



# Grassroots to Grassroots: Why Forest Preservation was Rapid at Loma Alta, Ecuador

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**Summary.** — What social arrangements stop deforestation? This paper chronicles the sociological factors underlying the rapid establishment, in 14 months, of a community-owned protected forest in Ecuador. Methods developed by the International Forestry Resources and Institutions (IFRI) research program provide a stakeholder analysis related to trends in deforestation. Interviews, community meetings, and informal discussions provide data on attitudes of local people during and after establishment of the forest preserve. Knowledge and resources external to the community motivated local people to preserve a cloud forest, but local institutions and communal land tenure were critical for the rapid establishment of the protected area.

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## 1. INTRODUCTION

Decentralization and conservation policies are changing the face of rural development in the tropics (Larson, 2002; Pinkerton, 1992). Now more than ever, nongovernment organizations (NGOs) are becoming involved in conservation and development at the village level (Atack, 1999). Integrated conservation and development projects (ICDPs) merge conservation of natural resources with local development in less-developed countries. ICDP organizations may be regional, national, or international, small or large, but they all tend to confront rural communities with new incentives ranging from educating girls to ecotourism (Smith & Ward, 2000; Wood, 1999). Reducing the rate of deforestation, especially in tropical areas, is a major goal of many ICDP organizations, especially those concerned with the loss of biodiversity. Because there is no one-size-fits-all approach to ending the tropical deforestation process (Bhattarai & Hammig, 2000), case studies that successfully integrate forest conservation with rural land use in tropical communities continue to provide empirical guidance for conservationists, rural developers and policy makers.

This study explores the socio-cultural and institutional relationships among two US-based nonprofit ICDP organizations and local stakeholders in forest conservation at Loma

Alta, a watershed owned by a community of rural families in western Ecuador. I attempt to explain why, at this particular location and social setting in Latin America, a protected area was established in only 14 months. The case study comprises an introduction to ICDP setting at Loma Alta, a brief description of data collection methods, an overview of the social processes that lead to making a communally owned protected forest, ICDP progress, and results of two surveys conducted in Loma Alta and a nearby community. The surveys provided a sample of opinions about, and participation in forest conservation facilitated by an NGO external to the community. The paper ends with a summary of the key factors leading to the successful establishment of the Loma Alta

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Ecological Reserve and what may be required to sustain the protected area.

## 2. METHODS

### (a) *Loma Alta, Ecuador: an attractive site for an ICDP*

Rural communities in coastal Ecuador have been managing watersheds for several millennia (McEwan, 1989). In the early 1900s, descendants of Manta Indians moved inland from coastal areas to farm and claim watersheds draining the western slopes of the Colonche Cordillera (Figure 1). These extended family groups planted a variety of crops and devised norms of land allocation that were and still are adaptive to the microhabitats on the slopes of the watershed. Lowlands were and still are used for settlements. Valley bottoms are now used for irrigating fruit and vegetable crops to meet the high demand for these items in Guayaquil, Ecuador's major port. Lowland dry forest has been almost completely destroyed by charcoal making, overgrazing, and firewood collection. In contrast, forested highlands remain lightly inhabited, and have been used for harvesting timber and game, and for growing Panama hat fiber (Becker, field notes). In 1936, Ecuador

passed the Law of the *Comunas* making traditional tenure arrangements of rural peasant communities legal (Government of Ecuador, 1936). Currently, about 3,000 people live in and share legal property rights to Loma Alta, a 6,842 ha watershed containing the headwaters of the Valdivia River (Figure 2).

In 1994, People Allied for Nature (PAN), a small (annual budget < \$30,000, no full-time employees) NGO based in the United States, formed to protect wildlife in tropical forests of Ecuador. A professional botanist in Guayaquil introduced PAN's four co-directors to community leaders in Loma Alta. At this time, the author was a PAN co-director and a scientist with Earthwatch Institute,<sup>1</sup> another US non-profit organization funding research and fielding volunteers for ICDPs around the world. In 1995, Hilgert and Andrade (1995) published maps showing that very few patches of mature moist forest remained in the Colonche Hills, and that Loma Alta had one of the largest patches, over 1,000 ha. Conservation International had completed a rapid assessment of biodiversity in forest fragments in the Colonche Hills (Parker & Carr, 1992), and the Nature Conservancy had been funding efforts to restore dry forest in the area. The Tumbesian region of southwestern Ecuador, in which the Colonche Hills are located, had just been

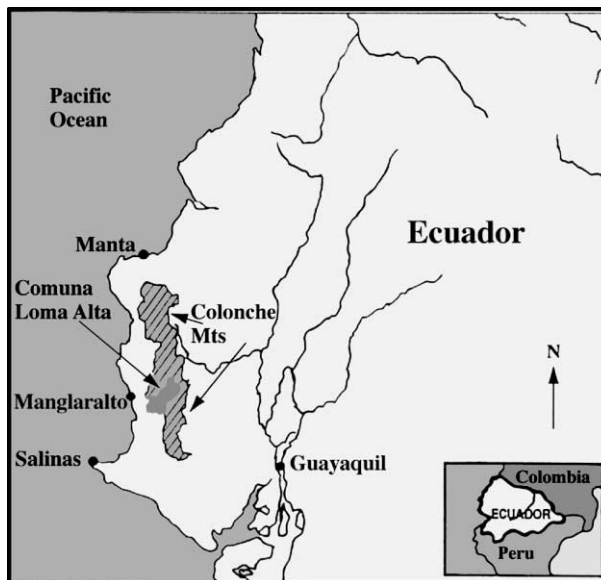


Figure 1. Map of western Ecuador showing the Colonche Hills and location of the Loma Alta watershed. Note that the highland forests of the watershed receive fog from the Pacific Ocean.

