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An Institute for Research and Education
on Social Structure, Rural Institutions,
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Land Tenure Center
Director: William Thiesenhusen
1357 University Avenue
University of Wisconsin-Madison
Madison, WI 53715

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Institute for Environmental Studies
Director: Thomas Yuill
550 N. Park Street, Room 40 Science Hall
University of Wisconsin-Madison
Madison, WI 53706

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PREFACE

Indigenous peoples occupy much of the remaining forestland in the Americas. Recognizing that in the 1980s, a number of groups working for forest conservation and indigenous peoples' land rights and economic development came to view market-oriented community forestry as a means to achieve their objectives. The symposium "Forestry in the Americas: Community-Based Management and Sustainability" examined the assumptions underpinning that premise and analyzed progress.

The symposium highlighted the diverse conditions community forestry enterprises face. The cases included the Menominee Tribe, with 140 years of experience with natural forest management, and the Multiethnic Indigenous Territory in Bolivia, where plunder of precious wood undermines indigenous cultures, delays a management plan, and depletes the resource base. There is a need for regional and case-specific analysis. In the upper Amazon, immediate survival of indigenous cultures and tropical forests may be better assured by legalizing indigenous rights to land and resources than by establishing forestry enterprises. Yet, tenure rights alone are insufficient to maintain forest ecosystems, as amply demonstrated by these cases. With them must come a local and national commitment and capability to manage forests sustainably, formalized in adaptable institutions. Cultural commitment can predate the forestry enterprise or it can be built along with it, as in the Quintana Roo communities and the Lomerío Project. These cases demonstrate the formidable challenge of economic globalization. Despite high commitment to sustainable management, nearly 80 percent of Mexico's community forestry enterprises ceased to operate at a profit in the face of cheap wood imports during the first half of the 1990s. It is an open question whether neoliberal economic policies provide a supportive context for forest conservation or long-term economic development of disadvantaged communities.

The community forestry enterprises presented here are a select group, having received substantial external funding and technical assistance. Most have successfully met enormous challenges. Beyond this relatively small circle, however, stand many failed and faltering community forestry enterprises. There is no simple formula for success; yet, important elements for sustainable forestry can be highlighted. These include: a commitment to maintain timber and forest ecosystems by individual resource users as well as state and national governments; tenure systems designed to maintain forests; a balance between individual and community interests; a flexible management plan embedded in local and national institutions; agile and entrepreneurial enterprise management that responds to changing markets and maintains community support; economic diversification to remove pressure from forests and cushion against market instability. This volume of symposium papers examines these issues.

Nancy R. Forster
Institute for Environmental Studies and
Land Tenure Center

I. MENOMINEE TRIBAL ENTERPRISES: A CASE STUDY

by

Paula Rogers Huff and Marshall Pecore[1]

1. LAND, FOREST, AND HISTORY OF THE MENOMINEE TRIBE

The Menominee Reservation is located in northeastern Wisconsin.[2] It is contained within Menominee County with which it shares the same borders. The reservation consists of approximately 235,000 acres of land, of which 220,000 acres are forested. Major tree species include white pine, hemlock, sugar maple, red maple, red oak, basswood, and yellow birch.

During the 1800s, Wisconsin was heavily lumbered for its white pine. The so-called Pine Barons bought and sold much of the standing timber in northern Wisconsin. According to Curtis (1959), the pine harvest was "the most thorough exploitation . . . of a single natural resource ever witnessed in Wisconsin." He reports that in the late 1800s, 3.4 billion board feet of pine timber were sent down Wisconsin rivers each year. The Menominee Forest escaped the ravage of the axe and became an island of large timber surrounded by agricultural land and regenerating forest. Landsat photos of the state of Wisconsin clearly show the boundaries of the reservation outlined by the darkness of the mature forest.[3]

Casual observers assume the Menominee forest to be pristine and untouched. Large diameter trees in a natural setting belie the fact that the Menominee Forest is one of the most intensively managed tracts in the Lake States. Over two billion board feet of lumber have been removed from the forest in the last 140 years, and yet the volume of sawtimber on the reservation is greater than when the reservation was established.

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[1] Paula Rogers Huff is the Director of the Sustained Development Institute, College of Menominee Nation; Marshall Pecore is the Chief Forest Manager, Menominee Tribal Enterprises.

[2] Appendix A presents social and economic background information for the reservation.

[3] Menominee County/Reservation is bordered by three counties: Langlade, Oconto, and Shawano. Of these, Langlade (which includes a portion of the Nicolet National Forest) has the most commercial forest land (66 percent); Oconto County has 53 percent commercial forest land; Shawano County 44 percent. Menominee County, on the other hand, is 94 percent forested. Agricultural lands account for well over 50 percent of the area in Shawano County, 25 percent in Langlade County, nearly 40 percent in Oconto, but less than 0.05 percent in Menominee County.

The Menominee look with pride on their forest and the forestry methods that have helped to maintain both the forest and the tribe. According to oral history, when the Menominee were faced with living on a small land base, the chiefs directed the tribe in the following manner, as quoted by Spindler and Spindler (1971):

> Start with the rising sun, and work toward the setting sun, but take only the mature trees, the sick trees, and the trees that have fallen. When you reach the end of the Reservation, turn and cut from the setting sun to the rising sun and the trees will last forever.

The forest is more than a source of income to the community, and this has contributed to the feeling that the forest should be properly managed to keep it intact for further generations.

The Menominee people are the oldest continuous residents of Wisconsin (Lurie 1980). The Menominee people originally claimed some 9.5 million acres in the United States, from the Escanaba River in the Upper Peninsula of Michigan south to the Milwaukee River and west to the Mississippi. Ownership of these lands was recognized by the US Government. Through a series of treaties (in 1828, 1831, 1836, 1854, and 1856) between the US Government and the Menominee Nation, these landholdings were reduced to 234,000 acres. The Treaty of 1854 established the boundaries of the reservation. The final Treaty of 1856 ceded two townships to the Stockbridge Munsee Indians of New York to use as their home.

In the 1800s, the land of the reservation was mostly forested. It contained vast tracts of pine, hemlock, and hardwood timber. These forests of their ancestors have always been very important to the Menominee people. When the US Government in 1850 tried to move the Menominee people west of the Mississippi (to eastern Minnesota), the Menominee's Chief Oshkosh refused to allow his people to be moved, saying that even the poorest of the Menominee holdings in Wisconsin was better than the land the US Government was offering. The Menominee Reservation was established four years later in 1854.

In 1887, Congress passed the General Allotment Act, which posed a serious threat to the Menominee Reservation and to the lands of other Indian nations. The government urged the Menominee to follow the lead of many other Indian nations in dividing their reservation into small parcels that would be owned by individual Indians. Under this system, the land would be in the hands of individuals who could do with it as they chose, even if that meant selling it.

The lands of many Indian nations were rapidly divided as a result of the General Allotment Act. The Menominee refused to participate in the Act and, therefore, maintained the collective land base that was instrumental in preserving the forest for the tribe. Today, the land remains in the collective ownership of the Menominee people.

Although given the reservation land as a home, the Menominee did not have full rights to manage their land. At first, the Menominee were only allowed to harvest dead and down

timber from their forest for their own use. As a condition of the treaty, a small sawmill was established at Keshena Falls in 1856 to meet the needs of the tribal community. It manufactured lumber, shingles, and other wood products.

The sawmill began manufacturing pine lumber for sale outside the reservation in 1871. This operation continued for 15 years. During that time approximately 100 million board feet of logs were cut for sale—all from dead and down timber. In 1890, the Menominee received permission from the federal government to cut green timber at an annual rate of 20 million board feet. This was the first attempt to calculate an annual allowable cut in the US. Over the next 17 years, 290 million board feet of timber were cut and sold.

Then, in 1905, a huge windstorm blew down approximately 40 million board feet of timber—twice the amount of the annual cut. This prompted Senator Robert LaFollette to argue on behalf of the Menominee people for the right to salvage the dead and down timber in addition to their allowable cut. The LaFollette Act was passed in 1908 and provided for construction of a modern sawmill at Neopit to help the tribe process this additional timber.

The role of the federal government was further defined in 1934 with the Indian Reorganization Act. This law established a trust responsibility for the Secretary of the Interior on behalf of the Menominee Indian Tribe. It called for the Secretary to "make rules and regulations for the operation and management of Indian forestry units on the principle of sustained-yield management." The Secretary defined sustained-yield management as "the yield of forest products that a forest can produce continuously at a given intensity of management."

The new sawmill complex at Neopit, built in 1908, allowed the Menominee to efficiently process their timber. In the 50 years following its establishment, more than one billion board feet were cut at the sawmill (Newell, Clow, and Ellis 1986). The sawmill profits, coupled with a successful lawsuit against the federal government for mismanagement of the forest, resulted in over $10 million in the Menominee Trust Fund by 1954. Meanwhile, the Menominee constructed a hospital and a clinic and established a law enforcement and judicial system. These successes were ultimately used to justify removing the Menominee people from federal protection through a plan called "termination." The process through which the Menominee ultimately consented to termination was a dubious one.[4]

The reservation was removed from federal trust protection status by the Menominee Termination Act, passed in 1959. This federal law continued to mandate forest management on a sustained yield basis. That requirement ensured the preservation of the forest and the tribal sawmill, which were the only significant sources of jobs, economic development, and

[4] A small number of Menominee people were polled and agreed to the concept of termination. However, the question of termination was tied to a $1,500 per capita payment from the Trust Fund. A positive answer approved **both** the per capita payment and the concept of Termination (Lurie 1980). The Menominee were told that the Senate would not approve a per capita payment unless the Menominee agreed to termination (Newell, Clow, and Ellis 1986).

tax revenue for the Menominee. During termination, the land was taken out of trust and the title was transferred to the tribal business, Menominee Enterprises, Inc. (MEI), and stock was issued to tribal members.[5]

Loss of tribal status proved devastating for the Menominee. In 1961, the Menominee Reservation became Wisconsin's 72nd county. The state assumed administrative and oversight responsibilities.[6] As a county, the tribe was required to pay state taxes on their land and submit to state jurisdiction. Building and sanitation codes had to be met, as did road standards. With the trust account dissolved and taxation of their lands specified by law, the Menominee began a downward economic spiral. The hospital and Bureau of Indian Affairs (BIA) schools were forced to close. MEI, trying to support the tribe and pay taxes, operated at a loss. One of the nation's most successful Indian tribes had become impoverished.

In an attempt to regain some financial security, MEI, with the assistance of a real estate developer, created the Legend Lake area.[7] Many of the Menominee people opposed this project, and, in the end, it did not provide enough revenue to help the Menominee recover from their financial problems.

Ultimately, the Menominee organized and rallied against Washington in an effort to regain their tribal status. In 1973, the federal government finally rescinded the order that had terminated the Menominee from federal protection. The Menominee were, once again, recognized as a sovereign nation through the Menominee Restoration Act. After restoration, MEI transferred assets back to the tribe, and the rights of members were restored. However, Menominee Tribal Enterprises (MTE), the successor business to MEI, had to take over the obligation of the bonds issued during termination and still carries that obligation today.[8]

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[5] Each of the 3,270 tribal members was allocated 100 shares of MEI. The members did not receive the stock directly. Rather, their rights were assigned to a Voting Trust. The Voting Trust was legally the shareholder of the stock and had the right to vote as they saw fit. Additionally, at the time of termination, each tribal member was given the per capita payment of $1,500 and issued a $3,000 income bond. The principal obligation of the bonds becomes due in the year 2000. On each bond there is a 4 percent annual interest ($120 on whole bonds) paid from the annual net income of MEI.

[6] The Menominee forest passed under the direction of the State of Wisconsin's Conservation Department (now the Department of Natural Resources). It was managed with the provision that the forest continue to provide forest products to the Neopit sawmill yet still be protected from exploitation.

[7] A large lake was created by damming up several small lakes and marshland. Hundreds of lots, constituting some 4,000 acres, were sold to non-Menominee at premium prices in an attempt to raise both revenue and the tax base of the county.

[8] The Voting Trust transferred the MEI stock to the Tribe. The stock was held by the Restoration Committee until the Menominee Tribal Legislature was constituted. The US Government paid $1 for each of the 327,000 shares of MEI stock. This was then distributed to the certificate holders, and the Voting Trust was dissolved. MTE has met its obligations to bond holders each year except one, when a partial payment was made. Some of these bonds were purchased from their original holders during a redemption

2. CURRENT STATUS OF RESOURCE TENURE AND COMMUNITY GOVERNANCE

With the restoration of Menominee tribal status, title to the land was once again transferred to the Secretary of the Interior to be held in trust for the Menominee people. This accomplished two things. First, it removed the tremendous tax burden that occurred when the Menominee lost reservation status. Secondly, the lands were better protected through the power of the Secretary. In trust status, the lands cannot be sold or traded without congressional approval.

As part of the restoration process, the tribe entered into the 1975 Trust and Management Agreement with the Secretary of the Interior. That agreement gives the Menominee Tribe the right to manage its forests (with oversight from the federal government), but with the provision that the tribe cannot sell or trade land without congressional approval. The agreement, which is still in effect, requires the tribe to develop and follow a forest management plan which "shall provide for the continuing operation of such land on a sustained yield basis." The management plan is developed by MTE's forestry personnel, approved by the tribal legislature, and then submitted to the Secretary of the Interior for approval. The forest management plan can be amended as long as it meets federal guidelines. The Secretary of the Interior must approve the management of the Menominee forest annually and has a trust responsibility to protect and improve forest resources for future generations. Through the BIA, the Secretary provides the ways and means to manage the forest for all the things the tribe wants for its own use, including timber and recreation.

The Trust and Management Agreement requires the Secretary of the Interior to provide services to manage the forest. In fact, the tribe carries out this duty and is reimbursed by the Secretary. The government provides the financial support for the forestry operation including salaries, operations, and support services. Two foresters from the BIA, as representatives of the Secretary of the Interior, are stationed at the Menominee Forestry Center. Also at the Forestry Center, at the request of the tribe, are staff from the Department of Natural Resources who are paid with federal funds.

2.1 Tribal government

The Menominee Indian Tribe of Wisconsin is a self-governing, sovereign nation, recognized by the US government. Through the Constitution and Bylaws of the Menominee Indian Tribe of Wisconsin (adopted in 1976 and approved by the Tribal Council, tribal members, and the Secretary of the Interior), the tribe has the power to set its own laws and the methods to enforce them. Menominee government consists of two separate and equal branches: a) the Menominee Tribal Legislature (MTL), which has sole power to enact laws

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period in December 1993. This was the only open redemption that has been offered. Occasionally, the board will approve the buy-back of a bond under special circumstances, such as hardship cases. About 60 percent of the bonds have been purchased, at fair market value.

and provide the mechanisms to enforce them; b) the Menominee Tribal Judiciary, which interprets laws and resolves controversies.[9] Anyone who enters the reservation, tribal member or not, is subject to tribal jurisdiction and must abide by tribal law. Tribal law enforcement officers also have the authority to enforce state laws on the reservation. The Federal Bureau of Investigation takes over in major crimes such as murder, rape, or armed robbery.

3. FOREST USE AND ITS CONTROL

3.1 Traditional resource use and control

Traditionally, the Menominee lived by hunting, fishing, and gathering. The forest provided them with everything they needed, including food, shelter, and clothes. Dwellings were constructed from small trees and covered with the bark of cedar and birch. Clothes were made from animal hides. Food was plentiful and included fish, game, berries, and wild rice. Birch bark was used in making everything from food containers to canoes (Ourada 1979), and plants were used extensively for medicinal purposes (Smith 1923). Porcupine quills, sometimes tinted with plant dyes, were used to decorate clothing and artwork (Ourada 1979). When the white people came, the Menominee expanded their use of the forest to include trading furs for supplies.

Today, many Menominee remain close to the land. Tribal members have "the right to hunt, fish, trap, and gather food from plants subject only to those tribal laws which are necessary to conserve these natural resources of the Tribe; **provided that** this right shall not include the right to engage in commercial uses of such tribal resources; such right is reserved to the Tribe acting through its Tribal Legislature" (Menominee Tribe of Wisconsin 1967). So, the right to hunt and gather food is reserved for tribal members for their personal use. They do not have the right to sell food taken from the forest for commercial purposes.

Many members of the tribe still use their hunting and fishing rights. Hunters take about 1,000 white-tailed deer and 100 bears per year. Rabbits and squirrels are also harvested, as are, to a more limited extent, ruffed grouse. Wild game, no longer a household staple, is considered a delicacy. Trapping beavers and muskrats provides food and income from furs. Hunting on the reservation has become more regulated in the last few years as a result of the adoption of the Menominee Tribal Hunting Code. The harvesting of food and medicinal plants is not regulated, so there are no figures available on the number of

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[9] MTL is composed of nine members of the Menominee Indian Tribe, seven of whom must be residents of the reservation. They are elected to fill three-year terms of office. The tribal judiciary is composed of a Supreme Court (with three Judges) and the lower courts. Judges are appointed by the vote of two-thirds of the MTL. The Supreme Court has jurisdiction over the appeals from the lower courts and is the "final and supreme interpreter of this Constitution and Bylaws, and all tribal ordinances" (Menominee Tribe of Wisconsin 1967).

households that participate or the amount of material that is harvested. Picking blackberries and raspberries on the reservation is a major fall activity for many tribal members. Some tribal members collect plants for medicinal uses. Wild rice, once a staple of the Menominee, still grows in the waters on the reservation, but the harvesting method is long and arduous. Most members find it easier to buy it at the store.

In the late 1800s, the tribe was involved in the maple syrup industry (Ourada 1979). Many members still collect maple sap and process it into maple syrup. One tribal member does so with the local high school students in order to help them preserve a portion of their culture.

Today, only non-food products are sold to outsiders, including the timber and wood products of the community-controlled enterprise. Some individual tribal members gather moss and other greens and sell them to floral product companies. Some sell cedar boughs. The biggest market is for ginseng, commonly called shang. There are several Menominee who gather shang on a regular basis and sell it to dealers in Wausau. It is then exported to China. Ginseng gatherers are very protective of their sites and careful in their collection methods. They always bury the seeds to ensure that they do not deplete the supply of ginseng.

Tribal members are allowed to cut firewood on the reservation. To do so, they must first get a Use Permit issued free by the Forestry Department. The permit allows for the harvest of 25 face cords of firewood, 100 cedar posts, and any number of evergreen boughs. About 350 people apply for the permit each year, and it is estimated that this amounts to about 3,000 cords or 1.5 million board feet of timber per year.

The Menominee have deep feeling for the forest, and that feeling guides their use of the forest. According to tribal chairperson Glen Miller, the Menominee are accustomed to being poor. Financial gain is not the driving force behind the Menominee and their forest. They have always been conservative in their dealings with the natural resources. As one elder said, "Everything we have comes from Mother Earth—from the air we breathe to the food we eat—and we need to honor her for that. In treating the forest well, we honor Mother Earth."

3.2 The timber management plan and forest monitoring

More than two billion board feet of timber have been harvested from the Menominee forests in the last 140 years, yet over that period the volume of sawtimber has remained constant or has increased. The policies and methods currently used to manage the Menominee Forest are described in the forest management plan, which details the harvest schedule, the compartment cutting system, the silvicultural prescriptions, and the monitoring system that provides information for determining the annual allowable cut of timber.

The impact of harvesting on the tree species is strictly monitored using two inventory systems: the Continuous Forest Inventory (CFI) and the Operations Inventory (OI). Ecological

monitoring for the specific purpose of assessing the impact of harvesting on the community's ecosystem has not been done.

The CFI monitors the forest health, including the area, volume, and condition of the timber, to determine how much of the forest can be harvested annually or over a longer period. The CFI consists of a systematic grid of permanent plots on which a number of variables (strata) are periodically remeasured. Thus, observers can track changes in the forest due to the forest management practices or natural occurrences. The present CFI system was begun in 1963 and collects detailed data on individual trees as well as the plot using the same techniques at each measurement.[10] This repetitiveness allows for direct comparison of data from one measurement period to another. The CFI is a refinement of a forest-wide inventory designed in 1959 to measure the volume and condition of the forest. Since the CFI system has been implemented, there have been four complete forest inventories. Recently, the Menominee have begun to track an additional variable—habitat type—in order to analyze the optimal habitat potential for a given site.

The OI System was installed in 1987-1989, and it monitors all forest land in order to determine where the timber types described in the CFI occur. Data are collected by stands, which are areas of like species (and other characteristics) growing together in uniform fashion. Stands are delineated from each other and identified in the OI database. Data common to both CFI and OI systems (such as cover type) are collected with the same specifications, allowing information from both inventories to be merged. This detailed stand information provides the basis for planning when and where to cut. Basically, the CFI is used for volume control and the OI for acreage control. A Geographical Information System (GIS), a computer based mapping system, is used to combine information collected through the CFI and the OI. GIS produces acreage information and graphical presentations (maps) of the data.

Biological inventories on the reservation have been limited. The only inventory of mammals was done in 1929 (Komarek 1932). Preliminary inventories of vascular plants (Goff, Zimmerman, and Zedler 1964) and birds (Gordon 1964) were done some 30 years ago. Since that time, some assessments of individual populations have been done—these were mostly aimed at game species and other higher vertebrates. The Menominee have identified the need to collect baseline data, and many inventories and surveys have been initiated or

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[10] The CFI consists of 941 permanent plots, each a 1/5 acre circle, set out on a roughly 3/4 mile by 3/4 mile grid throughout the forest. All commercial trees 4.96 inches or greater in size are measured in great detail. Trees smaller than the 4.96 inch diameter are counted on a 1/100th acre plot for precommercial tree estimates. Data regarding the entire plot are also collected and recorded in the database.

The large number of sample plots was installed to adequately monitor important subgroups or strata across the forest. One important strata is the cover type. The most important cover types are included with this intensity of sampling. Recently, an additional strata for habitat type has been defined, in order to analyze the forest condition based on site potential.

Each sample plot in the Menominee CFI represents 248 acres, not necessarily contiguous to the plot. Analyzing the representative sample indicates positive or negative trends for the forest.

planned. Appendix B describes these surveys and inventories and their implementation schedules.

Several significant changes have taken place in the forest resource over the past few decades. One is the reduction of forest land by housing, which could further diminish as more tribal members return to the reservation, attracted by increased economic development.[11]

The second change is the incremental transformation of the forest towards the northern hardwood cover type, mostly composed of hard maple with some beech, basswood, and yellow birch. It is a climax cover type that can occupy most sites on the reservation. Species in this type tend to show high vigor and, therefore, often remain after treatment because current forest management practices select the low vigor, high-risk trees. The forestry staff sees this as a problem since it could lead to a monotype across the forest. Silvicultural prescriptions are being modified to allow for the enhancement of species that do not regenerate well under historic single-tree prescriptions. With the use of a habitat classification system (Kotar, Kovach, and Locey 1988), sites are identified and assessed for their biological potential. Future management plans will use suitable silvicultural prescriptions to select for the most productive species on these sites. This will eventually lead to a more diverse forest composition of a higher quality.

A third positive trend is the increase in sawlog volume and the quality of the trees. Since 1963, the forest sawlog volume has increased to 1.7 billion board feet (a 13 percent gain), thereby meeting the tribe's objective to grow quality hardwood sawlogs. As the forestry staff continues to match sites with their potential, the volume and quality of sawlogs should continue to increase.

4. Organization of Production: The Menominee Forest and Timber Processing Mill

MTE is the principal business arm of the Menominee Indian Tribe of Wisconsin, operating under authority of the tribe's constitution and bylaws and directed by the forest management plan. The constitution empowers MTE to manage and operate the tribe's business assets, including "to log, manage, and reforest tribal forest land, and to manufacture, market, sell, and distribute timber, forest products, and related products." MTE manages and operates the property and subsidiary businesses within its scope of authority. Property includes the mill, forest land, and the property owned by the business. MTE has the power to buy and sell land and other property.

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[11] The tribe removed 5,200 acres from forest production in the 1960s in an attempt to generate income during termination. Since then, housing needs have removed another 1,000 to 2,000 acres from production.

MTE is run by a 12-member board of directors, which establishes overall policies and objectives for the management of MTE's affairs and assets, and evaluates management results. Board members must be enrolled tribal members and are elected by other tribal members for a three-year term. The present board is composed mostly of people who work at MTE.

The board of directors hires the president whose responsibilities include general supervision and management of the business affairs of the tribal enterprise. The president is an ex-officio member of all standing committees and has the general powers and duties of supervision and management usually accorded the president of a corporate body. Reporting to the president are seven department managers: Mill, Forest, Sales, Personnel, Purchasing, Financial, and Management Information Systems.[12]

Management personnel have worked for MTE an average of 22 years. The average mill worker has been with MTE for 13 years. Technical positions include lumber inspectors, electricians, head filers, head sawyers, and edger. Mill workers are trained on the job by other operators or through training workshops. These include extension and industry association short-courses, sometimes several months in duration.

Positions within the forestry enterprise are filled according to Ordinance 82.10 of the Menominee Indian Tribe. This ordinance ensures that qualified Menominee are hired first. If no qualified Menominee apply for the job, hiring is done in the following order: descendants of Menominee tribal members, spouses of tribal members, and other Indians. Non-Indians are hired only if there are no qualified people from the other categories.

