Small-scale Forest Economics, Management and Policy, 2(3): 327-341, 2003

Community-Based Forestry and Timber Certification in Southeast Bolivia

Josh M. McDaniel
School of Forestry and Wildlife Sciences
Auburn University
108 M. White Smith Hall
Auburn, AL 36849

Initiatives promoting community forestry in South America have significantly increased over the past decade. Many of these efforts have concentrated on indigenous lands where a large proportion of commercially valuable forests are located. One such project, among the Chiquitano Indians of Lomerio in southeast Bolivia, is examined here. Interviews with Chiquitano leaders, NGO and development organisation workers, and forest and sawmill workers, as well as ethnographic research in Chiquitano communities, are used to describe problems faced by the project in establishing forest management activities, organizing labour, administration, paying wages and distributing benefits. The author argues that many of the problems that the Lomerio project is experiencing can be traced to fundamental conflicts between Chiquitano culture and the values that necessarily accompany market-based development efforts such as community forestry. The research suggests that the key to success in Lomerio will lie in moulding the organisation of the project in ways that reflect Chiquitano patterns of work and production, and reconciling the demands of market economics with the values of reciprocation that permeate life in Chiquitano communities.

Keywords: timber certification, community forestry, Bolivia, South American Indians

INTRODUCTION

Community-based management of natural resources such as forests and fisheries has been promoted as the most viable means to integrate local people at the grass-roots into efforts in conservation and economic development (Western *et al.* 1994, Tenenbaum 1996). However, natural resource management initiatives often originate outside local communities, and create new levels of decision-making and socio-political arrangements within the communities the projects are targeted to benefit (MacDonald 1995, Smith 1995). They often require local people to restructure land tenure, create new political institutions, shift economic decision-making from the household to the collective level, and begin a much deeper participation in the market economy (McDaniel 2002). On the other hand, community-based approaches to natural resource management have played a strong

role in building local institutions for resource management, and for empowering rural and indigenous people throughout the tropics (Stocks and Hartshorn 1993, Vitug 1997, Becker 1999, Wily 1999).

This paper describes the opportunities, limitations and challenges of community-based management of forests embodied within an internationally funded conservation and development project with the Chiquitano Indians of the territory of Lomerio in south-eastern Bolivia. The Lomerio project is designed to create economic benefits for the local Chiquitano communities through the long-term use and management of timber resources on local lands. Certification or 'green labelling' is a key component of the project, and has allowed the Chiquitanos to access international markets for their timber, selling timber at a price premium to buyers in Europe and the United States who are willing to pay extra for wood products from well-managed forests. Local communities, with the assistance of professional forest technicians, utilise selective logging to harvest timber and minimise damage to the forest, allowing for the regeneration of commercial species and the maintenance of ecosystem structure and function. The harvested trees are milled in a sawmill that is collectively owned by the Chiquitano communities, and the timber is sold to national and international buyers. The project is designed to distribute profits from timber sales through the participating communities in the form of resources for schools and health clinics. However, the project has yet to become self-sufficient, and has not yet generated the expected financial benefits. Many problems and challenges have faced by the project in building a self-sustaining, economically-viable forest management operation.

Community-based forest management efforts in other parts of the world have faced problems negotiating the relationships between local communities and the outside funding and development agencies that are supporting the projects. Often, problems in these relationships result from corruption (Klooster 2000), power struggles (Stocks and Hartshorn 1993, Wily 1999) and institutional mismanagement (Schroeder 1999, Taylor 2000). Similarly, the Lomerio project has faced problems in dependence and patronage in the relationship between the Chiquitano political organisation CICOL (Central Indígena de Comunidades Originarios de Lomerío) and the outside organisations that are working with them on the project (McDaniel 2002, 2003).

This paper focuses specifically on the problems faced by the Chiquitanos in terms of production quality, marketing, labour relations, administration, and financial management. The analysis presented here is based on 13 months of fieldwork in Lomerio. As part of a larger ethnographic research project, the author interviewed past and present Chiquitano leaders, NGO and development organisation workers, community members and forest and sawmill workers. The author also organised the project archives, and had complete access to financial records and correspondences between the various organisations involved in the project. The following section provides an introduction to the study area, and the physio-geographic and cultural characteristics of Lomerio. Forest management and certification are then reviewed. This is followed by discussion of the problems in the project in relation to wages, the distribution of benefits, labour organisation, and project administration. The paper concludes with a discussion of the inherent conflicts between Chiquitano values and those of the market economy, and their significance for the future success of the project.

