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Tenure Regimes and Forest Management: Case Studies in Latin America

LAND TENURE CENTER
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by

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EXECUTIVE SUMMARY

Ecologists and social scientists are in the preliminary stages of understanding how to foster sustainable forest management, particularly in tropical ecosystems. It is vital to expand our natural and social science knowledge through research, the careful monitoring of development projects, and the synthesis of those experiences. This paper draws together our current knowledge on tenure issues in sustainable forest management and specifies areas for further research. It draws on recent research and case study experiences in Latin America, but many of its findings and the proposed research framework can be applied in other regions. One strong lesson which emerges from this synthesis is that tenure regimes must be designed for specific situations (i.e., for particular types of managers, ecological conditions, and demographic, market, and policy circumstances) and they must be adapted to changing conditions.

Most forests are occupied and conservation depends on people's commitment to appropriate management practices for the long term. Tenure regimes provide a framework for sustainable management. The two components of tenure regimes—access rights and resource use rules—are both essential for that framework. Furthermore, sustainable forestry requires that resource managers (whether they are households, communities, private firms, or the state) establish tenure regimes which promote conservation, that is, which incorporate site-specific and regional ecological knowledge into the resource use rules.

This paper draws together a number of general propositions for which there is a reasonable degree of consensus among researchers and planners. It also formulates research questions which delineate what we need to know to test and apply those propositions in a meaningful way. Action research and case study comparisons can further develop this research agenda. The most salient propositions and research questions are the following:

- Sustainable forest management requires people's long-term commitment, which will be strengthened if people (1) derive cultural and/or economic benefits from the resources, and (2) have a role in defining how resources will be used and how benefits will be distributed.

There is debate on how to link market activity and conservation, and whether forestry is always an appropriate conservation strategy. We need to determine what forest uses can raise local incomes without creating excessive pressure on the resource base (what uses pose the least threat to biological diversity; how much income can be generated from different forest uses; how tenure regimes can help keep traditional conservation practices from being overwhelmed by market pressures). To what extent can different resource managers define and enforce their own tenure regimes? What is an optimal role for outside institutions (e.g., the state, nongovernmental organizations)?

- Resource use rules and access rules must become more strict and oversight must be strengthened as population and market pressures increase.

We need to determine how different forest managers respond to increasing population and market pressures and how tenure regimes can help keep resource use sustainable under those conditions. How can different forest managers be monitored? How can tenure regimes keep from being overwhelmed by sudden economic shifts, such as trade liberalization?

- Different resource managers follow distinct cultural and social norms, which condition their response to market incentives, among others.

- Private firms are highly responsive to the market, and their forest use practices require strict oversight if they are to be sustainable.

We need to know how to monitor private firms (particularly during the harvest of high value timber). How can private firms with private tenure rights be monitored? How can we quickly strengthen state agencies' capacity to carry out even-handed monitoring? What other entities can monitor private firms (e.g., wood certification programs)?

- The social norms of traditional forest cultures often support conservation practices. Increasing their tenure security and granting rights to manage trees generally enhances their capacity to maintain those practices.

We need to know how the sustainable management practices of traditional forest cultures can be maintained and/or adapted in the face of demographic and generational change and increased market penetration. What are viable income-generating strategies for traditional forest cultures? How can we quickly strengthen state agencies' capacity to protect traditional forest cultures' access rights against outside intruders. Who should monitor forest cultures' resource use practices over the long term?

- In colonization areas lacking social cohesion and a forest culture, the process of developing a forest management plan (with scientific input from experts) can help disseminate ecological knowledge and create social cohesion.

There is a pressing need to identify effective methods for community organizing around forest management planning, particularly in areas experiencing rapid colonization. What are viable alternatives to private tenure (e.g., land trusts and easements)? How can they be implemented in forest areas where the resource managers lack a forest culture (e.g., private firms, colonists)? What are effective ways to monitor resource use practices in large resource management areas lacking social cohesion?

- Tenure regimes are exclusionary. When people lose access to resources in a given area, they are likely to use resources in other fragile localities.

We need to examine the cost-effectiveness of improving land access for people in potentially more highly productive agricultural areas versus providing livelihoods for more people in fragile forest areas.

- People's long-term commitment to sustainable forest management is enhanced if they derive benefits. Equity for women can be improved by increasing their involvement in management decisions. Equity for future generations depends on adequate resource regeneration and heritable access rights.

We need site-specific research to define and overcome specific constraints on women's participation, which is conditioned by the cultural and social norms of their communities, and by time, age, and social class constraints. Scientific research and education on appropriate silvicultural methods can help assure resource regeneration and equity for future generations.

- Deforestation is frequently driven by contradictory policies and differential incentives for agriculture and forestry.

We need to determine how to better coordinate agriculture and forestry planning with the goal of developing policy which affords protection for forestland while providing incentives for agricultural use of potentially more highly productive lands.

- Rapid trade liberalization and other sudden policy changes can potentially overwhelm existent tenure regimes and sustainable management systems.

We need to know how sustainable management systems can be better protected from sudden shifts in economic incentives. How can community groups practicing sustainable management increase their influence in the policy dialogue?

TENURE REGIMES AND FOREST MANAGEMENT: CASE STUDIES IN LATIN AMERICA

by

Nancy Forster and David Stanfield

1. BACKGROUND

Ecologists and social scientists are in the preliminary stages of understanding how to foster sustainable forest management, particularly in tropical ecosystems. It is vital to expand our natural and social science knowledge through research, the careful monitoring of development projects, and the synthesis of those experiences. This paper delineates our current knowledge on tenure issues in sustainable forest management and specifies areas for further research. It synthesizes discussions which occurred at the workshop on "Tenure Issues in Forest Management in Latin America and the Caribbean," held 30-31 July 1992, at the World Resources Institute, in Washington, DC.[1] Participants in the workshop included people who have been actively dealing with problems of land and tree tenure in forest management (see appendix 2 for a list of participants).

The workshop focused on specific geographic areas (called resource management areas, or RMAs), which had been identified as important for the conservation and maintenance of forests. RMAs include parks, national forests, biosphere reserves, areas controlled by indigenous groups, and other areas designated for sustainable forest resource use and/or protection.

The ten workshop cases (summarized in appendix 1) examined three types of primary managers. They included: (1) private firms with state concessions (INTECMACA Concession, Venezuela; state concessions in the Beni, Bolivia) or with private landownership (ENDESA-BOTROSA Reforestation Project, Manuel Durini Group of Companies, Ecuador); (2) nongovernmental organizations (NGOs) collaborating with government agencies to improve conservation practices of communities and individuals in large RMAs (BOSCOSA Project, Osa Peninsula, Costa Rica; ProPetén Project, Maya Biosphere Reserve, Petén, Guatemala); and (3) forest-dwelling community groups collaborating with NGOs (extractive

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1. The workshop was sponsored by two USAID-funded projects: DESFIL (implemented by Chemonics International) and ACCESS II (implemented by the Land Tenure Center, University of Wisconsin-Madison). It was funded by buy-ins from USAID (US Agency for International Development) LAC TECH Project (LAC/DR/RD).

reserves in Acre and Amapá, Brazil; Plan Piloto Forestal, Quintana Roo, Mexico; UCEFO, Oaxaca, Mexico; Yanesha Forestry Cooperative, Palcazú Valley, Peru; PUMAREN Project, Napo, Ecuador). The workshop did not examine cases in which the state was the sole manager.

This paper has two objectives. The first is to use the workshop discussion to develop a framework of analysis to explore the following issues: (1) how tenure regimes influence people's forest use practices; and (2) how tenure regimes for forest RMAs are conditioned by other factors, including population and market pressures, the social and cultural context (social class divisions, organizations, institutions, customs, and social norms), and the macroeconomic and political context. The second objective is to formulate an action-research agenda to evaluate current methods for forest management and to develop cost-effective ways to legalize and maintain tenure regimes which curb future deforestation. The workshop discussion formulated a preliminary series of hypotheses. Action research and case study comparisons can further develop them and determine their application to forest management.

2. TENURE REGIMES: SOCIALLY DEFINED STRUCTURES FOR RESOURCE MANAGEMENT

Tenure regimes are socially defined rules for access to resources (land, trees, water, minerals, etc.) and rules for resource use. Tenure regimes define people's rights and responsibilities in relation to resources. Such rules may be codified in law or can be part of the unwritten cultural norms of a people (Ratcliffe 1976, p. 21; Bromley 1989, p. 872; Boserup 1965, pp. 79-86). This paper examines tenure regimes for land and trees.