The Menominee Tribal Legislature has no operational authority over MTE. However, by constitution, it does retain the authority and power to "exercise all proper governmental and sovereign functions over the property managed or owned by the Successor Business (MTE)."

4.1 Production equipment

MTE owns all the mill's production machinery and mobile equipment.[13] In 1975, the mill underwent a complete renovation to upgrade the facility. Managers feel that the current level of technology and the capacity of the equipment is sufficient to meet present production needs. The MTE has newer and more technically advanced equipment than the majority of

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[12] MTE headquarters, which houses all administrative staff except for forestry, is located near the mill in Neopit. Forestry staff is housed at the Forestry Center in Keshena.

[13] Production machinery includes a full two-sided carriage band sawmill with kilns, rolling stock, and surfacing equipment. The mill's mobile equipment includes five 45-foot trailers. MTE leases two tractors to transport lumber. The road crew owns two bulldozers, two road graders, two front-end loaders, and three heavy dump trucks (16-yard, 5-yard, and 7-yard).

sawmills in the region. Within the last two years, improvements have been made in maintenance, carriages, and in the trimmer area. MTE plans to buy a new debarker.

The logging contractors own all their equipment. Most buy used equipment as new equipment is very expensive. Loggers are highly skilled, and turnover is low. Training is usually provided by the contractors, although most of the loggers have worked elsewhere and acquire skills before they come to work on the reservation.

4.2 Wood processing

The mill at Neopit operates throughout the year, with a two-week shut-down period for repairs. On average, the mill processes 10 to 11 million board feet per year into cut, rough, or finished lumber, as well as specialty products, depending on customer specifications.[14] Wood processing procedures are explained in greater detail below.[15] The mill utilizes everything, including log waste and bark. If the bark cannot be sold, it is used for boiler fuel heating the dry kiln, as is the sawdust. Log waste is chopped up in a "hog" and sold to pulp mills.

As noted previously, the mill was built in 1908. Several improvements have been made since that time, including modernization of the primary facility in 1975. Technical training of many employees (primarily through a national lumber inspector training program in Memphis, Tennessee) has yielded significant improvements. There are trained people in all phases of the operation. Training workshops have improved maintenance (for example,

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[14] The mill is budgeted for 34,000 board feet of hardwood per day (log scale) or 60,000 board feet softwood per one eight-hour shift. Until a few years ago, the mill ran two shifts per day, and now runs one eight-hour shift per day.

[15] Logging trucks bring logs directly to the mill log yard. There the logs are scaled for volume, and sorted by grade and species. Log-quality pulp logs and veneer logs are sold at this point. Sawlogs are loaded into the debarking area where, depending on their diameter, they are run through one of the two debarkers (MTE owns a HMC, Rossier Head debarker, and a Nicholson ring debarker). The scale is again recorded on the debarked logs. Subsequently, the logs are delivered into the mill on a bull-chain conveyor. Logs are processed down to a cant with two separate carriage band saws with computer-assisted headrigs (using thin kerf technology). Lower grade lumber is sent to the resaw. Lumber is sent to the edger, where it is edged for width, and finally trimmed for length. The grader inspects the lumber, after which it is scaled and sorted by length or grade per customer's order. It may be sold green at this point, or sent to the dry kiln. MTE operates four dry kilns, two at 60,000 board feet capacity and two at 25,000 board feet. MTE is now analyzing the net present value projection on expanding dry kiln capacity to maximize the value of selling dried product to new value-added machine centers. In addition, MTE operates a pre-dryer with 120,000 board feet capacity. Steam for these kilns is generated by two boilers with water tube capacity of 25,000 to 35,000 pounds for four-hour peaks. The boilers are also used to heat the production facility. MTE has three dry storage sheds with a total capacity of 1.75 million board feet. MTE operates a Yeats planer and two molders with several well-trained operators, exacting the production of quality crafted finished products.

boiler maintenance, electrical efficiencies, and kiln maintenance) and increased mill efficiency. In addition, MTE recently installed an advanced quality control system that focuses on cutting for grade and maximizing recovery. This initiative included the hiring and training of a Quality Control Coordinator. Finally, MTE has a fully-equipped machine shop with a skilled staff who provide "in-house" repairs and equipment maintenance. Their work includes equipment design improvements and "inventions" that improve the efficiency of existing equipment and dramatically reduce downtime. Skilled mechanics with a well-equipped garage maintain mobile equipment and rolling stock.

4.3 Revitalization and value-added processing

MTE recently began a strategic planning process to address the future of the forestry operation. A revitalization project is addressing inefficiencies in the primary wood processing facility with the goal of reducing operating costs.[16] Expanding value-added processing is expected to reduce raw materials sales to downstream manufacturing and to increase Menominee income. Plans for increasing secondary processing include: improving dry-kiln capacity, implementing cut-stock and finger jointing, establishing an efficient small-diameter/length log mill.

5. MARKETING

The Menominee system of sustained yield forestry presents distinct advantages as well as challenges with respect to marketing. Successful marketing requires detailed planning because the harvested species are not always the ones that are in demand. Until 15 years ago, MTE used a broker to market its products. Now they have a marketing department with two full-time salespeople, and one part-time employee. Both full-time people are lumber graders, which adds to their ability to sell the product. The MTE salespeople are shown a "menu" of timber to be harvested in the next year. From that, they plan a marketing strategy.

When MTE first started marketing its own products, the difference between market demand and product availability was a problem. However, the marketing department developed clientele, educated them about the Menominee harvesting system, and soon found they had loyal customers. MTE's established customers recognize that the Menominee produce quality timber. Customers initiate the procurement process with enough lead time for their particular needs. There is a steady customer base and order file for Menominee lumber, which commands a premium price. The mill has an excellent record of filling orders with quality products.

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[16] Efficiency is expected to improve through the following measures: a) introducing a more energy-efficient electrical system (that is, soft-start motors); b) replacing inefficient lighting with a high-tech lighting system; c) improving steam plant efficiency, including recovery of heat; d) reducing log waste through utilization of thin kerf technology; e) upgrading machinery to reduce down-time; and f) introducing quality control measures.

MTE is mainly a wholesaler of its merchandise, selling throughout the US and in international markets. It directly markets all products, which includes lumber, sawlogs, veneer logs, and pulpwood of the following types: hard maple, basswood, beech, red oak, soft maple, birch, aspen, white pine, red pine, hemlock. Fifteen high-quality finished wood products are currently available through MTE.[17] MTE owns three semi-trucks for hauling products throughout the midwest, although most customers arrange to haul their own goods. Two major US highways link the reservation both regionally and nationally, and there is a railroad spur to the mill.

Most of the product (85 percent) goes to customers who are end-users, 10 to 12 percent is for distribution, and a small portion is sold for retail or brokerage.[18] MTE markets to local small-dimension plants and to paper mills. They sell specialty woods to local manufacturing corporations for production of items such as windows and venetian blinds. Wood chips produced in processing are sold to paper mills for pulp, and shavings are sold to a company that processes them for animal bedding. When necessary, bark and chips are used as fuel for the MTE steam plant. Domestic buyers purchase 90 percent of the lumber processed at the mill.

In most years, MTE has not made a profit. Primarily, this can be attributed to the tremendous burden placed on MTE as a result of nearly two decades of termination and the resulting bond indenture. Other contributing factors range from economic situations to natural disasters, like the tornado of 1983 that blew down large amounts of white pine. For the last two years, however, MTE has shown a profit. In 1993-94, the profit amounted to nearly $1,700,000. This recent turnaround is attributable to a new philosophy of progressive management, new market penetration, and rigorous planning for growth to capitalize on emerging markets.

The issue of profit is a complicated one because MTE does not pay for the management of the forest resource. Through the arrangement in the Trust and Management Agreement, the Secretary of the Interior has an obligation to provide services for the benefit of the forest. These services (including fire protection, inventory assessments, and insect and disease control) would be provided whether the Menominee harvested their timber or not. These federal reimbursements entail much more than management for timber production, so it is difficult to sort out the cost of timber management alone. This professional management goes far beyond the services for which most forestry enterprises would contract.

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[17] Finished wood products include S4S stock, S2S stock, W.P. 4, W.P. 6, W.P. 116, SIS2E, decking, log siding, drop siding, shiplap siding, channel lock, bevel siding, moldings, paneling, wainscoting.

[18] The mill maintains a retail lumber yard where local tribal members can buy lumber at a reduced cost. It is a small operation and not advertised at this point—some tribal members are unaware of its existence.

The allowable cut on the Menominee Forest is 29 million board feet per year. Next year, the mill is expected to cut about 12 million board feet, considerably below its capacity of 20 million board feet. The remainder will be sold as veneer, pulp, sawbolts, and sawlogs to be processed elsewhere. The decision not to process the latter is based on economies of scale and the design of the existing mill, which does not allow for the efficient processing of smaller material. The sawmill at Neopit is well-equipped for primary processing of lumber, but that is not the area of most attractive profit in the lumber industry.

6. FUTURE STRATEGIES

In the past two decades, the trained and educated workforce on the Menominee Reservation has expanded considerably. This growing professionalism has contributed to the development and implementation of new strategies. MTE's long-term strategic planning seeks to eliminate inefficiencies in the primary wood-processing facility and to diversify and increase value-added processing. Furthermore, developing "green markets" through Green Cross Certification has enabled the Menominee to secure premium prices for their sustainably-produced lumber. This certification, conducted by Scientific Certification Systems of California, was the first of its kind awarded to a US timber producer (Landis 1992). In addition to green markets, MTE has been developing international markets (for example, for hemlock studs in Japan and hard maple in the UK).

Recently, the Menominee entered into an agreement with the Oneida nation to explore mutually beneficial economic development strategies. The Menominee have the forest resource and the mill. The Oneidas are favorably located near a population center and harbor and need to develop their business enterprise to serve a growing community. The two nations have formed the Venture Analysis Team which will be looking at possible ways the nations can work together to benefit the communities.

7. THE FORESTRY ENTERPRISE AND THE LOCAL ECONOMY

From its inception, the mill and the forestry enterprise have been the backbone of the tribal economy.[19] The mill has provided jobs for tribal members for nearly a century. The forestry enterprise directly generates hundreds of thousands of dollars in salaries and benefits to its employees and gives predictable work to the logging contractors and their employees. Nothing surpassed the forestry enterprise's impact on tribal economy until a casino operation was inaugurated in 1987.

The casino has generated a great deal of income for the tribe, which has invested most of the profit into services benefitting the community. Because of the casino, starting wages

[19] The reservation has a few small retail operations, several contractors (construction, electrical work, and plumbing), but no manufacturing.

for unskilled labor on the reservation are higher than in surrounding counties. Jobs are plentiful at the casino and pay well. As a result, other area employers must meet casino wages in order to attract employees. (Appendix A presents more information on employment and incomes.)

Over the past four or five years, the tribal economy has improved significantly and has become more resilient because of diversification through gambling, service-based businesses, and retail outlets. Current economic development has produced a high multiplier effect which has increased spendable income on the reservation.

Yet, even though the gambling operation brings millions of dollars each year into the tribal economy, people still regard the mill as the foundation of their economy. The Menominee see the mill as successful and stable, while the new economic ventures are viewed with uncertainty. Over the years, several community ventures have failed (for example, trusses, firewood, and industrial sewing), but the mill has always remained.

The mill has been a consistent provider of jobs for tribal members. The mill operation is not supplying the community as a whole with much income at this point. Although mill profits can be distributed to tribal members through MTL, they are currently reinvested for mill upkeep and improvements in order to cope with the incredible burden placed on MTE through the bond issue (see discussion of interest payments on bonds, above). According to Wendell Irving, chairperson of MTE's board of directors, "Some members just don't understand that if they took lump sum payments, they wouldn't get much. Three million dollars sounds like a lot of money, but if it is divided among 6,000 members, each would only get 500 dollars." Generally, most members are satisfied with the benefits of the forestry enterprise. It has provided steady income for many tribal members, and it conserves the ancestral forest.

8. Summary and Analysis

The Menominee people have lived on the reservation since 1854. Most of their land was forested then, as it is now. Yet, in those 140 years since 1854, the forest has been intensively managed—yielding some two billion board feet of timber. Still, visitors come to the reservation and marvel at what they perceive to be a pristine forest, unaware of the intensity of management.

The success of the forestry enterprise on the Menominee Reservation is rooted in the community. The tribal members maintain the enterprise—through their support of the harvest methods and their refusal to allow their forest to be degraded. To develop a market-oriented forestry enterprise that is ecologically and socially sustainable as well as economically feasible requires a society that is well-balanced with respect to these areas.

From an economic standpoint, the Menominee could be very wealthy if they chose to liquidate their forest, but that is not considered an option. The Menominee do not look at their forest just as a source of economic benefit. Thus, they continue to manage the forest as their ancestors did—for their children and their children's children.

If the Menominee ignored ecological concerns, they could also make a great deal more money. They could produce a monoculture of an economically beneficial species like red pine and cut and replant on a short rotation. They could push their forest in whatever direction that they think the market will go. They could cut based on market demand. But that is not what they have chosen to do. They have chosen to manage so that the diversity of species remains.

Menominee culture and society also contribute to this balance and, ultimately, to a successful forestry enterprise. The Menominee have been taught to respect all living things, and that respect is always there even when it is necessary to harvest. A tribal artist and elder, James Frechette, explains it this way, according to Wrone (1988):

> That whole practice of harvesting and processing (the wild rice) was formalized to the extent that the collection and preparing were carried out ceremonially. That is, it included the relationship of the people with the surrounding world and respect for its preservation.

The philosophy of the culture itself puts constraints on the harvest of the timber and also on the harvest of other forest materials. If a tribal member takes more than what is perceived by others to be necessary, whether it is game, ginseng, or firewood, other tribal members will let him or her know about it. Overuse is simply not tolerated. The communal attitude toward the forest is that of taking what is necessary, but nothing more than that.

A society that is skewed toward economic gain may well decide to overharvest the forest to reap immediate financial gain. A society driven by a culture oriented toward subsistence use may not be able to harvest at all. A society where the members cannot agree on goals, or changes them depending on the current power structure, will not be able to direct effective management of a community enterprise. The Menominee have been able to balance economic, cultural, and ecological values to maintain sustainable forestry.

8.1 Resource tenure and control of resource use

As a result of regaining tribal status, title to the Menominee's land is again held in trust by the federal government. The 1975 Trust and Management Agreement, however, gave the Menominee far-reaching rights to manage their land and resources. The people, through their elected MTE board, have the power to influence how the forest is to be managed. MTE is responsible for the development of a management plan that directs the forestry operation. The forest management plan is written with long-range goals that ensure both the productivity and maintenance of the forest. The plan is, by design, rigid enough to withstand the "more ephemeral Tribal concerns" (Menominee Tribal Enterprises 1988).

Tribal mandate dictates that the Menominee Forest be managed for maximum quantity and quality of sawtimber while maintaining like species. In other words, the Menominee forest is managed for production while preserving existing components of the forest. Fluctuating market demand does not influence management of the forest.

8.2 Impact of management on the forest resource and ecosystem

The Menominee's sustained yield system appears to retain the structural composition of the forest and has maintained the volume of sawtimber, which today equals (or may even surpass) the volume standing when the reservation was created even though over two billion board feet of timber have been harvested. Furthermore, a broad approach to management—one that focuses on forest cover types rather than on single species—has apparently preserved the diversity of the forest. It may be this diversity that has helped the Menominee Forest survive in the wake of natural disasters, such as insect infestations. Although biodiversity for the reservation as a whole has not been assessed, the foresters believe that this broad approach to management sustains rather than degrades the ecosystem.

Two indicator species that are commonly used to gauge ecological health in the northern forests of Wisconsin—hemlock and Canada yew—are relatively abundant in the Menominee forest. However, as noted above, no comprehensive biological inventories have been carried out on the reservation although the Menominee are in the initial stages of collecting baseline data for plants and animals.

Management of the Menominee forest has, of course, had an impact on the ecosystem. The CFI plots which are used to inventory species composition over time have shown that the composition of the forest has shifted to northern hardwoods as a result of the harvesting system. Fire suppression, too, has caused changes in the composition of the forest. Logging, along with building and maintaining roads, causes some environmental damage in spite of strictly enforced guidelines. Spraying of herbicides, although benefiting some species, does so at the expense of others.

8.3 Economic viability of the enterprise and the community

The Menominee have an incredible strength in their integrated forest management and processing facility. Management of the Menominee Forest with sustained yield practices has presented challenges as well as advantages both in marketing and in processing. Processing and marketing are always tied to the resource and the annual allowable cut. While this can present some interesting challenges for marketers, it has positive ecological consequences for the forest because market demand does not affect management decisions; rather, marketing responds to the resource. The forest drives the mill, the mill does not drive the forest.

At the moment, MTE is in need of some changes. There are major revitalization and diversification plans for the mill, which include added kiln capacity, dry storage, and value-added processing. Such changes will allow the mill to build inventory and process products in response to market demands. It will also give MTE more flexibility than it has had in the

past and the opportunity to develop a better marketing plan. With small-dimension log milling and more secondary production and product lines, the Menominee will be able to add more value to their products. The Menominee will increase community employment levels and enterprise profits without harvesting more trees. Green Cross and Smart Wood certifications will help Menominee wood command premium prices. Other new markets will allow the Menominee to sell products like paneling with knot holes, hemlock, big timber, and manufactured products such as windowsills and cabinets.

Managing forests for timber alone underutilizes potential income and benefits. Non-timber products, such as medicines, food, or crafts, are not providing tribal members with much income at this point, and it is uncertain whether individual members are interested in pursuing this opportunity. Tribal ventures such as tourism, which supplements the White River Apache's forestry operation (Davis 1993), have not been explored.

With over half of the enrolled tribal members living off-reservation, there are perhaps more pressing problems than the issue of income generation and distribution. The number of people returning to the reservation may grow as economic opportunities continue to increase on the reservation. Land use and the question of a burgeoning population is one that needs immediate attention. The tribe is in the process of developing a comprehensive land use plan that will be ready in 1999. At present, the land allocated for housing is limited. If land is removed from forest production to accommodate housing needs of tribal members, the volume of timber produced will decrease. Recently, the tribe purchased land in Shawano County to develop into a residential community.[20]

The forestry enterprise is considered by the Menominee to be the backbone of their economy, and there is general community consensus that the forest needs to be maintained for economic reasons. Yet, it is probably the Menominee dependence on the forest for cultural survival that has provided the real motivation to maintain their forest. If this is true, and the forest survives in its present condition because of traditional cultural beliefs, any cultural devaluation is a potential threat to the forest.

The forest has provided the Menominee people with employment, economic benefit, and a strong tie to their cultural heritage. If we look at the reservation as a whole, including humans and their needs as part of the ecosystem, harvesting has not been detrimental. Current management practices using sustained-yield forestry do not seem to compromise ecological sustainability. At this point, without more information, we can only look to the forest and see a healthy productive system and assume that our history proves that what we are doing works. For over 100 years, forest management has maintained both the forest and the people, and we expect that it will continue to do so.

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[20] The community, called Middle Village, is located between Keshena and Neopit and is expected to provide housing for about 500 people. Eight acres are designated for commercial development.

APPENDIX A: SOCIAL AND ECONOMIC BACKGROUND INFORMATION

According to the 1990 census, the total population of the reservation (not including Menominee County) was 3,411. Ninety-four percent of the population listed their race as American Indian. The population is steadily growing, and, as of August 1994, there were 3,539 enrolled members of the Menominee Indian Tribe of Wisconsin living on the reservation.[21] Another half of the tribal members (3,768) live off the reservation (Enrollment Office, personal communication).

The reservation is considered rural. Population centers include Keshena (pop. 685) Neopit (pop. 615), two smaller settlements (Zoar and South Branch), and a clustering of homes along Legend Lake (US Census 1990). A 1989 census showed a total of 934 households on the reservation in 1989. (A household is defined as all the people who live in a housing unit.) Of these households, 177 were located in Keshena, 161 in Neopit, and the rest in more rural areas. English is the primary language spoken in these households, although the Menominee language is spoken in about 15 percent of the homes (US Census 1990). In the last five years, there have been an average of 114 births and 33 deaths per year on the reservation (Center for Health Statistics, personal communication).

Sixty-one percent of the people living on the reservation in 1989 had at least a high school education. Of that number, 15 percent had some college training but no degree; 3 percent had associate degrees; 3 percent bachelor's degrees; and fewer than 1 percent graduate degrees (US Census 1990).

According to the 1990 Census, more than half (52.1 percent) of the people on the reservation were living below the poverty level in 1989. The median reservation household income in 1989 was $13,139, while that of the state of Wisconsin was $29,442. The mean family income on the reservation was $19,778, while that of nearby Shawano County was $32,919. The per capita income on the reservation for persons 15 years and older was $5,134; for Shawano County it was $10,586.

The Menominee Indian Tribe of Wisconsin is responsible for the administration of tribal programs. It employs 621 people, of whom 440 (71 percent) are Menominee, 24 (4 percent) spouses of Menominee, 17 (3 percent) are descendants (that is, a first or second generation offspring of an enrolled member), 7 (1 percent) are both spouses and descendants, 9 (1 percent) are other Indians, and 122 (20 percent) are non-Indian.

The Menominee Tribal Gambling Corporation (the Casino, Bingo, and the Crystal Palace) employed 484 people in 1993. Of these, 83 percent were Menominee, their spouses, or descendants.

MTE employs 170 people. One hundred (all Menominee) are employed at the mill, 40 (22 Menominee) at Forestry, 20 (15 Menominee) in the MTE office building, and 10 (all Menominee) in outlying areas. Currently, there are 26 logging contractors on the reservation, of which 15 are Menominee. Of the 143 crew workers, slightly less than half (68) are Menominee. MTE had a profit of $1,679,780 (salaries=$3,658,849) in 1993.

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[21] Enrolled tribal members have at least 1/4 Menominee blood, although there are some exceptions. Prior to 1953, a child born on the reservation was automatically enrolled.

APPENDIX B: BIOLOGICAL INVENTORIES

Birds

Breeding Bird Survey. Since 1991, personnel from the Wisconsin Department of Natural Resources (WDNR) have assisted the Menominee Conservation Department (MCD) and the Forestry Center in monitoring the presence and relative abundance of breeding birds on the reservation.

Ruffed Grouse. Surveys to monitor ruffed grouse population trends include Drumming Counts (a count of sounds of birds beating their wings in a spring mating display), tracked since 1991, and the Ten-Week Brood Observation Survey, initiated in 1994 to monitor reproductive success. The surveys are conducted by MCD, the Forestry Center, the Sustained Development Institute (SDI), and WDNR.

Eagles and Ospreys. The WDNR conducts an annual survey (since 1991) that monitors the location of nests through aerial searches and reproductive success through nestling banding.

Woodcock. Singing calls ("peenting") are counted each spring (since 1978) by MCD personnel for the US Fish and Wildlife Service.

Mammals

Furbearer Survey. The Northern Furbearer Track Count Survey, conducted intermittently over the last two decades, provides an index to the population size and the distribution of furbearers such as bobcat, coyote, fisher, otter, marten, and fox. In the past, the surveys were conducted cooperatively by WDNR and MCD. MCD and SDI plan to greatly expand them in the future.

White-tailed deer. To date, the deer population has been estimated by pellet-group counts. To get more accurate information, biologists on the reservation will begin estimating the number of deer on the reservation with the Sex-Age-Kill (SAK) method used in the rest of Wisconsin. The MCD, in conjunction with SDI, will gather information for the SAK by determining the age of deer harvested in Menominee County during the gun deer season. Reproductive trends will be monitored through Summer Deer Observations which will give an estimate of the number of fawns that are born in spring and survive until the fall harvesting season.

Bear. Bear registration is now required on the reservation. Beginning this year, MCD and SDI will take tooth samples (premolars) from bears to determine their age. From this information, a model can be constructed to estimate the population. Trends in population levels over the last few years have been evaluated using the information collected by the WDNR on annual Bear Bait Surveys.

Other

Frog and Toad. The purpose of the Frog and Toad Survey is to provide information on their relative abundance and distribution. Singing frogs and toads are tallied along set transects in the county. The survey has been conducted since 1992 by the Forestry Center.

Fish. The MCD has inventoried fish annually since 1978.

Natural Communities. The Bureau of Endangered Resources of WDNR has conducted a preliminary assessment to identify natural communities as well as rare and endangered species presumed to occur in Menominee County (Bureau of Endangered Resources 1990).

APPENDIX C: CHRONOLOGY OF EVENTS THAT HAVE AFFECTED MENOMINEE LAND, TRIBAL GOVERNMENT, AND THE FORESTRY ENTERPRISE

Beginning in 1828, the Menominee people's ownership rights to 9.5 million acres, previously recognized by the US government, were eroded through a series of treaties (1828, 1831, 1836, 1854, 1856) which drastically reduced the tribe's land base.

1854 Treaty—Current boundaries of reservation established.

1856 Treaty—Menominee ceded two townships to Stockbridge Munsee Tribe of New York.

1856—Small sawmill established in Keshena Falls for use by tribal community.

1871—First pine sales outside of reservation.

1887—Congress passed the General Allotment Act (the option to divide tribal communal land among individual tribal members); rejected by Menominee Tribe.

1890—Menominee Tribe obtained federal permission to cut green timber.

