsidies, because our focus was from the point of view of the communities. We did not undertake contingent valuation of the value of sustainable development benefits and losses caused by the project, but instead quantified benefits and losses in terms of capital expenditures and inferred losses.

2.1. RESULTS

Table II includes data on all the livelihood activities that have changed because of the NKMCA. The table shows that the Climate Action Project has had both costs and benefits for local stakeholders. The short-term costs to date have been borne most heavily in the community of Florida. Before park expansion the Moira timber concession employed most (~20) of Florida's men, and associated businesses employed other community members in activities such as laundry and food production. Produce was also imported from Chirapas, 10 km distant. Moira provided Florida with the services of a medical doctor for half a day per week, provided medicines at half price, assisted with education, provided daily free transport to Santa Cruz, and maintained the road out of Florida for 10 months of the year. Prior to park expansion Florida had a cash economy of its own, and access to the outside world.

Most of the concession's employees were from outside the community, and many Florida families were transients who would have been expected to leave once regular work disappeared. However, the local people claim that at least 20 Florida men lost their livelihoods because of the NKMCA. The timber concession provided work for 10 months/year, at a salary of \$66–133/month/man in 1996. The direct loss of income in Florida that can be attributed to park expansion was at least \$13 200–\$26 600 in the year immediately post-expansion. Related income, from sales of produce and services to the other ~200 workers is more difficult to

TABLE II

Losses and gains of human, physical and environmental capital in local communities as a result of the NKMCA (as of 12/1999).

<i>Form of capital and category of impact</i>	<i>Source of Impact</i>	<i>Value \$US</i>	<i>Explanation and breakdown of cost of purchases and activities that caused impact</i>
HUMAN CAPITAL			
<i>Direct losses</i> ¹	Moira timber concession	13 200– 26 600*	(direct employment in Florida)
	Related employment and services	n/a	
<i>Direct gains</i> ²	Park guard employment	31 200*	(annual salary for 10 guards from communities)
	Carbon monitoring employment	19 630	(salary for 10 months work for 15 men in 1997/9)
	Forest management employment	8 430	(salaries for ~ 70 people, mainly women and children)
	Education	10 390	910 (materials), 9 480 (school construction)
	Healthcare	55 330	3 710 (medicines/equipment), 15 000 (ambulance), 36 620 (healthpost construction)
	Capacity building	2 890	
PHYSICAL CAPITAL			
<i>Direct Losses</i> ³	Transport	50 000*	(road maintenance paid by concessionaire, plus free daily transport to Santa Cruz)
<i>Direct gains</i> ²	Road maintenance	28 000	
	Wells and water pumps	12 840	
	Rotating funds capitalization	55 130	
ENVIRONMENTAL CAPITAL			
<i>Direct losses</i> ⁴	The loss of all use-rights to 634,000 ha of forest in the expansion zone ³	n/a	
<i>Direct gains</i> ²	Assistance in the attempt to obtain legal title to 340,000 ha of forest	16 110	9 960 (legal fees), 6 150 (travel)
	Agricultural/forestry assistance	41 320	13 810 (seeds and associated equipment), 27 030 (Forest Management Plan), 480 (veterinary products)
	Other direct help to communities e.g. for emergencies, fellowships, communication, but not materials ⁵	14 710	

TABLE II
Continued.

<i>Form of capital and category of impact</i>	<i>Source of Impact</i>	<i>Value \$US</i>	<i>Explanation and breakdown of cost of purchases and activities that caused impact</i>
DIRECT LOSSES 1997–1999		229 800	plus loss of use-rights to land
DIRECT GAINS 1997–1999		358 380	

Sources: ^{1,3,4} Moira and community interviews, ^{2,5} FAN documents and interviews: see Table I for sample questions.

* = items that were repeated annually. For the totals we multiplied these numbers by 3 (i.e. 1997–1999).

n/a data not available.

¹ Related employment and services in Florida included laundry service and produce supplied to the timber company and its employees by locals, and the services of a doctor, and medicines and educational supplies provided by the company.

³ Moira claims to have spent at least \$50 000 a year maintaining public roads and the company also provided free transport from Florida to Santa Cruz for all community members. According to the Superintendencia Forestal, these values are probably inflated.

⁴ The communities of Piso Firme, Florida and Porvenir lost access to forests they had used for ~100 years, but this loss was at least partially compensated for in late 1999 when they received the rights to exploit palmito in 11 000 ha west of the Paragua.