THE STUDY AREA

Lomerio in southeast Bolivia lies in the transition zone between the humid tropical forests and savannahs of the north, and the dry savannahs of the Gran Chaco to the south. This area is a patchwork of savannah grasslands and deciduous wooded areas. Seasonality is a defining characteristic of the climate. Generally, July to September is the driest period of the year, and January to March is the wettest period. The average annual precipitation for the area is 1165.4 mm, and the average annual temperature is 24.2 C with ranges between 3 and 38.1 C (Navarro 1995). July is the coldest month, when fronts of cold air, or *surazos*, charge up from the southern regions of the South American continent, while October to December are the hottest months.

In comparison to wetter areas to the north, the forests are relatively species-poor. Trees are generally smaller in diameter and shorter in height in comparison to wet forests, leading to a much lower canopy than the wet forests (Bullock *et al.* 1995). These forests are dominated by leguminous tree species as well as species in the *Bombacacae* and *Anacardicaceae* families (Bullock *et al*. 1995).

According to the 1992 census there are 220,000 indigenous persons found among 36 different groups in the lowlands of Bolivia, from the Amazon to the north and the Chaco desert to the south (APCOB 1996). The Chiquitanos are the largest group in the *Oriente*, or lowlands, with a population of around 72,500, 34% of the total for all indigenous people (INE Census 1992). Lomerio is unique in that it is essentially a Chiquitano enclave. Over 99% of the residents are self-identified as Chiquitano (VAIPO 1997). Close to 80% of the residents speak *Besuro*, the Chiquitano language, compared to 10% in Chiquitano communities outside of Lomerio (VAIPO 1997). There have been numerous population censuses conducted in Lomerio, with widely varying results, probably due to temporary labour migrations, but the most likely population estimate is between 5500 and 6000.

FOREST MANAGEMENT IN LOMERIO

In Lomerio, the movement to begin forest management resulted from threats to the land and resource base. In the early 1980s, timber companies invaded Chiquitano lands to take out the most valuable timber species, primarily mahogany (*Swietenia macrophylla*) and Spanish cedar (*Cedrella odorata*). The Chiquitanos, represented by their grassroots political organisation CICOL, initiated the process of land titling, and petitioned the government to expel the 'pirate' companies from their lands. At the time, the national government was promoting export industries, such as timber. The Chiquitanos were told that their land claim would be strengthened considerably if they could show that they were putting the land to 'productive' use, meaning that they needed to start logging. They contacted the organisation APCOB (Apoyo para Campesino Indígena del Oriente Boliviano) for technical assistance, and began early efforts at logging and forest management after receiving funding from organisations in Europe and the United States.

According to former CICOL directors, in the early stages of the project the people of Lomerio had no clearly defined objectives for commercial use and management of the land. They wanted the land for subsistence hunting, fishing and agriculture,

and they knew that they did not want the 'pirate' companies coming in and stealing their trees.

In 1994, BOLFOR (Bolivian Sustainable Forestry), a forest management project financed by United States Agency for International Development (USAID), began working with CICOL and APCOB in Lomerio. Their main objectives were to further ecological research in Bolivia and to demonstrate the potential profitability of sustainable forest management practices through the process of international certification. BOLFOR worked with CICOL, the Chiquitano communities and APCOB to raise the forest management operations in Lomerio up to certification standards for sustainable management. BOLFOR also brought in a certification team from Smartwood, a certifying organisation accredited by the Forest Stewardship Council[1]. The Smartwood evaluation team certified the Lomerio operations, and the Chiquitanos began exporting certified timber in 1995.

The total area of Lomerio is 289,511 ha and of this 60,799 ha are under forest management. Twenty of the 28 communities in Lomerio participate in the project with the remaining eight communities possessing insufficient forest to be included in the plan. Men from all 28 of the communities work in the project, as harvesters, road-builders, sawmill workers, drivers, and in other tasks.

Forest management can be divided into three areas, each corresponding to a year of activity, viz. pre-logging, logging, and post-logging. According to the management plan for the project, there should be four communities working in each of these areas in any given year for a yearly total of 12 communities working in some aspect of forest management. This schedule has not been followed strictly. In any given year, the logging operations may finish in two out of the four planned areas, and loggers have to return the next year during the dry season. Each community that participates in the project has its forest divided into four blocks and in theory one of these blocks is logged every four years. This means that each block is logged once every 16 years. With the activities of pre-logging and post-logging taking place in the year preceding and following the logging year, the community is involved in forest management three out of every four years, and receives income in the form of wages and payments for logs during those years.