1905—Windstorm blew down 40 million board feet.

1908—LaFollette Act provided for construction of modern sawmill at Neopit.

1934—Indian Reorganization Act: Secretary of Interior assumed trust responsibility for tribe.

1954—Menominee Tribe had built up a $10 million trust fund from mill profits and a successful lawsuit against the federal government for mismanagement of tribal resources.

1959—Menominee Termination Act: Land was taken out of trust with the federal government (Department of the Interior) and title was transferred to the tribal business, Menominee Enterprises, Inc. (MEI). Termination Act mandated the continued protection of the forest on a sustained-yield basis.

1961—Menominee Reservation became Menominee County. State assumed administrative responsibility.

1963—Continuous Forest Inventory System instituted (refinement of system instituted in 1959).

1973—Menominee Restoration Act: Forestry Enterprise and other assets transferred back to the tribe; land placed back in trust with the Secretary of the Interior. Land cannot be sold or traded without congressional approval. Menominee Tribal Enterprises (MTE) became successor to MEI.

1975—Trust and Management Agreement established with the Secretary of the Interior. That agreement, which includes elements of the 1934 Indian Reorganization Act, constitutes the current legal basis for sustained-yield management.

1975—Indian Self-Determination Act: Tribal councils were given more authority and control over their affairs. BIA's role changed from control to service (at least for the Menominee Tribe).

1975—Mill modernized.

1987-89—Operations Inventory System instituted.

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II. THE YANESHA FORESTRY COOPERATIVE AND COMMUNITY-BASED MANAGEMENT IN THE CENTRAL PERUVIAN FOREST

by

Margarita Benavides and Mario Pariona[22]

Translated by Julia E. Salomón and Veronica Dujon

1. HISTORICAL BACKGROUND

1.1 The Yánesha: loss of territory and colonization

The Yánesha are one of 56 indigenous groups living in the Peruvian Amazon. Currently, they number 5,000 and speak a form of Arawak. Before the Peruvian forest was colonized, the Yánesha inhabited the valleys of Chanchamayo, Pozuzo, and Palcazú and their tributaries. They lived in dispersed settlements composed of various domestic units related through kinship. These settlements were economically and politically autonomous and were linked by exchanges and marriage alliances.

The primary subsistence activities were hunting, fishing, gathering, and slash-and-burn agriculture. Through mobility and exchanges between settlements, the Yánesha took advantage of the forest's diverse resources and, like other indigenous Amazon groups, maintained an ecologically-balanced relationship with the forest.

During the Incan Empire (14th-16th centuries), the Yánesha maintained themselves on the periphery of the Empire but were incorporated into the Incan economy through the development of cotton weaving (Richard Smith, personal communication).

The Yánesha's initial contact with the Spanish occurred in the 17th century. The Franciscans established missions in the region and attempted to confine the indigenous groups to nuclear settlements. In 1742, a rebellion under the leadership of Juan Santos Atahualpa began in the central jungle. A mestizo, Atahualpa assumed the identity of a messiah and

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[22] Margarita Benavides, an anthropologist, is the Coordinator of Projects in the Amazon Region, Oxfam America; Mario Pariona, a forester, is the Field Coordinator, Carbon Monitoring System, Oxfam America.

liberator from Spanish dominance. The Yánesha participated in this rebellion alongside other indigenous groups inhabiting the central jungle. Because of this rebellion, the Spanish did not attempt colonization of the central jungle until a century later.

Around 1880, military expeditions weakened Yánesha resistance and allowed the entry of missionaries and *colonos* (settlers)—Europeans, Japanese, Chinese, and *criollos* (whites of Spanish descent)—who established coffee, coca, fruit, and sugar cane plantations. By 1930, the most fertile land in the valleys was occupied by *colonos* who displaced the indigenous groups to the higher and poorer regions. From 1940 onward, this trend intensified with the immigration of *colonos* from the Peruvian highlands (Smith 1982).

The Yánesha of the central and lower Palcazú have had contact with a market economy since the end of the nineteenth century. However, this contact was always mediated by one of the local *patrones* (*colonos* who are landowners/businesspeople). These *patrones* took advantage of the Yánesha's lack of market knowledge and product prices, advancing loans in the form of industrial goods in exchange for future labor. Consequently, the Yánesha became indebted and were obligated to work for the *patrones*, thereby assuring the latter of a constant source of cheap labor. "At the end of the [19]60s, 90 percent of male Yánesha adults were indebted to some *patrón*, investing the majority of their productive time and energy in clearing forest and establishing pasture to pay off their debts" (ibid., p. 46).

By then, the Yánesha had lost a good part of their original territory as a result of the *colonos'* gradual land appropriation. In the 1960s, the Yánesha (and other indigenous Amazonian groups) began a process to reclaim their communal lands. This process was legally supported by the Law of Native Communities promulgated in 1974. The state recognized the existence of 29 native Yánesha communities and began a land titling process. As land rights were ensured and the reformist government and private institutions encouraged the process, the Yánesha began to sow commercial crops and establish pastures on their own lands (ibid.).

In 1976, there were more than 2,700 livestock in the Yánesha communities, including 1,800 of their own and another 900 under a sharecropping system called *al partir* that worked in the following manner: "The Yánesha raised the *patrones'* livestock on their own pasture, taking on the risks and costs. When the *patrón* wished, he would recuperate the original livestock (or the equivalent) and half the calves" (ibid., pp. 50-51). In 1982, there were approximately 3,000 livestock in the Yánesha communities. The livestock were transported to market by airplane because of the absence of roads in the valley. The *patrones* owned the small aircraft and monopolized livestock commerce (ibid.).

As the Yánesha assimilated the ideology of market systems, many learned to accumulate a cash surplus from their production and reinvest the capital in livestock. As a result, a process of economic and social differentiation based on an individual's purchasing power has emerged in the settlements (Smith 1982; CASA 1994, p. 77).

In 1981, communities in the Palcazú valley reported an annual population growth rate of 4.5 percent. This high rate was a result of immigration by other Yánesha from colonized and land-scarce areas of Oxapampa and Villa Rica (Smith 1982). Also in 1981, the Pichis Palcazú Special Project (*Proyecto Especial Pichis Palcazú*, or PEPP) began. From this, the Yánesha Forestry Cooperative (*Cooperativa Forestral Yánesha Limitada*, or COFYAL) was established in 1986. At that time, only nine of 14 Yánesha communities in the Alto Palcazú area had land titles. COFYAL would manage 28,266 hectares (ibid.).

The natural setting of the Palcazú valley is described in Appendix A. (See map in Appendix B.) Currently, 14 Yánesha communities, with a population of approximately 3,000, live in the drainage basin of the Palcazú. The inhabitants of the Palcazú valley may be divided into three groups:

1) The Yánesha, who live mainly in communities located in the upland areas and occupy approximately 40 percent of the valley (Stocks 1990: vii). They engage in traditional subsistence agriculture, hunting and fishing, and market activities that include raising livestock individually and communally. To a lesser extent they supply labor to the large landowners, mostly during the coffee harvest (CASA 1994).

2) The *colonos* of European origin, who own most of the fertile areas in the lower valley where the best soils are located. Most of the forest has been cut to raise livestock for which the Yánesha provide labor (ibid.).

3) The *colonos* of Andean origin, who live along the main rivers. They engage in both subsistence and commercial agriculture and raise livestock (ibid.).

1.2 Establishing the Yánesha Forestry Cooperative

In 1980, President Fernando Belaúnde Terry assumed power in Peru following 12 years of a military reformist regime. During his earlier presidency (1965-68), Belaúnde's economic development strategy for the country involved the colonization of the forest. This included building roads and establishing settlements, mainly for Andean colonists.

Under the second Belaúnde administration, PEPP was established. The total population in the Palcazú valley at this time was approximately 742 families and 3,710 people, of which 2,075 were Yánesha and 1,635 were new colonists (Tello 1981). PEPP's main objective was to "develop" the valleys by expanding the Marginal Highway (a north-south roadway following the foothills east of the Andes) to promote agricultural and agroindustrial development through settlement of 150,000 colonists. This demonstrates PEPP's colonialist ideology which was ignorant of the limitations of the region's natural resources.

Reactions to the government's announcement quickly surfaced. The representative organization of the Yánesha, along with other indigenous and support organizations, launched a national and international campaign whose repercussions transformed PEPP from a

colonization project to a resource-management project. The new target population was no longer the colonists but the Yánesha who had maintained the largest forested areas.

A basic requirement of the project was to protect the territory of the native communities **prior** to the construction of the access highway, since this highway would bring a massive influx of colonists. The project had various conservation and development components, such as:

- establishing conservation areas, including the San Matías and San Carlos protected forests, the Yanachaga Chemillén National Park, and the Yánesha Communal Reserve;
- establishing sustainable commercial agriculture that would generate monetary income through cultivation of perennial crops such as palm trees (*Guilielma gasipaes*) and coffee; (this component would also introduce hair sheep to replace cattle);
- providing health care for the communities; and
- managing a high diversity tropical forest through strip harvesting.

As part of this last component, COFYAL was organized in 1986 and founded in 1987. COFYAL's objectives were to provide employment for members of the indigenous communities, to manage the natural forests in a manner that achieved a sustainable supply of products, and to consolidate, develop, and protect (while respecting) the cultural integrity of the Yánesha people. This component of PEPP was developed by the Tropical Science Center of Costa Rica (Stocks 1990: v-vi).

PEPP was jointly financed by USAID (US$22 million) and the Peruvian government (US$8 million). The project utilized this funding until the end of 1988 when staffs from USAID and PEPP began to withdraw from the area as a result of subversive activities from the Shining Path and the Tupac Amaru Revolutionary Movement. The COFYAL component had an approximate investment of US$1.5 million through 1988.

The World Wildlife Fund (WWF) took over financing COFYAL through a national NGO known as the Peruvian Foundation for Nature Conservation (FPCN). Between 1989 and 1992, the WWF donated approximately US$350,000. Differences that had been developing between COFYAL and the FPCN grew deeper, causing the cooperative to close in 1993. Currently its facilities are sporadically used by the municipality and other local institutions for specific jobs such as making school furniture.

2. Classification and Distribution of Lands in the Valley

In 1986, PEPP determined the distribution of lands in the Palcazú valley: 39,893 hectares for the native communities and 22,512 hectares for successful *colono* bidders. These

lands included areas for human use and forest protection. In addition, they included gallery forests, seasonally-flooded palm forests (*aguajales*), and rubber tree forests (*shiringales*).

The following list shows land use in the areas occupied by the native communities (see also table 2.1):

- Lands for clean-tilled crops, which include annual crops or those with continuous economic production. In these areas, slash-and-burn agriculture is practiced with minimum two-year fallow periods.

- Lands for permanent crops, which include perennials or crops which produce for several years.

- Pasture lands, located on high terraces and gentle slopes (less than 20 percent grade). These generally support one head of livestock per hectare.

- Lands for forest production, which have or have had forest cover. They have shallow topsoils, slopes of more than 20 percent grade, and an acidic character. In Palcazú, they are mainly white sandy areas located on high terraces and dry hills, with moderate slopes, very susceptible to water erosion, markedly acidic with a high proportion of aluminum cations.

- Protected lands. These are areas that have serious limitations for agriculture, forestry, or grazing, but can be used for tourism, research, extraction of medicinal plants, wildlife management, watershed conservation, etc.

Table 2.1 Land classification of areas used by native communities in Palcazú

Native Communities	A	C	P	F	PR	Total (hectares)
Siete de Junio	1,232	4,497	0	2,373	681	8,783 *
Santa Rosa de Chuchurras	60	864	0	1,125	116	2,165 ***
Buenos Aires	136	1,309	0	1,093	845	3,383 *
Alto Iscozacín	0	0	1,660	626	216	2,502 *
Shiringamazú	305	936	0	1,288	322	2,851 ***
Loma Linda/ Puerto Laguna	110	1,132	167	1,783	2,788	5,980 *
Santa Rosa de Pichanaz	0	159	73	589	609	1,430 *
San Pedro de Pichanaz	0	270	135	406	5,490	6,301 **
Alto Lararto	0	1,064	0	669	312	2,045 *
Nueva Esperanza	15	607	1,213	1,161	1,457	4,453 *
Totals	1,858	10,838	3,248	11,113	12,836	39,893

A: Lands for clean-tilled crops
C: Lands for permanent crops
P: Pasture lands
F: Lands for forest production
PR: Protected lands

(Sources: * PEPP 1986; ** Tosi 1982; *** ONERN 1982)

Forest resources for management and development are located in the interior of the Palcazú valley. Of the valley's 88,400 hectares, 44,000 hectares have forestry potential. Of those, 20,000 hectares have potential for intensive cultivation and 24,000 hectares have limited productive capacity because of rugged topography.

PEPP, through its Cadastre and Titling Unit, classified land according to its potential. It also determined the existence of 11,113 hectares for forest production in the 10 communities located in the interior of the valley. Of these 10 communities, four associated with COFYAL. These communities—Shiringamazú, Loma Linda/Laguna, Alto Iscozacín, and

Santa Rosa de Chuchurras[23]—relinquished part of their land for forest management. The total land relinquished amounted to 1,600 hectares (see table 2.2). The 1989 population of the associated communities and the number of COFYAL members are found in table 2.3.

Table 2.2 Forest resource distribution in the cooperative member communities (1989)

Community	Forestry potential (hectares)	Forest area relinquished for production (hectares)
Loma Linda/Laguna	1,783	500
Shiringamazú	1,289	700
Alto Iscozacín	669	100
Santa Rosa de Chuchurras	1,125	300
Totals	4,866	1,600

(Source: COFYAL 1989)

Table 2.3 Population and number of members in COFYAL (1989)

Community	Population	Number of COFYAL members (domestic units)
Shiringamazú	351	48
Alto Iscozacín	188	13
Loma Linda/Laguna	555	54
Santa Rosa de Chuchurras	200	15
Totals	1,294	130

(Source: COFYAL 1989)

PEPP also established conservation units in the Palcazú river basin, such as the Yanachaga Chemillén National Park (122,000 ha), San Matías protected forest (32,000 ha),

[23] In this last community, the development plan was organized but no development strips were established because of a lack of forest roads.

and the Yánesha Communal Reserve (35,000 ha) owned by the Yánesha with restricted use rights. These conservation units are for the benefit of the region's population.

3. THE YANESHA COMMUNITIES

3.1 Internal organization

Native communities are a new institution for indigenous peoples of the Amazon. They were created by the Peruvian state through the 1974 Law of Native Communities, which recognizes the existence of native groups, their land rights to areas suitable for agrolivestock production, and their rights of usufruct to areas with forestry potential. However, the communities' traditional political organization and social and economic practices have continued in a parallel fashion. The domestic unit constitutes the base of production, which revolves around the extended family units interlinked by familial kinship.

Some of the communities are divided into sectors, each with its own authority. Communal authorities represent the whole community in external relations and organize internal work relating to schools and sanitation.

Each community has its own primary school while some have technical high schools. However, Yánesha youth have few opportunities to leave their local communities to pursue a secondary education.

Community health services are deficient. Some communities have a health post, but they face constant medical supply problems and limited health staff. PEPP, despite including a health care component, failed to change this situation.

3.2 Economic activities

The slash-and-burn agricultural system practiced by the Yánesha is well-adapted to the high precipitation and ecological diversity of the environment. Yánesha agriculture is based on three types of cultivated fields. One type is situated on fertile alluvial soils near river banks where beans, maize, and peanuts are grown, sometimes in rotation. Another type is found in areas unaffected by flood waters and where soils are more acidic. Bananas, maize, yucca (cassava), and fruits are grown in a three-year continuous cultivation followed by two to five years of fallow. The third type is found on high terraces or hills where soil acidity and levels of aluminum are very high and few crops can grow. Rice and yucca are both grown in the first year, then only yucca for another two years. The land is then left fallow for five to ten years.

Subsistence-crop fields, on average, are 0.7 hectare. An array of vegetables and medicinal crops are cultivated. Salick (1989) reports that the Yánesha cultivate more than 180 vegetable species, with yucca the principal subsistence crop. The Yánesha often sell the surplus of their subsistence crops. Some domestic units grow crops destined primarily for

market. Such cultivated lands are less diverse and in many cases are monocropped. In these cases, the plots vary in size from 1-3 hectares, with the main crops being yucca, rice, and banana.

All communities engage in bovine production communally or individually, as livestock are considered a kind of savings bank to provide funds for emergencies. PEPP encouraged production of small livestock such as hair sheep, ducks, chickens, and guinea pigs. Individual households own from one to 80 head of livestock. According to PEPP statistics, 1.5 hectares of pasture land sustains one cow and 30 hair sheep.

Fish constitute an important component of the Yánesha diet. Fishing is undertaken most often from May to November and less often from December to April because of high rivers. Recently, fishing has been adversely affected by the explosives, chemicals, and large nets used by colonists engaged in commercial fishing.

In the wake of subversive violence in the area, hunting has declined as a result of government restrictions on weapon ownership and the sale of bullets. To a certain extent this has favored the repopulation of wild animals.

Logging areas are established by each community and harvest is regulated by the communal assembly. There are two types of logging: **communal extraction**, with the income generated used for communal activities as defined by the assembly, and **individual extraction**, which requires the approval of communal authorities and is undertaken in designated areas. The income generated is to be used by the domestic unit for home improvement or for health and education. If not, applications for log sales are not approved and logs can be confiscated by communal authorities.

There are three major means of transportation in the valley. The first is by water in small canoes and motor boats. The second is by bus and trucks as far as Iscozacín and, in dry weather, to Santa Rosa de Chuchurras. In recent years, the sole road connecting Villa Rica and Iscozacín has deteriorated significantly, increasing transportation costs during the rainy season. The third means of transportation is by air: an airstrip in Iscozacín for planes of medium capacity (12 passengers) is the sole aerial link to the region. This mode of transportation is extremely expensive and is used by rural people only for emergencies.

3.3 The Yánesha and the market

Cash crops are maize, rice, beans, peanuts, yucca, bananas, and some fruit. They are sold mostly in local markets to *colonos* and other inhabitants of Iscozacín. Some crops, mostly maize, rice, and other non-perishables, are sold to bus drivers who take them to markets outside the valley. The Yánesha also sell fish and domestic animals such as chickens (and their eggs), pigs, and livestock. Women make a traditional drink from yucca that is sold mostly to indigenous people. Crafts such as baskets, small bags, and traditional garments are also sold. Some of these products are sold in Iscozacín and among the Yánesha.

Income earned from crop sales is low. It is difficult to generate money in local markets where everyone grows and sells the same products. Access to external markets is difficult (CASA 1994, p. 54).

Subsistence cultivation is the economic base for the Yánesha; however, contact with outside groups has created a need for items that require cash income for their purchase. The most common items needed by the Yánesha are soap, fishing lines, kerosene, blankets, metal kitchen utensils, clothing, sugar, salt, onions, radios, batteries, machetes, paper, medicine, and pencils for school children. A family needs about $1,500 annually for these items, and it is common for the Yánesha to work for large landowners to earn cash incomes. Monthly salaries from the COFYAL allowed some Yánesha to become more independent of the landowners compared to Yánesha who did not work for the cooperative (CASA 1994, p. 76).

3.4 Access and control of the natural resources

Land use for agrolivestock activities in the community is self-regulated by domestic units. The area needed for agriculture is generally determined by a household's annual consumption needs and its available labor. Communities are not allowed to own the forest, but they are legally authorized to manage and develop it through harvesting contracts granted by the Ministry of Agriculture. Without a permit, a community cannot harvest and/or sell timber or other forest products. Otherwise, products may be confiscated by forest rangers and auctioned by the state.

As COFYAL developed the forest management plan, it gathered traditional indigenous knowledge of forest use and management and combined it with recent scientific techniques. As a result, the Yánesha easily adapted to the plan. Yánesha technicians, with their knowledge of site quality and forest terrain, played an important role in identifying and using forest species.

3.5 Development of the forest resources

Logging activity in the valley increased after 1985 with the construction of the new highway. This increased pressures from commercial and small-scale loggers and lumber merchants.

Except for COFYAL, loggers in the region use selective extraction to plunder the forest. They cut only species with a high or acceptable commercial value. Such species include *tornillo* (*Cedrelinga catanaeformis*) and *cedro* (*Cedrela sp*). Most species are not harvested because they have very low market prices and high transportation costs.

Three types of loggers operated during the peak activity of COFYAL. One was the cooperative itself, which had a defined forest management plan geared towards maximum exploitation of the existing biomass in strips of forest. This system had major problems in that a large number of species had to be marketed. Since COFYAL is no longer operating,

traditional woodcutters are able to use the communal resources as they wish. As a result, some forest areas are near destruction.

The second type of loggers are companies with extensive experience in the timber business. They have working capital to buy standing timber. With a pool of machinery and skilled staff, they use highly selective extraction to take the highest quality commercial logs. They transport the round logs to sawmills in Villa Rica, La Merced, and Oxapampa.

The third type are small-scale loggers who buy a few standing *cedro* or *tornillo* trees which they cut in the forest with chain saws and transport to the side of the highway for sale. Occasionally they take them to Lima. The Yánesha also engage in this activity.

4. THE YANESHA FORESTRY COOPERATIVE

4.1 Biodiversity and inventory of natural resources

There are many studies of the valley's flora and fauna that identify species and their distribution. Other scientific studies have focused on botanical and ethnobotanical identification to determine the potential and different uses of forest resources. Fairly detailed forest inventories have determined the distribution of forest species and also have helped establish production volumes for saw wood, electrical and telephone poles, fence posts, and lumber for rural construction.

The Tropical Science Center, in conjunction with PEPP technicians, processed the data from the inventory of communal forests and devised a forest management plan. Sample-intensive inventories were conducted in the production forests to determine the approximate volume of wood that would be industrially processed. COFYAL's trained technical team conducted these inventories each year just before strip harvesting. The data were processed and analyzed in the management offices of the cooperative.

4.2 The forest management plan and ecological monitoring

In 1984, PEPP in conjunction with the Iscozacín Forest District established a system to regulate forest resources. The Iscozacín Forest District is the administrative and financial body responsible for forest management and harvest. It oversees 96,000 hectares. Its control extends from the Bocaz river in the community of San Pedro Pinchanaz in the south to the Pozuzo river in the northeast; and from the Yanachaga Chemillén National Park in the west to the San Matías and San Carlos forest reserves in the east. To facilitate administration of forest production, the district is divided into four sectors, and each is further divided into sections. These sections are the basic units for forest inventories and are determined according to topography, forest characteristics, and proximity to access roads. A section might be occupied by a community or several colonists.

Within each section, technicians identify areas of production forest which are recognized by the community according to its land use plan. They also conduct a systematic inventory and identify different forest types. The sections are divided into forest production blocks (FPB) to establish permanent production areas. These areas are delineated by distinctive natural characteristics or by boundary markers. Each FPB is an independent unit and may contain various operable forest stands that, in turn, have various production strips. The production strips are areas destined for harvest and vary in size according to their operability and function. Operability is determined by topography, soil types, and distance from access roads. The optimal size of a production strip is 1 hectare. A strip must be given a uniform silvicultural treatment. Sometimes, however, a FBP differs significantly from established norms; for that unit, the management plan attempts to customize procedures for harvesting, silvicultural treatment, and regeneration.

The usual silvicultural system is known as "protective strips" or a "strip shelterwood system." This is not the only method that could be applied to forests of the Palcazú valley; several alternative management systems could be implemented, such as a selective controlled system, group strip clearing, diameter and height controls, and selection based on chronological age or phenological maturity.

Silvicultural design consists of clear-cutting trees within narrow but long forest areas. Each strip has a minimum width of 20 meters and a maximum of 35 meters. Length is determined by topography, access, and other factors. When feasible, the strip must be parallel to rivers and gorges in order to avoid river crossover. The strip is an opening or long alley that is surrounded by natural, unlogged forest. The latter serves as a source for seed dispersion to stimulate natural regeneration in each harvested strip. The surrounding forest is not harvested for at least 25 years to ensure that the regenerating strip has adequate biological diversity, growth, and shade.

Exploitation of the biomass must be complete, as it is an important component of the forest management plan. The plan requires felling all trees and harvesting most of the biomass. All trunks, large and medium branches, some vines and non-timber forest products are extracted, leaving only small branches and leaves on the ground to supply nutrients to the regenerating forest. To encourage natural regeneration of tree species, the canopy must be open enough to allow adequate light and heat to reach the forest floor.

The management plan also allows for silvicultural interventions in the regenerating strips. Once the young trees have formed a closed canopy, thinning can create an optimal diversity of species and a density to encourage growth. In general, the goal of these interventions is to improve forest composition and obtain a high quantity and quality of timber within a short cutting cycle.

The management plan projects a 40-year cycle between clear cuts on a strip. The area of the annual allowable cut is fixed and is based on the production forest's total area and not on the rate of increase in volume in a given area. It is expected that data generated from

future studies will help refine a more accurate cutting cycle. The proposed plan is tentative, but the estimated length of the cycle is based on the following criteria:

- Growth potential of the remaining forest. Studies have established that the average time for a majority of forest species to reach milling quality is 40 years.

- Market demand and product quality. Obviously, it is difficult to predict market demand 40 years in advance, but trends in current market conditions can be used to alter the cutting cycle for the strips.