The collectivity (usually a political entity such as the nation-state, a subdivision of the state, or a local community or clan) which legitimizes these rules typically retains some rights to the resource, while the designated resource users (households, firms, or groups) hold other rights. The division of tenure rights reflects power relationships and is often conflictive. The workshop cases showed how tenure rules have been established and how the inherent tensions have been managed in different social contexts.

As social creations, tenure regimes are subject to constant revision. Tenure security is never absolute, but depends on shared social understandings (Irvine, Simeone),* which are shaped by perceived social and political power.

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* Such parenthetical references, which do not include a date of citation, allude to workshop participants (see appendix 2).

2.1 ACCESS RIGHTS AND THE CAPTURE OF BENEFITS

Access rights to land and/or trees may be held by individuals, households, extended families, firms, communities or other groups, municipalities or other public entities, and/or the state. Rights may also be shared among one or more of those entities.

Forms of access include unwritten customary rights, private ownership, renting, leasing or having a concession from the owner of the resource, and squatting (possession without a property title or a clear lease from the owner).

Rules of access under notions of "ownership" (customary or formal) include the right to exclude others. Ownership may also encompass rights to sell, to subdivide, to rent, to leave idle, and to give as inheritance. The number of ownership rights and the time period over which these rights can be exercised vary in different social situations. Rules of access also include easements and/or trusts where a social entity acquires rights from the owner to pass over the land and/or develop the land in specific ways. Rules of access to land and trees often differ for men and women, and sometimes differ for ethnic groups, castes, or other social entities.

Access rules also specify how the benefits generated from an economic use are distributed. For example, an owner of a piece of forested land may implement a share agreement whereby s/he gives rights of access and use to an individual to clear the land and plant pastures, the value of which will accrue to the owner. The individual with access rights gets to use the land for harvests in the interim period.

2.2 RULES FOR RESOURCE USE

Rules for the use of forest resources can be extensive or limited. They may be based on local custom, framed through mutual agreements among resource users, or prescribed by other entities holding access rights, such as state agencies. Use rules may restrict the use of particular forest products to a set time period, to certain seasons, to specific levels of consumption, and/or to particular harvesting techniques.

The use of forest resources is also influenced by other positive and negative incentives, such as subsidies, trade policies, legislation and regulation (e.g., requirements to clear forest to acquire land title), market forces, and other pressures which might induce conversion of forestland to alternative uses.

3. FACTORS IN ESTABLISHING AND MAINTAINING SUSTAINABLE FOREST USE

The workshop discussion assumed that most RMAs are occupied. Sustainability, therefore, requires that people use resources in such a way as to assure a continued supply over a long time period (Hart and Sands 1991). Sustainability has a biological component in that it should preserve the forest cover as well as complex forest ecosystems. Successful long-term management of RMAs also has a social component in that it must have the cooperation and support of local people (Brandon and Wells 1992). Many argue that local residents' commitment to sustainable management is more durable if they participate in planning and equitably share in the benefits of forest use. Many also contend that biological and social sustainability depends on generating economic benefits for local residents through successful interactions with the marketplace.

To keep forest use sustainable, therefore, it is necessary to legitimize and maintain conservationist tenure regimes. Such regimes integrate region- and site-specific **ecological knowledge to keep resource use sustainable** (what to harvest, how much, where, in what manner and season) with **effective tenure structures** (access rights, use rules, and benefit distribution determined and monitored by designated individuals and institutions). If forest use is market oriented, those elements must also be integrated with **business strategy** (type of business, scale of operation, level of profit, investment of profits, and strategies to shape the economic policy context).

The workshop discussion produced four general guidelines for sustainable resource use:

(1) Maintain conservationist tenure regimes appropriate for different types of managers working in specific ecological, demographic, sociocultural, policy, and market conditions.

(2) Institute financially profitable linkages between the extractors and users of forest resources and the marketplace.

(3) Equitably distribute the benefits of forest resource use among the local population and within households.

(4) Build in the capacity to influence and adapt to a changing institutional and policy context.

It is critical to increase region- and site-specific research to operationalize these guidelines, to measure the ecological and social impact of different management systems, and to develop more specific management criteria (Frumhoff et al. 1993).

4. MAINTAINING CONSERVATIONIST TENURE REGIMES FOR DIFFERENT TYPES OF FOREST MANAGERS

It is essential to understand the incentives and constraints influencing different forest managers in order to maintain tenure regimes which foster the conservation of resources and biological diversity.

In most countries in Latin America and the Caribbean, the state has been the primary owner and administrator of forests. Traditionally, the state has regarded forestland as the agricultural frontier. More recently, crushing external debt has led governments to view forests as a source of foreign exchange. While state agencies' management and oversight of forests have often been ineffectual and corrupt, the workshop case studies demonstrated the pressing need to strengthen government institutions' knowledge of ecology and their capacity to even-handedly monitor and regulate resource use. Austerity policies and restructuring, however, constrain effective state oversight.

Donor agencies show growing interest in designating private firms as forest managers and in granting them private ownership rights, given historical problems with concessions. It can be argued that private firms have the organizational strength to effectively secure and defend their access to resources, formulate management plans, develop market linkages, and secure favorable access to capital and technology. Proponents argue further that private firms with private property rights will manage forests sustainably in order to protect their investment. Critics counter, however, that private firms are influenced primarily by financial profitability and may plunder forest resources to invest returns elsewhere. Some also argue that private firms provide only limited benefits to local populations.

In recent years, NGOs and donor agencies have actively supported the notion that forest conservation depends on getting local people committed to the sustainable use of forests. Efforts along this line have involved organizing the residents in and around RMAs into economic units which benefit from the sustainable use of forest resources. In successful cases, community-based management has increased local employment, achieved more equitable distribution of benefits from profits, capitalized businesses, and developed social infrastructure. There has been an uneven record of success, however, and the costs to implement community-based management have varied significantly in different contexts.

The workshop discussion was consistent with Carol Rose's (1991) contention that all forest managers (individuals, communities, firms, and the state) face similar problems in devising tenure regimes for sustainable resource use: they must maintain appropriate resource use practices and keep out competitors.

The costs to maintain tenure regimes vary according to the level of oversight necessary to prevent unacceptable resource depletion, which, in turn, depends on the demographic and economic pressures on the resource base (Rose 1991). When pressures on the resource are low (i.e., where market demand is low and road access is limited), traditional management

systems are usually effective. Under such conditions, it would not be cost-effective for external entities to impose a rigorous system of rules and oversight.

Rose (1991) also argues that social norms influence resource managers, conditioning their response to incentives. That contention suggests that profit-maximizing private firms may operate differently than indigenous groups who wish primarily to secure tenure rights to forestland, with a secondary interest in profits (Macdonald 1992).

Management practices, therefore, are apparently not only shaped by demographic and market pressures but also by culture. Managers will have varying commitment to forest conservation and varying capacity to achieve it, given differing knowledge bases. These points can be framed in three hypotheses:

Different resource managers follow distinct social norms, which condition their response to market incentives, among others.

If so, tenure regimes must be tailored accordingly.

Increasing tenure security improves the likelihood that people will conserve forest resources, but tenure security is not always sufficient to guarantee such conservation. It is also necessary to implement resource use rules and oversight appropriate to resource managers' economic and cultural orientations.

In the absence of the cultural values and knowledge which promote forest maintenance (or as such cultural values break down) and under conditions of high and clear market signals about the value of forest products, tenure regimes are critical to check social actors from despoiling forests.

As demographic pressure and market demand for a given forest resource increase, tenure regimes require more stringent rules for resource use and rigorous oversight to assure a continued supply of that resource.

Case studies can facilitate further examination of these hypotheses. The workshop examined three types of cases: private firms managing concessions or private property; forest cultures managing their traditional lands; and nongovernmental organizations collaborating with government agencies to manage large forest areas lacking social cohesion (see appendix 1).

4.1 PRIVATE FIRMS MANAGING CONCESSIONS OR PRIVATE PROPERTY

The workshop discussion on private firms generated the following hypotheses:

The forestry practices of private firms are influenced more by financial profitability than by tenure security (long-term concessions or private property rights).

If financial profitability is a primary incentive for private firms (whether they have long-term concessions or private property rights), strict tenure regimes and rigorous oversight are critical for maintaining the resource base.

The three case studies on private firms appear to support the hypotheses. Timber concessions in the Beni, Bolivia (case 2), indicate that, as long as there are strong economic incentives to plunder (i.e., for the first cut of mahogany and cedar), improving tenure security by increasing the length of concessions will be attractive to companies but will not in itself promote conservation practices among private firms (Rice). Oversight of the Beni concessionaires was weak.