In the pre-logging phase, roads are cut to allow the entrance of tractors and trucks that take the logs out. A forest inventory is conducted, trees are marked for extraction, and silvicultural treatments are applied to the area to be logged[2]. In the post-logging phase silvicultural treatments are also applied, and a set of diagnostic samples are taken from permanent plots to allow monitoring of how the forest is responding to the extractions.

Logging in Lomerio uses techniques termed Reduced Impact Logging (RIL) (Putz 1994, Dickinson *et al*. 1996), which is promoted by international timber certifying organisations. Forest inventories are employed to determine the amount and distribution of trees that should be retained to provide seeds for regeneration. The construction of roads and log landings is designed to minimise soil damage and

[1] The Forest Stewardship Council is an international accrediting organisation based in Oaxaca, Mexico, that has developed internationally recognised principles and criteria for sustainable forest management.

[2] Silvicultural treatments include vine cutting, liberation thinning, enrichment planting and prescribed burns.

disturbance to the forest. Directed felling is used to minimise damage to the surrounding trees and vegetation. Research is currently being undertaken to determine the benefits and feasibility of using controlled burns of logged areas to speed regeneration of some of the commercially valuable timber species (Kennard *et al*. 2001, 2002).

THE ROLE OF TIMBER CERTIFICATION IN THE LOMERIO PROJECT

Forest certification has gained a strong following as one of the greatest hopes for slowing environmental degradation in tropical areas, and for bringing a needed spark to community forestry (Viana *et al*. 1996, Kiker and Putz 1997). The experience in Lomerio certainly demonstrates the potential of certification, but it also clearly illustrates its limitations and problems.

Prior to receiving certification, timber from Lomerio had been sold either in Santa Cruz or to purchasers in other Bolivian cities such as Cochabamba or Sucre. Immediately after receiving certification the Chiquitanos began receiving inquiries from the USA and Europe about their certified timber and shipments began soon after. Certification, however, has not resulted in a quick and easy windfall for the Chiquitanos. Quality standards for international export are much higher than that required for timber sales locally or regionally. The Lomerio sawmill has had tremendous difficulty mastering the cutting techniques that would allow orders to be filled with timber of export quality. Waste and inefficiency in the milling process have undercut profitability. Also, the most common species in Lomerio, while familiar to consumers in Bolivia, are not well known outside of South America. At first, international demand was not great, and the commercial sales staff had to spend most of their time educating potential purchasers about their timber species.

The financial benefits of timber certification appear obvious. As indicated in Table 1, average prices for timber sold regionally ranged between US $0.38/board foot and US $0.92/board foot, and prices for export timber averaged US $1.22/board foot. While timber exports only accounted 21.5% of the total volume of timber sold in 1997, these sales represented 37.1% of total income to the sawmill (Table 1).

Table 1. Summary of timber sales by market for 1997

Market	Quantity (board feet)	Share of total sales (%)	Market value (US$/board foot)	Income (US$)	Share of total income (%)
Lomerio	54,696	41.9	.38	20,785	22.4
Santa Cruz	31,316	24.0	.76	23,800	25.6
Cochabamba	12,411	9.5	.92	11,418	12.3
Sucre	3,833	2.9	.63	2,415	2.6
Int'l export	28,296	21.5	1.22	34,521	37.1
Total	130,552	100		92,939	100

Source: CICOL (1997).

In contrast, sales of timber within Lomerio signified 42% of the total volume sold, but only represented 22.4% of the income. The sales of timber in Lomerio were primarily to the Catholic Church, local communities, APCOB and for the construction of the CICOL office. According to project personnel, most of the sales were at prices far below costs of production. Chiquitano leaders and technical assistants alike realise that the key to success in the project lies in developing an international market for their most common species.

Curupau (*Anadenanthera colubrina*) is the most common timber species found in the forests of Lomerio. Because of its hardness, curupau is also one of the most difficult species to cut and store as timber. Milling of curupau in Lomerio costs US$0.97/board foot, much higher than other species.[3] When sold locally or regionally, its price was never over US$0.38/foot, but sold as certified timber internationally, its price jumps to US$1.20/foot. A total of 17,646 board feet of curupau were sold in 1997, representing 63% of all timber exports.

Despite these benefits, the future of certification is far from certain in Lomerio. During the initial Smartwood evaluation of 1995, the technical forest management aspects of the project received relatively high scores. Ironically for a community forestry project, the majority of the conditions for continued certification had to do with community relations. Smartwood listed a series of improvements that the project would have to complete before the next evaluation in 1998 if the project would continue to maintain certification. These improvements concerned deepening community participation in the decision-making of the project, increasing Chiquitano participation in the administration of the sawmill and the forest management activities, increasing communication between the institutions and between the communities and the institutions, and the creation of a monitoring system that tracked social and economic effects of the forest management activities.