- Pressure by owners who want to obtain timber and income. This can shorten or lengthen cutting cycles in forests undergoing regeneration.

The management system defines certain specifications for harvesting forest products. These include: extraction phases, minimum diameter, and which species to extract. Those guidelines are complemented by market demand for final products as shown in table 2.4.

Table 2.4 Descriptions of products extracted from the forest

Species	Diameter class	Products	Length (meters)
All	2-4	Supports used in agriculture and general construction	1-4
All	4-8	Fence posts	2.8-6
Specific	8-18	Utility posts	6-18
All	>18	Saw wood for different uses	1-4

Extraction is carried out through the following process:

1) The strip is identified one year prior to harvest and marked with painted stakes. During this phase, forest roads are established.

2) All the understory vegetation and vines are cut to facilitate felling and removal of logs.

3) Trails are built to allow timber removal by oxen. On average the trails must be 3 meters wide and preferably located on one side of the strip.

4) The area for stacking logs must be located at one of the points connected to the forest road and have an average area of 500 square meters.

5) Felling is gradual, in accordance with the forest strata, and controlled so trunks fall inside the strip.

6) Oxen, harnessed to carts or sulkies, are used to move trunks from the strips to the first gathering point to reduce soil compaction and erosion of forest topsoil.

7) Transport of logs from the first gathering point to the processing center is done by a front loader, platform truck, or trailer truck.

Initially, the intention was to use 100 percent of the forest biomass, including logs, bark, branches, and residues for producing firewood and charcoal. This idea was accepted by the Yánesha, but expectations were dampened because of problems with technology and marketing.

Small trees (8-15 centimeters in diameter) were used for fence posts, while trees 16-30 centimeters in diameter were used for telephone and electric poles. Trees with diameters over 30 centimeters were sawed for boards.

This proposal for forest use seemed optimal; however, market realities made it unworkable. Peru's market responds to a forest industry based on selective, migratory exploitation. Such use is associated with low productivity levels, inadequate technology and negative ecological consequences.

The objective in the forestry sector is to reach an equilibrium between the forest, the processing plants, and the market. It needs profitable production units that use a maximum timber volume per area of natural forests with quality control. Implementing that idea requires a continuous supply raw material produced through a sustainable management plan.

4.3 Forest management and technology

The COFYAL sawmill had the following machinery:

- A portable Mighty Mite saw, able to process 3,000 board feet in an eight-hour day. This machine was not used at full capacity since it was designed for greater diameters (20 inches) than what was produced in the area (16-20 inches). Normally 1,500 feet were processed in an eight-hour day. To function better, this machine would have required a "log turner."

- The Pres-Cap system to preserve logs by injecting water and hydrosoluble salts under pressure. This system relied on a motor with 35 hp, various

iron valve caps to introduce the preservative into the logs, two air compressors, and a room to mix and recycle the preservative.[24]

- A refined saw with a capacity of 8,000 board feet per eight-hour day to make boards out of material sawed with the Mighty Mite saw. This saw had excess capacity, given that the Mighty Mite has a maximum capacity of 3,000 board feet.

- A carpenter's shop supplied with tools and machinery.

- A sawmill with a track. Incorporated in 1991, it had a capacity of 1,500 board feet in an eight-hour day. It was easy to use and was used communally by loggers in the area. A specialized saw for dimensional cuts (*machimbradora*) was also purchased to supply local and regional markets.

The cooperative's logging machinery included: one eight-ton platform truck; two double-traction trucks; one front loader; one caterpillar tractor for road construction; eight oxen trained to pull logs; 10 motor-powered saws of different capacities; equipment and tools for carrying out logging, forest management, and inventories.

During the period of USAID financing, there were 12 technicians and scientists assessing COFYAL's different management areas. In 1989, when funding was provided by the WWF and FPCN, there were four advisors: one in administration, one in forest management, one in marketing, and one in forest extension. The last was responsible for COFYAL/community relations. The Yánesha received training in these different areas and readily handled responsibilities in activities such as managing the forest. While they also took on administrative and management jobs, the difficulty of those roles meant that, in practice, the advisors carried out most of the coordination with Yánesha leaders and the community assemblies.

Technical staff, both Yánesha and outside advisors, hardly changed over the years; however, during the FPCN's tenure, the advisor for forestry extension was constantly replaced because of strained relations between the cooperative and the communities.

A recent study summed up the difficulties the cooperative experienced:

> The Pres-Cap system of preservation was introduced by foreign advisors as the best solution. But it was a bad decision in economic and environmental terms. Similarly,

[24] While the cooperative was in full operation, the chemicals used for preservation were constantly recycled. Later, residues were stored in sealed metal barrels in a sheltered area. These residues should have been sealed in cement blocks to prevent leakage into the environment. However, this was not done. We have no information regarding what actually happened to these residues.

> the semi-portable circular saw [the Mighty Mite] was also the result of USAID involvement, and can be criticized for its excess capacity and for creating too much waste. It is a classic error of development projects to transfer technology to countries which do not have the technological background for operation and maintenance, nor the replacement parts for such machinery (CASA 1994, p. 72).

4.4 Forest management and political structure of the community

COFYAL was organized as a multicommunity cooperative to manage the forest, the processing center, and marketing. Four Yánesha communities participated. When the cooperative closed in 1993, there were 159 members (CASA 1994, p. 59). Membership required community nomination. The idea to create the cooperative originally came from the outside, from PEPP. For the indigenous communities and the Federation of Yánesha Communities to accept the cooperative, it was necessary to carry out prolonged talks and incorporate anthropologists into PEPP.

The highest decision-making body was a general assembly of members from the four communities participating in the cooperative. The assembly elected an administrative committee with a president and a supervisory committee that represented each of the communities. It also elected chairpersons for each of the cooperative's management areas.

The associated communities agreed that COFYAL could use community forests. However, the communities did not receive what they had expected from the cooperative. The cooperative initially established the following arrangement with the associated communities. The strips cut in community forests were to be fully inventoried. A bookkeeper was to register for each community the volume of timber transported to the sawmill, the volume processed, and the volume sold. According to cooperative regulations, 25 percent of the income from sales was to be reinvested in the community and 75 percent in the cooperative. Since the cooperative did not earn profits, it opted after each fiscal year to reinvest 5 percent of income from sales into the community.

4.5 Commercialization

From the start, COFYAL encountered marketing problems:

- Drastic changes in the political economy of Peru prevented adequate estimates of market demand.
- Products manufactured by the cooperative lacked acceptability since they were unfamiliar to local consumers.
- The forest management system's high production costs prevented COFYAL's output from being competitive.

- The Yánesha were inexperienced and had insufficient training in administration and marketing.

- The enterprise never established adequate marketing strategies.

COFYAL had to compete directly with larger lumber companies with many years of experience. This forced them to consider marketing principles such as timely deliveries, an order book, product quality, and respecting the customer. They had planned to expand product lines to try to earn profits. To achieve this, the cooperative planned to produce as many highly-processed products as possible with the installed equipment to add greater value to their production. They would also avoid sales to intermediaries and attempt to reach consumers directly through delivery to Lima.

Despite marketing difficulties, the cooperative was able to establish sales at the following levels:

Local sales, mainly to the native communities and some colonists. The commercialized product was almost always wood for home construction and furniture such as chairs, tables, benches, bunkbeds, doors, and windows. Although promoted, charcoal sales were scarce. Some payments were in cash, but most buyers preferred to use wood or trees as a form of payment.

Regional or national sales. It was necessary to enter these markets to sell cooperative products. Initially, it was difficult, but within a short time COFYAL began selling preserved utility poles in the central area of Peru and posts to support climbing plants in Ica and Canete. A good part of the sawn wood was sold in Lima and Huancayo.

Foreign sales. Contacts with international markets were made possible through visits from groups that promote commercialization of tropical woods from sustainably managed forests. Yet, foreign markets are very demanding. Many new companies such as COFYAL are not ready to regularly sell in such markets because they do not have a sufficient quantity of high-quality wood, adequately dried wood, rigorous control of pests, or sufficient capital to finance marketing costs. Nor do such companies often have the ability to produce special cuts or exact measurements, to carry out administrative tasks for export, to maintain continued contact with the customer, or to deliver orders on schedule.

Nonetheless, the cooperative did place wood in the foreign market. Four containers of lumber were exported to England and two containers to California. This amounted to approximately 54,000 board feet.

4.6 Influence of cultural values on forest use and attitudes toward forest management

According to CASA, the Yánesha had mixed views on the cooperative. "Some communities have small land areas per capita. Population growth has worsened that situation.

In such communities there was a growing conflict among families, who, based on customs, wanted the forest areas to be used for other purposes" (CASA 1994, p. 61).

Among the Yánesha, economic responsibilities lay within the boundaries of the family. Social, economic, and cultural ties within families are strong, creating problems in adapting to a cooperative system. "From interviews with residents from the San Luis sector (Shiringamazú Community), we found a pronounced distrust of the cooperative. It was generally accepted that the idea of a forestry cooperative was good, but at the same time there was widespread criticism of how it was run." Residents criticized the managers and their style of management. Although the managers were elected, the most qualified did not necessarily end up in managerial positions (CASA 1994, p. 63).

> The Yánesha paid more attention to personal considerations rather than to issues related to economic management of the cooperative. We found that they were aware that many of their decisions were economically unsustainable (like hiring more workers than necessary) but also considered it appropriate that many people were employed by the cooperative (CASA 1994, p. 64).

Stocks and Hartshorn (1993) add: "The way in which community members were employed by the cooperative contributed to the feeling that the cooperative was an employer rather than an institution which they owned."

The Yánesha in the cooperative had to handle the entire process: planning, management, administration, logging, processing, sales, deciding whether to focus on regional or local markets, etc. This is a huge task for people accustomed to a subsistence economy. They also had to deal with questions about the organization of the cooperative and community relations. Although it has been restructured throughout the years, the cooperative is still a foreign organization to the Yánesha (CASA 1994, p. 61).

4.7 COFYAL's impact on Yánesha society

The number of Yánesha employed at the cooperative has varied since its inception, with the maximum number of employees being 49. However, a number of these were undergoing training for future work (CASA 1994, p. 76). Normally, the cooperative employed 32 workers.

The cooperative had a campsite where workers and employees lived. The workers were picked up by the cooperative's transportation service on Sundays and returned to their homes on Fridays. This schedule kept them away from subsistence and household responsibilities, causing discontent among the women and affecting male subsistence chores.

In some cases, cooperative employees hired other Yánesha to do work associated with slash-and-burn agriculture on their own fields. To hire these workers, the Yánesha members would take out loans from the cooperative. In other cases, workers missed work to carry out

agricultural responsibilities. The cooperative tried to handle this through substitute employees. However, absences of regular workers created problems.

The Pueblo Libre sector, in Shiringamazú, abandoned its traditional settlement on fertile land to relocate near the cooperative. This was done to enable residents to work at the cooperative and to set up small shops to serve the workers. Money earned by cooperative employees circulated through the businesses in this small settlement. However, the establishment of Pueblo Libre around the cooperative caused conflicts with other sectors of the community, since many people did not like the way it had developed. They disapproved of the youth going to Puerto Libre to drink beer, disliked the fact that *colonos* were allowed to live there, and disliked the way in which Pueblo Libre residents maintained their fields (CASA 1994).

The crisis and closing of the sawmill affected residents of Pueblo Libre more deeply than those of other sectors. The residents from Pueblo Libre were far more dependent on the income and services generated by the cooperative. Currently, income from the cooperative has disappeared and the shops are in decay but some still receive income from the Yánesha, loggers, bus drivers, and travelers. With the closing of the sawmill, many of those who had moved to Pueblo Libre have returned to their original settlements (CASA 1994).

Capital accumulation from cooperative salaries was evident. Some individuals invested in livestock, and some families bought motorcycles, sewing machines, and televisions with their incomes (CASA 1994).

5. CONCLUSION

PEPP, under which COFYAL was created, was transformed from a colonization project to a resource management project that provided benefits to the region and its inhabitants. All 14 native communities in the valley eventually received land titles. The project established watershed conservation and controlled the influx of colonists when the new highway was built. However, COFYAL had several problems that hindered its continued existence. First, the initiative came from outside the Yánesha communities, although the project progressively adapted to indigenous needs. Despite modifications, the project was too large and complex and was not adapted to the Yánesha reality. This created difficulties in management and administration, in the operation of machines and equipment, and in marketing. It also led to friction between forestry work and subsistence activities and to problems in the relations between the cooperative and the community.

The forest management system was successful ecologically and in incorporating the Yánesha into the operations; however, it was not profitable. There were problems in placing products in a market that is geared toward high-value woods exploited and commercialized in conventional ways.

Outside factors did not help the cooperative's development. The political economy and laws of the country prohibit any type of concessions being made toward a project for sustainable management of resources. Poor roads created high transportation costs and made it difficult to secure inputs and to place products in the market. The political violence which Peru experienced in recent years, particularly in the central jungle, was intense and directly affected the cooperative's functions.

The fact that COFYAL failed does not mean that a forest management system undertaken by the Yánesha in their communal areas should be dismissed. However, it would require favorable economic and political conditions and would need to consider the circumstances of the Yánesha and the market.

APPENDIX A: GEOGRAPHIC BACKGROUND

The Yánesha Forestry Cooperative is located in the native community of Shiringamazú in the Palcazú river valley, in the District of Palcazú (capital city Iscozacín), Province of Oxapampa, Department of Pasco in the central jungle of Peru.

The valley is located between the 9° 46' 24" and 10° 29' 39" southern latitude parallels and the 74° 59' 24" and 75° 29' 59" western longitude meridians. The valley stretches between Puerto Mayro (260 meters above sea level) and the Yanachaga and San Matías mountain range (2,500 meters above sea level). The Palcazú river basin has a surface area of 469,518 hectares. The valley floor comprises 88,400 hectares, of which 26,376 are appropriate for agriculture, 18,024 for livestock, and 44,000 for forestry.

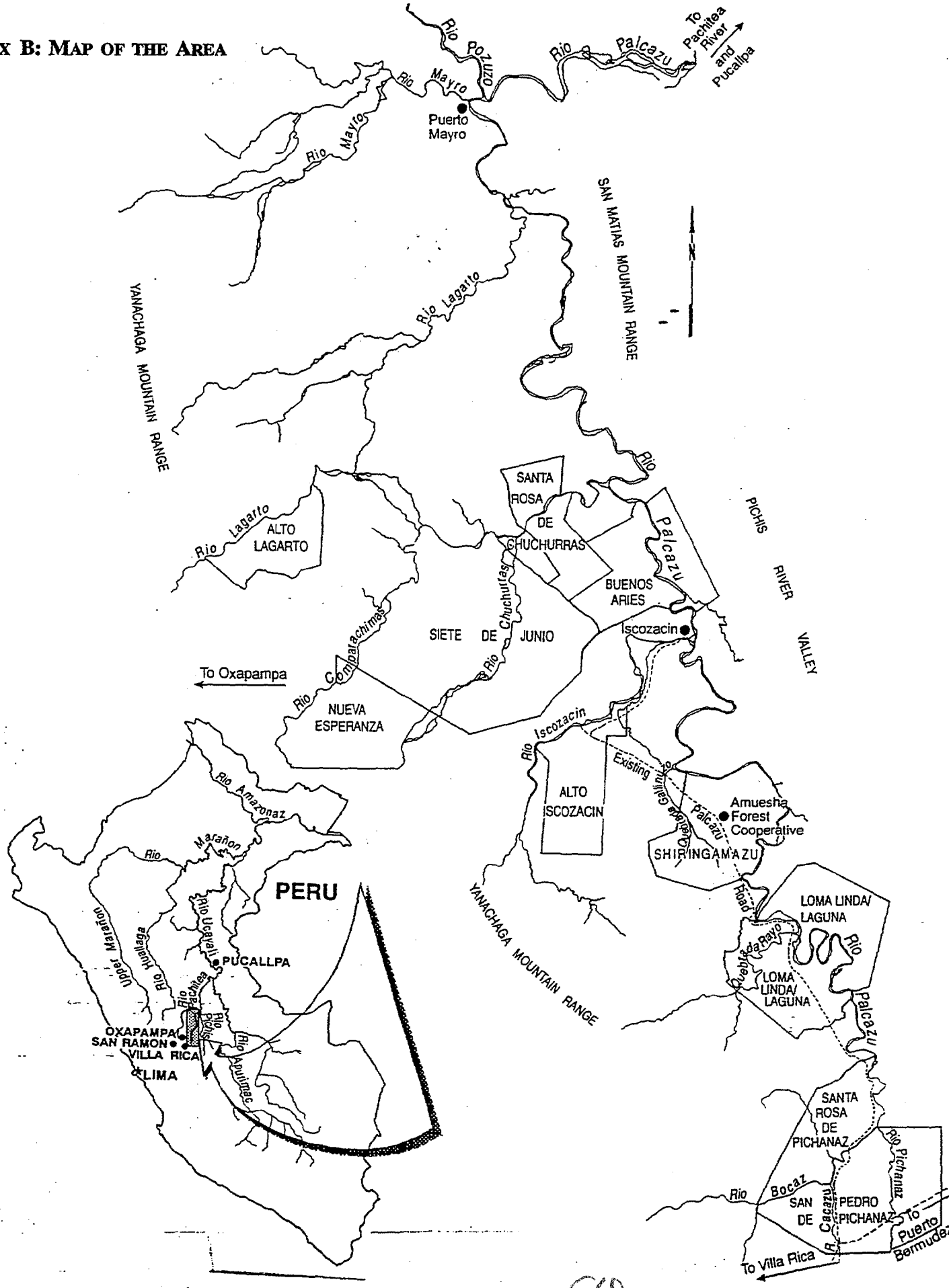
The region is swept by erratic, humid, and hot trade winds that generate high rainfall (ranging from 3,000 to 7,106 millimeters per annum) and many clouds in winter. The months with the highest rainfall are December and May. There is no definite dry season as torrential rains may fall any time of the year. Temperature in the valley ranges from 10 to 38 degrees centigrade, with an average temperature of 23.2 centigrade for the year and an average relative humidity of 85 percent (PEPP 1986).

The river basin is surrounded by the Yanachaga and San Matías mountain ranges which run north to south. They are characterized by a complex formation of wide and steep hills intricately divided. These mountain ranges extend from the Huampumayo to the Shiringamazú rivers and divide the lowlands on the west side of the valley from the narrow terraces and hills south of the valley. The lowlands are characterized by flat and fairly fertile lands while the terraces and hills are composed of rocky terrain and shallow lithic soils. The Yanachaga and San Matías mountain ranges blend at the southern end of the valley to form a complex mountainous body.

The Palcazú river originates in the south of the valley where the rivers Azuliz, Bocaz, and Cacazú join. It receives discharge from rivers and streams that create an integrated drainage system. They form a subparallel level to the primary rivers that carve the valley, leaving rocks and sharp inclines.

As classified by the National Office of Natural Resource Evaluation (ONERN 1982), the valley's predominant Holdridge life zones are: (a) humid tropical forest (3,030 ha), with potential for agriculture and forestry located between 270 and 700 meters above sea level; (b) very humid tropical forest which covers the lower areas (89,312 ha) located between 300-700 meters above sea level; and (c) humid tropical forest in transition to super-humid, pre-montane rain forest which is more humid than (a) and covers 11,710 hectares.

PPENDIX B: MAP OF THE AREA



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III. Forestry Project of the Indigenous Chiquitano Communities of Lomerio

by

Amado Olivera V.[25]

Translated by Ivonne Plankey Videla

1. Introduction

In Bolivia, until a few years ago, conservation and sustainable use of natural forests were nothing but lyrical concepts used by ecology and forestry groups. Such groups generally were seen as idealistic, and their proposals were considered obstacles to economic growth. This image was created by the private sector in order to justify extracting timber from Bolivia's supposedly inexhaustible tropical forests.

Bolivia has a total area of 1,098,581 square kilometers. According to the ecological map, 545,275 square kilometers are subtropical and about 72,000 square kilometers are tropical. It should be noted that 34,500 square kilometers of tropical areas are in transition to subtropical. Most of these forests are in the eastern part of the country (particularly in the departments of Santa Cruz, Beni, and Pando) and north of La Paz. Given the extensive subtropical forest, Bolivia is more of a subtropical country than a tropical one.

Forests with diverse ecological characteristics cover 51 percent of the national territory; savannahs and bush-like vegetation cover 30 percent. The remainder is covered by cultivated land, wetlands and/or floodlands, permanent ponds, uncultivated lands, permanent ice and snow, and populated areas.

The most well-known indigenous groups in Bolivia are the Quechuas and the Aymaras, who for centuries have lived in the Andean valleys and high plateaus. In the eastern lowlands, indigenous groups have for many years lived harmoniously in the forests, well-adapted to that environment and with their own social structures and subsistence strategies. Like the Quechuas and Aymaras, these indigenous peoples felt the impact of European colonization,

[25] Amado Olivera V. is a forestry engineer with the Support Project for Indigenous Peasants in Eastern Bolivia (APCOB).

and many have disappeared. Two centuries ago an estimated 130 ethnic groups inhabited the lowlands, but today there are only 36 communities whose populations range from 50,000 people to fewer than 50. The great majority of indigenous people live in the departments of Santa Cruz, Beni, and Pando.

The importance of indigenous people in forest development and conservation is being recognized, although the form of cooperation and their degree of participation is still not well-defined in Bolivian official policies. However, a pioneering forestry project is in the hands of an indigenous organization, the Inter-Communal Headquarters of the Communities of Eastern Lomerío (CICOL). This organization receives technical assistance from the non-governmental organization Support Project for Indigenous Peasants in Eastern Bolivia (APCOB). This, in turn, receives assistance from the Dutch Service of Cooperation with Development (SNV) and financial support from the Dutch organization HIVOS and Oxfam America.

2. LOMERIO AND THE CHIQUITANOS

Lomerío is situated 80 kilometers south of Concepción, in the region of Santa Rosa del Palmar, in the Province Nuflo de Chávez, Department of Santa Cruz. The geographic coordinates are 16° 30' to 16° 53' south and 61° 37' to 62° 13' west. The region belongs to the Precambrian shield and is known as the Great Chiquitania. The vegetation is a complex mosaic of forest, savannah, agricultural areas, and wetlands with a high level of biological diversity.

Since the end of the last century, Lomerío has been a refuge for the Chiquitano indigenous people who fled the slave-like conditions on *haciendas* and the forced labor of the rubber plantations. The grandparents and parents of the present youth established small settlements and began to live in freedom, working the land and taking whatever the forest and rivers offered.

There are presently 35 communities and small settlements in Lomerío, with almost 8,000 inhabitants, most of them Chiquitanos. The number of families per community ranges from 10 to 150, while the average is 30. Each family averages seven members. The population is very young: 49 percent are under 15 years of age, 34 percent are between 15 and 44 years of age, 7.5 percent are 45 and up, and 9.5 percent do not know their age.

Rural-urban migration for young people between 15 and 24 years of age is primarily to Santa Cruz. They migrate either to seek work or to pursue secondary education.

There is some level of malnutrition in 34 percent of the infant population. Malnutrition affects more women (47 percent) than men (27 percent).

In Lomerío, there are five or six ranchers who exert a powerful influence over the well-being of the Chiquitanos. Recently, the Chiquitanos formed a council of authorities to resolve problems in the area. The council consists of *corregidores* (government appointed Indian liaisons with indigenous populations), civic committees, mayors, the parish, and CICOL, the legal entity representing all the Lomerío communities.

The Chiquitanos' social organization and relationships are intricate and help groups of extended families maintain ethnic unity. The current extensive kin relationships can be traced back to one or two principle ancestors described in mythology. The complex network of family relationships and the system of *compadrazgo* (an important fictive kin relationship between a child's parents and godparents) are necessary for the survival of this indigenous people. It constitutes the basis for solidarity, mutual support, and reciprocity within the communities and the entire ethnic group. The distribution of goods and resources among families and the exchange of food and other gifts facilitates survival in times of scarcity.

Chiquitanos use different forms of cooperation to carry out labor-intensive tasks. For example, in exchange for food and drink provided by the family requiring help, other families will provide their services in cutting trees, clearing forest, harvesting, or constructing a house. Communal labor maintains roads and plazas, constructs schools and health clinics, and helps in community gardens. Thereby, the cost of developing and maintaining community infrastructure is reduced.

3. Problems with Controlling Natural Resource Use

The forests of Lomerío are poor in valuable commercial species and some areas are degraded. This has occurred for two reasons: 1) private logging companies exploited the economically valuable species in the communal forests without any management plan; and 2) population growth in the territorial area has been restricted by surrounding properties and, therefore, is increasing pressure on community lands. Local agriculture, which uses slash-and-burn techniques to prepare garden sites, is steadily reducing fallow time and extending the cultivated area to produce sufficient food. This can become a serious problem for managing natural resources. Both forestry and agriculture put pressure on hunting, fishing, and gathering, thereby endangering the balance of the ecosystem as well as the subsistence base and continuity in the Chiquitanos' ethnocultural organization.

Faced with these problems, CICOL's forestry project has proposed the integrated management of the renewable natural resources in an effort to build alternatives to continued degradation.