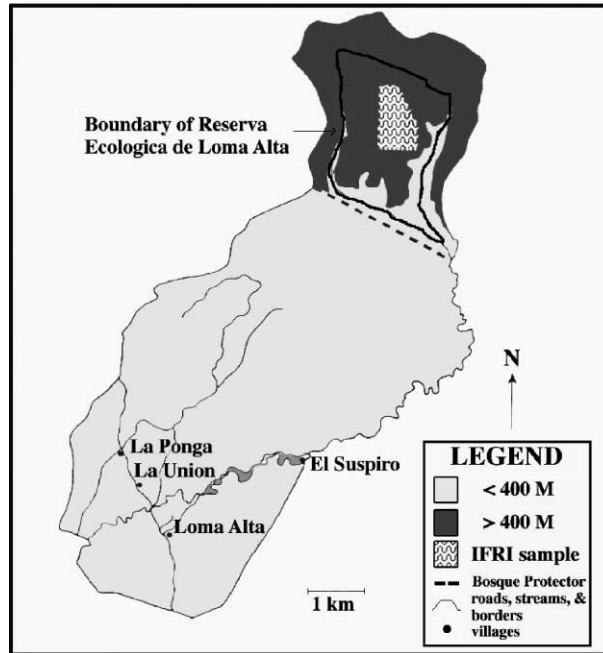


Figure 2. Map of the Loma Alta watershed showing location of settlements, boundaries of the community's forest reserve, elevation, and the boundary of nationally designated protective forest. Loma Alta's southern boundary borders the Valdivia river (Rio California on some maps).

identified as a center of "endemism" for bird species (Best, 1992; Best & Kessler, 1995). Thus, in June of 1995, when PAN began its ICDP effort, conservationists had identified the coastal moist forests as threatened areas with important biodiversity. Local communities in the Colonche Hills were just beginning to interact with organizations implementing ICDPs. It was in this social setting, that only 14 months later in August of 1996, the community of Loma Alta established its ecological reserve.

Loma Alta has three fundamental preconditions for sustainable natural resource management. They have secure property rights favoring a long-term outlook toward common property (McKean, 1996; Schlager & Ostrom, 1993). Second, they share a long history of local decision-making about land allocation (Bromley *et al.*, 1992; Ostrom, 1990), and thus have the capacity to make rules to regulate forest exploitation. Third, forest resources have economic value, so incentives exist for individual stakeholders to make rules that manage forest resources in a sustainable manner (Gibson & Becker, 2000).

To determine if people-forest relationships and local governance of natural resources in Loma Alta were sustainable, PAN collaborated

with the International Forestry Resources and Institutions (IFRI) research program, based at Indiana University (Ostrom, 1998). IFRI was/is attempting to explain deforestation at the micro-level around the world by using standardized methods to collect data on a common set of biophysical, socioeconomic, and institutional variables relating forests and forest user groups (Gibson, McKean, & Ostrom, 2000). After discussing the aims of the study and the goals of PAN at several village meetings, villagers came to a consensus that they would participate in the IFRI study, and embark on an institutional relationship with PAN.

#### (b) Surveys about local knowledge and attitudes

To learn more about local attitudes about forest conservation and PAN, two studies were conducted after the communal forest reserve had been established. The first study employed a simple questionnaire (see Appendix A) designed to compare knowledge and attitudes of people at Loma Alta to people at Rio Blanco, a similar community that had not been influenced by ICDP activities. During July and August 1997, interviews were conducted at El

Suspiro, a settlement of 60 households in the Loma Alta watershed where most of the local forest users lived. Rio Blanco was a smaller settlement of 28 households using highland forest in a watershed about 20 km north of Loma Alta. Earthwatch teams interviewed all available adult decision-makers by visiting all of the households in each community.

A second survey was completed in December 1999 at Loma Alta, more than three years after the forest reserve was officially established, demarcated, and under patrol by village guards. Although the community council maintained written records of their agreements with PAN, it was not clear how local citizens felt about the relationship with the foreign NGO or whether people knew the new reserve's rules very well and abided by them. The second survey tried to answer the following questions:

- (i) To what extent are local community members familiar with the rules for forest use established via agreements between the community and PAN?
- (ii) Given that all villagers lived in the lowlands, and many, especially women, rarely visited the highland forest, did individuals know the real size of the reserve and exactly where the reserve was located?
- (iii) What role did local people expect PAN to take in making rules for the reserve?
- (iv) Did the extent of participation in PAN projects make people more knowledgeable about wildlife and forest ecology?
- (v) Did the extent of participation in PAN projects more positive toward outsiders?

As a variable, participation was measured according to the extent to which individuals attended PAN workshops, attended village meetings focused on reserve management, and/or helped with demarcation and guarding of the reserve.

Adult villagers were randomly selected from numbered houses in four settlements in the Loma Alta watershed. A peer who had received training in conducting the surveys interviewed them. Participation in the survey was voluntary.

### 3. RESULTS AND APPLICATION OF IFRI STUDY

At Loma Alta, robust micro-institutions, secure land tenure, and economic value for forest resources were not sufficient to cause villagers to design rules to sustain their highland forest (details in Gibson & Becker, 2000). Instead, the

1,650 ha of highland moist forest were steadily being cleared and degraded by customary land allocation practices and the community's inability to defend their property from an aggressive ranching family. As of 1995, ranchers had destroyed about 200 ha through conversion.