When the project was re-evaluated in 1998, many of the same problems in community relations and project administration were listed, but the project maintained its certification, primarily on the strength of technical forest management. Many of the project personnel were not confident that the project could or should meet Smartwood's conditions before the next evaluation. In 2001, the project lost its certification because of a failure to make these improvements. The following sections provide more detail on the problems that are plaguing the Lomerio project. Many of these same problems can be generalised to other community forestry efforts in indigenous communities in South America, and the lessons learned in Lomerio can be applied elsewhere. These are not just problems related to certification, but to the general process of creating collective forest management operations.

[3] This value represents the average production cost for milling curupau and does not distinguish between costs for three different quality categories recognised in Bolivia. Project personnel reported that these data were not available since they calculated costs on the processing of logs and considered the quality categories of timber to be different products resulting from the same process, sharing the same costs.

THE PROBLEM OF WAGES AND OTHER 'BENEFITS' IN LOMERIO COMMUNITIES

As a community forestry project, the Lomerio project is designed to distribute profits and benefits to the member communities through wages, log purchases, and the commercial sales of timber from the sawmill. Table 2 presents an estimate developed by project managers of the benefits paid in the form of wages to the local communities involved in the forest management operations in 1997. The table shows the number of days worked in each activity, total wages paid, and the communities in which the work was done. In general, the communities involved in each aspect of the operations supplied the workers for the specific activities taking place in their forests. Forest workers receive 25 Bs. per day (about $5 US), and the sawmill pays between 15 and 40 Bs. per log depending on size and species. In the original management plan written by CICOL and APCOB, the wages paid to community members were meant to be a temporary benefit of the project that would be eliminated as the communities began to feel that they were the 'owners' of the sawmill and shared in its profits. Consequently wages were to be reduced by 20% per annum as the sawmill became more efficient and began to realise profits. This has not yet occurred. The sawmill has had problems covering costs and paying communities for the logs extracted from their forests. In the eyes of the community members the wages have become *the* benefit of the project.

One community protested a proposed reduction in the daily wages from 25 Bs/day to 20 Bs. /day and threatened to pull out of the forest management project entirely. The situation created a crisis among the project workers, as well as among the CICOL directorship, as differing opinions regarding the Chiquitano's participation in the project came to the surface. In a meeting to discuss the problem, a number of Chiquitano forest technicians, on salary from the project, argued that the community should do the work without being paid any wages. They argued that if all of the communities pitched in to make the project work Lomerio as a whole could receive the benefits. In the meeting, the community members who were protesting the wage reduction then asked the technicians to reduce their salaries by a fifth. This ended the discussion, with everyone agreeing to keep salaries at 25 Bs/day. The workers in the communities saw the project as just another source of wage labour, and they were no more willing to take a pay cut from the project, than they would accept a pay cut from a rancher whom had employed them or in any other form of wage labour. The crisis caused a great deal of public and private criticism of the project. Later, one of the technicians reported to the author:

> If Florida [community protesting wage reduction] wants to sell wood, then they have to manage their forests. They are not working for APCOB or BOLFOR. They are not working for CICOL. They are working for themselves. It is like if I was building a corral and I asked 10 men to come and work. Those men would expect to be paid, right? I would have the obligation to pay. But, I would not expect anyone to pay me for working on my own corral. It is their forest. We are not obligated to pay. (Chiquitano forest technician 1998).

Table 2. Estimated financial benefits paid to communities in association with the forest management project in 1997[4]

Operation	No. of day wages	Unit cost (Bs)	Benefits per community (Bs)	Total benefits (Bs)	Communities involved
Pre-logging					
Boundary delineation	130	25	3,250	13,000	
Sample collection	30	25	750	3,000	La Asunta
Commercial census	250	25	6,250	25,000	Fatima
Marking for directed felling	125	25	3,125	12,500	Las Trancas
Installation of permanent Plots	50	25	1,250	5,000	San Simon
Follow-up	20	25	500	2,000	
Sub-total	605		15,125	60,500	
Logging					
Road design	20	25	500	2,000	Las Trancas
Road construction	72	25	1,800	7,200	Todos Santos
Secondary road construction	216	25	5,400	21,600	San Simon
Construction of log landings	20	25	500	2,000	Puquio
Raw material			26,250	105,000	
Sub-total	328		34,450	137,800	
Post-logging					Palmira, Bella Flor
Silvicultural treatments	500	25	12,500	50,000	Surusubi, Las Trancas
Sub-total	500		12,500	50,000	
Grand total	1433		62,075	248,300	

Source: CICOL (1997).