In case 1, the Venezuelan government had marginally stronger oversight capacity, but concessionaires' management practices apparently depended on their individual commitment to sustainability (Ochoa and Dillenbeck). Exemplary firms, like INTECMACA (case 1), have voluntarily practiced sustainable management and have supported research to improve biodiversity conservation. Yet, INTECMACA recently determined that incorporating its own research recommendations have undermined its competitiveness. Under current conditions in Venezuela, government-mandated management plans apparently help pace timber extraction over a 30- to 40-year period. To assure continued regeneration of marketable timber (a precondition for private firms' interest in a second and third cut), concessionaires' management plans must be more scientifically based and oversight (by government or other agencies) must improve. Comparative case studies should examine how such guidelines affect firms' profit margins and competitiveness.

The workshop included only one project involving a private firm with private property rights. Limited information was available because it had been recently inaugurated. The Durini Group of Companies in Ecuador, through the ENDESA/BOTROSA Reforestation Project (case 3), has undertaken an initiative (supported by loans and grants from the World Bank) to buy private property from colonists and establish plantation forestry. The workshop discussion hypothesized that private firms utilize such strategies after primary forests have been exhausted, that is, after the highly profitable first cut (Rice, Simeone). The Durini Group expects the ENDESA/BOTROSA plantations to sustainably produce marketable timber by the year 2010. Meanwhile, the corporation continues to secure timber from unsustainable production and, increasingly, from Indian lands (Simeone, Irvine). Its current timber purchases are not subject to oversight. The plantation project will be monitored for only a limited number of years.

Improving oversight appears to be one of the most important prerequisites for sustainable forest management by the private sector. Yet, we need more information on how to do it, particularly when firms have private property rights. Market forces alone are an ineffective means of maintaining sustainable resource use. Furthermore, neither tenure regimes nor oversight can guarantee that private firms will remain after the first timber cut. If concessionaires leave a forest management area, it is likely that the public sector will bear the cost of establishing an alternative system of forest protection.

4.2 FOREST CULTURES MANAGING TRADITIONALLY OCCUPIED LANDS

A series of hypotheses and tentative conclusions on forest cultures emerged from the workshop discussion, which also emphasized the importance of monitoring the impact of growing demographic and market pressures on those cultures.

> **The social norms of traditional forest cultures often support conservation practices. Legalizing tenure rights of cohesive forest cultures to their traditional lands and their rights to manage trees generally enhances their capacity to maintain those practices.**

The workshop identified "forest cultures" as groups with a traditional claim to a forest area, technical knowledge about it (forest species, soils, how to manage it in a sustainable manner, etc.), and an interest in conserving it (Irvine, Macdonald, Simeone). Increasing security of access to forestland by Indian and other longstanding forest communities and secure **management rights** to trees have apparently helped maintain forests in five workshop cases: the extractive reserves in Brazil (case 4); the ejidos in Quintana Roo, Mexico (case 5); Indian communities in Oaxaca, Mexico (case 6); in the Palcazú Valley, Peru (case 7); and in Napo Province, Ecuador (case 8). Market pressures varied in these cases, as did management rights and the strength and influence of "forest culture." In Latin America, legalizing access rights for longstanding forest communities generally requires demonstrating economic use of forest resources. Thus, related interventions included improving sustainable management systems and resolving business and marketing problems. Other interventions enhanced the distribution of benefits.

Forest culture RMAs are generally based in traditionally claimed lands. In cases 4-7, the groups also gained management rights to their trees. Forest cultures occasionally self-organize to secure access and management rights. The Awá in northeastern Ecuador delineated their own territory (creating a boundary of market-oriented species to mark possession) and subsequently secured formal access rights from the state. Low population pressure has helped them protect their perimeter. UCEFO in Mexico (case 6) largely initiated and capitalized its own community forestry organization. More often, linkages with national and international allies enable forest cultures to secure land and forest management rights. The defense of forest culture communities' rights has not been automatic nor is it necessarily durable over time. It has depended on strong community organization and on supportive allies from other social segments (see section 7, below).

Forest cultures' traditional management practices generally provide the foundation for sustainable resource use.

> **Making use of the skills of forest cultures can put order into land use, develop sustainable land use plans (use rules), and form market linkages which foster sustainable use.**

In Brazil, the rubber estate became the model for extractive reserves (case 4). One of the most significant developments in the Yanesha Forestry Cooperative in Peru (case 7) was improving the strip shelterbelt system (particularly methods to designate production and protection forest) through dialogue between project managers and local residents with intimate knowledge of the local ecology (Simeone). The PUMAREN Project (case 8) also uses that approach and encourages local informants to identify extractive products with potential market value.

Local decision-making on forest management practices, however, does not always result in sustainable resource use. The Mexican indigenous communities and ejidos have based their forestry operations on previous experience with concessionaires (and, more importantly, on a government-mandated management system). Snook (workshop participant) argues that long-term regeneration of market species depends on revising silvicultural practices. Local management is also increasingly affected by generational differences (Butler). As the younger generation becomes more educated, it is more prone to turn to externally designed technologies and management practices rather than traditional procedures. It is important to record traditional knowledge before the older generation passes. As market pressures grow in traditional communities, economic incentives will increasingly condition local decisions and thereby increase the need to monitor management practices to keep them sustainable.

Social norms in traditional communities often support relatively equitable distribution of benefits and consensual decision-making, which foster social cohesion. Yet, traditional norms can also become constraints.

> **The sociopolitical culture of traditional communities (consensual decision-making, equitable division of profits, leadership rotation) may help promote social cohesion but can undermine business efficiency.**

Workshop participants Snook and Zazueta argue that for Plan Piloto and UCEFO (cases 5 and 6), tradition has sometimes hindered efficient business practices. More research is warranted on how to retain the social advantages of traditional forest cultures while increasing the entrepreneurial agility of community-based businesses.

Finally, there is debate whether traditional forest management practices, particularly extractive activities, can significantly improve incomes and levels of living of local populations, since they tend to produce low economic returns (Gibson). Proponents argue that diversifying markets and adding more value at the local level will improve incomes (Schwartzman, Butler). There is a critical need for research on the biological impact of different extractive strategies to determine their long-term viability. It may be that extractive activities cannot support a significant part of the development burden (i.e., financing education and health services).

4.3 MANAGEMENT OF LARGE FOREST AREAS LACKING SOCIAL COHESION

The workshop discussion identified social cohesion as a necessary, though not sufficient, condition for resource conservation. It has been critical for the functioning of most community groups (i.e., to gain access to land and management rights to trees, implement participatory land-use planning, enforce tenure regimes, build external alliances, and influence national policy). The state is unlikely to grant access rights to social entities lacking social cohesion.

It is precisely the lack of social cohesion that presents serious problems in large, newly created RMAs. Such areas often lack a single, traditional management entity and have a variety of resource users (and often a high influx of migrants) who have unclear and/or overlapping tenure rights. The workshop cases in this category included the Chimanes Forest in the Beni (case 2), the BOSCOSA Project (case 9), and the ProPetén Project (case 10).

NGOs, often in collaboration with government agencies, have taken on the task of managing some of those complex and difficult RMAs, but they have had significant problems in establishing land use plans and monitoring systems. State agency employees with responsibilities for the RMA may not share the goals of NGO managers; jurisdictions are often unclear. The newly arrived migrants are often desperately poor and bring resource management practices from other ecological conditions which may not be applicable to tropical lowland forests. They also often lack a history of local cooperation. Establishing management and monitoring systems under such conditions entails high costs.

> **The process of participatory land-use planning (to establish or maintain conservationist land-use practices) can develop social cohesion and eventually help maintain conservationist tenure regimes.**

The BOSCOSA Project (case 9) has developed innovative approaches to deal with tenure conflicts and low social cohesion. Because overlapping tenure rights made it difficult to clarify access rights for local residents, the project focused first on establishing conservationist land-use practices, the second component of tenure regimes. Through the process of participatory land-use planning, local residents are developing social cohesion and a political power base from which they will eventually seek government approval of their sustainable management plans and formalization of tenure regimes. The project has mandated that local residents maintain forest cover, but allows them to determine how to accomplish it. The project has also fostered the agglomeration of highly fragmented individual parcels under common land-use plans. It is unlikely that residents of those forest reserves will ever receive private property titles, but they can increase the security of their rights to manage forestland through land trusts and easements. We need much more information on how to implement such alternatives to private land tenure, particularly in areas where managers lack a forest culture.

Participatory land-use planning has also been successful in a number of forest culture communities and may also serve the ProPetén Project (case 10) as one strategy to help

establish conservationist land-use practices and tenure regimes. The task in the Petén is difficult, however, because it is under intense population and market pressures (annual population growth is 8 percent, illegal logging as well as annual cropping of corn and beans are highly profitable) and most residents (other than small Indian and extractivist communities) lack a forest culture. To reduce threats to the Petén's forests, it is also necessary to deal with the broader national context of land maldistribution, inadequate land access for a large rural population, and unsupportive government policies (e.g., incentives to convert forests to cropland and policies which support colonization rather than land redistribution or labor-absorbing industry).