⁵ APOCOM has also repaired and furnished two houses for its technicians, and provided material items to the communities such as plastic sheeting, paints, minor tools, wire etc., costing approximately \$17 000.

estimate, but it seems likely that such income was significant for a community with very limited access to cash.

However, it is difficult to quantify the changes actually caused by park expansion. Under the new Bolivian forestry laws passed in late 1996 (Ley Forestal No. 1700 and Ley del Servicio Nacional de Reforma Agraria No. 1715) concessionaires are now required to manage their forests sustainably using a government-approved Management Plan and Annual Operating Plan. Implementation of the new laws would have diminished the impact of logging in what is now the expansion area, and could even have completely removed the threat of timber exploitation by making logging the eastern side of the Paragua commercially untenable. It is not certain whether the loss of income from logging in Florida can fairly be ascribed to park expansion, or whether, given the new laws, Moira would have left Florida anyway. It is indicative that the NKMCAAP compensated the concessionaires for \$1.6 million. That such payments were deemed necessary by the project developers suggests that the loggers were not going to leave the area on account of the change in the laws.

The extent of agricultural activities in the communities has changed little following expansion because most existing fields were outside the new park boundaries. Palmito exploitation has ceased inside the park, although the reduction in

activities reflects a period of poor management, lowering of world prices, and over-harvesting of the resource, rather than an expansion-induced loss of the resource-base. Indeed, the palmito factory in Porvenir was operating again January 2000 with 75 workers, using plants from outside the park. In the long-term however, palmito exploitation seems unlikely to be commercially profitable in Bajo Paragua.

The project addressed the loss of local people's use of the forest and its carbon by creating APOCOM (Apoyo Comunitario), a 5-year, \$0.85 million program that is helping develop sustainable economic opportunities that do not negatively impact the forest (in 2001 APOCOM was extended for another 5-years with an additional \$0.5 million). APOCOM projects include assistance with agroforestry, non-timber forest products, ecotourism, health, infrastructure and medical attention, road improvements, and legal assistance for gaining title to the land outside the expansion zone. APOCOM has focused on providing better education, health-care, and improved roads as these were identified as the communities' priorities in the pre-project diagnostic study. Significant resources are now also being spent on helping the communities gain title to their land, as this has emerged as the major issue in Bajo Paragua.

The park expansion and associated activities have generated significant employment in the last few years. Approximately 80 community members have worked with APOCOM surveying forest resources inside and outside the expansion area for carbon monitoring and preparation of the palmito and Forest Management Plans. The park also employs 26 full-time park guards, 10 of whom are from the communities. APOCOM has also directly invested in training and capacity building, such as the training of 6 community members as tourist guides. After training, two of these guides each earned \$150 from tourists in Florida during the last three months of 1999. A significant proportion of APOCOM's investments in health and education, wells and water pumps, and road maintenance has been in construction. The ~\$90 000 APOCOM has invested in this type of infrastructure in the communities appears likely to contribute to towards local sustainable development.

Many residents of Bajo Paragua argue that the critical cost of park expansion has been the loss of their traditional land in what is now the park expansion zone east of the river. While the Bolivian government owns this land, upon this ownership was superimposed timber concessions, palmito concessions, and local peoples' customary rights. Even though the communities did not have legal title, their right to sustainable exploitation of its' natural resources is recognized and guaranteed under the Bolivian Constitution (Article 172, paragraphs 1 and 2). Its loss will likely have long-term consequences. This forest has provided the main source of cash income to the communities for several generations, from rubber exploitation starting in the 1900s, through hunting, logging and the palmito exploitation that continued until the forest was absorbed into the park. The forest provided income to Bajo Paragua in boom-bust cycles, so it is difficult to say what resource the people

may have been able to exploit in the future. However, losing the rights to this land prevents the communities from benefiting from any future income opportunities.

The park expansion decree included two provisions that are critical for compensating the local communities. Article Six of Decree 24457 'recognizes and guarantees the subsistence use and exploitation of renewable natural resources by the towns and communities (of Bajo Paragua), within the expansion zone, as agreed by the corresponding regulations provided in the Park's management plan'. Article Seven of the Decree 'establishes the necessity to implement within the term of one year communal reserves for the(se) populations. . . (and) with limits defined through a participatory study, an exclusive territory with rights to use resources in a sustainable manner to improve their quality of life'. However, as of July 2000, four years after the Decree was signed, the three communities were prohibited from using almost all resources in the expansion area, and had only recently received limited use-rights on other territory.