While most of the full-time project workers, both Chiquitano and non-Chiquitano, realise that it would not be feasible or desirable to eliminate the daily wage payments at this point, they do see that as a goal. The community members also do not see the wage reduction plan as a desirable goal. Few have faith that the project will ever attain the level of self-sufficient profitability that would allow the dissolution of subsidies.

[4] All monetary values expressed in Bolivianos (US $1 = 5.2 Bs).

LABOUR RELATIONS AND PRODUCTION IN THE SAWMILLING OPERATION

The sawmill is the centrepiece of the Lomerio forest management project, and as such is the locus of many of the major problems. According to the overall project plan, the sawmill should be the component of the project that allows the entire project to move from subsidised and dependent on external support, to self-sustaining and financially independent. Non-Chiquitano project staff and some Chiquitanos hope that the profits from the sawmill will eventually replace grants and loans from international funding agencies, and help strengthen education and health services, as well as the basic infrastructure in Lomerio.

Since the sawmill first began operating in 1988, one of the greatest problems has been a consistent delinquency in paying communities for logs taken from their forests. The sawmill is deeply in debt, and at times has to pay outside creditors in place of paying the communities. This has decreased the confidence of the communities in the sawmill, and lessened the motivation for community participation in the forest management program. This in turn reduced the potential pool of workers who are ready to dedicate themselves to working in the sawmill and making it productive.

Production had become more efficient by early 1998, but this was seen by the sawmill employees as primarily a result of the organisation and work schedule put in place by outside administrators. There was a great difference between the interpretations of the performance statistics for 1997 (reported in Table 3) among Chiquitanos and non-Chiquitanos, as well as between public meetings and in private conversations. In a meeting of the administrative counsel that oversees the operations of the sawmill, the head of production (non-Chiquitano, employee of BOLFOR and APCOB) listed a number of reasons for the lack of production, including equipment problems, inconsistency in supply of raw materials, lack of training in new milling standards, and inconsistent cash flow. His suggested solutions were to buy more and better equipment, improve infrastructure for log delivery, and improve storage facilities. In private, however, the same person said that the last line of Table 4 is the most telling. He said that Chiquitano workers in the sawmill would not show up to work. Out of 120 possible work days, the sawmill was open only for 71. Also, on those 71 days that the sawmill was operating, it was rarely fully staffed. He believed that the sawmill could cover financial costs if it was fully staffed at least three quarters of the scheduled work days (90 days per year). The sawmill workers are paid a salary, and the salary is not dependent on how many days they show up for work.

Table 3. Sawmill production goals versus production results for 1997

Production goal for 1997	Production result for 1997	Success in meeting goal (%)
Produce 280,129 board feet	83,128 board feet	30
Average 1,751 board feet per day	1,137 board feet per day	65
Process 600 trunks	230 trunks	38
Work 120 days (May-Oct)	71 days	59

Source: Valencia (1998).

In a series of strikes in the early years of the sawmill, the workers had obtained the agreement that they would be paid monthly salaries, not hourly wages. They are paid between 400 and 730 Bolivianos monthly depending on skill level and experience. The sawmill is only open for 6-8 months per year, depending on the length of the dry season, so the workers had to continue activities such as farming and raising cattle to support themselves year-round. They argued that they occasionally had to take off days during sawmill operations to tend to required tasks in the agricultural cycle. The result, according to the administrators, is that taking time off is the rule rather than the exception. Any attempts to install a more disciplined work schedule were met with rigid resistance, and since it was difficult to find labour in the first place, the administrators had little choice but to give into the demands.

TRANSFERING RESPONSIBILITY TO CHIQUITANO ADMINISTRATORS

Declining production and mounting debts led CICOL to take dramatic efforts to restructure the entire sawmill organisation in 1997. For the first years after the sawmill opened, CICOL policy dictated that Chiquitanos fill all administrative positions, and non-Chiquitano staff function as technical consultants. The Chiquitano administrators were being trained on-the-job, and none of the early administrators possessed the skills necessary for managing an operation the size of the sawmill. Many of the non-Chiquitano staff took de facto control over some aspects of the operation. This dual system of official and unofficial administrators was a complete failure according to Chiquitanos and the development organisations alike. The main problem was ambiguity over responsibility and decision-making.