5. MARKET LINKAGES AND CONSERVATION

There is serious debate about how increased market pressure interacts with conservation. Profitable use of forest resources can encourage conservation, but increased market demand for timber or other forest products may also lead to plundering by individuals, communities, or firms. Culture apparently conditions resource users' response to market pressures, but traditional social norms are highly vulnerable to breakdown under growing market pressure (Lawry 1989). Conservationist tenure regimes and rigorous monitoring can also provide a measure of protection against the pressures of market demand. The workshop discussion also hypothesized that:

> **The relationship between markets and conservation, in part, depends on what products are sold and on who benefits.**

Marketable products which depend on the continued existence of the forest may lead to sustainable use while markets for timber may produce the opposite effect (Irvine, Snook). There is a critical need for more research on how to maintain conservationist practices within a market context.

6. EQUITY AND CONSERVATION

Section 3 discussed the proposition that people are more likely to develop a long-term commitment to conservation if they share in the benefits of forest use. The workshop examined how tenure regimes affect equity in four contexts: inside and outside RMAs, within households, and across generations.

6.1 OUTSIDE RMAS

Tenure regimes are by definition exclusionary, since they authorize some people to use a given set of resources and prohibit others. Legalizing tenure regimes, therefore, may

produce unanticipated environmental costs by pushing the excluded people to degrade resources elsewhere (Painter). In addition to maintaining effective and equitable tenure regimes in forest areas, therefore, it is also necessary to resolve problems of resource access and employment in agricultural areas of higher potential (Dorner and Thiesenhusen 1992; Forster 1992). We need to determine viable ways to do this, particularly to overcome barriers created by land market imperfections.

> **People who have been excluded from access to resources in a given RMA are likely to use fragile lands in other areas. Improving access to land and employment in areas that can tolerate higher population densities will reduce pressure on fragile lands.**

6.2 INSIDE RMAS

There is a pressing need for research on how different management models (e.g., private firms versus community-based enterprises) affect resource access and benefit distribution. The workshop case studies suggested the following hypothesis:

> **Profits from community-based forest enterprises are more likely to be spent and invested locally and be distributed in an equitable manner (including within households) than the profits from forest use by private firms.**

There is also a great need to determine how different groups in communities (i.e., segmented by social class, age, gender) use forest resources and how social and political divisions affect their access as well as their influence in management planning.

6.3 WITHIN HOUSEHOLDS

To improve equity within households, it is necessary to make special efforts to increase women's rights in tenure regimes. Action research and cross-cultural comparisons can help determine how to accomplish that. Strategies include instituting co-equal property rights and increasing women's leadership roles in community forestry enterprises. Workshop cases 6-8 suggested the following hypothesis:

> **Women's involvement in forestry management is influenced by cultural norms specific to their communities and by other constraints such as time, age, and social class.**

6.4 ACROSS GENERATIONS

Snook maintains that Plan Piloto's inadequate silvicultural methods and the current rate of mahogany harvest will significantly reduce supply for the next generation. She emphasized the importance of research and continuous education, particularly for community organizations managing forests, to reduce impulses to take quick profits which might jeopardize future

benefits. Stanfield emphasized the importance of formulating tenure regimes which allow the transfer of access rights to future generations.

Equity for future generations depends on tenure regimes and resource management plans which assure adequate resource regeneration and inheritable access rights.

7. THE IMPORTANCE OF A SUPPORTIVE LOCAL AND NATIONAL CONTEXT

The workshop discussion hypothesized that sustainable resource use depends on the local population's long-term commitment to the resource base and the knowledge to maintain it. Conserving that resource base depends on effective tenure regimes, which require strong, representative organizations and a supportive macro policy context. We need more information on how community groups can influence that context, particularly the regulatory apparatus, and better adapt to unexpected changes.

Strong, representative, local organizations and political support within regional and national institutions can help maintain conservationist tenure regimes.

7.1 THE LOCAL CONTEXT

Resource managers' capacity to maintain tenure regimes depends, in part, on their ability to influence the macro incentives system.

Politically weak social groups with limited capital need outside assistance to protect boundaries. Forest cultures (particularly in sparsely populated areas) need collaborative institutions to help protect their areas from resource pirates and to favorably shape national policy. There is a pressing need to find effective ways to strengthen institutional support for forest cultures.

7.2 THE MACRO CONTEXT

The macro context in which RMA managers operate influences the viability of conservationist tenure regimes. For example, the political climate in Guatemala limits community organizing. Mexico's Ejido Reform Law (the amendment of Article 27) and the North American Free Trade Agreement (NAFTA) are creating new economic and tenure incentives for forest users and will very likely increase incentives to deforest (Snook, Székely). In Ecuador, government promotion of colonization in lieu of adequate land reform has encouraged lowland deforestation.

Sudden market changes can undermine community-based management and well-functioning tenure regimes, as illustrated by recent developments in the Brazilian extractive reserves (case 4). A recent downturn in rubber prices (due to increased production of

plantation rubber and the elimination of government subsidies) has reduced the profitability of natural rubber collection and increased out-migration from the extractive reserves. That trend may ultimately undermine the ability of the local power base to maintain the reserves (Schwartzman and Butler).

> **Sudden changes in the economic profitability of a given resource (e.g., as caused by macroeconomic policy or market shifts) can potentially overwhelm any tenure regime and its ability to maintain a sustainable production system.**

At the same time, macroeconomic policy which distorts market signals (e.g., bans on round log exports, tariff barriers, price controls, and credit policies) can lead to inappropriate resource-use decisions by private firms and community enterprises (Gibson, Rice; Vincent 1992). Distorted market signals can encourage overharvesting and inappropriate decisions on scale, thereby fostering long-term excessive demand for forest resources and their depletion, as illustrated by the ENDESA/BOTROSA plywood processing plants (Simeone). Simply unfettering markets, however, is an inadequate solution (Rice, Stanfield). Sustainable production systems require some protection against sudden market shifts.

The workshop discussion suggested two approaches for dealing with contextual factors: (1) design tenure regimes which are flexible enough to adjust to inevitable economic and policy changes (Zazueta); (2) empower resource managers (particularly community groups) to influence the direction of economic and policy change (Donovan, Macdonald, Schwartzman, Zazueta). Extensive case-study comparisons can evaluate a range of empowerment strategies, including community organizing and forming outside alliances, regional federations, and associations.

8. WEIGHING THE COSTS AND BENEFITS OF DIFFERENT FOREST MANAGERS

This paper has proposed that the social costs to maintain sustainable forestry vary directly with population and market pressure. The lowest cost option for conserving forests is to do nothing in areas where market and population pressures are low, particularly where roads do not provide easy access (Rose 1991). The paper also posits that cultural and social norms influence the costs of conserving forests under different managers. Table 1 lists some hypothetical costs for maintaining conservationist tenure regimes under different managers.

It is important to undertake comparative research to define more precisely the costs incurred for different managers and to determine benefits. At this point, it is possible to offer a few tentative generalizations:

- All management entities (individuals, communities, firms, NGOs, states) need to monitor boundaries and all potentially create external costs (e.g., people excluded from RMAs may deforest elsewhere).

TABLE 1

Hypothetical costs incurred with different forest managers

COSTS	MANAGERS		
	Self-organized "forest cultures"	**Atomized individuals in large management areas**	**Private firms**
Monitor boundaries against intruders	moderate	high	moderate
Monitor to control pillaging by managers	low to moderate	high	high
Research/education on forest ecology	low to moderate	moderate to high	moderate to high
Community organizing to create cohesiveness	low to moderate	high	low
Business training	moderate	high	self-financed
Downstream cost of pushing problems elsewhere	potentially high	potentially high	potentially high

- All management entities require oversight to prevent plunder and unsustainable resource use. Most state agencies, however, are ill prepared at this point to monitor resource users effectively. State environmental monitoring agencies must be strengthened and professionals must be trained and equipped, tasks which require time and entail costs. Table 1 hypothesizes lower costs to monitor forest cultures than to oversee private firms, a reason to favor the former, at least for the near term.

- Forest cultures' traditional knowledge of forest ecology and their commitment to forests facilitate the incorporation of conservation principles into forest management plans. Table 1 hypothesizes higher costs for private firms on that dimension.

- Forest cultures often need outside support (from the state, NGOs, international groups) in defense of their access rights.

- All management units require capital investments to develop profitable forestry enterprises and frequently draw on public capital.

- Research is needed on more cost-effective ways to establish sustainable resource use in large management areas with heterogeneous and growing populations.