Land allocation in the highlands was democratic and egalitarian. Plot sizes were restricted to 10–30 ha, creating a patchwork of forest and crops. Deforestation and fragmentation were increasing as young families were being allocated land in the highland forest commons (details in Gibson & Becker, 2000). Each family typically clears between three and 10 ha for crops. Eventually, fragmentation and total loss of forest habitat would lead to an extirpation of local forest wildlife (Lovejoy *et al.*, 1986). There were also no rules constraining hunting by community members, although people did say that game animals were used more when families lacked money to buy meat. Individuals were unanimously opposed to market hunting by anyone.

#### (a) Stakeholder analysis

In addition to determining current sustainability of forest relationships at Loma Alta, the IFRI data contributed to a stakeholder analysis by:

- (i) Identifying people, groups, and institutions that would influence PAN's ICDP initiative (either positively or negatively).
- (ii) Anticipating the kind of influence, positive or negative, these groups would have on PAN's ICDP goals.
- (iii) Helping PAN develop strategies to get the most effective support possible and to reduce obstacles to successful implementation of a protected area for wildlife in the Colónche Hills of Loma Alta.

Rules for forest protection had not been crafted partially due to conflicting needs of forest stakeholders (Gibson & Becker, 2000) and the fact that they did not perceive a value for indirect ecosystem services or option values provided by the forest (Becker, 1999). One major stakeholder, Panama hat fiber growers, replaced patches of forest with a sustainable crop. They obtained use rights to a forest parcel, cleared 1–5 ha, and planted Panama hat fiber, *Carludovica palmata*, locally called *paja toquilla*. They aimed to expand their fields and would not promote rules restricting forest clearing for their crop. In contrast, woodcut-

ters, as a second stakeholder group, had an incentive to protect large blocks of forest, but did not make a strong case for controlling activities on parcels because timber harvesting was no longer very profitable. Most of the primary forest trees had been harvested during the 1960s and 1970s.

The most important stakeholders, from a strategic point of view for conservation and development, were not even aware of their linkage with the highland forest. Most families in Loma Alta make a living by irrigating crops in the lowlands. The water they use is partially derived from fog captured by the highland forest. While fog capture was physically obvious to researchers working in the highlands, people living in the lowlands did not understand this ecosystem service (Becker, 1999). No one, including the scientists, knew the quantity of fog and mist intercepted by highland vegetation during the six-month *garúa* season until Earthwatch teams and villagers collected data on this phenomenon (Becker, 1996).

There was also an illegal user group (stakeholder) invading the community forest. About 600 ha of mature forest remained in remote parts of the community owned watershed because few people wanted to travel more than three hours from home to cultivate hat fiber or cut timber. With little human presence, nearly one-third of the forest commons was in the process of being converted to pasture by ranchers from Manabi, a more Mestizo, less indigenous, ethnic group. Although leaders and members of Loma Alta had obtained military assistance to evict ranchers from their property, the ranchers returned.

(b) *From stakeholder analysis to ICDP strategy*

By identifying forest user groups, IFRI results helped PAN to predict the impacts that forest conservation would have on each stakeholder and what sort of support for forest protection they might get from each group. Panama hat fiber growers would have to be convinced not to expand their fields in the highlands.<sup>2</sup> Woodcutters would need to be convinced to regulate or stop timber harvests in the highlands, and ranchers would need to respect community property rights and leave. A conservation strategy for PAN became clear. If and when lowland farmers, the majority of the community, made the connection between the distant forests and their water supply they

might become a persuasive majority in support of forest preservation.

As members of a legally recognized community and owners of a watershed, farmers, woodcutters, and fiber growers all negotiate land use on their shared property. Individuals express their concerns, desires, opinions, and proposals at monthly community meetings. Men and women over 18 years old, who have paid a small annual fee to be a community member, elect a five-member council of leaders annually. The President and other council members represent the community to external organizations, negotiate contracts with outside institutions, and listen to and resolve problems within the community.

Early in 1996, PAN began an urgent campaign to convince farmers that a forest reserve would help secure water resources in the lowlands. Measurements of fog capture (Becker, 1999) indicated that in the 1996 fog season (June–November), the community lost an average of two million L of water per hectare wherever forest was converted to pasture on windward slopes above 500 m. PAN hired an Ecuadorian environmental educator to work in the community coordinating an adult Ecology Club where this information was conveyed and the benefits of a protected area were discussed.

During June to August 1996, PAN and Earthwatch research teams presented data, a video about fog capture, and a map detailing an appropriate size and location for a forest reserve to protect water resources at community meetings. After six special meetings, consensus was derived through rigorous debate (for more detail see Becker, 1996, 1999). At the end of August, 1996, the voting adults of Loma Alta unanimously declared about 1,000 ha in the highlands (450–800 m) as the *Reserva Ecológica de Loma Alta* (Figure 2). The whole process had only taken 14 months from concept to consensus.

(c) *Institutional co-evolution during the early ICDP phase*

The first normative change the community decided upon was that common property in the highlands would not be further divided and that use on allocated plots would be held constant or reduced. Families losing use rights were few (three) and were headed by the young men intending to harvest trees. They readily accepted the offer to work as guards for the new reserve instead of cutting trees.