In 1996, CICOL decided to change the administrative organisation and clearly delineate responsibilities. CICOL, APCOB, BOLFOR and the workers of the sawmill met and created an administrative counsel with representatives from each group. The counsel met several times a year. They reviewed the production and accounting reports, and selected the persons who would fill important positions. An outside administrator and an outside accountant were brought in to manage the sawmill and begin a more orderly system of record-keeping. APCOB and BOLFOR staff were placed in charge of overseeing three of the primary areas: equipment maintenance, production and commercial sales. These administrators were to train Chiquitano technicians who would eventually take their place when they had acquired the necessary skills. The stated goal was to transfer skills and knowledge to the Chiquitanos so that the administrators from APCOB and BOLFOR could eventually step aside. Chiquitanos made up all of the labour positions – drivers, mechanics, saw operators, and general labourers – and were in charge of the logging section of the operation.

So far, the process of transferring skills to Chiquitano administrators has not been successful. There have been innumerable workshops conducted over the years, but it has not resulted in increases in Chiquitano management responsibilities. The blame rests on both sides. The Chiquitanos resist being placed in positions of responsibility, and many of the development workers said privately that it was just easier for them to make the management decisions rather than train the Chiquitanos to make them. Also, Chiquitanos are quick to point out that once the Chiquitanos do

take over management of the project, many the outside workers will be looking for another job. Hence, there is a lack of motivation on behalf of the technicians to train the Chiquitanos.

Sundberg (1998, p. 92) referred to this type of situation as the 'culture of simulation.' The outside organisations work to accomplish what they have in the management plan, 'simulating' that they are helping the locals. The locals mainly do what they are told, specifically all tasks involving manual labour, and thereby development is 'simulated,' while actually nothing has changed. In the case of Lomerio, both the outside organisations and the Chiquitanos have willingly fallen into this arrangement. The NGOs have a project in Lomerio, and the Chiquitanos have another source of wage labour.

Ideally, a number of years should have been spent training the Chiquitanos before the sawmill was purchased. Now, the immediacy of unpaid loans, funding reviews and timber orders makes it difficult to return to the beginning in the training process.

INDIGENOUS MANAGEMENT AND THE MARKET ECONOMY

Along with difficulties in labour organisation and production, the sawmill has been plagued by the mismanagement of funds. Along with the equipment bought by a Dutch NGO, the sawmill was provided with about US $300,000 in start-up capital. The Chiquitano administrators gave a great deal of this away in the form of loans to communities and informal loans to individuals and sawmill employees. These loans were used to help communities with building schools and to pay teachers and as small enterprise loans for groups of individuals (primarily for pasture establishment). Table 4 reports the difference in the amount and distribution of loans in 1996 in comparison to 1997 when outside administrators took control. The amount was cut to one fifth what the previous Chiquitano administrators had given out, and most of these loans were to communities rather than individuals. One of the primary goals of the new administrators is to change the perception of the sawmill as an unlimited source of cheap loans or 'gifts' to the people of Lomerio.

Smith (1995) has discussed the relationship between the indigenous economy and the marketplace in the context of the market enterprises that are proliferating in indigenous communities across the South American lowlands. The indigenous moral economy is dominated by rules of reciprocity and rewards for generosity; the market economy encourages individual accumulation. In the case of Lomerio, the capital for the sawmill is based on a gift, or a donation. Is this money subject to the demands of reciprocity and exchange? If the people of Lomerio are the owners, do they have claims to this money that the administrator must honour?

Table 4. Loans made by sawmill in 1996 and 1997 in US dollars

Loan recipients	Loan amount ($)	
	1996	1997
Communities	8,572	5282
Individuals	17,650	1026
Sawmill employees	6,050	20
Total	32,272	6,328

Source: CICOL (1997).

Table 5 shows that the sawmill has been dependent on outside loans and donations to cover financial costs.[5] Without donations the sawmill would be heavily in debt. In meetings of the administrative counsel, Chiquitano leaders argued forcefully to include the donations as income in evaluating the performance of the sawmill, while the APCOB and BOLFOR administrators evaluated the sawmill purely in terms of income versus costs. The goal of the outside administrators is long-term financial sustainability, and the goal of the Chiquitano leaders is long-term funding sustainability.

Table 5. Income, costs, and outside subsidies for the Lomerio sawmill in US dollars

Sawmill financial balance	Income, cost or subsidy amount ($)		
	1994	1996	1997
Timber sales	74,502	19,640	54,768
Costs	98,254	53,222	68,543
Balance	-23,752	-33,582	-13,775
Loans	0	31,305	13,696
Donations	5,463	0	68,902
Net balance	-18,289	-2,277	68,823

Sources: CICOL (1994, 1996, 1997).

Chiquitanos commonly argued about whether the sawmill was a 'project,' in the sense of being a means of securing donations and funds from outside agencies, or was a business subject to the rules governing a market economy. Most saw it as a 'project,' and even said that it was a great lure for securing funds. Many of the outside administrators saw it as a business and tried to make it operate like one. In meetings, they frequently admonished the Chiquitanos for failing to see it in that light.