APOCOM has invested ~\$16 000 in the attempt to get title to an exclusive territory for the communities. FAN is helping the communities petition the government for a Territorio Comunal Originario (TCO). Progress has been made – in 1998 the Bolivian President recognized the communities claim for native indigenous status, and as of December 21st 1999 the communities had the right to exploit palmito on 11 000 ha to the west of the Paragua. It is unknown though how long the full claim process will take, and whether the communities will obtain title to the total area claimed, given that much of the land claimed by the communities is still legally under timber and palmito concessions.

The measurable direct losses and benefits of the park to the communities from 1997–1999 add up to \$229 800 and \$358 380 respectively. The data relating to losses should be treated with some caution though, because we cannot independently verify the losses to Florida of the departure of the timber company, nor the veracity of the claim that Moira was on the verge of bankruptcy and would have departed anyway. Also, most critically, the above figures do not include the loss of the option value of use rights to the land east of the river, nor the potential benefits that may potentially be gained if the project succeeds in providing communities with a compensatory area of forest. What the totals can tell us though, is that APOCOM has invested significantly in the long-term sustainable development of the communities across Bajo Paragua. Between the individual communities however, the distribution of costs and benefits is unbalanced: Florida has borne the majority of the direct costs of expansion, while the three communities have shared the benefits.

2.2. DISCUSSION

Most successful conservation and development projects have involved local communities in project development (Wells and Brandon 1992), and it is increasingly apparent that such involvement must be from the outset. The NKMCA developers

attempted to communicate with the local communities about the Park expansion, sending technical advisory teams and flying the then-director of the National System of Protected Areas to Piso Firme. However, many people in the communities say that they were not consulted, and there is still significant resentment, especially in Porvenir, that the developers did not listen to the perspectives of the area's residents prior to expansion. The San Ignacio municipal government approved the park expansion on 24th December 1996 (Resolution 051/96), but we were told in the communities that this was done without the agreement of the local residents.

The San Ignacio-based Martin Schmidt Foundation undertook a rural diagnostic study prior to project implementation, but this study was only undertaken after the project was approved. The question posed to the locals therefore was not 'Do you want this project?' but 'You are having this project: what would you like from it?' Effective implementation of benefits by APOCOM is slowly overcoming the mistrust that this process engendered, and APOCOM is gradually increasing local involvement in the project.

The Park Management Plan (1996) is ambiguous about what access the communities' have to the Park's resources. What villagers can and cannot do in the expansion area is thus subject to interpretation. For example, in 2000 a few villagers thought they could hunt for subsistence in the Park, but most that we questioned thought they could not. The Park Director and Municipal Government say that all hunting is prohibited in a National Park, but FAN staff and National Government say that subsistence hunting is not necessarily prohibited. The Government decree said that hunting for subsistence is allowed, but subject to the Park Management Plan (which is interpreted by the Park Director).

While APOCOM is now building trust and steadily improving living standards in the communities, it is clear from the villagers that there is still resentment about the way the project was pushed through without their consent. Not only did it engender mistrust, but the process also created a climate of expectancy and dependency. For some, APOCOM is viewed not as a development partner, but as a paternalistic charity. There was no contract, either implicit or explicit, detailing the communities' and APOCOM's rights and responsibilities, so naturally the program is not viewed as a partner.

Project implementers must specifically decide what they are trying to achieve, in terms of charity, compensation, or development. The appropriate implementation program will depend on the goal. It is also important to avoid the development of unrealistic expectations. Resentment was generated in Bajo Paragua when a significant proportion of the \$0.85 million that the communities perceived to be theirs seemed to 'disappear' into project developers' salaries and administrative costs. The rural diagnostic assessment also built expectations as people were essentially asked for a shopping list of what they wanted from the project.

Recognition of both legal and customary rights of all involved stakeholders, including local people, may well be critical for successful long-term carbon management. The NKMCAP developers recognized, at least in principal, the informal

and customary rights of the communities to the park expansion area. However, despite this recognition and, indeed, the communities' constitutional rights to the land, 4 years after expansion, only minimal compensation has been received. This raised local concerns not only because of the project's impact on livelihoods, but also because of the perceived inequity of costs and benefits across stakeholder groups. The least vocal stakeholders perceive that they have borne a significant resource loss, yet have received less compensation than other more vocal stakeholders, including the project partners themselves.