The 1980s saw the first tensions between the Chiquitano population and the logging companies that were advancing into their forests, exploiting them without providing benefits for the native inhabitants. With the support of APCOB and in accordance with the Center for Forestry Development, the Chiquitanos were able to expel the logging companies. As soon

as CICOL was established, APCOB helped it design a strategy for territorial defense based on a forestry project. In 1984, using the existing legal mechanisms in the Agrarian Reform Law, the Forestry Law, and the Law of Fauna and Wildlife, CICOL petitioned for a forestry concession for 21 Lomerío communities. CICOL/APCOB conducted a forestry inventory and formulated a forest management plan for each community. The hope was to superimpose over communities' agrarian land titles the right to sustainably manage their inter-communal forest (which covered an area beyond the titled land). The intention was to consolidate control over the Chiquitano territory and to terminate private logging of communal forests, thereby protecting the land and forest resources.

Unfortunately, in the ten years since the beginning of the project and after lengthy legal preparations and petitions to the state and other authorities, CICOL has secured neither the forestry concession nor the legal recognition of its territory. CICOL, however, has established a model forestry project, unique in Bolivia, with the direct participation of its local population. The project manages the natural tropical forest, utilizes forest resources, processes timber from managed forests, and maintains nurseries and tree plantations for reforestation.

With the support of APCOB, CICOL maintains its long-term goal to contribute to the socioeconomic development of the Chiquitano communities of Lomerío through the defense and consolidation of their territory and through the sustainable management of their natural resources.

4. CONSERVATION OF ECOLOGICAL PROCESSES AND BIODIVERSITY IN THE LOMERIO FOREST

4.1 Land use and natural resource inventories

Land use in the Lomerío territory is approximately as follows (in hectares):

High forest:	7,232
Medium forest:	39,334
Low forest:	9,000
FOREST TOTAL:	55,566
SAVANNAHS AND GRAZING LANDS:	125,000
AGRICULTURAL AREAS:	9,025
ISOLATED HILLS:	27,565
TOTAL* (surveyed and occupied):	**217,156**
UNDEVELOPED GOVERNMENT LAND:	81,110
TOTAL (claimed by CICOL):	**298,266**

*Total includes land titled to the indigenous communities through agrarian reform (87,749 hectares), private land titled to white ranchers, and land given in concessions to forestry and mining companies.

A number of studies have been carried out since the beginning of the project. The first was a forest inventory that served as the basis for the project. Each year foresters inventory 14 native species with commercial value to record the number greater than 40 centimeters diameter-at-breast-height. In sample plots, studies focus on natural regeneration of the commercial species, floristic composition, forest structure, and medicinal plants and their uses. Forestry and ecology researchers carried out a study of landscape ecology in the Concepción and Lomerío regions. Only a wildlife study is lacking. It is expected that inventories of wildlife and other biological resources will be conducted by the BOLFOR (Bolivia Sustainable Forestry Management) Project, supported by USAID and the Bolivian government.

4.2 Forestry management and ecological monitoring

Since 1986, CICOL has used a forest management plan formulated with the beneficiary communities' participation, adapted to their demands, and based on their experiences. The plan uses silvicultural practices adapted from the CELOS system.[26]

[26] The CELOS (the Dutch acronym for Center for Agricultural Research in Surinam) management system was developed in Surinam for timber production in natural forests. The system is polycyclic, with rotations of 20-25 years. Timber harvesting is carefully controlled to reduce damage to the residual stand

The following species are being harvested and managed in the project:[27]

Ajunau (*Pterogyne niens*);
Cedro (*Cedrela spp*);
Roble (*Amburana cearensis*);
Tajibo (*Tabebuia spp*);
Morado (*Peltogyne cartolifolia*);
Verdolago (*Terminalia sp*);
Jichituriqui (*Aspidesperma sp*);
Tarara (*Centrolobium spp*);
Picana negra (*Cordia glabrata*);
Cuchi (*astronium urundeuva*);
Paquió (*Hymenea caubaril*);
Soto (*Schinopsis sp*);
Yesquero (*Cariniana sp*);
Sirari (*Ormosia sp*).

These species range from 15-25 meters in height with a usable trunk of 4-8 meters. Non-timber forest products are usually taken from the branches and bark of trees harvested from savannahs and overgrown gardens. The communal forests of Lomerío are classified into agricultural areas, productive forest (for sustainable timber harvest), and protected forests. The management plan takes in all the Lomerío territory of 298,266 hectares. Each year, the project manages 1,600 hectares in four communal forests (400 hectares each). The current 20-year regeneration cycle is more than satisfactory for CICOL's sawmill enterprise, installed to process exclusively the timber coming from the managed areas.

The forest management design is flexible, allowing areas to be harvested out of turn if a community has priority needs and if another community will cede its turn. The technical forestry team of CICOL/APCOB assists communities in selecting trees and logging.

Silvicultural management follows two main principles of the CELOS system: to harvest efficiently with minimum damage to the soil and surrounding forest, and to increase the growth of commercially valuable species. Since 1992, the CICOL/APCOB technical forestry team has monitored the growth of commercial species on permanent sample plots with and without treatment to evaluate the effects of harvest and silvicultural treatments on soils and the biomass.

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and to minimize the export of nutrients. After harvest, non-commercial species are killed to reduce the competition the commercial species face.

[27] In clearing forest for agricultural gardens, species used for firewood include *Curupaú* (*Diptaderia spp*), *Cari Cari* (*Acacia sp*), and *Momoquí* (*Caesalpiria floribunda*). Savannah species most used for firewood are *Chahaco* (*Curatella americana*), *Cuta* (*Pyllostylum sp*), and *Arca* (*Acacia sp*).

4.3 History of the management and conservation of the forest

In Bolivia, a number of efforts are attempting to utilize and manage natural forests in a sustainable fashion by applying silvicultural treatments adapted to particular types of forests and environments.

In the Noel Kempf Mercado Park, in the northeast part of the Department of Santa Cruz, information is being gathered to classify the forest, and the local population is about to be included in the park management.

In the Chimanes forest in the western part of the Department of Beni, the Headquarters of the Indigenous Communities of Beni has initiated efforts toward forest management in the region, with support from the Center for Investigation and Documentation for the Development of Beni (CIDDEBENI). There have been difficulties in getting effective participation from the native inhabitants of the forest.

The SENMA BID (World Bank) Project, in the Forest of Chimán Yapacaní located in the north of the Department of Santa Cruz, failed because it did not take into account the owners of the forest; that is, the peasant population.

Finally, the forestry project of Lomerío, presented here, has established itself as the only ongoing project of sustainable forest management in Bolivia. It has won itself an important place in the construction of development alternatives.

There have been significant advances since the project began in 1986. It is important to note the participation of the 35 Lomerío communities in formulating this management plan. To date, 9,000 hectares of communal forests have been harvested with the effective participation of Chiquitano forest workers trained within the project in technical and social matters. These workers are involved in the planning, accountability, and execution of their own project.

Because of irrational exploitation practiced in the 1980s by the private logging companies who entered the area, there is now a great demand for valuable species such as *Cedro* (*Cedrela spp*) and *Moraldo* (*Peltogyne cartolifolia*). In order to recover these species, the project limits their harvest and, where possible, leaves seed trees for regeneration. Also, since 1986, the project has promoted reforestation of valuable native species. To date almost 20 communities have agroforestry plantations and enrichment plantings in former agricultural gardens undergoing forest regrowth. Such plantings have different purposes, such as producing timber and restoring soils and depleted species.

The future use of land and natural resources will be better planned by the people of each community as a result of the project's classification of communal forests. The communities are already aware of the need to protect the environment and sustainably utilize natural resources.

Given that Lomerío has very shallow soils and fragile forests, the CELOS system is the most appropriate means of forest management. Particularly important is the directional cut to foster natural regeneration. Additional information is needed on the ecological functions of the region's commercial species and the minimum diameter for an optimal cut to assure regeneration. Scientific research will continue in sample parcels.

There is a risk of ecosystem degeneration due to improper management arising from a lack of technical training or the use of chemicals to poison unwanted species. To improve the management system, it is vital to have trained personnel carry out activities and to utilize native cultural knowledge and practices, such as ringing the tree with an axe and cutting vines with a machete instead of using chemical products to control regrowth of vegetation.

5. LAND TENURE SYSTEM: ACCESS, CONTROL, AND DISTRIBUTION OF LAND AND RESOURCES

5.1 Access to the forest

The territorial question is the main problem for the indigenous people of the Bolivian lowlands. All other problems, linked either to production, health, education, and so on, are dependent on access to land and, therefore, to survival strategies for the culture itself.

Historically, the indigenous people of the eastern lowlands occupied large areas of the nation. Their way of life and their socioeconomic organization required ample geographic spaces. Today, they occupy marginalized spaces, with insufficient fertile lands to cover their basic needs. The forest is essential for supplying a wide range of products and for spiritual sustenance. The forest has sustained the indigenous people and their way of conceptualizing their world. It is not coincidental that the areas with the most biological diversity are those under the control of indigenous people.

In the 1970s, the Forestry Law and the Law of Fauna and Wildlife were proclaimed in Bolivia. These laws permit the concession of forestry and hunting areas in territory belonging to indigenous communities. The Mining Law also gives rights to exploit minerals in soil and subsoil. Even though the rights of indigenous communities are confirmed in Treaty 169 of the International Labor Organization of the UN in Geneva, and ratified in law 1257 by the Bolivian government in 1991, present legislation denies territorial rights to indigenous communities. The indigenous people could be given their own indigenous legislation, but to date it does not exist.

The Law of Reforms to the Political Constitution of the State was an opportunity to incorporate indigenous rights. For the first time in the history of Bolivian legislation, indigenous communities were recognized. Article 1 of the Political Constitution of the State speaks of Bolivia as "free, independent, sovereign, multiethnic, and pluricultural." Article 171 of the Bolivian Bill of Rights represents an advance in the sense that "the social,

economic, and cultural rights of the indigenous peoples are recognized, particularly in relation to their original communal land." The concept of indigenous territory, however, is not recognized. In reality, Decree Law 3464 of the Agrarian Reform Law (proclaimed in 1953) still determines the legal status of land tenure. In fact, it has created excessively small landholdings in the western part of the country and enormous cattle ranches in the eastern lowlands. The majority of indigenous people in Bolivia's lowlands do not own communal lands. In order to obtain collective deeds, the communities must pass through a complicated series of legal steps at the local and national levels. The process is costly and lengthy, often without positive results.

The Chiquitano communities of Lomerío have land rights through agrarian titles granted by the National Council for agrarian reform. Some communities obtained their first titles after proclamation of the Agrarian Reform Law. Others have processed their titles through the Apostolic Vicariate of Ñuflo de Chávez (1970-1980). Titles for 13 communities are still not finalized. (For the present situation of land tenure and access to the forest for the Chiquitanos, see table 3.1.)

Table 3.1 Land access and use in CICOL communities

Community	Area (in hectares)				
	Total	Agriculture	Fallow	Forest	Savannah
Santa Anita	2,884	171	60	1,700	953
Cerrito	4,190	390	100	1,800	1,900
Puesto Nuevo and Las Trancas	5,555	500	40	4,100	915
Santo Rosario	1,822	100	68	1,100	554
San Simón	1,867	150	74	1,200	443
Monterito and Surusubí	8,321	243	70	6,500	1,508
Fátima, Florida and Todos Santos	11,721	600	421	9,000	1,700
San Lorenzo	3,251	139	51	660	2,401
Coloradillo and San Pablo	3,269	460	53	2,050	706
San Antonio, Potrerito, Santa Elena*, Carmema*	12,472	617	156	9,500	2,199
San Martín	3,143	238	30	2,500	375
La Asunta and Cornocal	9,509	3,200	45	6,000	264
Púquio	4,098	244	60	2,500	1,294
Palmira	4,452	355	145	1,610	2,342
San José Obrero	3,569	410	50	2,320	789
Salinas	4,946	300	40	300	4,306
Bella Flor	2,211	150	20	2,000	41
Los Rincones	469	50	10	400	9
Total	87,749	8,317	1,493	55,240	22,699

* annexes of San Antonio

5.2 Resource control in the area

The current forest law gives communities preferential rights to utilize forests on the agrarian properties they possess. The state owns most of the nation's forest land and often gives it in concession to large private logging companies. Communities may be better stewards since they have internal mechanisms for control. Each community with communal property or forests requires the consent and agreement of all the community over resource use. Families or family groups must request the right to use land. The council of authorities currently meets when outsiders enter the area to cut timber, mine, or for other reasons. The council is generally able to expel outsiders, thereby protecting the resources. Such controls have functioned efficiently since 1992. There are 50 indigenous forestry guards, accredited by the Ministry of Sustainable Development. Each one has the right to confiscate any resource that has been illegally exploited and bring charges against trespassers.

5.3 Resource distribution

Members of Lomerío communities have a communal right to make decisions on land use and the distribution of benefits from natural resources, be they timber or non-timber products. The community participates in managing the forestry project by classifying areas for forestry, agriculture, and cattle raising. Community government grants rights to families or family groups. In marketing lumber, the timber harvested from each communal forest is given over to the inter-communally-owned mill in two forms: either through the sale of standing trees selected by the technical management team, or through a process whereby the community and mill go half-and-half on cutting timber, with the community offering the standing trees, the enterprise cutting these trees and hauling them to the mill where the sawn planks are divided between the community and the enterprise. In both cases, the community, through the mayor, distributes benefits to each family or uses the money or milled wood to build houses and schools, or for other community benefits.

In the last three years, the Lomerío communities have been able to appreciate the benefits of the project, whether through valuing their own forest or enjoying housing improvements. They feel satisfied because they themselves have been able to utilize and manage their resources. However, they still need to add more value to the processed lumber. The mill administration is seeking ways to accomplish this.

One common difficulty is that the communities that are part of the harvesting and forest management plan sometimes ask the project for permission to harvest their communal forest before the proper time because of urgent economic needs. In many cases this is not approved because the technical team and machinery are unavailable. But the project will give a community money to be paid back through future lumber production, thereby avoiding non-planned forest use or timber sales to other enterprises.

Over the past three years, the communities have accepted the project as theirs, though some people still have doubts. As communities come to feel they have rights over the forest without running the risk of being overrun by logging companies, they are more satisfied with

the project. Despite the fact that communities have only agrarian reform land titles, they feel like owners of the forests and want to consolidate the entire territory.

CICOL's forest management project, aside from sustainably harvesting timber and fostering development (the fundamental aspect of the project), also considers ecological criteria. It respects the rules or norms of management and use of the communal forests proposed by community members (*comunarios*). The permits given by the communal authority or the fulfillment of agricultural work in the areas classified as such, and the effective participation of the *comunarios* in the plans for forest management, are the best guarantees of success for sustainable interventions to maintain the ecological balance. Other ways to enhance success are in technical training for forestry workers and *comunarios* and in sensitizing the local population through educational activities about the work and benefits of the project.

Besides the rules and criteria for resource management, such as those of the Council for Forestry Management, the concepts that would most help maintain the forestry ecosystem are the principles of rights and responsibilities of tenure and use, rights of the indigenous peoples, and the management plan. Reinforcing these principles requires constant monitoring and evaluation in order to gain insights that might aid the sustainability of the forestry ecosystem.

6. Integrating Forest Production and Marketing with the Cultural, Economic, and Political Structures of Indigenous Communities

The forestry project's primary objectives are to manage timber production for both quality and quantity, to market the processed timber from the native species, and to improve the socioeconomic conditions of the Lomerío communities through the services and benefits of the mill.

Other objectives are to:

- utilize the forests of the territory of the Chiquitanos of Lomerío, preserving the biological diversity and the environment to sustain the way of life of present and future communities;
- maintain the mill as a collectively-owned enterprise, as a source of employment for a sector of the population, and as a source of income for the collective benefit of all the communities of Lomerío;
- supply the communities of Lomerío with timber from their communal forests for non-commercial family use and to obtain communal income through the sale of selected trees harvested according to the management plan of the inter-communal enterprise;
- enhance the human resource by developing in the men and women the knowledge, ability, and aptitude to take control of the development needs of the community; and
- use enterprise profits to meet the collective needs of the Lomerío population.

Since the mill began functioning in 1988, it has worked below capacity and therefore has not been profitable, although it is not in a critical situation. Evaluations and feasibility studies indicate that it is possible to improve its output and its financial viability through adjustments in administration, organization of production, and marketing. Mill production provides important services to the community by generating employment and an economic stimulus.

The enterprise presently functions with 32 salaried workers (from 15 different communities) selected by Chiquitano authorities. Only during the first years of production did the mill rely on volunteers. The enterprise is directed by the Chiquitanos themselves and assisted by APCOB in administration, production, and marketing.

6.1 The forestry enterprise and the political community structure

The project administrator, who is answerable to CICOL and APCOB, hires personnel who are placed according to their level of training. Changes in personnel are made by the administrator, though this rarely occurs. Mill workers frequently resign. The Chiquitano's work habits and lifestyles are linked directly to their customs, and many have trouble adapting to the schedule required by mill work because they have agricultural duties to meet family consumption needs. The technical forest management personnel (forest workers) have not changed. They are permanent personnel and have been trained in both technical and in sociocultural matters.

The board of CICOL and the general assembly of the communities have the right and power to supervise and decide fundamental changes in the management of the mill.

6.2 The forestry enterprise and technology

Machinery belonging to the inter-communal forestry enterprise consists of a saw mill with a band saw for processing timber from the communal forests. For timber harvesting, there are four chainsaws, two tractors, a log loader, and four winches. There are three trucks to transport round logs from the forest to the mill and to take milled timber to markets in the same area or in Santa Cruz, the capital city of the department. A pickup truck and a motorcycle are used for support activities in the project. APCOB assisted in installing the sawmill and training personnel in enterprise management by contracting technical experts in business and forest management.

One problem with the mill is its excess capacity in relation to the volume of timber Lomerío's communal forests can potentially produce. It would be better to have one or two portable sawmills and/or a smaller fixed sawmill. The mill presently processes round logs into planks, boards, posts, beams, wood chips, and other products. It uses a band saw with a 7 millimeter blade to saw raw logs. Although the plant's installed capacity is 6,000 board feet per day (requiring 20 cubic meters of timber per day), it actually works eight months per year and processes 2,000 board feet per day. Average annual production is 352,000 board feet per year. The mill's energy source is a diesel generator, rather than wood. Wood waste benefits

the communities for kitchen use and firing kilns to make roof tiles. The mill's administrators have been forced to produce more at lower cost to keep functioning as an inter-communal enterprise. This has helped promote efficiency and accountability in management.

6.3 Survival of the forestry enterprise

The inter-communal forestry enterprise of CICOL has become an important source of employment for the communities of Lomerío and the Chiquitano families. Despite inherent difficulties in training workers and administrators for the milling enterprise, as well as those caused by illegal competition from logging companies, CICOL has been able to harvest and process timber within a framework of sustainable management. A recent evaluation indicates that CICOL is virtually certain to secure "green market" certification for its timber enterprise. The *comunarios* increasingly recognize the benefits of forestry work in improved housing and in the successful communal plantations. The Chiquitanos' economic strategies have changed as a result of greater involvement in local and regional markets in recent years.

A factor to consider in the development of market-oriented enterprises is the way in which communities' culture and customs influence work rhythms. For example, in Lomerío, celebrating the patron saint feast days in each community generally interrupts forestry activities since it involves neighboring communities. Also, the forestry enterprise needs to take into account crop planting and harvest. Seasonal rhythms in agriculture—the Chiquitanos' economic base—cause delays in forestry activities for lack of manual labor. Chiquitanos' cultural commitment to sustainable forestry could be increased by accommodating the management plan to needs for subsistence hunting, fishing, and gathering (for example, fruits and medicinal plants). Sustainable forestry could also be strengthened through political measures, such as signing treaties with authorities to provide better security against penetration of the managed areas, for example by logging companies.

6.4 Marketing

The mill enterprise markets only products from commercial native species managed in the community forest. The following is an example of annual sales of those species (in board feet).

Tajibo:	82,194
Roble:	27,442
Cedro:	2,234
Cuchi:	2,836
Tarara:	1,012
Yesquero:	705
Jichituriqui:	651
Paquió:	326
Picana:	150

These products are sold locally to a parish project to construct indigenous communal housing as well as regionally to buyers in Santa Cruz. Seventy-five percent of the wood is sold directly to consumers and 25 percent to intermediaries.

Distribution from the production site to local and regional markets is by truck on inadequate roads. The time needed to fill orders depends on the quality, quantity, and species requested. Product quality is reasonably acceptable. Demand for lumber fluctuates. Sometimes demand is for only one species, while other times it is for high-value species, but in small volumes. There is also variation in demand for short-dimensional or long-dimensional wood for construction purposes. Currently, income generated by the mill covers only the costs of timber processing, which prevents investment in machinery and other necessary tools. Furthermore, the mill generates insufficient income to pay for managing the forest.

The mill has not been subsidized since 1992, except for externally-funded technical assistance. Suspension of donations for basic expenses caused the mill to adjust its costs to find ways to produce more for less and to seek new markets. Chiquitano personnel are being trained to assume the project's technical, administrative, and negotiation work. While the enterprise has not generated profits to date, it has reached a point of equilibrium between operating costs and income generated. Positive results are expected from the plan to restructure the mill in 1995.

The enterprise's marketing strategy is linked to the mill restructuring plan. The intention is to increase production, improve quality, and obtain "green market" certification to enter international markets. The enterprise is working to find new clients, to market species that currently lack market demand, and to produce products with more value added. Marketing is currently under the mill administrator's control, who is a Chiquitano elected by the general assembly.

Production in the milling enterprise must be in accordance with the volume of wood produced through sound forest management. It must also make good use of the greatest quantity of timber species the forest yields. In this way, negative ecological consequences can be avoided.

7. CONCLUSION

The biggest problems for the community are in marketing, which requires external support (often financial) to explore potential markets, and in forest management and ecological monitoring, both of which require technical assistance. Given these problems, external funding is required. The forestry enterprise cannot self-finance the sustainable management of the communal forests and still maintain the mill enterprise.

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IV. Reflections on a Proposal for Forest Management and Harvest in the Multi-ethnic Indigenous Territory of Beni, Bolivia

by

Zulema Lehm and John Kudrenecky[28]

Translated by Daniel Jaffee and Julia E. Salomón

1. Introduction

> The loggers tell us: "While you are at your meetings, we keep felling trees [and] if the Mojeños don't sell us the wood, we buy it from the Chimanes."
>
> The chainsawers come, fell mahogany trees and then the [businesspeople and timber buyers] arrive saying: "What are you going to do with that wood that's already cut down? It will rot. You're better off selling it to us. Everybody wins."

These testimonies from communal members of the Multi-ethnic Indigenous Territory (*Territorio Indígena Multiétnico*, or TIM) of the Chimanes Forest, illustrate the primary mechanisms used by timber businesspeople to secure mahogany trees at ridiculously low prices. The area's generalized poverty and scant medical services and schools encourage such tactics. The resulting uncontrolled mahogany traffic, indirectly legitimized by the Bolivian government, has produced a perverse situation that hinders the formulation and application of sustainable development strategies by the indigenous population. The rush to harvest mahogany is rampant inside and outside the TIM and jeopardizes the goal of the indigenous people: legal recognition of their territory by the state.

Given those parameters, we will discuss the conflictive situation of the indigenous communities inhabiting the Chimanes Forest in the northeastern Bolivian state of Beni. In relation to that situation, we will examine a proposal for forest utilization prepared by the

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[28] Zulema Lehm is the Director of the Center for Research and Documentation for the Development of Beni (CIDDEBENI); John Kudrenecky is a forestry engineer with CUSO-Canada.

Center for Research and Documentation for the Development of Beni (CIDDEBENI), a non-governmental organization that has worked with the indigenous organizations of Beni since 1987.

More than just describing the development of a forestry enterprise, we will analyze and evaluate the viability of a proposal. This analysis is distinguished more for its examination of the dynamic social, political, and organizational conflicts in the indigenous communities than for its detailed presentation of forest resource management and usage principles. The proposal's forest management plan, however, contrasts notably with the selective mahogany extraction and the low levels of industrialization practiced by the non-indigenous timber companies in the region.

This work is the result of systematic information-gathering since 1986 by CIDDEBENI. Many of the ideas presented here are the result of collective debate within that organization and illustrate the challenge in supporting indigenous populations and organizations.

2. REGIONAL CONTEXT

The Chimanes Forest is an area of approximately 1.2 million hectares, located in southwest Beni (see map, Appendix B). Classified as humid, subtropical forest, it is one of the zones of Bolivia richest in tree species of commercial value, such as mahogany (*mara* or *caoba*; *Swietenia macrophylla*) and *cedro* (*Cedrela odorata*). The area extends from the Andean foothills (Mosetenes and Eva Eva ranges) to the Beni tropical plain.

The forest owes its name to the fact that its mountainous western edge, specifically the entire watershed of the Maniqui river, is the traditional home of the indigenous Chimán people. Nevertheless, the forest's tropical lowlands are also home to communities and settlements of the Yuracaré, Mojeño, and Movima people. The indigenous population of the Chimanes region is distributed between these ethnic groups: 2,188 Mojeños, 2,170 Chimanes, 181 Yuracarés, and 28 Movimas (CIDDEBENI 1990). These forest dwellers represent only a portion of the population of their respective ethnic groups in the state of Beni. Within the Chimanes Forest are two indigenous territories: the Chimán territory, comprising 392,000 hectares, and TIM, comprising 355,000 hectares. This report is concerned specifically with the latter. According to 1992 census figures (INE-BENI 1993), the TIM is home to 14 cultural sub-groups totaling 2,919 inhabitants (see table 4.1), distributed among 20 communities and settlements.