This problem illustrates the differences in values between the Chiquitano economy and the market economy. It also illustrates the differences in priorities for the project between the Chiquitanos and the outside organisations. The Chiquitano administrator who distributes the project funds to family and friends is rewarded with status and prestige for his generosity, and his actions make perfect sense in the indigenous economy based on reciprocity. However, this type of economic behaviour quickly leads to bankruptcy in the market economy where managers must invest capital carefully, and accumulate cash rather than distribute it freely.

The non-Chiquitano administrators see the project funds strictly as capital to invest in the forest management and sawmill operations. One of the most common complaints expressed by Chiquitanos is that the project funds are not used to improve health and education quality in Lomerio, or to improve agricultural and cattle production. Most people in Lomerio were not interested in becoming loggers or workers at the sawmill. They were farmers and they wanted the project to reflect their interests. People living in Chiquitano communities were upset when the flow of loans and free milled timber was slowed by the outside administrators. They complained that the sawmill was no longer *for* the people of Lomerio. The

[5] No records could be obtained for 1995, nor for the period before 1994.

Chiquitano administrator who distributed project funds to these people was being an effective manager in the eyes of the communities of Lomerio. To many of the non-Chiquitanos and funding agencies this type of behaviour was mismanagement at best and corruption at worst.

CONCLUSIONS

Community-based forestry has not emerged as the panacea that was expected in Lomerio. This is despite all of the elements being in place for community-based forestry in Lomerio to demonstrate its effectiveness. Land tenure is secure, and the proper institutional arrangements for managing resources are in place. There are substantial economic incentives at the community level for implementing sustainable management programs. Further, for the most part, financial risk is being absorbed by funding from international donor agencies. Despite this, the project has encountered serious problems in achieving financial self-sufficiency. The fundamental problem faced by the project is cultural rather than fiscal or administrative.

Once while working in San Lorenzo with a group of men to clear a field, the author discussed the problems in the sawmill with the group, none of whom were employed by the sawmill, nor in the forest management operations. The author had presumed that working for the sawmill would increase one's standing in the community. The workforce in the sawmill was young men, primarily. Many of the workers were recently married, and they were using their salaries to buy materials for house construction. It was assumed by the author that having a regular, relatively high source of cash income would be a desirable goal, demonstrating ambition and competence to the rest of the community. However, the men working in the field had another perspective on wage labour in the sawmill. They said that the sawmill workers 'had one foot in the cemetery.' They asked what would happen if they were injured, or if the sawmill closed. How would the men and their families eat? They said that a Chiquitano man was judged by how well he farmed. Without crops, they said, they are not even Chiquitano. The author asked many of the sawmill workers about this, and they agreed. Some said that they were ashamed that they did not have crops, and that they had to buy their food.

Any attempt to use market-based approaches to development and natural resource management in indigenous communities must take these value conflicts into consideration. Many of the problems that the Lomerio project is experiencing in labour relations, administrative capacity building, and production efficiency can all be traced to fundamental conflicts between Chiquitano culture and the values that necessarily accompany market-based development efforts such as community forestry. Nonetheless, community forestry is still the best available option for the Chiquitanos to manage their land for the long-term while creating economic opportunities for their communities. The key will lie in moulding the organisation of the project in ways that reflect Chiquitano patterns of work and production, and reconciling the demands of market economics with the values of reciprocation that permeate life in Chiquitano communities.

ACKNOWLEDGEMENTS

This research was funded by BOLFOR (The Bolivian Sustainable Forestry Project), a USAID and Bolivian government sponsored program. The author would like to thank BOLFOR for all of their assistance in carrying out the research. The author would also like to thank the people of Lomerio, the directors of CICOL, and the staff of the organisation APCOB for their patience and assistance on this project.

REFERENCES

APCOB (Apoyo para Campesino Indígena del Oriente Boliviano) (1996), *Politicas y lineamientos para el trabajo con pueblos indigenas*, Santa Cruz, Bolivia.

Becker, C.D. (1999), 'Protecting a Garua forest in Ecuador: The role of institutions and ecosystem valuation', *Ambio*, 28(2): 156-161.

Bullock, S.H., Mooney, H.A. and Medina, E. (1995), *Seasonally Dry Tropical Forests*, Cambridge University Press, Cambridge.

Chiquitano forest technician, personal communication, 13 March, 1998.

CICOL (Central Indígena de Comunidades Originarios de Lomerío) (1994), 'Annual Accounting Report of La Esperanza Sawmill', Lomerio, Bolivia.