Table 1 does not address the benefits of different managers. This paper has posited that private firms are comparatively weak on promoting equity but strong on generating capital and market access. Community-based management can potentially achieve a more equitable spread of benefits and foster local social development but often has limited capital and market access. Székely proposed that forest communities ally with private firms to generate capital.

9. SUMMARY AND CONCLUSIONS

The workshop discussion allowed us to frame a number of preliminary hypotheses and tentative conclusions relating to broad research themes. It is important to undertake action research and comparative case studies to further develop this research agenda. The broad themes and related research questions include:

(1) Maintaining conservationist tenure regimes for different forest managers facing varying population and market pressures.

The conservation strategies discussed at the workshop entailed people's use of resources by incorporating ecological principles into resource management plans and, often, by increasing market linkages. This analysis has posited that all resource managers (firms, cohesive communities, atomized migrants, state agencies) face similar problems in keeping resource use sustainable, but that social norms condition managers' response to incentives. A number of hypotheses and tentative conclusions follow:

As demographic pressure and market demand for a given forest resource increase, tenure regimes require more stringent rules for resource use and rigorous oversight to assure a continued supply of that resource.

Different resource managers follow distinct social norms, which condition their response to market incentives, among others.

Increasing tenure security improves the likelihood that people will conserve forest resources, but tenure security is not always sufficient to guarantee such conservation. It is also necessary to implement resource use rules and oversight appropriate to resource managers' economic and cultural orientations.

The forestry practices of private firms are influenced more by financial profitability than by tenure security (long-term concessions or private property rights). Their high responsiveness to market signals requires strict tenure regimes and rigorous oversight to maintain the resource base.

The social norms of traditional forest cultures often support conservation practices. Legalizing tenure rights of cohesive forest cultures to their traditional lands and their rights to manage trees generally enhances their capacity to maintain those practices.

The relationship between markets and conservation, in part, depends on what products are sold and on who benefits.

Related research questions include: How can practices that conserve resources and biological diversity best be incorporated into tenure regimes and resource management plans for different managers (the state, private firms, community groups)? Under what conditions is it useful to promote market linkages to foster conservation? What are the costs and benefits? How can tenure regimes be made progressively more rigorous to assure conservation and sustainable resource use under increasing population and market pressures? What are the relative conservation costs and benefits to society of different resource managers, such as community organizations in cohesive communities versus atomized ones, private firms, state agencies?

(2) Involving local residents in conservation and sustainable management.

Experiences with community-based forest management have generated tentative conclusions which can be further investigated through action research and case studies.

Making use of the skills of forest cultures can put order into land use, develop sustainable land-use plans (use rules), and form market linkages which foster sustainable use.

The sociopolitical culture of traditional communities (consensual decision-making, equitable division of profits, leadership rotation) helps promote social cohesion but can undermine business efficiency.

The process of participatory land-use planning (to establish or maintain conservationist land-use practices) can develop social cohesion and eventually help maintain conservationist tenure regimes.

Related research questions include: What characterizes effective community organizations? What financial, organizational, technical, and managerial support can improve their effectiveness? What is a constructive role for NGOs? What community organizing strategies have best promoted forest management planning in colonization areas?

(3) Equity and conservation.

The workshop discussion posited that the long-term commitment of local residents to sustainable resource use is, in part, influenced by the benefits they gain. There is a pressing need for further research on how tenure regimes can influence equity inside and outside

RMAs as well as within households and across generations. The discussion generated the following hypotheses and tentative conclusions:

People who have been excluded from access to resources in a given RMA are likely to use fragile lands in other areas.

Improving access to land and employment in areas that can tolerate higher population densities will reduce pressure on fragile lands.

Profits from community-based forest enterprises are more likely to be spent and invested locally and to be distributed in an equitable manner (including within households) than the profits from forest use by private firms.

Women's involvement in forestry management is affected by cultural norms specific to their communities and by other constraints such as time, age, and social class.

Equity for future generations depends on tenure regimes and resource management plans which assure adequate resource regeneration and heritable access rights.

Related research questions include: How well do different management models (private firms, community enterprises) generate local employment and equitably distribute profits? What is the cost-effectiveness of improving land access in higher-potential agricultural areas in comparison with developing livelihoods for more people in forest areas? What strategies have increased equity for women in different cultural contexts?

(4) Establishing and maintaining a supportive local and national context.

Strong, representative, local organizations and political support within regional and national institutions help maintain conservationist tenure regimes.

Resource managers' capacity to maintain tenure regimes depends, in part, on their ability to influence the macro incentives system.

Sudden changes in the economic profitability of a given resource (e.g., as caused by macroeconomic policy or market shifts) can potentially overwhelm any tenure regime and its ability to maintain a sustainable production system.

Related research questions include: What are effective methodologies for building strong local organizations? How can outside alliances effectively influence macro policy? What is the best means to deal with unsupportive and contradictory policy over the short term (i.e., land reform agencies and forestry ministries working at cross purposes, incentives for agriculture rather than forestry)? What are the management needs for community-based forestry enterprises in Mexico's increasingly open market? How can traditional communities better articulate what they need? How do NGOs eventually work themselves out of a job?

APPENDIX 1

CASE STUDIES

CASE 1. INTECMACA CONCESSION, VENEZUELA

José Ochoa G., *Instituto Nacional de Parques* (INPARQUES), Venezuela; Mark Dillenbeck, IUCN-US

INTECMACA (*Industria Técnica de Maderas, CA*, a subsidiary of *Organización RDV*) manages a 185,000-hectare concession from the Venezuelan Forestry Service, SEFORVEN, in the Imataca Forest Reserve, more than 3 million hectares of lowland rain forest in northeastern Venezuela. Precipitation ranges between 1,800 and 2,000 millimeters per year. Soils are acidic sandy loams with low nutrient levels. The forest's composition is highly diverse (more than 300 species per hectare in some areas).

For commercial use of public lands, SEFORVEN requires that concessionaires produce a 40-year management plan for polycyclic harvesting, a 5-year plan, and annual cut plans. Under the long-term plan, the concession area is divided into 40 compartments, one of which is harvested per year. Advancement depends on adherence to the annual and long-term plans. Firms can renew harvesting rights at the end of the concession period. The system precludes rapid forest exploitation and discourages unauthorized cutting, since firms must prevent illegal settlement.

INTECMACA (viewed as Venezuela's most environmentally conscientious timber concessionaire) has voluntarily followed sustainable management practices under these guidelines. Additional factors have helped it maintain a sustainable management system. An FAO (Food and Agriculture Organization) forestry training project in the 1970s created a local constituency for sustainable forest use. Exogenous threats to the concession are low (i.e., there is minimal population pressure, and poor soils make alternative land use unattractive). Gold mining could pose a future threat. Currently INTECMACA and the miners collaborate to control access as does the military, since the concession is near the disputed border with Guyana.

The firm has hired highly qualified personnel and invested in forest management research. INTECMACA-funded research may lead to new approaches to protect biological diversity within industrial forest concessions (Ochoa et al. 1992). Yet, INTECMACA recently eliminated its research operation since SEFORVEN's pressures to adopt improved practices made the concessionaire less competitive vis-à-vis others not subject to such influence.

Other problems also constrain sustainable forest management in Venezuela. SEFORVEN does not utilize regional ecological planning and manages forests with an

inadequate scientific basis. Its budget is insufficient to enforce management plans (harvested timber is generally checked only at the base camp). The legal basis for forest management is weak, and there are strong pressures for nonforestland use. Local people are generally excluded from SEFORVEN's activities.

Dillenbeck and Ochoa concluded that in Venezuela, the success of forest management by concessionaires depends on their individual commitment because SEFORVEN lacks the institutional strength to regulate them appropriately. Furthermore, forest protection by concessionaires beyond the first 40-year cutting cycle depends on the continued availability of commercial timber. If timber fails to regenerate adequately, firms will withdraw.

CASE 2. STATE CONCESSIONS IN THE CHIMANE FOREST, DEPARTMENT OF BENI, BOLIVIA

Liliana Campos and Richard Rice, Conservation International

The Chimane Forest, a 1.2-million-hectare mosaic of ecosystems (including tropical wet forest and seasonally flooded savanna), is located on the southeastern flank of the Andes in the Beni. The forest has the largest mahogany reserve in Bolivia and one of the largest in South America (Jones 1990). It is sparsely populated by four ethnic groups assimilated at varying levels into Westernized culture. The Indian groups retreated into the forest over the past 30 years as they lost land to a cattle boom and to the elite-dominated agrarian reform in the Beni (Jones 1990). In the 1980s, ranching profits plummeted during the nation's economic crisis and subsequent structural adjustment.