Three stakeholder groups forfeited, some of their rights to the project: the government, the timber concessionaires and the communities. The government agreed to forfeit potential revenues from timber sales in the expansion area, and in compensation received 49% of the projects' potential carbon credits, and \$0.25 million for capacity building. The timber concessionaires agreed to sell their investments in the area and immediately received 17% of the project's funds (\$1.6 million). The communities were the only group not given the option of rejecting the project proposal, have fewer resources than the other two stakeholder groups, and are receiving approximately 10% of the project's funding (\$0.85 million) over 5 years (minus funds management and overhead costs), and may receive a land package at some time in the future. Because of the losses of livelihood and area under traditional tenure, the slow progress on the land claim, and the fact that the majority of APOCOM's direct investments are in long-term infrastructure, some of the villagers we interviewed in January 2000 felt that the impact of park expansion on their lives had so far been negative.

This perception is exacerbated by recognition that many of the project's investments have little or no relationship to either conserving C or mitigating the impact of park expansion on the local communities – for example \$0.7 million to build capacity in FAN's Department of Science, \$0.5 million to commercialize this Department's discoveries, and \$0.25 million to improve facilities for high-end ecotourism at Flor de Oro, far from the expansion zone and the communities.

Some of the linkages between APOCOM's development assistance and the project's conservation goals are clear, while others are not. The timber concessionaires signed an agreement to cease logging the forest east of the Rio Paragua, and received compensation: the link between C protection and cessation of logging is clear. In contrast, the local communities are prevented from using all the forest's resources inside the expansion area – not just the C – and the project has given them items such as healthcare, education and better roads. There is a danger that the lack of a clear C-APOCOM link may ultimately increase leakage of C benefits. Few people in the communities seem to understand that APOCOM and any future assistance is conditional on the protection of C resources both inside and outside the park. Without this understanding, and without a development assistance project that clearly reinforces this understanding, there is little incentive for the communities to invest in C protection to the west of the Rio Paragua. To minimize the danger of leakage, future project developers may want to consider explicit contracts that,

in return for development benefits, not only limit communities' rights to exploit C stocks within the project area, but also limit such exploitation – and hence leakage – outside the project boundaries. In particular, community incentives to protect carbon stocks could be reinforced if a share of carbon revenues were allocated for future development benefits.

In terms of the other project components, the ecotourism, research and development, and commercial exploitation investments seem only weakly linked to the project's goal of carbon sequestration. These programs seem risky strategies for long-term park protection, are unlikely to provide significant revenue streams to the park, and the relatively large amounts of these investments have been criticized by a number of APOCOM beneficiaries on the basis of their lack of equity. If the experiences of conservation and development projects are repeated, then the nebulous relationship between the NKMCA's C goals and its development and fund-raising activities may cause long-term problems, not least in an increased risk of leakage.

3. Conclusions

The NKMCA shows that forest protection C projects have great potential to simultaneously sequester C, protect biodiversity and contribute to sustainable development. However, if forest protection C projects are indeed to contribute to improving rural livelihoods, they must be designed and implemented participatively from the earliest stages of project development. Further, equitable distribution of the benefits among stakeholders requires that traditional use rights to forests are recognized and adequately compensated. Where rights to forests are overlapping, unclear and based on customary usage, project developers need to be particularly alert to the traditional rights of poorer and less vocal stakeholders, such as local communities. Implementers should also ensure that the linkage between C sequestration and project's development activities is direct and apparent. If these conditions are not met, forest protection C projects run the risk of not effectively contributing to local sustainable development – a situation that could negatively affect the project's long-term ability to sequester C.