Table 4.1 Indigenous populations in the multi-ethnic territory, 1992

Indigenous group	Population	Percent
Mojeño Trinitario	1,362	46.7
Mojeño Ignaciano	978	33.5
Mojeño Javeriano	3	0.1
Movima	158	5.4
Chimán	185	6.3
Yuracaré	136	4.7
Trinitario-Ignaciano	52	1.8
Trinitario-Chimán	5	0.2
Trinitario-Yuracaré	1	—
Ignaciano-Trinitario	2	0.1
Movima-Yuracaré	11	0.4
Chimán-Trinitario	22	0.7
Yuracaré-Trinitario	3	0.1
Mosetene	1	—
Total	2,919	100

(Source: INE-BENI 1993)

The Chimanes are highly mobile and live in small, dispersed settlements in the Andean foothills, with the settlements growing in size, density, and stability as one moves toward the plain. The Chimanes use forest resources and small agricultural plots basically for subsistence, which is complemented with sales in the urban center of San Borja of some agricultural products such as rice. The Chimanes are also engaged in the growing trade in mahogany and *paños de jatata* (*Geonoma deversa*), a small palm whose leaves are used for roofs in the tropics. Because of its aesthetic qualities and durability, market demand for the palm is increasing. Historically, a cultural characteristic of the Chimán people has been the absence of centralized leadership; instead, community leaders are those with influence over their own domestic group, the five to ten families that constitute a settlement. Only recently,

with the conflict generated by timber exploitation, has the Chimán Council been created to represent the entire indigenous group (CIDDEBENI 1990).

The Mojeño people have larger settlements, located principally along the region's rivers, although they are also dispersed across a wide area and are highly mobile. The tendency to establish small villages with relatively large populations, already present in the pre-colonial period, was intensified during the 17th and 18th centuries by the Jesuit missionaries' campaign to bring indigenous people into settlements (*reducciones*). The Mojeños maintain important cultural traits from this experience of settlement, including their organization into councils (*cabildos*) with 12 to 20 leadership positions and a capacity for convocation and representation that transcends the boundaries of the settlement. In the center of the Chimanes Forest the Jesuits organized the San José mission in a Mojeña settlement; the mission disbanded after the expulsion of the Jesuits in the 18th century.[29]

During the rubber boom at the end of the 19th century, a Mojeño millenarian movement known as the "Search for Loma Santa" emerged in response to fraud, forced labor, and the massive invasions of *criollos* (whites of Spanish descent) and mestizos to the former *reducciones*. The search for a sacred location, free of social and cultural pressures, has motivated the Mojeños' periodic migrations until this day. Through these migrations they have reoccupied places they inhabited before the Jesuits established *reducciones*. Those include the Chimanes Forest and the region between the Isiboro and Secure rivers, both regarded as special sites since the beginning of the millenarian movement (Lehm 1991).

Although the Mojeños primarily have a subsistence economy based on slash-and-burn agriculture, hunting, fishing, and gathering, they are linked to the market through sales of small agricultural surpluses. To occasionally generate more cash, they sell canoes, wagon wheels, other wood products, and, more recently, mahogany trees (CIDDEBENI 1990).

The Yuracarés are represented in the Chimanes region by two communities in the northwest of the forest, a fragment of the major group located in the Isiboro-Sécure and El Chapare regions of Beni. In the Chimanes zone, the Yuracaré communities are similar to those of the Mojeños. The Movima were also settled into *reducciones* during the 17th and 18th centuries. They share settlements as well as social, economic, and cultural characteristics with the Mojeños (CIDDEBENI 1990).

Since 1987, as a result of the presence of non-indigenous timber industries, the Mojeños, Yuracares, and Movimas in the Chimanes Forest have grouped themselves around an indigenous Sub-Center, which operates from San Ignacio de Mojos, a small town located near the forest.

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[29] The impact of the Jesuit *reducciones* was important since currently Mojeños are divided into four groups with distinct dialects and cultural characteristics: *Trinitarios*, *Ignacianos*, *Loretanos*, and *Javerianos*, which refer to the former settlements of Trinidad, San Ignacio, Loreto, and San Javier.

The Chimanes region also contains cattle ranches, seven forestry concessions, some mestizo peasant communities, and two urban centers—San Borja (pop. 11,072) and San Ignacio de Mojos (pop. 4,832) (INE-BENI 1993).

In 1978, the Bolivian government declared a temporary moratorium on commercial forestry in the Chimanes Forest. In 1982, it set aside part of the forest for the Beni Biological Station, an area UNESCO recognized as a Biosphere Reserve in 1986. The resulting conflicts and their effect on the region's inhabitants and environment are detailed below (see section 4).

3. LAND, FORESTS, AND NATURAL RESOURCES

The Chimanes Forest consists of more than 1 million hectares encompassing plant species of high economic value and habitats of threatened or endangered animals such as jaguars (*Pantera onca*), caimans (*Caimán yacare* and *Melanosuchus niger*), and anacondas (*Eunectes murinus*). It also includes areas necessary for the protection of key watersheds and wetlands that are critical refuges for wildlife.

According to several studies conducted in the Chimanes Forest, this is one of the nation's most ecologically fragile areas because of its biological diversity as well as its location at the headwaters of the Mamoré watershed (FAO/CDF 1979; Bascopé 1982; Rojas 1985).

The TIM region is 150 to 250 meters above sea level and is classified by Killeen, García, and Beck (1993) as Humid Forest. It is characterized by alluvial soils and deficient drainage. Its climate is subhumid, with four to six dry months and an average precipitation of 2,180 millimeters annually (AASANA 1994). The vegetation is typically evergreen, although there are also deciduous species and a high proportion of palm trees (Killeen, García, and Beck 1993; Kudrenecky 1992; Llanque 1991; Annas 1994).

3.1 Flora

In its flora, the Chimanes Forest is one of the most diverse in Beni. The variety of natural environments that characterize the region—mountains, foothills, inter-montane valleys, forests, wetlands, and savannah—foster a greater species diversity than other forest formations (*Centro de Datos para la Conservación* 1989).

While there is no official list of threatened or endangered plants of Bolivia, the *Centro de Datos para la Conservación* (CDC), based on a study by Estenssoro (1988), has developed a preliminary list of threatened species in the Chimanes region (see table 4.2).

Table 4.2 Threatened plant species in the Chimanes Forest

Scientific name	Common name	Category	Priority
Podocarpus c f. deifolius		U	low
Carludovica palmata	*jipijapa*	T	middle
Jessenia bataua	*majo*	U	middle
Bactris gasipaes		T	middle
Socratea exhorriza	*pachiuba*	T	high
Euterpe sp	*asaí*	U	middle
Geonoma deversa	*jatata*	U	middle
Tabebuia impetiginosa	*tajibo*	U	low
Tabebuia serratifolia	*tajibo*	U	low
Amburana cearensis	*roble-soriocó*	T	low
Calophyllum brasiliense	*palo maría*	U	low
Platymiscium ulei aff.	*tarara*	U	low
Cedrela odorata	*cedro*	U	high
Swietenia macrophylla	*mara*	T	high

T=THREATENED (Species experiencing rapid population decline due to intensive exploitation or destruction of habitat.)

U=Status UNKNOWN (Species suspected threatened, but there is a lack of sufficient or reliable data for the species to be precisely categorized.)

(Species have been assigned a priority based on the degree of threat.)

(Source: CDC 1989)

In the TIM, one encounters the following vegetation types (adapted from CDC 1989).

Upland dense forest: A mixed forest, without clearly dominant species, that develops in nutrient-poor clay soils on high, old terraces. This forest type exhibits a continuous canopy at heights of up to 30 meters and includes such trees as *almendrillo* and *mapajo*. Of all the

forests in the region, these are the richest in species of commercial interest, such as mahogany, *cedro*, and Bolivian oak (*Amburana cearensis*).

The highly mobile Chimánes mainly use this type of forest. However, Mojeño and Yuracaré groups located in other areas also utilize the upland dense forest to obtain wood for canoes and other products, for *jatata* roofing, and for medicinal plants.

Between 1988 and 1989, a logging road and numerous trails were built in this area to facilitate timber extraction. Because this zone is richest in commercial species, it has become one of the most contentious areas of the TIM.

Alluvial riparian forest: These forests are located along riverbanks, creeks, and ravines, on alluvial soils in the plains, and on abandoned agricultural plots. On riverbanks, a transition can be observed from small grasses to a fast-growing sparse forest higher up on the banks. This pattern is clearly visible on the Apere River within the TIM, among other locations.

These zones contain the majority of indigenous settlements, principally Mojeño and Movima. Here they hunt and fish and practice slash-and-burn agriculture. However, this is also the zone where timber companies have recently built sawmills and a new highway, resulting in a considerable decline in fish and game populations. The indigenous inhabitants now are forced to cover a greater distance to hunt in the upland forests or swamp forests.

Lowland swamp forest: A sparse forest 15 to 20 meters in height, situated in areas with poor drainage, where the soil remains saturated up to seven months of the year. It normally exhibits a high degree of dominance by vines and *patujú* (*Heliconia sp*). While this forest type is poor in species of commercial interest, it is an important habitat for much wildlife.

Humid savannah with seasonal flooding: These savannahs support herbaceous graminoid vegetation, along with shrubs and scattered trees dispersed within high, dry pastures. They are found generally at moderate elevations, or at the edges of streams and depressions—areas which remain saturated up to seven months of the year. This vegetation type includes several communities of deciduous and fire-resistant plants, as well as forested islands of evergreens and palms (Beck 1983; CDC 1989). These savannahs are important as wildlife habitat as well as for their potential for raising beef cattle. These areas are occupied primarily by private, non-indigenous cattle owners.

Permanently flooded mixed savannah: These savannahs are located in flooded and low-lying zones, found between the Apere and Aperecito Rivers in the TIM. This vegetation consists of various communities of grasses (*cañuela blanca*, *cañuela morada* and *tacuarilla*) that are associated with other aquatic species. Aquatic plants and helophytes (plants that grow on the moist margins of swamps and marshes) are also found (Beck 1983; CDC 1989).

Marshes: Bodies of water with cushions of floating vegetation and some rooted plants at the margins. Marshes are common in the forested areas west of the Apere River in the TIM.

3.2 Fauna

The majority of studies on the fauna of the region have been conducted within the Biosphere Reserve at Beni Biological Station. However, present data indicate that the entire state of Beni is rich in vertebrate species. So far, 1,327 species have been identified, representing over 50 percent of the known species in the nation (CDC 1989). The 940 species identified in the Chimanes Forest constitute 38 percent of the national total.[30]

Table 4.3 Estimated number of species in the region

Taxa	Bolivia	Beni	Chimanes
Mammals	280	148	80
Birds	1,257	657	420
Reptiles	250	111	45
Amphibians	200	26	10
Fish	500	385	385
Total	2,487	1,327	940

(Source: CDC 1989)

The forest diversity in the region creates a great variety of habitats and strata for fauna. The survival of these forest species is critical: they are the most important source of protein for the human inhabitants.

[30] The Chimanes region is important ichthyologically and represents 77 percent of all fish species registered in Bolivia. The avian fauna is also very rich in species and subspecies which are distributed throughout the different strata of the forest (CDC 1989). The fauna in the savannahs, while less diverse than in the forests, presents species with a higher degree of ecological specialization. In wetlands, there are associated species and those that visit to obtain water and food.

4. TENURE SYSTEMS: ACCESS, CONTROL, AND DISTRIBUTION OF LAND AND RESOURCES

The majority of the indigenous communities have not received land titles under the agrarian reform, much less forest concessions. In contrast to the Andes, where Bolivia's agrarian reform led to a redistribution of land, in the eastern part of the country the reform actually further consolidated large agricultural and ranching holdings and completely disregarded the indigenous populations' patterns of spatial occupation and land use.

Ignoring native rights, the Bolivian government made a series of decisions about the Chimanes region between 1978 and 1986 that profoundly affected its indigenous communities and created an atmosphere of uncertainty and insecurity. Conscious of the region's forest wealth, the government in 1978 declared the Chimanes Forest a Reserve with a Moratorium on Commercial Forestry (*Reserva de Inmovilización Forestal*) through Supreme Decree 15584. According to Bolivia's General Forest Law, such a reserve temporary prohibits timber extraction while studies are conducted to classify the area as either a Permanent Production Forest or as a Protected Forest. In other words, the state either opens the forests, through public bidding, to harvest by timber companies, or it maintains the forests as protected areas with permanent limitations on the use of the resources.[31] Between 1976 and 1979, studies were conducted in the forest, but these focused exclusively on the timber resource; studies of other species of flora and fauna, as well as social and cultural issues, were not done.

In 1982, 135,000 hectares in the northern part of this reserve became the Beni Biological Station; it was later declared a Biosphere Reserve by UNESCO. Meanwhile, in the southern section, despite being officially off-limits to forest extraction, two timber companies were actively exploiting the area. In 1985, they pressured the government to rescind the region's designation as a Reserve with a Moratorium on Commercial Forestry. In 1986, through a complex legal process, the Bolivian government changed the official status of the Chimanes Forest, converting 579,000 hectares in the southern portion into Permanent Production Forest, open to timber harvesting by legally-constituted timber companies.

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[31] The national parliament has been debating a new Forestry Law. Critical issues include the timber companies' demand that forest concession areas be titled like agrarian property, with permanent access and rights to freely manage the property. The concessions, they argue, provide precarious and insecure tenency which inhibits investment in silvicultural management. Those opposed to their proposal argue that the State is the owner of the forest land and should not alienate its rights. They assert that if such lands are permanently alienated to the forestry companies, there is no guarantee they will not convert them to other uses (such as cattle grazing, as occurs in Brazil) or engage in land speculation. The tax system is a second critical issue in the debate. Until now, taxes have been charged on extracted wood. The new law would base taxes on the area of the concession, thereby creating incentives for smaller concessions and the use of a greater number of timber species. In Beni, concessions range between 30,000 and 300,000 hectares. The timber companies oppose the proposed tax system, arguing that high costs of production would make them less competitive in international markets.

The process of declaring the Chimanes Forest a reserve and, later, granting concessions to seven timber companies was remarkable in that the existence of indigenous populations was not considered. The possibility that they should contribute to the decision-making process was not even entertained. From the start, the activities of the timber companies created conflicts with the indigenous communities. Installing sawmills in communal areas, cutting trees used by the inhabitants for canoes and cart wheels, depleting wildlife, obstructing rivers with bridges, constructing roads that caused soil damage, and sociocultural aggressions (occupation of religious centers, arrogance, etc.) are some of the acts frequently denounced by the communities in the region. Faced with these developments, the indigenous communities began to organize. This led to a mobilization in 1990 known as the "March For Territory And Dignity." Hundreds of residents of the forest and their supporters walked over 650 kilometers in 32 days to the capital La Paz, covering some of the most rugged territory in the Americas.

As a direct result of this march, the Bolivian government enacted Supreme Decree 22611; this decree:

- signifies that once the 20-year contracts with the timber companies expire, the entire region of Chimanes will be indigenous territory.[32] The law prohibits new timber concessions to non-indigenous entities, grants of agricultural or cattle lands, and colonization;
- defines three types of zones: 1) **indigenous territories** (the Chimán Indigenous Territory and the TIM); 2) **protected zones** (the Beni Biological Station, Yacuma Regional Park, and the Eva Eva Watershed Reserve); and 3) **zones for commercial use** (422,000 hectares surrounding the TIM);
- establishes that the indigenous territories are inalienable, indivisible, and cannot be lent or mortgaged; these territories are recognized as collective property;
- prohibits all types of resource extraction by third parties in the indigenous territories, as well as the cession of any rights by the indigenous inhabitants;
- establishes that if the indigenous people wish to develop a commercial forestry enterprise, they must observe relevant laws, including the General Forest Law and Rules, the Commercial and Industrial Law, the General Labor Law, etc; and
- recognizes, at the same time, the titles of agricultural and cattle properties legally constituted within the indigenous territories prior to the law's passage.

[32] The new Forestry Law being debated in parliament proposes that management contracts for the concession areas be changed from 20 years to 40.

Supreme Decree 22611 recognized the Indigenous Territories but did not require the establishment of an official land title nor the demarcation of territorial boundaries. Despite this, through the Amazon Cooperation Treaty, indigenous organizations are receiving assistance from the European Economic Community for boundary marking, which has been underway since 1993 without help from the Bolivian government.

Inside the TIM, which the Supreme Decree designates as collective property, it can be observed that agricultural gardens (*chacos*) are managed by individual households. When soils are exhausted and left to fallow, however, the households progressively withdraw during the successive stages of forest regrowth. When households withdraw, the areas are utilized by multiple families (and sometimes multiple communities) for hunting, fishing, and collection of forest products. That tenure arrangement holds when resources are used for subsistence. Yet, in recent years, with the growth of the market for mahogany, frictions surrounding the use of the forest have increased between ethnic groups and communities. It is clear that conflicts are linked to the commercial value of the forest, the construction of roads for timber extraction, and increased desire for cash income in the indigenous communities. This dynamic, so foreign to traditional indigenous systems, has occurred rapidly without formal or informal rules or regulations to guide access rights and management of products destined for sale, thereby producing the chaotic and conflictive use of mahogany.

5. History of Forest Exploitation in the Chimanes Area

In 1987, a year after one of the Chimanes areas was declared a Permanent Production Forest, the Chimanes Program was created. The goal of this program was to guide the logging industry in creating a model of sustainable tropical forest management that could be emulated and applied in other parts of Beni and Bolivia. The Chimanes Program had forestry, biological, and socioeconomic sub-programs. In practice, however, only the forestry sub-program was put into action. Even though Supreme Decree 22611 instructs the Chimanes Program to take into account the legally recognized native territories, this did not happen. Since 1988, the International Tropical Timber Organization (ITTO) has financially supported the Chimanes Program.

Although Beni forestry policies and the Chimanes Program management plan call for harvesting a variety of timber species and increasing industrialization, this has never been put effectively into practice. In the Permanent Production Forest, where the Chimanes Program is active, the timber companies selectively cut high-value tree species, principally mahogany, and sell boards without further industrial transformation. Their pattern of selecting areas for the annual cut appears to be more consistent with an intent to exploit the richest zones first rather than to implement a system of sustainable forest management (Synnott and Cassells 1991). In addition, their cutting practices are extremely wasteful, due to lack of investments that would permit more complete utilization of the timber.

Table 4.4 Timber companies' use of mahogany in the Chimanes Forest (in cubic meters)

Timber company	Fatima	Bolivia Mahogany	Hervel	Bosques del Norte	Monte Grande	Madre Selva
Original volume	186,260	185,601	140,364	22,582	64,920	13,375
Remaining area*	70%	40%	100%	90%	95%	80%
Amount harvested: 1987	5,649	2,200	78	51		
1988	4,875	2,300	3,365	3,287		
1989	4,487	4,016	5,301	4,598		
1990	6,335	4,188	3,362	5,666	4,378	1,527
1991	5,134	4,222	4,049	185	6,947	
1992	2,715	828	1,512	0	894	0
1993	6,271	7,701	431	3,510	6,644	1,508
Total	35,466	25,455	18,098	17,297	18,863	3,035

*Surface area remaining after passage of Supreme Decree 22611, which recognized the indigenous territories and accordingly reduced the area of timber concessions.

(Source: Roos 1992; CDF 1994)

Table 4.5 Companies' use of other species in the Chimanes Forest (in cubic meters)

Timber company	Fatima	Bolivia Mahogany	Hervel	Bosques del Norte	Monte Grande	Madre Selva
Amount harvested: 1987						
1988						
1989	463			199	.	
1990	940			245	25	99
1991	1,341	6	302	185	56	
Total	2,744	6	302	629	81	99

(Source: Roos 1992)

Though the Supreme Decree prohibits non-indigenous enterprises from cutting timber within the TIM, the timber companies have discovered indirect ways to obtain the mahogany. The growing value of timber has fostered groups of "chainsawers" (illegal woodcutters) among the marginal population of the nearby urban centers. Frequently, these chainsawers are "enabled" by the timber companies, although this activity is prohibited by law. In the locality of San Borja alone, 300 chainsawers have been registered and are actually organized into cooperatives that enter the indigenous territories to cut timber. Subsequently, the timber companies pressure the indigenous people to sell the trees illegally felled by the chainsawers, paying between US$50 and $120 per tree, far below its actual market value. According to estimates by Beni Technical University, a mahogany tree processed locally and marketed in Santa Cruz can yield a net profit of US$1,000 (Ojopi and Machado 1991).

Under such conditions, sustainable forest management became impossible. Indigenous communities were being robbed of resources and income while market processes and local and national governance were corrupted. Government and business colluded to pressure indigenous leaders to sell felled mahogany to timber companies at low prices. Once that process was in motion, ethnic groups competed to make such sales.[33] Supreme Decree 23107 sanctions public auctions of felled timber, which actually has fueled more sophisticated corruption and timber depletion. In 1992, an auction was held to sell approximately 2,800 mahogany trees felled in the TIM and the Chimán territory by chainsawers. Access to the auction was limited, and only two companies (Bolivian Mahogany and Bosques del Norte) benefitted, paying 439 *bolivianos* per tree (approximately US$107). Proceeds were divided according to law between the indigenous organizations and the Bolivian Forest Police. Profits for the logging companies apparently were significant: mahogany, after being sawn locally, sold in Santa Cruz for approximately US$1,725 per tree, more than 16 times the price paid to the indigenous communities (Ojopi and Machado 1991).

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[33] An example of such competition can be seen in the following events. Early in 1991, news surfaced regarding a meeting in La Paz between the Fátima sawmill owner's son and two indigenous representatives. All reports concurred that the director of the Bolivian Indigenous Institute (the state entity in charge of indigenous affairs) used his influence to bring the indigenous representatives to the meeting, where they entered into a contract to sell the Fátima sawmill 512 felled mahogany trees (equivalent to some 1,500 sawlogs) for 50,000 *bolivianos* (approximately US$12,000)—over 97 *bolivianos* per tree. At the meeting, each representative received 12,500 *bolivianos*, with the promise of the same amount upon recovery of the trees. Upon learning of the event, the Center for Indigenous Communities of the Beni and the Sub-Center for Cabildos of San Ignacio de Moxos denounced the contract and demanded that the director of the Bolivian Indigenous Institute resign. Yet, in June 1991, the leaders of the protesting organizations signed a new contract (thereby nullifying the earlier one) to sell mahogany trees for 150,000 *bolivianos* (approximately US$40,000)—nearly 293 *bolivianos* per tree. Interethnic tension was a catalyst for the sale, since there was a threat that if Fátima did not purchase mahogany from the Sub-Center of San Ignacio it would buy from the Chimán Council (A.D.C. 3/6/1991). In fact, early in 1991, the sawmill had purchased 750 mahogany sawlogs (equivalent to 250 trees) from the Chimán Council for 30,000 *bolivianos* (approximately US$9,000) (A.D.C. 5/1991).

Encouraged by the legal cover of an auction to secure downed mahogany, the timber companies spurred more tree cutting with the goal of achieving another auction sale. However, since income from an auction legally must be divided between the indigenous organizations and the forestry police, the indigenous leaders of the TIM have preferred selling felled timber directly to the logging companies, thereby avoiding the need to split income with the state. Between July and September 1994, the sale of approximately 3,130 mahogany trees from the TIM took place in that way. Although the forest law expressly prohibits such transactions, paradoxically, they have been carried out with the approval of the Center for Forestry Development in the Northern Region, the state entity charged with administering and controlling forest use.

The situation has greatly weakened the indigenous organizations. Communities have no way to exercise social control over their leaders, and there are no mechanisms for the leaders to show accountability to the community members. In addition, even though a Preliminary Management and Development Plan exists (which can be characterized as a management plan for the area, not as a forestry plan), it has not been adopted as a plan that would guide investments in the communities.

Damage to the forest under the current system of selective extraction is primarily due to road construction, which causes disturbance and compaction of the soil and destroys vegetation. The trees knocked down during road construction, for example, damage more trees when toppling, creating a corridor of secondary damage as wide again as the road. In addition, the construction of temporary "crazy bridges," built with tree trunks and soil, interrupts river transport by indigenous people and contaminates the waters with resins and sediments.[34]

Between 1986 and 1993 two roads were built which skirted the edge of the indigenous territories. Since 1993, three new roads have been built, along with innumerable trails, which have penetrated into the center of the TIM. With the roads, the pressures to extract timber from the TIM have increased considerably.

6. Planning a Response

Since the official recognition of the indigenous territories in 1990, CIDDEBENI has fostered a number of activities in the TIM with the goal of consolidating the territory and developing an autonomous management and administrative capacity on the part of the indigenous organizations.

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[34] Because of its abundance and form, *ochoó* (*Hura crepitans*) is used to construct the bridges. The indigenous people use its resin as fish poison in some bodies of water during specific times of the year.