Table 1. *Chronology and types of PAN projects completed in the Comuna of Loma Alta after the establishment of the Loma Alta Ecological Reserve*

Date	Project	Type
September 1996	Salaries for four reserve guards	Conservation
September 1996	Pan matches funds raised by parents to hire additional teacher in a village	Development
December 1996	Two week forest guard/guide course	Conservation
June 1996	Tagua Jewelry Training	Development
January 1997	Teacher and Remedial Education	Development
March 1997	Salaries for four reserve guards	Conservation
April 1997	Conflict resolution with ranchers	Integrated
April 1997	Electricity for La Ponga School	Development
1998	Reforestation	Integrated
1999–2001	Maintain teachers and guards	Integrated

With the foundation of the ecological reserve, collaborative management of the refuge by PAN and the community became a reality. Shared management was made official by a written document called the Agreement of Mutual Help. According to this document, a conservation benefit valued by PAN was to be accompanied or followed by a development benefit desired by the community. As shown in Table 1, this “tit-for-tat” arrangement led to village-level improvements (development), forest protection and reforestation (conservation), and employment and training related to forest protection and tourism (integrated conservation and development).

Initially, community leaders favored social projects and expressed little interest in conservation projects (unless they involved direct payments for work, such as planting trees). This attitude had been cultivated during relationships with large donors who paid locals to plant trees in the arid lowlands. Community leaders were adept at getting PAN to commit to long-lasting community development projects in exchange for minor efforts at forest conservation (with the exception of planting trees for which they were paid). A review of resolutions and annual reports from 1994 to 1999 indicate that PAN’s activities and aims diverged from wildlife conservation, becoming more oriented toward capacity building (training) and community development (Table 2). For example, PAN provided funds for one village teacher in 1996, three teachers in 1997, and five as of November 1999 to augment the government teaching staff in the schools.

With time, requests the community made of PAN became more sensitive to conservation. Early in the relationship, villagers requested funds for the Saint’s Day Fiesta, a large party featuring a band and substantial quantities of

Table 2. *Responses to the question: are highland forests important?*

Response	% Rio Blanco (n = 18)	% El Suspiro (n = 32)
No	5.6	0
Yes, lumber	11.0	0
Yes, food	5.6	3.1
Yes, protection	0	6.3
Yes, farming	61.1	31.3
Yes, water	5.6	41.0
Yes, beauty	0	15.6
Other	11.0	3.1

If yes, what is the main reason?

food and drink. After three years working with PAN, villagers requested a workshop to make value-added crafts from forest products: Panama hat fiber and vegetable ivory. Several community members stated “these activities will reduce the need to expand fields and save the forest.”

By inviting ranchers and leaders of Loma Alta to a conflict resolution meeting in Guayaquil, PAN ended clearing for pasture in the highlands. The president of PAN, a lawyer, explained to the ranchers that they were breaking the law by invading the highlands owned by Loma Alta. The ranchers were also made aware that their activities reduced the water available in Loma Alta, and that they might be asked to pay for the value of the lost water (~\$128,000 at 1996 values). When it was also made clear that PAN and the community planned to train guards to patrol the communal boundaries of the reserve, the ranchers agreed to leave the highlands (and did). One rancher justified his presence stating, “I thought no one was using the land.”

Today, PAN continues to pay for reserve guards. These men generate and sustain

enthusiasm for the reserve in lowlanders who rarely see the forest, its orchids, monkeys and birds. One guard bragged, "...we are special in Loma Alta...we are the only community with such a wonderful forest."

#### 4. RESULTS OF SURVEYS

Half the households in El Suspiro ( $n = 32$ ) and 64% of the households ( $n = 18$ ) in Rio Blanco were represented in the first survey. Although 95% of the respondents said they valued highland forests and used the highlands for similar reasons, people from Rio Blanco gave more utilitarian reasons for valuing the forest than villagers from El Suspiro (Table 2,  $P < 0.05$ ). Compared with the diverse set of values for forests given by people from El Suspiro, respondents from Rio Blanco had a narrower set. The majority said the forests were most important for farming. Respondents from El Suspiro emphasized the importance of ecosystem services, specifically water conservation, more so than respondents from Rio Blanco (Table 2; Chi-square = 15.9, d.f. = 1,  $P < 0.05$ ). While no one from Rio Blanco indicated that beauty was the most important aspect of the forest, five respondents from El Suspiro did ( $P < 0.05$ ), showing that they had aesthetic appreciation or "existence value" (Pearce & Moran, 1995) for the forest.

Respondents from both communities compiled similar lists of local wildlife suggesting that traditional knowledge and awareness about the biological diversity in the forest was the same. Snakes and big cats were most frequently listed as species the villagers wished were less abundant, because they were dangerous to people and killed domestic fowl. Some respondents also desired fewer monkeys, parrots, squirrels, raccoons, and skunks because they damaged crops. The majority of respondents wished that deer, rabbits, wild pigs, and forest rodents, the favorite local game meat sources, were all more abundant. Thus, despite environmental education aimed at generating existence value for wildlife, utilitarian values about wildlife prevailed in both communities.

Although, Earthwatch research teams, PAN leaders, and environmental educators had spent two years describing the concept of ecotourism<sup>3</sup> and using the term around villagers at Loma Alta, only four respondents from El Suspiro recalled the term and could adequately explain the concept. These four either worked

as research assistants on Earthwatch projects or were married to someone who worked as a research assistant. No one in Rio Blanco was familiar with the term or the concept. Despite their lack of definitional capacity with "ecotourism," 63% of the respondents from El Suspiro were in support of promoting it at Loma Alta. In contrast, only three respondents from Rio Blanco (16%) were in support of having outsiders visit their forests.