The Beni Biosphere Reserve was created in 1986 (four years after the biological station). Also in that year, the government opened the Chimane Forest to commercial timber extraction because of pressure from timber interests and local government and civic groups suffering the effects of structural adjustment. Seven Bolivian timber companies were granted concessions to half the forest area (Jones 1990). A commission made up of the Beni Forestry Service, Conservation International, and the local Association of Lumbering Companies was formed to develop a sustainable timber extraction plan. Yet, despite the emphasis on sustainable management (and involvement by the International Timber Trade Organization, ITTO), the early life of the commission seemed to increase the lumber interests' power to destroy forest (Campos-Dudley 1992).

The forest-dwelling Indians were excluded from planning activities, but their growing demands led to a study commission's recommendation to cede forest fringe lands to ethnic groups while concessionaires kept the center. Government inaction precipitated the 1990 Indian mobilization and their 400-mile march from the Beni to La Paz. Strong national and international support helped convince the government to recognize Indian territorial rights and governing bodies and to agree to halt new concessions and assign existing ones elsewhere. Nonetheless, the seven concessionaires continue to harvest high grade mahogany. At their logging rate in 1990, it was estimated they would extract all the mahogany in the Chimane Forest in fewer than 5 years (Jones 1990).

This case raises a number of salient points: (1) the difficulties of establishing tenure regimes which keep timber extraction sustainable in large RMAs where: (a) there are strong economic incentives to plunder, that is, to pillage for the first cut of high value timber like mahogany and cedar (Rice); (b) there is intense competition for resources by different socioeconomic interests; and (c) forest inhabitants' political and social organization is weak; (2) the destabilizing effects of a macroeconomic crisis on natural resource use; (3) the importance of local and international linkages to empower the poor; and (4) the difficulty of determining when NGOs should leave (Campos).

CASE 3. ENDESA/BOTROSA REFORESTATION PROJECT (DURINI GROUP OF COMPANIES), ECUADOR

Michael Painter, senior researcher, Institute for Development Anthropology (IDA); Dana Younger, consultant, Environment Unit, International Finance Corporation (IFC); the private sector lending arm of the World Bank Group

The IFC and the Global Environment Facility (GEF) recently authorized $7.5 million in loans and grants for the ENDESA/BOTROSA Reforestation Project of the Durini Group of Companies in Ecuador. That assistance, combined with private capital, will enable the corporation to purchase 6,100 hectares of colonist landholdings in the nation's northwestern lowlands near Quinindé. In the project area, 43 percent of the land is in original or secondary forest, 47 percent is in pasture, and 10 percent is in crops. The project will establish plantations of mixed native hardwood species on 5,000 hectares, which, together with the company's existing 3,400 hectares of plantations, will (by the year 2010) supply the Durini Group's two wood processing plants, ENDESA and BOTROSA, with sustainably produced timber (full plant capacity requires 114,000 cubic meters per year). Site-based research suggests that plantations produce ten times more marketable wood per land area than natural forest management.

The region is characterized by lowland tropical moist forest with some of the world's most species-rich plant communities, supporting as many as 3,000 plant species (20% endemic to coastal Ecuador). Rainfall ranges between 2,500 and 3,500 millimeters per year. Most soils are volcanic ash—acidic with weak structure, low organic content, low tolerance for compaction, and high potential for erosion.

Since 1945, some 92 percent of western Ecuador's forests have been cleared or modified to some degree. In the deforestation process, colonization efforts and the timber industry have maintained a symbiotic relationship. National legislation has provided a legal framework for deforestation by requiring that colonists have 50 percent of their allotment in production to secure title. The timber industry, in turn, has depended on logs from colonist holdings, particularly after concessions were eliminated in 1982. Deforestation is fueled by the forestry ministry's weakness, its jurisdictional conflicts with the agrarian reform agency (*Instituto Ecuatoriano de Reforma Agraria y Colonización*, IERAC), and government incentives which favor agriculture rather than forestry and reforestation rather than primary forest conservation.

During twenty years of colonization in the project area, low prices and disease for coffee and cacao have induced colonist land sales, moderate land concentration, and the emergence of cattle production and African oil palm and banana plantations. An IDA study (DeWalt 1992) found that approximately half of those selling land to the Durini Group were original colonists.

Discussion of this case raised a number of issues: (1) the difficulty of monitoring the land use practices of private companies with private land tenure (the IFC will monitor the project for 12 years, the length of the loan agreement); (2) the ethics of granting subsidies to a private firm responsible for extensive deforestation (Simeone); (3) the pressure for indigenous communities to sell resources (thereby undermining their economic future) because of the Durini Group's high demand for timber from their natural forests over the next 20 years (Irvine); (4) whether the scale of the ENDESA/BOTROSA factories is too large to be sustainably supported by the resource base (Simeone); and (5) whether the project is setting back carbon sequestration and reducing biological diversity (replacing a potentially species-rich secondary forest with a limited number of species). The GEF and IFC assessments of these issues, as well as more project information, can be found in the GEF public document and the environmental assessment. [Request the documents (identified by project name) from: Martyn Riddle, Environment Unit, Room I-10-157, International Finance Corporation, 1818 H Street, NW, Washington, DC 20433; 202/473-4779 (phone); 202/676-9495 (fax).]

CASE 4. EXTRACTIVE RESERVES IN BRAZIL

Chico Mendes and Upper Juruá extractive reserves in Acre—Steve Schwartzman, Environmental Defense Fund; extractive reserves in Amapá—John Butler, World Wildlife Fund

The social movements which gave birth to extractive reserves in the Brazilian Amazon arose in areas of ongoing resource wars. The reserves emerged as a new conservation unit that blocked large-scale ranchers and loggers' predatory land use and allowed small producers to secure land tenure rights without having to deforest. Historically, rubber and Brazil nut extraction has maintained biological diversity.

The movement began in Acre, where rubber extraction dates from the last century's rubber boom. Moist tropical upland forest (*terra firme*) covers most of the state, over 4 percent of which had been deforested by 1987. The movement responded to developments in the 1960s and 1970s (the collapse of the traditional rubber economy, the rubber barons' withdrawal, and the opening of the frontier), which set off intense land conflicts between local rubber tappers and new investors from the South who employed massive deforestation to establish land rights. When the rubber tappers' unions occasionally won conflicts, the federal land agency awarded 50-to-100-hectare lots to individuals, a tenure solution which undermined traditional resource management systems.

NGO activists in the National Council of Rubber Tappers (CNS) and the Institute for Amazon Studies (IEA), therefore, turned to the traditional rubber estate as a model for

extractive reserves. Individual holdings within the traditional estate had no visible boundaries, but rights to trails were assigned and recognized. The Chico Mendes extractive reserve contains 19 former rubber estates. The extractive reserves belong to the government, which grants usufruct rights for 30 years (with renewal options) to traditional forest product extractor communities. There are now over 3 million hectares assigned under 2 reserve categories. The IEA calculates that 25 percent of the Amazon has potential for nontimber forest product extraction.

The extractive reserve model is a flexible instrument which has secured tenure rights for a variety of Amazon peasant communities. The process of community organizing has provided the means to develop broad-based local land-use planning. Yet, existing reserves face a number of economic and social problems. The decline of rubber prices has in some areas led to more predatory use of other resources with commercial value. Low incomes and limited services have made abandonment a growing problem. Schwartzman and Butler argue that, even if rubber prices improve, extractive reserves will survive only if they diversify production for cash income, aggregate more value at the local level, and improve market linkages and services. The extractive communities have discussed timber extraction, though the current leadership is firmly opposed to it.

The discussion of extractive reserves raised a number of other salient issues, including: (1) whether to make extractive rights transferable (Stanfield); (2) how to strengthen extractivists' institutions and improve their ability to influence macro-level policy (Schwartzman); (3) how to monitor whether resource use is sustainable; and (4) the capacity for extractive activities to improve rural levels of living (Gibson).

CASE 5. *PLAN PILOTO FORESTAL*, QUINTANA ROO, MEXICO

Laura Snook, Yale School of Forestry and Environmental Studies

The *Plan Piloto Forestal* (PPF) is a community forestry project initiated in 1984 through combined initiatives of the Mexican-German Forestry Agreement of the GTZ, the governor of Quintana Roo, and the Mexican subsecretary of forestry. At that time, a 25-year mahogany concession (500,000 hectares) to a government veneer plant had terminated. The PPF focused on organizing 10 ejidos to take over harvesting their own 120,000 hectares of mahogany-rich forests and establish a marketing association. By 1992, the PPF had expanded to 50 ejidos controlling some 500,000 hectares of forestland.