6.1 Protection

In November 1991, two groups of Indigenous Territorial Guards were formed, currently totaling 25 youths selected by their communities to operate in the most conflictive parts of the territory. The guards have been trained in indigenous and environmental law, patrol techniques, environmental monitoring, and other skills.

These guards take confiscatory action against people illegally extracting the resources of the TIM. They have also begun posting the boundary of the territory and have covered 51 of the 272 kilometers of markable perimeter. The work of the guards is becoming ever more difficult, however, in the face of an avalanche of illegal timber cutters encroaching on the TIM.

A number of factors undermine the effectiveness of such forest protection measures. Efforts have focused on a relatively small group of young people in the communities, thereby inhibiting the involvement of communities as a whole;[35] the TIM's vulnerable zones are located far from indigenous population sites; indiscriminate road building in the interior of the TIM has facilitated illegal loggers' access; and the region's increasing contact with the open market has generated a growing demand for food and consumer goods and, thus, a greater need for cash. The easiest way to secure cash is through the sale of trees. These internal changes cause the system of forest protection and control to falter and threaten to make it ineffective.

Protecting the forest has demanded the bulk of the energy of the region's indigenous organizations, forcing them to ignore other important tasks such as strengthening their own base and engaging in planning.

6.2 Planning

In May 1991, in the community of San José del Cavitu, CIDDEBENI and departmental indigenous leaders facilitated the first Seminar Workshop on Management and Development of the Chimanes TIM. The workshop identified future training activities, proposed alternative management plans for the TIM, defined the organizational structure of the TIM and of proposed management programs, and proposed necessary research.

Growing out of the May gathering, a training workshop was held: "Planning, Administration and Protection of Protected Areas in Indigenous Territories." From this workshop emerged an operation plan for the TIM for 1991-92. This plan, in turn, led to the

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[35] In 1992, the Bolivian government created the Indigenous Forest Patrol as an offshoot of the Forest Police which trained the patrol. The communities' dependence on an entity external to the indigenous organizations caused distorted relations between the patrol and community members. Salaries for the patrol were paid by the government. Community participation was paralyzed, since salaries could not be paid to all TIM *comunarios*. Community members felt little responsibility for control over their territory.

Preliminary Plan for Protection and Development of the TIM (CIDDEBENI-COTIM 1992), developed with the participation of four trained indigenous community members and two CIDDEBENI technicians.

The planning process has involved indigenous participation on three levels: 1) the *corregidores*, or representatives from the indigenous settlements and communities; 2) the leaders of supra-communal organizations (the government of the TIM and the Sub-Center of San Ignacio de Mojos); and 3) indigenous technical teams.

However, at the time of drawing up and executing the plans, organizational problems began to arise, including difficulties with communication and a lack of internal legitimacy of the *corregidores*. These problems have their origin in several factors, including:

- From the advent of the supra-communal organizations, with which the area has no historical experience, representatives have been elected for having the ability to read and write, speak Spanish well, etc., rather than for having traditional values that might favor the election of indigenous authorities.

- The area's multi-ethnic character involves a series of complexities that have not been sufficiently taken into account. There are zones in the TIM where one or another indigenous group predominates, yet in a considerable number of communities, several distinct groups coexist via marriage. Each and every group, in such a situation, feels it is inadequately represented in the supra-communal organizations. Tensions among the supra-communal organizations heighten that perception.[36] Thus, planning is carried out by people who cannot count on the trust and support of their communities; and the plans are not accepted by the majority of the indigenous population.

As mentioned previously, the need for protection is urgent and has been a central focus in the planning process. It is particularly pressing because of the market's growing influence within the indigenous communities, which have responded spontaneously without a global, long-term vision.

6.3 Training

In addition to the course mentioned above, other instruction on community-based forestry and organization is taking place. The goal is to train the indigenous technical teams and representatives on protection techniques, silviculture, law, and, potentially, negotiating

[36] There are serious conflicts between the Chimán Council, the primary organization of the Chimán people, and the Sub-Center of San Ignacio, predominantly Mojeña. Yuracarés and Movimas belong to the latter, but it is not clear they feel their interests are fully represented (Vargas 1994).

techniques. Two indigenous youths are studying forestry at the University of San Simón in Cochabamba. A support and exchange program has been established with the Technical School in Rio Colorado which functions in a region close to the TIM and trains students as agronomy technicians.[37]

Training has been directed at the protection team. However, the Catholic Church, through the San Ignacio parish, has developed training activities with community members. Such activities include literacy classes, marketing, and health. Although this process is not directly related to the new indigenous organizations, in some cases it has motivated and strengthened them, especially women's organizations.

6.4 Research

A number of studies have been carried out in the Chimanes Forest as part of the Preliminary Plan for the TIM (see Appendix A). The studies have improved forest knowledge and provided the basis for the proposal for Management and Integrated Use of Forest Resources of the TIM (CIDDEBENI-COTIM 1992). The studies, however, did not establish the rationale with which the indigenous people should use their resources. This goes beyond enumerating uses of different species and is related more to the forms of ideology and organization, including relations with external agents, that influence such use. Such information is important because the indigenous communities currently lack a consensus on norms to regulate resources, especially those for sale.

7. THE PROPOSAL FOR MANAGED AND INTEGRATED USE OF FOREST RESOURCES IN THE TIM

The proposal to manage and utilize the forest was designed while simultaneously developing the protection teams, training program, and research. The proposal places a total ban on cutting trees in the TIM. Yet, it also allows the indigenous communities to utilize for the next two years the illegally cut trees in the area (approximately 1,000 mahogany trees alone as of March 1994). They would process the wood with portable sawmills and in communal carpentry workshops. During this time, the plan provides for intensive training and research, and the development of a management plan to use the standing forest.

The plan's general objective is to improve the quality of life of the communities of the TIM through sustainable use of forest resources, thereby offering a viable alternative to unsustainable exploitation by chainsawers, timber companies, and other non-indigenous agents. The specific objectives are to train the communal residents of the TIM, to develop integrated use of forest resources, and to manage the forest for sustained yield. The general elements of the management plan have been laid out: "The Indigenous Forest Use Plan is

[37] Approximately 11 indigenous students participate in the exchange program, and some non-indigenous students conduct their research in TIM communities.

modeled to follow indigenous peoples' management methods, utilizing a large number of different species for diverse applications and developing integrated use" (CIDDEBENI-COTIM 1993).

The plan proposes a 6,000 hectare management unit bordering two of the existing roads in the central forest. With a 100-year rotation, 60 hectares will be harvested annually. Initially, they will harvest all species greater than 40 centimeters diameter-at-breast-height (dbh). The silvicultural system will be subject to research and experimentation to develop a system that maintains the natural diversity of the forest.[38]

The decision to site the 6,000 hectare management unit in a zone fairly distant from the communities was intended to avoid land-use conflicts, to utilize the many species suitable for construction materials, and to facilitate timber extraction, since the timber companies had already built roads. It is hoped that more intensive activity in this zone will confirm economic occupation and improve local control and consolidation of the TIM. It should be noted that the mahogany in the area already has been logged by the timber companies. (However, because the site is distant from populated areas, management activities are unlikely to be integrated into the indigenous communities' economies or organizational dynamics. Furthermore, the proposed area is rich in fauna which may be affected by timber harvesting.)

The problems the plan is likely to encounter are interrelated. First, the market does not have an equal demand for different species or their products. Second, using diverse species for the market presumes a higher degree of industrial and organizational capacity than exists. Currently the organization and division of labor are family-based. Third, the market is likely to require different work rhythms than those customary to indigenous peoples.

Initially, the project planned to create a guaranteed market by improving indigenous housing and communal infrastructure (schools, council houses, etc.). While such a proposal has merit, it is difficult to fund. A market study was not planned.

The project is to be managed essentially by the indigenous people of the zone. The highest decision-making unit would be a body of *corregidores* and indigenous community

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[38] The timber companies currently use a 40- or 50-year rotation. This proposal doubles the rotation time to 100 years to give a margin of security to the regeneration and maturation of the forest. The 40 centimeters dbh minimum size is established to generate adequate raw material and to open the forest canopy sufficiently (50 percent) to encourage natural regeneration. Nevertheless, these guidelines are not based on any actual experience in the region, thus the need for research and experimentation. The carpentry workshops are designed to add value to the wood and to make use of diverse species. The plan calls for carpentry workshops to produce construction materials (parquet flooring, doors, etc.), furniture, means of transport (canoes, wagon wheels), and artisan goods. To maintain low costs of production and minimize soil damage, the proposal calls for logs to be removed by oxen, a method familiar to some indigenous groups, especially Mojeños. However, the feeding and health of the animals requires a specific program component. The San Ignacio Sub-Center and the community of San José are developing cattle breeding in the natural savannah zones in the TIM.

representatives (*Encuentro de los Corregidores y Representantes*). A second-tier supra-communal unit would be the TIM's governing body. Finally, the project would be administered by the indigenous technical team, in collaboration with a technical assessment team. An estimated 130 workers for the project (including administration) would come from the indigenous communities.

This organizational proposal presumes that both the *Encuentro* and the TIM government (currently chosen by the *Encuentro*) are viewed as representative and legitimate. It does not adequately take into account the fact that those organizational units are relatively new to the communities and have a low level of maturity. Within that weak governing structure, the plan creates an administrative unit with economic power and the prerogative to determine resource use but which may not be viewed as representative or legitimate, even though it is formally responsible to the *Encuentro* and TIM government. Because the proposal has not emerged from an analysis of the structures and organizational dynamics of indigenous families, communities, and settlements, difficulties arise when distributing responsibilities and benefits.

However, the problem that caused the proposal's demise was political. At the end of 1993, the proposal was presented to the European Union for funding. While it was initially approved, the European Union demanded a guarantee (warrantor's signature) from the Bolivian government. During the process to secure it, members of the Bolivian parliament associated with the timber industries launched a campaign opposing the proposal. These politician-businesspeople wished to appropriate the 2,800 illegally-felled trees in the TIM. They pressured Bolivian government authorities and the indigenous communities to sell the trees to the timber companies. Their disinformation campaign and attacks on the viability of an indigenous forestry enterprise disheartened the indigenous communities and led some to sell the felled trees in the TIM. With that somewhat desperate reaction, the communities hoped to finally resolve the problems, conflicts, and pressures they faced.

The proposal had been based on the premise that the owners of the land ought to receive a fair price for their resources while they conserve the natural environment. It opposed the model being implemented by the non-indigenous timber companies in the region. Yet, it failed to take into account the dynamic surrounding an extremely high-value species such as mahogany. The indigenous communities have been progressively integrated into that commercial dynamic. This has created in the communities a growing demand for cash, which can be met easily through direct sale of felled trees. The proposal attempted to oppose the dynamic of mahogany commerce, even as it allowed processing of felled mahogany trees for the medium term. It was finally overwhelmed by that dynamic.

APPENDIX A: CHRONOLOGICAL LIST OF BIOLOGICAL STUDIES OF THE MULTI-ETHNIC INDIGENOUS TERRITORY

Feasibility Study of the Chimanes Forest. FAO/CDF, 1979. Forest inventory of the Chimanes region, divided into three zones. Presents detailed information on 24 species. Identifies economic potential of the forest.

Forest Management Plan: Chimanes Permanent Production Forest. D. Goitia, et al. 1988. Overall forest management plan for the seven original concessions under the Chimanes Program.

Socio-Economic Diagnosis of the Chimanes Forest: Phase One, the Problem of Territoriality of the Indigenous Peoples. CIDDEBENI 1990.

Management Plan of the Beni Biological Station Biosphere Reserve. Biological Station 1991. Defines the zoning of the area and priorities for protection, research, and community development.

Forest Inventory in the Zone of the Rio Cuverene. Oscar Llanque 1991; Beni Technical University. Operational inventory of forestry potential in three distinct zones, including a complete inventory of a parcel of 108 mahogany trees (*Swietenia macrophylla*). Study includes a total of 52 hectares in strips. 102 species are classified by common and scientific names.

Preliminary Map of the Vegetation of the TIM. Ximena Aramayo 1991; CIDDEBENI. A first attempt to define the vegetative cover of the territory, hand-drawn, based on satellite images without ground-truthing. Scale 1:100,000.

Identification of Fauna in the Central Zone of the TIM. Cynthia Silva 1991; CIDDEBENI. Evaluation of Fauna in the Central Zone. Methodology used: transects, track identification, interviews with community members. The area included Cuverene River to Puente de los Gatos, the Madres Selva highway, Bolivian Mahogany highway, Carmen del Aperecito, and Chinsi Viejo River.

Interim Evaluation on Project PD 34/88 REV. 1(F). Conservation, Management, Utilization and Integrated and Sustained Use of the Chimanes Region. Synnott and Cassells 1991. Evaluation of Chimanes Program procedures with recommendations for changes in annual cut and incorporation of indigenous populations.

Traditional Chimán Agriculture and its Relation to the Soils of the Beni Biosphere Reserve. Richard Piland 1991. Unpublished thesis. Study of the agriculture of the Chimán people within the Beni Biological Station.

User's Guide to the Beni Biosphere Reserve Biodiversity Plots 01, 02, 03, and 04. Dallmeier, et al. 1991. A guide for users of the permanent biodiversity parcels in the Biosphere Reserve.

Forest Inventory in San José del Cavitu and Tacuaral. John Kudrenecky 1992; CIDDEBENI. Operational inventory in two zones of the TIM. Twenty-two hectares inventoried in strips, with common names of all trees over 30 centimeters dbh, to arrive at a better identification of the forest structure. 95 species identified by common name.

Future Administration of the Chimanes Forestry Sub-Program. Roos 1992. A work plan for the Chimanes Program in response to the recommendations in the evaluation by Synnott and Cassells.

Preliminary Plan for Protection and Development of the Multi-ethnic Indigenous Territory. CIDDEBENI-COTIM 1992. Defines general directions and priorities for management of the territory.

Preliminary Classification of Ecosystems in the TIM. Richard Annas 1994; CIDDEBENI. Detailed inventory in two areas of the central zone of the TIM. Detailed data for 4 hectares (40 parcels) of all plants above 10 centimeters dbh. In each parcel a visual description of the soil profile was registered and soil samples collected. Samples of each species encountered were collected and identified by the La Paz National Herbarium. 220 distinct species registered (although some only to the level of family).

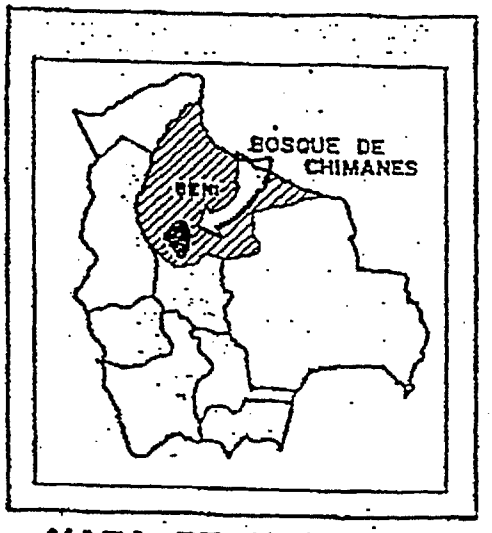
Biological and Economic Analysis of Selective Harvesting of Mahogany in Bolivia. Gullison 1994. Study conducted in collaboration with the Chimanes Program. Includes ecology of lesser-known species, development of a classification system based on remote sensing, effects of selective cutting on biodiversity and road design. Results have not been fully published.

Judicial Study on the Legal Status of Cattle Ranching Properties Inside the TIM. Hugo Montellano 1994. Amazon Cooperation Treaty, National Secretariat of Ethnic Affairs, Center for Indigenous Peoples of the Beni, and CIDDEBENI, with support from the European Union. 1994.

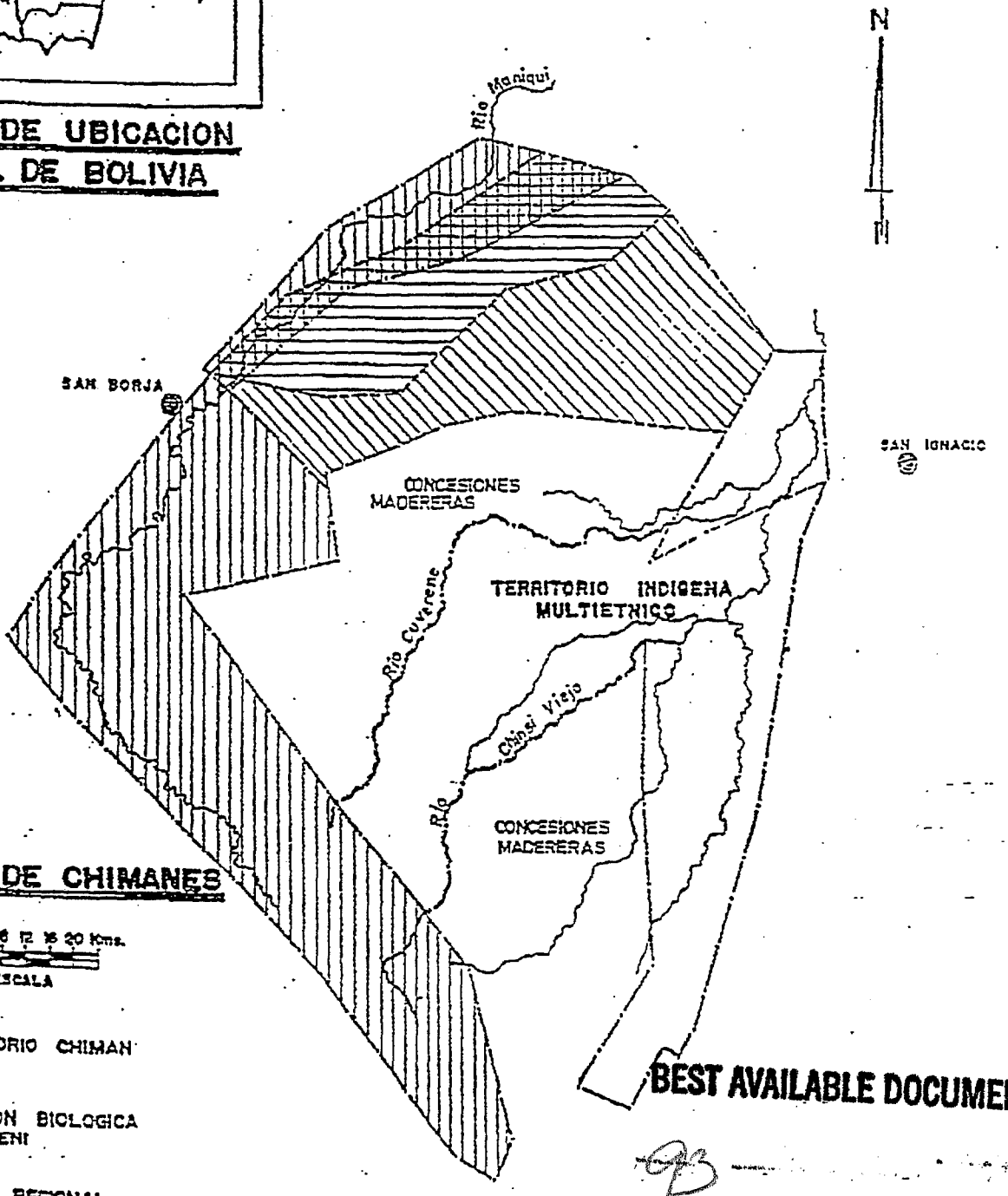
Political Organization and Socio-Economic Practices of the Yuracaré and Movima in the TIM. Miriam Vargas 1994; CIDDEBENI.

In general, these studies have not been conducted with the participation of the indigenous population. While the studies done by CIDDEBENI generally have been carried out jointly with youth from the indigenous technical teams, their methodology has still not fully involved the social base in these communities. The result is studies which provide insights on the forest but are not rooted in a full understanding of the actions and awareness of indigenous peoples. Note that the Chimanes Forest is home to 20 indigenous communities representing four cultures.

APPENDIX B: MAP OF THE AREA



MAPA DE UBICACION
REP. DE BOLIVIA



BOSQUE DE CHIMANES

BEST AVAILABLE DOCUMENT

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A.D.C. 3/6/1991

Contrato hecho por la venta de 512 arboles de mara de la zona de El Carmen del Aperecito, Territorio Multiétnico.

A.D.C. 5/1991

CIDDEBENI, Parroquia de San Ignacio de Mojos, UNITAS, Coordinadora de Solidaridad con los Pueblos Indígenas-Regional La Paz, Movimiento Laico para América Latina, Periódico AQUI, Telesistema Boliviano Canal 2 de La Paz, Subcentral de Cabildos Indigenales de San Ignacio de Moxos: Informe: Verificación del Cumplimiento del Decreto Supremo 22611 en el Territorio Multiétnico de Chimanes. San José del Cavitu, Bolivia

V. Forestry Communities in Oaxaca: The Struggle for Free Market Access

by

Francisco Abardía Moros and Carlos Solano Solano

Translated by Ivonne Plankey Videla and Loraine Woodard

1. Introduction

Today in Oaxaca it is normal to talk of forestry communities and to see communally-owned trucks, cranes, tractors, sawmills, workshops, and factories. Yet, commercial harvest of the indigenous communities' forests began only in 1949 with the arrival of the first logging companies. Prior to that time, *comuneros*[39] cut trees for their own use and sold very little. Before using the axe, they would speak to the *chaneque* (forest spirit) to explain their needs and ask forgiveness for causing harm. The arrival of the commercial logging companies transformed forest use in the region and, along with it, the indigenous communities.

This case study will show how numerous Oaxacan communities gradually became "social protagonists"[40] over the course of four decades, able to creatively shape their development. By the early 1980s, 60 of 83 forestry communities were engaged in commercial

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[39] Legally, *comuneros* or *ejidatarios* are male or female household heads with land rights (which can be transmitted to heirs) and voting rights in the community assembly, the highest government body in *comunidades* and *ejidos*. The Mexican Constitution of 1917 legally defined *comuneros* as those who "from time immemorial" have enjoyed rights of usufruct of their ancestors' lands managed under traditional communal schemes. Mexico's land reform laws enabled Indian *comunidades* to obtain property titles for their lands through presidential decree. They could also recover land that had been usurped if they could legally substantiate when and how it had been taken. The *ejido* was established as a land tenure arrangement to entitle landless peasants, who were given the legal right to petition for expropriation of private estates above a certain size. Mexico's 1992 constitutional reform eliminated that right for new *ejido* claimants. Indian communities retain their prior rights to recover and title land.

[40] *Sujeto social*. This important term refers to the communities' involvement in deciding for themselves how their forests would be used; before this transformation into "social protaganists," the communities tended to be mere objects that were exploited by external forces such as non-indigenous logging companies.

logging. They ultimately displaced the parastatal and private timber companies and opened Oaxaca's wood market to free competition. At that point, the communities faced two challenges. First, they had to move beyond artisan-level timber extraction, which limited them to cutting a small volume of trees or selling standing timber. By mechanizing they could more effectively compete in the market for round logs. Second, they had to establish sawmills to enter the lumber market. The communities dealt with those challenges between 1983 and the early 1990s by establishing forestry enterprises. Currently 60 communities engage in logging by selling either standing timber or round logs. Of those, 43 own mechanized logging equipment and 17 operate sawmills as well, enabling them to sell round logs, boards, and, to varying degrees, more sophisticated manufactured products.

While progress varied during that second phase, the most successful forest communities made significant economic gains and improved their conservation practices. Those with the greatest organizational capacity began to capture a significant part of the economic surplus that had previously flowed out of their local economies, enabling them to capitalize their industries at a level unthinkable in previous decades. Forestry profits distributed to *comunero* households fostered social and economic improvements. The most successful communities were able to accomplish this while retaining the fundamental core of their traditions. They maintained respect for the forest and elements of traditional community organization while incorporating from external sources the technology and organizational forms and practices for business development.

By the mid 1990s, however, the consolidation and expansion of such successes had become more difficult, since the community enterprises faced qualitatively different conditions compared to 1983. Not only did the they face the conventional problems, such as domination by private and parastatal timber companies (the traditional plunderers of community forest resources[41]) and the difficulties involved in trying to fully develop their business potential, but the community enterprises faced entirely new problems arising from the process of economic globalization. These challenges are the focus of this study, which analyzes the ascendence of more efficient business competitors (usually from highly industrialized countries) that are displacing many Mexican producers from traditional export markets and even their own domestic markets. Also analyzed are the concomitant problems, such as monetary instability and high interest rates for loans. Finally, in the appendix, the specific case of Ixtlán is examined. Ixtlán is a community that is distinguished by its high level of success in developing community-based forestry; however, economic globalization has challenged Ixtlán's forestry enterprise, and this study concludes with a look at how the community is coping.

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[41] Despite the fact that the government discontinued granting forestry concessions in 1986, some private logging companies still remain economically active.

2. THE GENESIS OF INDUSTRIAL FORESTRY

The *comuneros* of Oaxaca's Northern and Southern Sierras traditionally subsisted on agriculture. Their coniferous and broadleaf forests served only as specialized niches for the plant and animal species they had learned to sustainably harvest. The communities mainly produced corn, combined with other important crops such as wheat at high altitudes and sugarcane in low-lying tropical areas. Their cropping complex encompassed an intricate blend of the native and the adopted. Artisan production (pottery, leather, cotton, and wool textiles) and small-scale cattle ranching complemented their agricultural activity. Each region was integrated though a complex system of commercial interchange in which foreign merchandise played a small role.[42] Commerce was carried out using mule trains or the backs of *comuneros* themselves. Goods moved by way of the paths that crisscrossed the sierra.