##### (a) *Local knowledge, attitudes, and perceptions about the Loma Alta Ecological Reserve*

Sixty-one household decision-makers (10 women, 51 men) completed the second survey aimed at determining opinion and knowledge about the Loma Alta Ecological Reserve. Just under half (49%) came from El Suspiro, the settlement with the most users of the highland forest. The remainder represented the lowland settlements of Loma Alta, La Ponga and La Union where people had more interest in irrigation and market crops.

All respondents knew when the reserve was established (August 1996) and where the reserve was located (highlands), but only 42% knew its correct size. One person said it was an order of magnitude larger, but the majority, 57%, thought the reserve was an order of magnitude smaller (100 ha rather than 1,000 ha). Proximity to the reserve did not influence knowledge of the reserve's correct size (Chi-square 2.26, d.f. = 2,  $P = 0.32$ ), but participation in demarcation of the reserve did. Of the 30 respondents who had helped demarcate the reserve, 76% of them knew its correct size, whereas only 10% of non-participants knew the reserve's true size (Chi-square = 27.3, d.f. = 2,  $P < 0.001$ ).

In reply to two open-ended questions about the purpose of the reserve, 57% of the respondents emphasized preservation of biodiversity, 38% listed ecosystem services (water and soil conservation), and the remaining three respondents listed, tourism, science, and defense of property rights. When asked to rank the most important benefits of the reserve, the majority (65% of the respondents) indicated that water conservation, employment, and land security were all equally important and deserving of "first place." Water conservation was ranked uniquely as the most important benefit by 28% of respondents. Employment and land security were ranked as uniquely first by less than 5% of the respondents.

(b) *Local knowledge about new rules in the reserve*

Hunting wildlife and cutting trees are not permitted in the reserve and this information is posted at all major entry points to the reserve. Other restrictions are known by forest guards and are listed in management documents kept at the community office. Local knowledge of rules was evaluated by asking respondents to indicate if nine activities were either "permitted" or "not permitted" in the forest reserve. Thus, a perfect score was 9. Respondents averaged 6 correct answers  $\pm 2$ , equivalent to knowing about 70% of the rules.

The fact that hunting was not allowed was the best-known rule. Only four of 61 respondents claimed that hunting of wildlife was permitted. But, when presented with "hunt butterflies" as a choice, 12 people said this activity was permitted, showing a lack of consistency in interpretation of the general rule forbidding hunting of wildlife. Seven respondents stated that the harvesting of trees was permitted, although it is not.

A multiple regression of six factors likely to influence knowledge of rules (Table 3) show that a person's age, attendance at PAN workshops, or time spent on PAN projects were not significant. Family size and participation in establishing the reserve were negatively correlated with knowledge of rules (Table 3). The only significant positive correlation with knowledge of rules was the number of visits to the reserve ( $P = 0.02$ ). Still, the six-factor model explained 41.2% of the variation in knowledge about rules (ANOVA, d.f. = 6, 52,  $F = 6$ ,  $P < 0.0001$ ).

(c) *Local attitudes toward rules and collaborative management of the reserve*

All of the respondents stated that they supported having rules of use in the reserve, but

Table 3. *Multiple regression to determine which variables had predictive value for variation in knowledge of rules pertaining to activities in the Loma Alta Ecological Reserve*

Dependent variables	Coefficient	T-value	P-value
Workshop participation	0.149	1.02	0.31
Contribution score	-0.248	-1.4	0.16
Age	0.034	1.45	0.15
Family size	-0.193	-2.4	0.02
Visits to reserve	0.140	2.4	0.02
Establishment score	-0.518	-3.4	0.00

Analysis of variance d.f. = 6, 52;  $F = 6.1$ ,  $P < 0.0001$ .

the concept of who made the rules varied. One person said they did not know who made the rules, 49% said that the President of the community made the rules, 40.6% said the community made the rules, and 8.4% said that PAN made the rules. Respondents from the three lowland communities, closest to where community meetings take place and to where the president lives, were more likely to say that the president made the rules. In contrast, respondents from the more remote village of El Suspiro were more likely to say that the community and/or PAN made the rules. Of the respondents from El Suspiro, 67% said the community and/or PAN made the rules, compared with 42% of respondents living near the seat of local government (Chi-square = 6.7, d.f. = 3,  $P = 0.08$ ).

Seven respondents (11%) stated that they were initially opposed to making the reserve. By the time a vote was taken on the issue, four of these had decided to support the reserve. Only 38% of the respondents voted "for" the reserve at a community meeting (many respondents had not been at the meeting). Distance from the voting center did not influence participation in that particular vote (Chi-square,  $P < 0.79$ ), nor did attitude (for or against) towards forming the reserve ( $P < 0.77$ ).

A surprising result was that many villagers who participated in demarcation of the reserve were not in support of making the reserve (Figure 3). While 52% of respondents favored making a reserve, only a quarter of this group joined the effort to demarcate the reserve. In contrast 41% of respondents were ambivalent or opposed to the reserve, and 80% of this group helped mark the boundaries of the reserve (Chi-square = 17.3, d.f. = 3,  $P < 0.001$ ).

When asked who should manage the reserve, the majority (62%) supported collaborative management by the community and PAN. One person said that only PAN should manage the reserve, while 37% said only the *Comuna* should manage the reserve. Those who viewed the president of the *Comuna* as the rule maker showed less support for collaborative management than people who viewed rule making as a community effort (Chi-square = 41.2, d.f. = 6,  $P < 0.01$ ; Figure 4).