The PPF area has seasonal, semideciduous, tropical forests. Rainfall ranges between 1100 and 1500 millimeters per year. The limestone soils are shallow and topography is flat. Frequent hurricanes followed by extensive forest fires (fueled by the felled trees and branches) provide ideal conditions for the abundant regeneration of mahogany in extensive even-age stands.

Most of the PPF ejidos were established in the 1930s to tap chicle latex used to make chewing gum. The chicle economy gave the local population a major incentive to conserve

forest and kept the population density low (each tapper was allowed 420 hectares of forestland). In 1990, the chicle cooperative went broke as a result of mismanagement and ejido members have become more dependent on mahogany for income.

Three-fourths of the project area's land is held under communal tenure, providing ejido members with secure usufruct rights but prohibiting land division and market transactions. Trees belong to the federal government, which also mandates forest management practices. Ejido forests are divided into 25 cutting areas, one of which is cut over each year according to a selective, diameter-limit harvesting plan. Research (Snook 1992) shows that the Mexican system's assumptions about growth are unrealistic (mahoganies require about 120 years to reach a 55-centimeter commercial diameter, not the 75 years of the current rotation) and there are insufficient provisions for regeneration. Mahogany regeneration in Quintana Roo owes more to hurricanes, forest fires, and the chicle economy than to the Mexican system of forest management.

The PPF ejidos have enjoyed a unique set of opportunities for sustainable forestry: low population pressure, abundant agricultural land, secure land tenure, strong government institutions, assistance from a well-connected donor agency, and community experience in forestry under concessions.

They also suffer from constraints, which include: lack of site-specific research on which to base national legislation for forest management; strong incentives for government foresters and communities to cut forest "fast and hard," which is depleting current stock; ejidos' lack of information on how to manage for the long term; and community associations' preference for taking profits (divided equally among members) rather than paying good wages (a problem which has caused some forestry associations to collapse because they cannot keep workers in the woods).

Other incentives for deforestation are increasing. The rate of (over)harvesting has transformed large quantities of forest capital into liquid form in ejidos which have few options for investment. Cattle ranching is perceived as one way to retain the value of money derived from mahogany sales, so pastures are becoming more widespread. This year's presidential decree permitting ejido lands to be divided up and sold as private property, unless they are forestlands, also provides a perverse incentive for deforestation. The effect of NAFTA is not yet clear.

CASE 6. UCEFO, OAXACA, MEXICO

Aaron Zazueta and Bruce Cabarle, World Resources Institute (WRI); Guillermo Castilleja, World Wildlife Fund (WWF); Miguel Székely, *Instituto de Investigaciones Sociales, Universidad Nacional Autónoma de México* (UNAM), Mexico

The *Unión de Comunidades y Ejidos Forestales de Oaxaca* (UCEFO) is a community-based forestry enterprise established in 1986 after intense community struggle. Communities across Oaxaca began mobilizing in 1981, toward the end of a number of 25-year concessions of Sierra Juárez and Sierra Sur forests to state-owned and private companies. The companies had harvested extensively without ensuring forest regeneration. During the concessions, the forested area of the Sierra Juárez declined from 43 to 28 percent. The region is characterized by temperate montane forests, primarily mixed pine and oak. The oak forests are some of the richest in the world in terms of species diversity. Altitudes range from 800 to 3,500 meters; 85 percent of the slopes are greater than 30 percent.

The Zapotec communities inhabiting the forest gained few benefits from the concession. Between the mid-1970s and mid-1980s, up to 46 percent of the population was forced to migrate in search of employment. In the early 1980s, some communities, in collaboration with a Ministry of Agriculture task-force team, got permission to harvest timber on their lands and worked to secure forest management rights. At that stage, the government (through the Ministry of Agriculture) regulated all forest management decisions. In 1986, the nine communities which eventually formed UCEFO convinced the government to cede management rights after they successfully controlled a forest plague. Pressure and legal actions by the Oaxaca communities also helped pass a new forest law, ending concessions in 1986.

UCEFO was established as a nonprofit organization, thereby free from control by the Ministry of Agrarian Reform. The communities operate as independent firms and retain collective land titles. They include 18,000 people and a land area of 122,000 hectares (70,000 hectares are production forests). UCEFO's wood production is 60,000-70,000 cubic meters per year (20% of Oaxaca's total production) and the capital assets (saw mills, trucks, etc.) of UCEFO and its member communities total $4.5 million. Community-based forestry has raised local incomes and expanded social infrastructure. Strict internal controls suppress corruption.

The workshop discussion highlighted the following issues in this case: (1) The dynamics of tradition and modernity: Social cohesion deriving from communal tradition was critical for UCEFO's early success, but it constrains business, particularly under trade liberalization. Consensual decision-making in town meetings often inhibits management agility. Changing community leaders every one to three years reduces continuity and experience. The often inward-looking communities must become more active in the national policy dialogue. (2) Improving understanding of forest dynamics: Recent WRI research concluded that the incorporation of forestry into traditional agriculture has reduced clearing for *milpa* and diminished fires. There is a perceived dichotomy (also among professionals)

between forestry and agriculture, yet the agricultural fields and the burn have historically fostered good regeneration of commercial timber. (3) The impact of NAFTA: Since Oaxaca's timber yields are low and transportation costs high, it is likely to lose markets under free trade. WWF research (Castilleja) recommends improved silvicultural practices to raise yields, improved processing, and developing new market niches. (4) Women's participation: The informants agreed that increasing women's leadership role is at the heart of crucial organizational problems in the Zapotec forestry enterprises. The workshop discussion emphasized that involving women is a complex problem and strategies must be culture specific.

CASE 7. YANESHA FORESTRY COOPERATIVE, PALCAZÚ VALLEY, PERU

Robert Simeone, natural forest management specialist and former program manager

The Yanesha Forestry Cooperative (COFYAL) was formed in 1986 with 200 members as part of the USAID-funded Central Selva Resource Management (CSRM) project. Both were born out of a USAID-financed road-building and colonization project initiated by President Fernando Belaúnde Terry in 1980. Opposition by Indian organizations, environmentalists, and human rights advocates convinced USAID to transform the project to natural resource management, the CSRM project. As a funding condition, USAID required that ten Yanesha communities in the Palcazú Valley receive land titles. The five Indigenous communities in COFYAL manage some 2,000 hectares of production forest reserves and wood processing facilities. Another five native communities may eventually add 6,500 hectares of production forest. The Indian lands lie between two state-owned conservation areas, the 122,000-hectare Yanachaga-Chemillen National Park and the 145,818-hectare San Matias-San Carlos Protection Forest.

The upper Palcazú Valley is classified as premontane rain forest and the lower valley as tropical wet forest with more than 1,300 tree species. Rainfall averages between 6,000 and 7,000+ millimeters per year. In the project area, elevations range from 300 to 1200 meters and the red clay soils are acidic, aluminum abundant, and nutrient poor.

The population in the Palcazú Valley totals some 7,000 persons, including descendants of Swiss and Austrian colonists, mestizo colonists, and Ashaninka and Yanesha Indians. Prior to the 1968 land reform, landownership was highly concentrated, a legacy of the early twentieth century rubber boom. The Yanesha failed to benefit significantly from land reform (a limited number of individual lots and communities were titled). Prior to forming COFYAL, many Yanesha worked as sharecroppers, clearing forest to establish pasture for large landholders' cattle in exchange for half of the offspring.

The CSRM project promoted the Tropical Science Center's strip shelterbelt management system, based on gap phase dynamics for forest regeneration in 30-40 year cycles. Management entails clear-cutting timber in long (200- to 500-meter), narrow (30- to 40-meter) strips bordered by intact natural forest. In 1985, the system was substantially

enhanced by incorporating indigenous knowledge of the local ecology. Through dialogue and debate, local informants identified protection forest and operable forest for production. The management system processes nearly all the biomass into saw wood, preserved round wood for poles, and charcoal. The processing facility includes a portable sawmill, preserving equipment, and a charcoal kiln. USAID withdrew in 1990 because of Shining Path guerrilla violence. The WWF has worked with COFYAL since 1987.

This case provides a number of lessons, including the inadvisability of imposing externally designed management plans. Simeone recommends that project designers identify only general goals and outcomes. The social and economic mechanisms to achieve them should be determined through a process that taps local knowledge. Management strategies and scale should be specified through dialogue in the community. Donovan argued that the strip shelterbelt system which calls for multiple products means complexity for marketing. The project has had particular problems developing markets for the chemically treated fence, telephone, and utility poles. Donovan suggested that the Yanesha have failed to aggressively develop markets. Gender issues were inadequately addressed in the project design. When they later became manifest, there were significant differences between Ashaninka and Yanesha women, suggesting that culture is an important issue and community dialogue is essential.