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References

- Bass, S., Dubois, O., Moura Costa, P., Wilson, C., Pinard, M. and Tipper, R.: 2000, *Rural Livelihoods and Carbon Management*, London, IIED Natural Resource Issues Paper No. 1, International Institute for Environment and Development.
- Biodiversity Conservation Network: 1996, *Stories from the Field and Lessons Learned. Evaluating an Enterprise-Based Approach to Community Conservation in the Asia/Pacific region*, Washington DC, WWF/TNC/WRI.
- Brandon, K., Redford, K.H. and Sanderson, S.E.: 1998, *Parks in Peril. People, Politics, and Protected Areas*, Washington DC, Island Press.
- Brown, S., Burnham, M., Delaney, M., Powell, M., Vaca, R. and Moreno, A.: 2000, 'Issues and challenges for forest-based carbon-offset projects: A case study of the Noel Kempff climate action project in Bolivia,' *Mitigation and Adaptation Strategies for Global Change* **5**(1): 25–37.
- Catari, M., Armijo, E., Ibisch, C., Torrico, A., Vargas, I. and Ibisch, P.: 1996, *Bases para un Plan de Manejo de los Recursos Naturales de la Franja del Bajo Paragua*, Santa Cruz, Bolivia, FAN.
- Chambers, R.: 1994, Participatory Rural Appraisal (PRA): Analysis of Experience. *World Development* **22**, 1253–1268.
- Child, G.: 1995, *Wildlife and People: The Zimbabwean Success*, Harare, Wisdom Foundation.
- COP Decision 17/CP.7: 2001 *Modalities and Procedures for a Clean Development Mechanism as defined in Article 12 of the Kyoto Protocol*, 8th plenary meeting UNFCCC COP.
- Cornwall, A., Gujit, I. and Welbourn, A.: 1994, 'Extending the horizons of agricultural research and extension: Methodological challenges,' *Agric. Human Values* **11**, 38–57.
- IIED: 1994, *Economic Evaluation of Tropical Forest Land Use Options. A Review of Methodology and Applications*, London, International Institute for Environment and Development.
- IFAD/FAO: 2000, *Carbon Sequestration Options under the Clean Development Mechanism to address Land Degradation*, Rome, IFAD/FAO.
- IPCC: 2000, *Summary for Policymakers, Land-use, Land-use Change and Forestry, A Special Report of the Intergovernmental Panel on Climate Change*, Montreal, IPCC.
- Killeen, T.J. and Schulenberg, T.S.: 1998, *A Biological Assessment of Parque Nacional Noel Kempff Mercado, Bolivia*, RAP Working Paper No. 10, Washington DC, Conservation International.
- Metcalf, S.C.: 1995, 'Communities, parks, and regional planning: A co-management strategy based on the Zimbabwean experience', in J.A. McNeely (ed.), *Expanding Partnerships in Conservation*, Washington DC, Island Press, pp. 270–279.
- Plan de Manejo Parque Nacional Noel Kempff Mercado, Bolivia: 1996, *Ministerio de Desarrollo Sostenible y Medio Ambiente*, La Paz, Ministerio de Desarrollo Sostenible.

- Ostrom, E.: 1990, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge, Cambridge University Press.
- Pearce, D., Day, B., Newcombe, J., Brunello, T. and Bello, T.: 1998, *The Clean Development Mechanism: Benefits of the CDM for Developing Countries*, London, CSERGE, University College.
- Pronk, J.: 2001, *Core Elements for the Implementation of the Buenos Aires Plan of Action* (dated 21 July, 2001, 10.47 pm), IISD, Linkages, Negotiations: Sunday, 22 July, 2001.
- Rocheleau, D.E.: 1994, 'Participatory Research and the race to save the planet: Questions, critique and lessons from the field,' *Agric. Human Values* **11**, 4–25.
- Salafsky, N. and Margoluis, R.: 1999, 'Threat reduction assessment: a practical and cost-effective approach to evaluating conservation and development projects,' *Conserv. Biol.* **13**, 830–841.
- Sedjo, R.A., Sohngen, B. and Janger, P.: 2001, 'Carbon sinks in the post-Kyoto world', in M.A. Toman (ed.), *Climate Change Economics and Policy*, Washington DC, Resources for the Future, pp. 134–142.
- Smith, J. and Scherr, S.J.: in press, 'Capturing the Value of Forest Carbon for Local Livelihoods', *World Development*.
- Smith, J., Mulongoy, K., Persson, R. and Sayer, J.: 2000, 'Harnessing carbon markets for tropical forest conservation: Towards a more realistic assessment,' *Environ. Conserv.* **27**(3), 300–311.
- Toman, M.A.: 2001, *Climate Change Economics and Policy*, Washington DC, Resources for the Future.
- UNFCCC: 1997, *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Bonn, UNFCCC.
- UNFCCC: 2001, The Marrakesh Accords & The Marrakesh Declaration. <http://www.unfccc.int>
- Wells, M. and Brandon, K.: 1992, *People and Parks: Linking Protected Area Management with Local Communities*, Washington DC, World Bank.