## 5. DISCUSSION

The Loma Alta Ecological Reserve protects a subspecies of mantled howling monkey (*Alouatta*

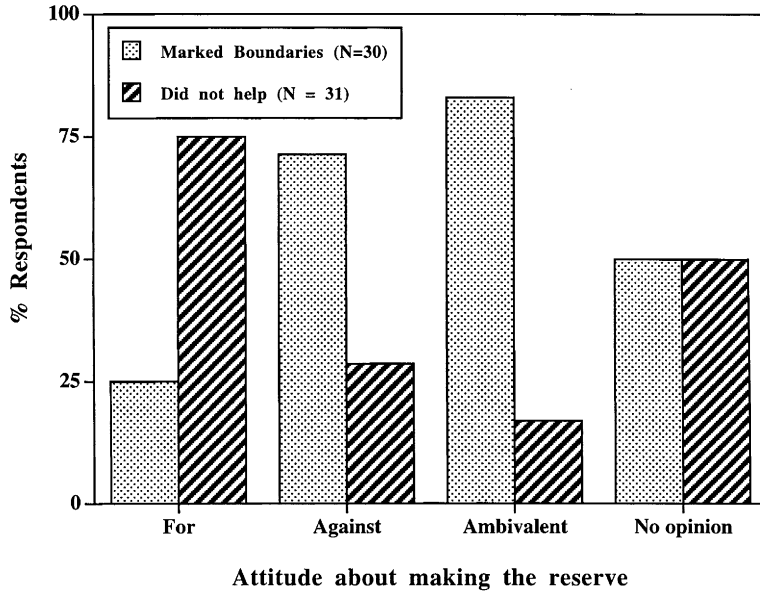


Figure 3. Community members participating in demarcation were more opposed to the reserve than respondents who did not help mark boundaries of the reserve ( $\chi^2 = 17.3$ ,  $d.f. = 3$ ,  $P < 0.01$ ).

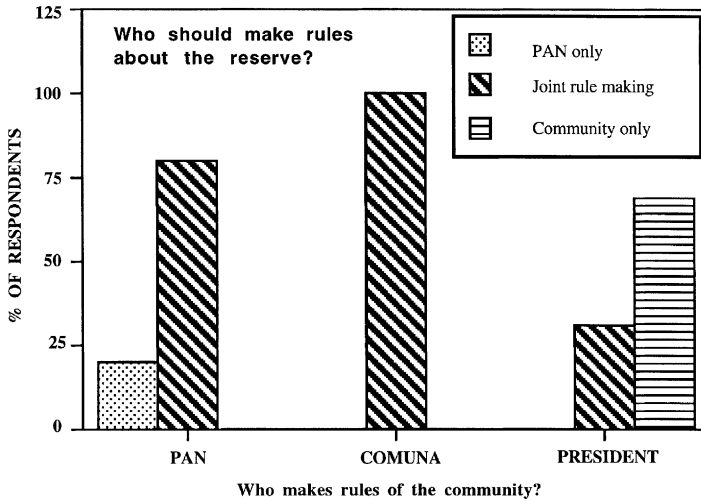


Figure 4. Respondents who stated that the communal president was the main rule maker ( $N = 29$ ) were more likely to support community management of the reserve, exclusive of PAN rather than collaborative management. Respondents who viewed the community (themselves) as rule makers ( $N = 28$ ) were more supportive of collaborative management ( $\chi^2 = 41.2$ ,  $d.f. = 6$ ,  $P < 0.01$ ).

*palliata*) and at least 14 other species of mammals, and over 200 bird species, including 12 species of conservation concern (Becker & Lopez Lanus, 1997). During dry seasons in the reserve, *Psychotria* shrubs bloom and attract thousands of hummingbirds representing some 25 different

species, including endangered Little and Esmeralda's Woodstars (*Chaetocercus bombus* & *C. berlepschi*). Most importantly, for local farmers, the highland forest traps millions of gallons of fog each year providing wells and rivers in the arid lowlands with water year round.

While there are many potential discussion points, I focus on the following: why the reserve established so quickly, the effect of external organizations on local institutions, the people most involved in marking the reserve boundaries, why participation in PAN educational projects failed to improve knowledge about rules of use in the reserve, and lessons ICDP professionals provided by this case.

(a) *Why was the reserve established so quickly?*

Larson (2002) states that three key factors are needed for local governments to be good resource managers: capacity, incentive, and long-term commitment. Loma Alta's town council was strong on long-term commitment and capacity but lacked sufficient incentive. In this case, an external organization and new information was required to create incentives and justify forest preservation.

Loma Alta's system of self-governance was a key element in establishing the community forest reserve. Without a local institution representing the community, and without a collective tradition of decision-making, consensus and support for a forest reserve from the many different families and forest users would have been difficult to achieve. Collectivism stands out as a major cultural reason that the reserve was established so quickly.

Individual opposition to the reserve was predictable from an economic standpoint as it threatened perceived future benefits. Those who had the most to gain financially and directly by destroying the forest, Panama hat fiber growers, were the most opposed. In an individualistic culture, such as the United States, "victims" with individual losses would not only slow decision-making for the common good, they might be compassionately supported in their quest for compensation. In a collective culture, individual benefits are not a justifiable reason for sacrificing the common good (Gudykunst, 2000). At Loma Alta, community members quickly convinced hat fiber growers to do what was customary in many indigenous cultures: do what is best for the good of the group (Kluckhohn & Strodtbeck, 1961).