CASE 8. PROJECT PUMAREN, NAPO PROVINCE, ECUADOR

Dominique Irvine and Ted Macdonald, Cultural Survival

PUMAREN (*Programa de Uso y Manejo de Recursos Naturales*) is a regional natural resource-management program established in 1988 by the Indian federation, FOIN (Federation of Indian Organizations of Napo), representing 60 communities. PUMAREN currently receives assistance from Cultural Survival (CS) and the World Wildlife Fund (WWF).

The PUMAREN program area, near the volcano Sumaco, is home to nearly 9,000 of the estimated 50,0000 lowland Quichua Indians in the Ecuadorian Amazon. FOIN leaders initiated the program to halt uncontrolled logging after the construction of a road opened access to this biologically rich territory. In late 1987, logging companies, including ENDESA and Arboriente, negotiated with indigenous communities to buy standing timber. FOIN wanted a more sustainable economic alternative and viewed legal recognition of land rights as a prerequisite to good management. Under their traditional tenure systems, each indigenous community had recognized areas of resource use for agriculture, collecting forest products, hunting, and fishing. Individuals and households established rights to current agricultural land and to the trees and other resources in agroforestry plots.

The discovery of oil in the early 1970s precipitated a land boom as colonists entered the Amazon. In response, indigenous peoples tried to legalize their traditional territories. Many Indian families, particularly in the Tena area, applied for individual land titles under the agrarian reform laws. They converted forest to pasture to demonstrate land use. Indian

organizations, however, urged communities to obtain global land titles and to define larger indigenous territories.

As part of that strategy, PUMAREN's first phase focused on establishing land rights. Less than half of the communities had any legal rights and only one-third had global title. Today, only 25 percent of the communities lack legal standing and 60 percent have communal title. PUMAREN has shifted Indian families from obtaining individual titles (with incentives for deforestation) to obtaining community titles that permit management of larger areas and favor forest conservation.

The second phase focused on exposing the ten indigenous promoters forming the PUMAREN team to a variety of natural resource-management alternatives through Indian-to-Indian exchanges and training. In the current phase, the PUMAREN team is working with three FOIN communities to implement a pilot forest-management project. The management team is delimiting areas of protection and production forest and carrying out forest inventories. The organizing committee has worked with the communities to develop a plan for a low-impact forestry enterprise using portable sawmills to cut timber in the forest, mules to extract wood, kilns for drying, and a small shop for carpentry work.

Salient issues in this case include: (1) The indigenous organizations' recent negotiations with the government to increase legalized indigenous territory through co-management agreements to protected areas (such as Sumaco) place indigenous resource-management programs like PUMAREN at the heart of the forest conservation debate. (2) Frequent leadership turnover had made it difficult for federation leaders to undertake and implement technical projects. PUMAREN has provided a stable technical arm for the indigenous organizations. (3) There is a pressing need to involve women as decisions are made on how to organize the forest industry (what products, how time should be organized, etc.). Travel away from home and inadequate time have been constraints to women's involvement in the management team. PUMAREN and the participating communities are searching for new models to integrate women.

CASE 9. THE BOSCOSA PROJECT, OSA PENINSULA, COSTA RICA

Richard Donovan, Rainforest Alliance; Bruce Cabarle, World Resources Institute; Matt Perl, World Wildlife Fund

The BOSCOSA project, implemented by the *Fundación Neotrópica*, a Costa Rican NGO, was initiated in 1988 to link conservation with social and economic development on the Osa peninsula (approximately 175,000 hectares). The Osa peninsula contains the only remaining lowland tropical wet forest (with exceptionally high levels of biodiversity and high value tropical timber) on Central America's Pacific Coast. The peninsula is a mosaic of cleared land and fragmented forest parcels that includes highly disturbed forest, young secondary forest, and nearly intact primary forest in protected areas (Perl et al. 1991). The project has focused primarily on the *Golfo Dulce* Forest Reserve.

The population of the Osa peninsula has increased rapidly over the last 20-30 years. The government established protected areas during the 1970s and early 1980s, while also promoting colonization. Deforestation increased rapidly after 1985 when an all-weather road penetrated the area, a large labor force was unemployed when the banana company terminated operations, and the price of gold rose, attracting miners and adventurers. The current population of 50,000 is composed almost entirely of colonists and a few Indians, neither of whom can be characterized as forest cultures.

Less than 5 percent of the Osa population has free and clear title to the land on which they live (Cabarle et al. 1992). Overlapping tenure claims on many land parcels foster insecurity and conflict. Difficulty in sorting out access rights led the project to focus first on establishing sustainable land-use practices. The project has set a general objective to maintain forest cover, but allows local populations to determine how to accomplish it.

One project strategy seeks to agglomerate highly fragmented forest parcels for management purposes. Common land-use management plans are developed through the process of community organizing. That process also develops a political power base from which the community can eventually seek government formalization of the management plans and the tenure regimes to sustain them. Innovative experiments include family rain forests and community rain forests (conservation easements which increase tenure security and local incomes while assuring forest cover maintenance) and the FIPROSA trust fund (a strategy to "make conservation pay" by providing soft credit and direct payments to families inscribing forestland for conservation purposes). Field foresters monitor participants' management practices.

Constraints on natural forest management in Costa Rica include policy biases toward agriculture and conflicting jurisdictions of the agrarian reform agency and the forestry ministry. Tenure rules enforced by the forestry ministry deny legal residence to people living in forests within its jurisdiction, creating a perverse incentive to deforest. BOSCOSA and CEDERENA (a Costa Rican NGO specializing in environmental law) recommend recognizing usufruct rights (through long-term concessions) for communities which agree to practice sustainable forestry.

Experience from this case permits a number of generalizations: (1) Establishing sustainable forest management in areas where tenure regimes and social cohesion must be developed is a process requiring 10-20 years (Donovan). (2) Sustainable forest use requires strict monitoring as well as response to market signals (Donovan). (3) Current government rules place nearly insurmountable barriers to practicing sustainable forestry in Costa Rica (Cabarle).

CASE 10. THE PROPETÉN PROJECT, MAYA BIOSPHERE RESERVE, PETÉN, GUATEMALA

Norman Schwartz, Conservation International

The ProPetén project, established in 1991, is part of the USAID-financed Mayarema project to develop a sustainable management plan for the 1.5 million-hectare Maya Biosphere Reserve (MBR) in the northern third of the Department of Petén. Deforestation in the Petén is estimated at 40,000 hectares per year. Yet, threats to the Petén's forests must be seen in a broader national context of land maldistribution, inadequate land access for a large and rapidly increasing rural population, and government policies which encourage colonization rather than land redistribution or labor-absorbing industry.

The current situation in the Petén also stems from policies set by FYDEP, a parastatal organization which managed the department from 1959 to 1990. North of parallel 17°0', FYDEP established a forest reserve and granted timber concessions. To the south, it adjudicated land which benefited primarily elites and capitalized *ladino* farmers (Schwartz 1987). The completion of an all-weather road in 1970 led to a rapid population increase. Annual growth is currently over 8 percent. After FYDEP was dissolved, administration of land in the Petén passed to INTA (the agrarian reform institute) and the reserve passed to CONAP (the National Council for Protected Areas).

The Mayarema project operates within a contradictory policy context. Jurisdictions for INTA and CONAP are not clearly delineated. Although CONAP is responsible for the MBR, it is institutionally weak and lacks power to impose legal control. A recent logging ban has increased illegal logging, which CONAP and other state entities have been unable to control. To combat the illegal activity, the government will reinstate industrial logging concessions. Yet, CONAP's limited monitoring capacity makes that solution problematic. Industrial logging may also conflict with xate, chicle, and allspice extraction by local communities. Contradictory policy also stems from the government's view that the Petén is a breadbasket. Current market demand and government incentives for agriculture encourage forest clearing and mono-cropping of corn and beans, thereby encouraging the advance of the agricultural frontier.

There is debate within various agencies whether to establish sustainable land-use practices by improving tenure security (if so, in what form) or by organizing communities to improve resource use, the strategy of the BOSCOSA project and ProPetén. The project must stabilize forest use within a difficult context. The Petén's population is large and young (50 percent are 15 years of age or younger). The population is concentrated in southern Petén and the buffer zone, where there is little available land remaining. The legal situation is complex. The southern Petén has some 80,000 property holders, but only 5 percent have registered title. Many parcels have overlapping rights, most titles are not registered, and wealthy absentee landlords with titles are returning to claim property.

Other critical debates within the project include: Can industrial timber concessions and extractivist activities coexist? Who monitors each and how? Who should monitor the

rapidly proliferating NGOs? How should the project and residents of the MBR deal with different levels of understanding at different levels of government?

APPENDIX 2

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