CICOL (Central Indígena de Comunidades Originarios de Lomerío) (1996), 'Annual Accounting Report of La Esperanza Sawmill', Lomerio, Bolivia.

CICOL (Central Indígena de Comunidades Originarios de Lomerío) (1997), 'Annual Accounting Report of La Esperanza Sawmill', Lomerio, Bolivia.

Dickinson, M.B., Dickinson, J.C. and Putz, F.E. (1996), 'Natural forest management as a conservation tool in the tropics: Divergent views on possibilities and alternatives', *Commonwealth Forestry Review*, 75(4): 309-315.

INE Census, (1992), *Instituto Nacional de Educacion - Censo 1992*, La Paz, Bolivia.

Kennard, D.K., Fredericksen, T.S. and Mostacedo, B. (2001), 'The potential of prescribed fire for the management of timber species in dry forests: A case study from Lomerio', in B. Mostacedo and T.S. Fredericksen (eds), *Regeneracion y Silvicultura de Bosques Tropicales en Bolivia*, Proyecto de Manejo Forestal de Sostenible (BOLFOR), Santa Cruz, Bolivia.

Kennard, D.K., Gould, K., Putz, F.E., Fredericksen, T.S. and Morales, F. (2002), 'Effects of disturbance intensity on regeneration mechanisms in a tropical dry forest', *Forest Ecology and Management*, 162(2-3): 197-208.

Kiker, C.F. and Putz, F.E. (1997), 'Ecological certification of forest products: Economic challenges', *Ecological Economics*, 20(1): 37-51.

Klooster, D. (2000), 'Institutional choice, community, and struggle: A case study of forest co-management in Mexico', *World Development*, 28(1): 1-20.

Macdonald, T. (1995), 'Latin American community-forestry and indigenous politics in the 1990s: Shifting concepts of land tenure and use', paper presented at symposium *Forestry in the Americas: Community-Based Management and Sustainability*, University of Wisconsin, Madison, WI.

McDaniel, J.M. (2002), 'Confronting the structure of international development: Political agency and the Chiquitanos of Bolivia', *Human Ecology*, 30(3): 369-396.

McDaniel, J.M. (2003), 'History and the duality of power in community-based forestry in Southeast Bolivia', *Development and Change*, 34(2): 339-356.

Navarro, G. (1996), 'La vegetacion de Lomerio', in T. Centurion and I.J. Kraljevic (eds), *Las Plantas Utiles de Lomerio*, BOLFOR, Santa Cruz, Bolivia, pp. 31-67.

Putz, F.E. (1994), *Approaches to Sustainable Forest Management*, Working Paper No. 4, Center for Internal Forestry Research, Jakarta.

Schroeder, R.A. (1999), 'Community, forestry, and conditionality in the Gambia', *Africa*, 69(1): 1-22.

Smith, R.C. (1995), 'The gift that wounds: Charity, the gift economy, and social solidarity in indigenous Amazonia', Conference paper presented at *Forest ecosystems in the Americas: Community management and sustainability*, University of Wisconsin, Madison, WI.

Stocks, A. and Hartshorn, G. (1993), 'The Palcazu project: Forest management and native Yanesha communities', *Journal of Sustainable Forestry*, 1(1): 111-135.

Sundberg, J. (1998), 'Strategies for authenticity, space, and place in the Maya Biosphere Reserve, Peten, Guatemala', *Conference of Latin Americanist Geographers*, 24(1): 85-96.

Taylor, P.L. (2000), 'Producing more with less? Community forestry in Durango, Mexico in an era of trade liberalization', *Rural Sociolog*, 65(2): 253-74.

Tenenbaum, D. (1996), 'The Mexican miracle: Community forestry', *Business and Society*, 39(1): 47-49.

VAIPO (Viceconsul de Asuntos Indigenas y Pueblos Originarios-Censo), (1997), *Lowland Census*, La Paz, Bolivia.

Valencia, E. (1998), personal communication, manager, BOLFOR, Santa Cruz, Bolivia.

Viana, V.M., Ervin, J., Donovan, R.Z., Elliott, C. and Gholz, H. (1996), *Certification of Forest Products: Issues and Perspectives*, Island Press, Washington, D.C.

Vitug, M.D. (1997), 'The politics of community forestry in the Philippines', *Journal of Environment and Development*, 6(3): 334-40.

Western, D., Wright, R.M. and Strum, S.C. (1994), *Natural Connections: Perspectives in Community-based Conservation*, Island Press, Washington, D.C.

Wily, L. (1999), 'Moving forward in African community forestry: Trading power, not use rights', *Society and Natural Resources*, 12(1): 49-61.