Evaluation of opportunity costs may also have played a role in favoring forest protection over continued allocation and open access. Timber value of the forest was low, the cost effective areas for plantations of Panama hat fiber were in use, and an outside organization

was willing to pay for forest preservation including ridding the community of invading ranchers and finding employment for new families requesting plots. Collaborative management promised to solve the land security problem with ranchers that had plagued the community for decades.

Villagers we spoke with during the IFRI study in 1995 did not understand the term "protective" as defined by the 1981 Law of Forests establishing "protective forests" through out Ecuador. This term refers to the fact that forest cover sustains the ecological integrity of watersheds by reducing soil erosion and by maintaining water quality and quantity. Given the history of boundary disputes, it is understandable that many villagers thought "protective" referred to protecting their tenure rights. In fact, when the three men intending to harvest trees in the remote commons were asked to be guards, one said, "Fine, that is a good way to protect our land and I would like to do that for the community."

According to Hofstede and Bond (1984), security is a value that is strongly shared by individual and collective cultures. Community and PAN members valued tenure security so using their institutions to assure Loma Alta's property rights seemed like the right thing to do. In addition, members of the individualistic, goal-oriented culture representing PAN and Earthwatch derived great satisfaction from accomplishing goals. This cultural synergism can be viewed as another factor favoring rapid success.

(b) *The value of small scale ICDPs for local community institutions*

Although some indigenous peoples have norms that conserve and enhance tropical forests (Becker & Leon, 2000; Chernala, 1989), many of these ecologically sensitive cultural systems have been severely eroded by national and international development policies (Barbosa, 1996; Pinkerton, 1981). According to Edwards (1999), making a difference to livelihoods and capacities of local people depends on fostering autonomous grassroots institutions, and on linking them with markets and political structures at higher levels. Participation by PAN and Earthwatch at community meetings reinforced local and traditional institutions where informed consent maintains local control over land use in a communally-owned watershed (McIntosh, 1999). Currently, leaders at

Loma Alta negotiate with outside research and tour groups wanting to study and visit their reserve. Local service providers enjoy additional income by providing visitors with food, transportation and guidance during visits to the forest. As of June 2002, however, Loma Alta still had no consistent entrance fee, nor had they posted any rules beyond those at boundaries of the reserve.

Establishment of the protected area was fast, but sustaining it will take time, and whether the community will ever be able to steward the reserve without external funding is questionable. Currently, between \$6,000 and \$16,000 per year has been spent maintaining the reserve and doing community development. These costs are low given the number of endemic and endangered species in the reserve, and the amount of money spent by nongrassroots development organizations.

In 2001, Ecuador shifted from Sucres to US dollars and this led to a collapse in the local market for Panama hat fiber. In 2002, March floods destroyed vegetable market crops. Out of desperation, these events made nature tourism more attractive to local leaders and community members. Coastal tourism is being emphasized in regional development plans, so the community imagines a role for its forest within that framework, but no one in the community has any risk capital. Most families survive on \$50–\$100 per month. Perhaps a corporate partnership would improve the community's capacity to develop ecotourism. A partnership between indigenous people and a nature tour organization has sustained both forest and local institutions in the southern Amazonian region of Peru (Stronza, 1999).

(c) *Why were most participants in boundary marking opposed to the reserve?*

When marking the boundaries, PAN directors thought a supportive crowd accompanied them sharing their goal of making a protected area. Instead, survey results suggest that helpers consisted of people most distrustful of the outsiders and most concerned about losing their land-use rights in the highland forest. Participants wanted to see where the reserve boundaries were in relationship to their parcels. Since the collective culture had defended the common good at their personal loss, they might as well monitor the potential impacts by assisting with marking the boundaries.

This is not a minor detail, because a misunderstanding about motivation could lead to inappropriate expectations by the ICDP organization. Had PAN expected the boundary markers to help with reserve management, they would have noted a lack of enthusiasm.

(d) *PAN educational projects did not improve knowledge about rules of use in the reserve, nor change traditional attitudes toward wildlife species*

Working with PAN to mark and manage the reserve did not enhance a person's knowledge of reserve rules. This result seems counterintuitive, but since rules were still being debated during the establishment phase, participation may have led to confusion about the rules. Moreover, since many of the early participants (boundary markers) were opposed to the reserve, they may have preferred not to know the rules.

Cultural orientation may also explain the poor knowledge of codified expectations. On several different occasions after the reserve had been in existence for several years, individuals came before the community council requesting permission to cut trees in the reserve, a clear breach of the rules. Such behavior seemed baffling to me, but in the cultural framework discussed by Hofstede and Bond (1984), it makes sense. In collective cultures, individuals perceive themselves through interdependent relationships, not by following a list of rules. Actively going to the reserve, having repeated interactions with guards, and contesting rules at the community meetings reinforce knowledge of rules and the degree to which the rules truly apply in the community. Thus signs and codes that work in Western parks may not work in all cultures, yet they are often a priority of Western-oriented ICDPs. The rules posted on the reserve boundaries have stopped exploitation of deer by commercial hunters from Guayaquil and are respected by foreign tourists.

Because the survey comparing attitudes toward wildlife was made only one year after the reserve was established, there had not been much time for development of nonutilitarian values for wildlife. Now that villagers in Loma Alta have been educated about endemic birds and have benefited from tourists they would probably have more value for nonutilitarian forest resources than a "control" group such as Rio Blanco.

(e) *Implications for integrated conservation and development projects*

PAN's institutional capacity was appropriately matched for the scale of self-governance at Loma Alta. ICDP organizations need to consider the institutional scale of their work. Regional and national governments in less-developed countries may readily accept and absorb large donations, but they may override local authorities and the local "common good" in the process of working for what is perceived as being best for the region or nation. Since international donors tend to work with governments at a national scale, their projects may threaten local institutions simply by failing to recognize and use them.

PAN reached the establishment phase of its conservation goal quickly by:

- (i) Assessing the capacity and design of local institutions.
- (ii) Fostering the local institutions that existed rather than trying to create new ones.
- (iii) Designing the conservation strategy to suit values of local stakeholders.

There are numerous social science tools used to evaluate communities prior to initiation of conservation and development projects. With the exception of IFRI, few standardized research instruments focus specifically on the rules and institutions created by local people and their effects on forest condition. IFRI combines participatory rural appraisal, institutional analysis, and measurements of the forest to reveal historical and current rules of use and consequent forest condition (biomass, diversity, structure, etc.). An easily overlooked asset of IFRI is that it provides an objective framework for doing a stakeholder analysis. While additional anthropological and sociological approaches are desirable to triangulate and achieve reliable interpretation of social contexts, IFRI provides an integrated approach bringing natural and social scientists in contact with local people where all share a focus on forest management.

We learned that at Loma Alta it was best to negotiate and communicate openly at the community level. Personal negotiations generated jealousy and reprimands from leaders as they were seen as seeds of inequality in the collective society. Community members in remote villages were the most self-governing and had more of an entrepreneurial attitude about ICDP efforts.

McKean (1996) states that privatization of common pool resources may promote biologi-

cal collapse because privatization leads to fragmentation. She also suggests that one feasible solution to this problem may be communal management of large resources with rules to share benefit flows from the intact resource. Private allocation of use rights within a communal framework was fragmenting the forest at Loma Alta. It was justified as a means of maintaining equality among individuals. Achieving McKean's hypothetical solution at Loma Alta required interactions with outsiders who valued intact forests and could communicate a "common good" that justified stopping plot allocation, fog capture. Thus, while self-governance can lead to conservation of natural resources (Ostrom, 1990) and economic sustainability at a local level (Dunsmore, 1998), rural communities in less developed countries do not consistently have the ecological knowledge or the economic capital to achieve stewardship of large natural resources such as intact forests (Wainwright & Wehrmeyer, 1998). For many years to come, external institutions will be required to finance and reveal pathways for conservation. Local institutions can play a key role in speedy support or rejection of outside ideas, thereby maintaining cultural integrity. In this case, members of an urban-industrial, global, and goal-oriented culture achieved their conservation aims quickly largely because indigenous institutions in a subsistence-oriented, collective culture embraced an enterprise that optimized the common good.

## 6. CONCLUSIONS

Accomplishing sustainable development and natural resource conservation through decentralization is a dynamic and dual challenge. Not only must national governments and international donor organizations decentralize the allocation of funds and projects, but local communities who may be accustomed to external control of natural resources (Pinkerton, 1992) must establish or revive self-governance and cope with new institutional relationships (Becker & Ostrom, 1995; Eccleston, 1996; Wainwright & Wehrmeyer, 1998). The Loma Alta case suggests that ICDPs may be most successful where local people have a strong system of self-governance and communal tenure of natural resources, and when ICDP organizations are flexible enough to set goals that are compatible with local values.

Many strategies are needed to protect biodiversity and to reduce inequality among people. Given the history of displacements of indigenous peoples by governments and colonialists (McLaren, 1999), PAN decided to collaborate with local people to protect a forest rather than invest in buying land. It

remains to be seen whether the people of Loma Alta will take ownership of the preservation concept. For now, the forest stands, fog is collected, wildlife is protected, and with NGO investments of around \$10,000 per year, the community seems serious about keeping it that way.

## NOTES

1. Earthwatch Institute ([www.earthwatch.org](http://www.earthwatch.org)) promotes sustainable conservation of natural resources and cultural heritage by creating partnerships between scientists, educators, and the general public.

2. When PAN proposed a protected area, growers of panama hat fiber (*paja toquilla* or *paja*) were most opposed. They were persuaded, however, to support the reserve by lowland farmers, but only under the condition

that they could retain *paja* fields at the level of 1996 coverage. Since 1999, the price for *paja toquilla* has declined to the extent that some families have abandoned their mountain plots.

3. Ecotourism, as defined by the Ecotourism Society, is responsible travel to natural areas that conserves the environment and sustains the well-being of local people (Wood, 1999).

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#### APPENDIX A. SURVEY I. OPINIONS ABOUT WILDLIFE AND HILL FORESTS IN WESTERN ECUADOR

During June–August of 1997, interviews were conducted in two rural villages of southwestern Ecuador. First respondents were asked to recount their personal history and talk about local social life. Next the interviewers asked questions (below). Finally, personal information about the informant was requested: name, profession, education, age, sex, community membership.

##### Survey questions:

1. Are the highland forests important to you? If yes, Why?
2. How much time do you spend in the highland forests of the Comuna? What do you do there?
3. What is the most important wild animal in the forest? Why? What is the next most important wild animal and why?
4. Name up to 10 wild birds that live in this area. Which ones do like the most? Why? Which one do you dislike the most? Why?
5. What wild birds and mammals from this area have you or members of your family eaten during the past 5 years? Has this changed from what you did 20 years ago? If it has changed, why?
6. What wild animals do you wish were more abundant? less abundant? Why?
7. What is ecotourism?
8. Should ecotourism be promoted in your community? Why or why not?