Oaxaca's forests contained a multitude of plant and animal species, conserved by its indigenous peoples, the Zapotecs, Chinantecs, Mixtecs, and Chatinos. Before the 1950s, the forest was used primarily for domestic purposes (building materials, fuelwood, edible and medicinal plants, and hunting) and secondarily for producing charcoal and tools for regional markets. The population exerted little pressure on the forest.

Mexico's forest laws of 1926 and 1942 restricted access by outsiders to forests on the lands of *ejidos* and *comunidades*. The laws stated that commercial forestry could be carried out only by community cooperatives coordinated by *ejido* or communal government authorities. In 1947, President Miguel Alemán proclaimed a new forest law to promote rapid industrialization of those forests.[43] Presidential decrees would establish industrial forestry units to be awarded as 25-year exclusive concessions to soliciting enterprises. The owners of the forest land, in most cases the peasant and indigenous communities, lost all rights to their resources. Cutting trees for domestic use was formally subject to authorization by the concessionaires, even if the company did not exploit those particular timber species.

In addition to ceding extensive rights to the concessionaires, the 1947 forest law also obligated them to support public works and services in the region although it established no specific guidelines. Furthermore, it required the companies to pay a just price for the timber through a stumpage fee to the owners of forest land. Although the law failed to define a just price, it established a mechanism to set it. Concessionaires and communities would sign an annual contract specifying the volume to be harvested and the stumpage fee. The law left the communities one instrument for defense—their ability to reject the annual contract.

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[42] Trading zones in the Northern Sierra included the regions of Ixtlán, Camotlán, El Rincón, Villa Alta, and Mixes, and in the Southern Sierra, the regions of Chatina and Coatlanes.

[43] The National Constitution of 1917 designated natural resources under and above the land surface (including trees) as national property. The State, therefore, had power to assign access rights (property rights, concessions, renting rights, etc.) for their exploitation.

3. In the Beginning Were Roads

Economic policies of the 1950s were shaped by the view that rapid industrialization would put Mexico on equal footing with the superpowers. Such policies fostered the growth of cities, particularly Mexico City, and generated unprecedented activity in the construction industry, drastically increasing the demand for wood.

During those years, the first logging companies became active in Oaxaca. In 1949, the Oaxaca Forestry Company (*Compania Forestal de Oaxaca*, or CFO) began to construct a road from Zimatlán toward the forests of San Pedro el Alto, whose steep slopes until then had been reached only on foot or horseback. CFO had peons with picks and shovels build trails in the Southern Sierra so that mules could drag out logs. The company installed artisan-level sawmills, which were considered archaic even then. A few years later, with a little more capital and machinery, the Tuxtepec Paper Factory (*Fábrica de Papel Tuxtepec*, or FAPATUX) did the same in the Northern Sierra. The concessionaires introduced commercial forestry to the area and used previously unknown tactics to induce the communities to sell timber at ridiculously low prices. They promised to build public works in the communities—promises usually unfulfilled. Then they provided communal authorities with gifts and entertainment; mescal and beer were mixed with signing one-sided contracts. Later they added bribery and violence.

Conditions improved rapidly for the enterprises. In 1956, FAPATUX received an exclusive concession for 251,825 hectares of forest in Oaxaca's Northern Sierra and its spurs, which included the community forests of Ixtlán, Atepec, Macuiltianguis, Calpulalpam, Xiacuí, Zoquiapan, Teococuilco, and Aloapan. Two years later, another presidential decree added the forests of Comaltepec. For its efforts, CFO was rewarded in 1958 with a 25-year concession of 163,784 hectares—the communal forests of San Pedro el Alto, Textitlán, Zaniza, Teojomulco, Texmelucan, Ozolotepec, Quiegolani, Quieri, Lachivia, Lachivitó, Chivaguela, Lachixio, and other smaller communities. The presidential decrees were proclaimed "for the public good."[44]

In the early stages, CFO and FAPATUX provided only limited work for local *comuneros* since they brought skilled workers from other regions, primarily Michoacán. Yet, gradually the communities asserted their status as owners of the forest. In 1963, they began to demand that the logging enterprises give preference to local labor. As more jobs were opened to *comuneros*, tensions between agriculture and forestry began to develop within the communities. Forestry was becoming an important income supplement for many *comuneros*, causing them to gradually abandon agriculture. This was the first evidence of the profound change forestry wrought in Oaxaca.

During the 1960s, the large companies consolidated their activity. The road network expanded. Local *comuneros* became a skilled labor force for industrial forestry. Business

[44] Official Diary of the Federation, 23 October 1956 and 2 April 1958.

prospered during that period of relative calm. Conditions also seemed to improve for the communities. Stumpage fees, though minimal, increased year by year with expanded logging. Complementing that income were public works such as schools, electricity, and potable water. The concessionaires promoted such projects to maintain the guise of compensating the communities. In fact, many of the projects were financed through the federal budget.[45] Forestry salaries were generally sufficient for individual households, since such income usually complemented agriculture, small-scale cattle ranching, and artisan work. Sometimes forestry work even allowed small, but significant, capital accumulation. In Zimatlán and Sola de Vega, CFO helped some *comuneros* buy trucks to transport timber. Thus, some livelihoods became directly linked to the company's business. It appeared that forestry organized by large companies benefitted everyone, creating the illusion of a dynamic equilibrium. Yet, it soon became apparent there were cracks in this social system, cracks that expanded as the decade continued.

4. Forestry, Agriculture, and Community Cohesion

As mentioned, Mexico's development model also increased tensions between agriculture and forestry in Oaxaca. To complement industrialization, the state promoted the "green revolution" to rapidly increase agricultural output.[46] Expanded production of high-yielding wheat and maize varieties created surpluses for export. The latter reached their maximum levels from 1965-69.[47] The green revolution, however, created negative effects in Oaxaca. That rain-fed area was ill-suited for the improved grain varieties. Moreover, the same roads that enabled timber to flow out allowed cheap maize, sugar, and wheat flour from other regions to flow in, undercutting prices for Oaxaca's principal agricultural products. Maize became a less attractive crop for peasants to produce. Mexico's commodity price policy further exacerbated that effect. Farmers were eventually caught in a squeeze. The price they received for their crop was not keeping up with the cost of inputs.[48] As it became less economically attractive to produce maize, *comuneros* increasingly turned to forestry to

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[45] In Ixtlán, public works were carried out by the federally-funded Papaloapan Commission (*Comisíon de Papaloapan*). The commission, however, made it appear that FAPATUX was paying for the public works.

[46] The "Green Revolution" promoted improved seed varieties and associated practices (fertilizers and irrigation) and increased production of basic grains, mainly wheat and corn in Mexico.

[47] Maize exports during the 1960s were uneven. At the start of the decade, exports totaled over 450,000 tons. They dropped sharply from 1961-63, reaching a low point of 78 tons, and rose to their maximum levels between 1965-1969, surpassing 1.2 million tons in 1965 and 1967. By 1970, exports fell to around 2,000 tons (CDIA 1980).

[48] The guaranteed price for maize remained frozen from 1955 to 1963 at US$800/ton, and from 1963 to 1972 at US$940/ton (CDIA 1980). The government began to eliminate price supports in the 1980s.

supplement household incomes. As they gained greater rights to work as wage laborers harvesting timber on their lands, they further abandoned agriculture.

Grain production in the District of Ixtlán (Northern Sierra) from 1950-1980 demonstrates the decline of agriculture. Prior to the 1960s, Ixtlán had been self-sufficient in maize and wheat and even sent surpluses to neighboring regions (Villa Alta and Los Valles) between 1950-1960. Incentives to abandon agriculture were so strong, however, that between 1950 and 1970 the area planted to maize in Ixtlán dropped by 72 percent and total production dropped by 80 percent. Wheat production decreased by 95 percent during that period. The sharpest declines occurred during the 1960s. Since forestry salaries were insufficient to provide livelihoods, high rates of migration from the Northern and Southern Sierras began and continue to the present.

Table 5.1 Maize production in the district of Ixtlán

	1950	1960	1970	1980
Area planted (ha.)	15,521	16,881	4,346	4,866
Total production (tons)	14,702	10,637	2,976	4,909
Productivity (kg/ha.)	947	630	685	1,009
Percentage in comparison with 1950				
Area planted	100	109	28	31
Total production	100	72	20	33
Productivity	100	67	72	107

(Source: Agricultural, Cattle Ranching, and *Ejidal* Census from 1950 to 1980)

Table 5.2 Wheat production in the district of Ixtlán

	1950	1960	1970	1980
Area planted (ha.)	7,452	5,645	443	150
Total production (tons)	6,457	4,099	308	135
Productivity (kg/ha.)	866	726	695	900
Percentage in comparison with 1950				
Area planted	100	76	6	2
Total production	100	63	5	2
Productivity	100	84	80	104

(Source: Agricultural, Cattle Ranching, and *Ejidal* Census 1950 to 1980)

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The transition to forestry had failed to establish a complementarity between agricultural and forestry incomes. Rather, it generated a tension that finally exploded. Forestry concessions expanded, followed by the decline of agriculture and increased out-migration. It is important to gain a better understanding of community strategies during this period so as to extract lessons which might help with current problems.

The transition can be interpreted in various ways. The communities could be viewed as victims. As agriculture was increasingly devalued, *comuneros* were forced into local forestry jobs to avoid migration. Yet, those salaries could not compensate for the progressive disappearance of maize. Ultimately, they were forced to migrate. Those who remained became increasingly dependent on CONASUPO grain, unreliable in quality and supply.[49] Maize became a burden on the family budget instead of its basic starting point. The high out-migration beginning in 1960 was the indicator of a long chain of afflictions.

The *comuneros* cannot be viewed simply as victims, however. Some abandoned their fields before agriculture was no longer economically viable and migrated before economic pressure left them with no other option. Migration decisions by individuals and small groups often reflect initiative to zealously seek self-improvement in the outside world, beyond the traditional dynamic of their communities. Informants indicate that forestry wage-labor around 1960 in the Northern Sierra provided better income and opportunities than work in the fields. A growing modernization fever seemed to cause many to migrate. While some who left to study outside the community came back (typically school teachers), others found better employment and housing in urban centers, especially Mexico City. Some migrants consolidated networks of fellow Oaxacan *braceros*[50] "on the other side" to get relatively attractive contracts in specific agricultural areas in the US. These observations show that the communities cannot be considered mere objects of external forces, since they also played a role as protagonists, making decisions as independent actors. In many respects, the communities were authors of a counterproductive strategy in which they collaborated to dismantle their agriculture, disperse their community through migration, and transform traditional self-sufficiency into dependency.

It is useful to examine the role of community institutions (traditional elders, agrarian authorities, municipal authorities, general assemblies of *comuneros*) to better understand how collective and/or long-term interests were defined and balanced in relation to individual interests. Despite high out-migration from Oaxaca, individuals' links to communities have remained remarkably strong. Migrants return to their villages from the city or even another country when designated by community assemblies to serve in one- or two-year government

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[49] CONASUPO, the National Commission of Popular Subsistence, was a giant state agency that regulated grain and oilseed markets and provided consumer subsidies for food staples (bread, tortillas, beans, eggs, milk, and cooking oil). It set producer prices and supplied farmers with subsidized inputs in exchange for selling their crops to CONASUPO.

[50] Farmworkers who migrate seasonally.

posts. Community mobilization, such as that which pressured concessionaires to hire local labor, kept communitarian links alive among migrants. Communities refer to the long process to develop community-based forestry as "the struggle." Most migrants assumed an obligation to support that struggle, either through monetary contributions or by bringing experience gained in the external world to community government. They could respond to communal needs thanks to what each had gained through individual efforts.

These observations permit a cautious conclusion. While it is obvious that the communities' strategy had a very high cost, it is also apparent that it was efficient in coupling *comuneros'* individual interests with the common interest. Asserting that it was a preconceived strategy would exaggerate the communities' level of control. Yet, it did not happen by chance or through the inertia of traditional loyalties. The communities exercised a certain degree of decision-making capacity to use the individual interests of their members to favor the common interest. Similarly, they were able to couple opportunities offered to individual members "outside" with possibilities created within the communities themselves. To that extent, they became active protagonists in the process of transforming their communities, instead of submitting to the process as if it had been imposed by an adverse destiny.

5. A Troubled Life for FAPATUX and CFO

As it became evident that the salaries paid by FAPATUX and CFO were steadily deteriorating, the communities struggled to improve them. At first, *comuneros'* demands for pay increases in both the Northern and Southern Sierras were ignored, largely because the forestry workers were not unionized.[51] That failure, however, caused the *comuneros* to take a new approach. If, as workers, they could not get the companies' attention, they could do so by rejecting the annual timber contract. In 1967, the community of Macuiltianguis began a contract strike, and soon a total of 14 Northern Sierra villages refused to contract with FAPATUX. The movement continued intermittently until 1972 when the company signed an agreement that partially answered the communities' labor demands. The strike was peculiar for two reasons: the striking workers were the owners of the forests; and the communities, rather than labor unions, had become the defenders of forestry labor.

In the Southern Sierra, particularly in the districts of Zimatlán and Sola de Vega, communities took similar action, but with less spectacular style. There were no strikes, nor did newspapers report developments. In several communities, the *Comisariados de Bienes Comunales*[52] simply took it upon themselves to negotiate with CFO. In that way they demonstrated that they were the owners of the forests and that it was sometimes necessary

[51] Most were local *comuneros*, called "free workers" by the concessionaires. The few remaining Michoacán workers were unionized, but their organization was weak.

[52] Village authorities in charge of communal property.

to prod Mexican rule of law in order to assure that it was applied. Parallel community action in the Northern and Southern Sierras gave birth to a time of troubles for FAPATUX and CFO.

6. THE BEGINNING OF THE END OF THE FORESTRY CONCESSION ERA

When the FAPATUX and CFO concessions were about to expire, the majority of the communities demonstrated that what one learns well, one never forgets. Their experience during the unequal war with the large forestry enterprises finally led them, in 1980, to oppose renewal of the concessions that had allowed the companies to exploit the timber.

Several examples illustrate how the communities reached their decision. The community forests of Santiago Textitlán in southern Oaxaca were not part of the CFO concession. Yet, CFO put up strong resistance when Textitlán tried to form a communal forestry enterprise in 1972. CFO ultimately brought suit[53] against the Ministry of Agriculture's authorization to allow Textitlán to directly exploit its forest resources. In 1977, the court decided that the communal enterprise could sell timber, but only to CFO. The accord ran into trouble almost immediately because CFO repeatedly lowered its purchase prices. The community had no other leverage except to refuse to sell timber. By 1979, Textitlán no longer sold timber. CFO would not pay market prices and, by law, the community could not sell to others.[54]

San Pedro el Alto in Zimatlán also forcefully disputed with CFO over forestry resources during these years. San Pedro is unique in having unusually high social cohesion which historically has helped it retain ownership over extensive and rich forest lands. San Pedro was one of the first communities to establish a relationship with the large forestry enterprises. CFO entered San Pedro's territory at the end of the 1940s, even before the concessions were established. As CFO workers, San Pedro *comuneros* eventually learned almost all aspects of forestry. Moreover, the company helped the community buy trucks for timber transport during the 1960s. Many *comuneros* became vehicle owners and the community itself formed a transport company which it administered through the

[53] A *juicio de amparo*, which allows a plaintiff to bring to court a claim that a legal right has been violated by government action.

[54] It is worth noting the communities and companies' contrasting attitudes toward the market and economic modernization. The communities, generally regarded as backward, opposed the monopsony conditions the concessions created. In contrast, the modern enterprises, CFO and FAPATUX, blocked market mechanisms central to the workings of free enterprise. They used the principle of free enterprise at their convenience to justify their excesses.

comisariado.[55] Disputes began in 1978, when San Pedro demanded that CFO improve its harvesting practices and leave less cut timber in the forest. The company agreed to pay for all cut timber, but reneged the following year. The community held up the next contract until the timber bill was paid. In 1980, CFO again refused to honor the accord and began firing San Pedro workers as a way to pressure the community to renew the annual contract. Tired of waiting for payment and indignant over the firings, the *comunero* assembly removed all CFO vehicles (trucks, cranes, etc.) from one of its sawmills and held them in the churchyard as ransom until the timber payments were settled. The workers were finally reinstated and the timber bill paid. Only two years remained on the 25-year concession, and San Pedro signed no further contracts with CFO. During that time, the community's transport company hauled timber in other parts of the region, at better rates.

In the Northern Sierra, similar disputes occurred after the strike against FAPATUX. The struggle of San Pablo Macuiltianguis stands out. In 1978, the community, with the assistance of *comuneros* who had studied outside the community, initiated a project to process oak timber in which FAPATUX had no interest. Only after overcoming strong opposition from the company and ultimately threatening to suspend the timber contract could the community install a workshop to manufacture tool handles.

Because of these and other struggles, *comuneros* established in 1979 the Organization in Defense of Natural Resources and Social Development in the Sierra Juárez (*Organización en Defensa de los Recoursos Naturales y Desarrollo Social de la Sierra Juárez*, or ODRENASIJ). The objective was to repeal the concessions, or at least to prevent their renewal when they expired. The organization eventually included 18 communities in the Northern Sierra which demanded the right to exploit their own forests and freely sell timber to the highest bidder. ODRENASIJ led the movement for community appropriation of forest resources. It brought many other communities into the struggle in 1981 by organizing a national meeting of forest communities, which took place in San Pablo Macuiltianguis. As the Mexico City daily *Uno Mas Uno* reported on 4 May 1981:

> Close to 300 peasant delegates, representing 20 communities from Oaxaca, Morelos, Guerrero, Michoacán, Veracruz, and Chiapas, agreed today to create an interstate organization of peasant forestry communities so they can exploit their own forests and put an end to the plunder and excessive logging of their forest wealth by private and parastatal concessionaires.

In the Southern Sierra in March 1982, eight communities led by San Pedro el Alto and Santiago Textitlán sent a letter to the President of the Republic demanding repeal of the CFO concession. They kept their organization together for months, pursuing objectives similar to

[55] While San Pedro has had to resolve many problems with the transport company, it is an important example of productive coupling between individual and collective interests that has helped the community maintain social cohesion. Other communities were less successful.

those of the communities in the Northern Sierra. The organizations from the two Sierras eventually merged.

7. Building Community Forestry

In early December 1982, news was published in Oaxaca that presidential decrees had renewed CFO and FAPATUX forestry concessions, but on more flexible terms.[56] Within days, hundreds of copies of the decrees were circulating in Oaxaca, reproduced either by photocopy or mimeograph. Many were accompanied with a letter of commentary from ODRENASIJ. Copies of the decrees reached the Southern Sierra only fifteen days after they were published, circulated by a group of nuns, bilingual teachers, and ODRENASIJ collaborators. On 17 December, ODRENASIJ distributed a flyer in the Northern Sierra calling for a meeting in Santiago Comaltepec in order to analyze the presidential decrees and consider what to do.

In the Southern Sierra, representatives from San Pedro el Alto and San Vicente Lachixio met in early January with communal and municipal authorities from 13 villages affected by the CFO concession. Most of these villages were in Sola de Vega and Zimatlán; one was in Yautepec. The tone with which the San Pedro el Alto representative opened the meeting demonstrates how the communities saw their future at that moment.

> We want this situation cleared up. The Company has always concealed its proposals to the government. They always do everything behind the communities' backs. They have always violated the contract in their operations and payments. We must protest this decree to be free and, if possible, to organize ourselves to establish our own sawmill. If we can't do this, the most important thing is the free market, that every village be free to sell. It's possible to contract with the Company, but we must demand our rights.[57]

Discussion at the meeting proceeded in that vein. Among the agreements reached, one stands out: "All the people present have agreed to defend the free market system that would allow each one of the represented communities to use its natural resources, particularly from the forest, according to its own interests and communal decisions."

During the following fortnight, regional meetings were held in several areas. By the end of January, 27 communities in the regions of Sola de Vega, Zimatlán, Yautepec, Juquila, and the Sierra Juárez had initiated legal action. The disputes came under the jurisdiction of the federal judge in Oaxaca, who decided to suspend the contested presidential decrees until a legal decision had been made. Meanwhile, the disputes gained the attention of the media,

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[56] Decrees of 23 and 24 November 1982, published in the Official Diary of the Federation on 26 and 29 November 1982.

[57] This and the quote following were transcribed from a video tape of the meeting.

which at times raised more scandal than the communities would have liked. In the ensuing national debate, many voices were raised against the new forestry concessions although defenders were not lacking. All the political parties entered the debate, along with many labor unions, peasant and indigenous organizations, professional organizations, local and federal congressmen, bishops, and government functionaries.

On 19 March 1983, community representatives, constituted as the Assembly of Authorities of Oaxaca Forestry Communities, decided to publicly state their position on the debate. Two days later, President Miguel de la Madrid was to visit Guelatao in the Northern Sierra to celebrate the birth of Benito Juárez. There he was presented with an open letter that synthesized the reasons that made the decrees unacceptable: "We cannot agree to them because they are illegal. . . . We cannot accept them because they condemn us to a new form of slavery. . . . We cannot accept them because they put our resources in danger." The president promised to review the decrees that day. While that was not a resounding triumph, it was the first step on the road to repeal. A total of 35 legal complaints[58] were admitted by the federal judge, who temporarily suspended all concessions in Oaxaca. By December 1984, the judge had decided on all cases and nullified the forestry concessions granted in 1982.

Until 1983, the forest communities, obligated by the concessions, simply sold standing timber to the logging companies. When the federal judge temporarily suspended the forestry concessions, the communities ceased to be legally obliged to sell their timber. In the months between the suspension order and the definitive sentence, individual communities stopped selling timber and none signed contracts during 1983. Little by little, FAPATUX and CFO lost their suppliers. Logging production in Oaxaca fell by 30 percent in 1983, compared to the previous year. Forestry analysts thoroughly discussed the crisis of production and ways to overcome it. None, however, mentioned the silent strike nor its cause: the logging companies' accumulation of abuses.

In 1986, a new forest law was passed that ended the regime of compulsory forest concessions to private companies, thereby opening the way for communities to directly benefit from their own resources.

9. Summary and Conclusion

This account of events illustrates the transformation of the Oaxaca peasant communities' role in exploiting their forest resources. It also illustrates how some were transformed into social protagonists with the ability to creatively shape their communal destiny. Until some 45 years ago, the communities cut timber on a small scale. When the concessionaires initiated forestry on an industrial scale, the communities were limited to a

[58] The legal claims (*demandas de amparo*) were admitted by the federal judge on the argument that constitutional violations had been committed against the communities. An *amparo* suit is a legal action used when the constitution has been violated.

passive role—charging a fee for extracted timber. Their passivity was accentuated because the forestry concessions were given under monopsony conditions. The legal recognition of community rights over the forests achieved 40 years later did not by itself convert the communities into social protagonists. Rather their transformation was gradual, achieved by taking an ever more active role in the conflict which eventually led to cancellation of the forestry concession, to legal recognition of community rights, and to opening the regional timber market.

Each community defined efficient strategies for coupling individual interests of members and the common interests of the community. A parallel coupling took place between the communities' internal resources and those from outside to reach the common goal: cancelling forestry concessions and opening the timber market to free competition. Each community experienced a dynamic internal transformation that was ever more extensive and profound by continually renewing the social pact and mobilizing social energy. The communities also established new external pacts and loyalties with different forestry communities in a larger geographical area and with other external agents.

It is important to emphasize that all communities did not develop as social protagonists in the same way or to the same degree. After the concessions were cancelled and even after the new forest law was passed in 1986, some communities continued to sell standing timber under virtual monopsony conditions imposed by logging businessmen through economic coercion or violence. Others sold standing timber under somewhat more competitive market conditions. Some achieved a deeper transformation during "the struggle" and sold logs in markets they created. Communities whose forests were ceded to large companies assimilated the necessary skills to run mechanized equipment and, in several cases, acquired the machines themselves as payment for debts the companies had left pending. Other critical elements in the process included government programs, market dynamics, and even external agents who provided assistance.

Becoming a social protagonist is not an all or nothing matter. There are qualitative differences between communities that sell standing timber on the free market, those that sell round logs, and those that carry out industrial processing. Furthermore, a community's place on that spectrum does not necessarily predict its future standing. Some communities that had never been part of a forestry concession now operate industrial sawmills, while others with that experience have returned to selling standing timber or, in some cases, have quit exploiting their forests. The concept of social protagonist is not static, nor is it achieved by an isolated action or by a simple legal decree. Rather it evolves through a non-linear, dynamic process. It is fueled by continual reconstruction of the social pact within a given community and by the internal dynamics of power. In successful cases, it gives rise to disciplined and coordinated action based on resolving differences between individual interests and the common interest. The creative interaction between those differences can create a fertile coupling that energizes mobilizing initiatives. The case of the indigenous community of Ixtlán in the appendix illustrates this capacity. It also makes tangible the challenge that economic globalization imposes on the survival of forestry communities and the scope of their ability to face that challenge.

APPENDIX: COMMUNITY FORESTRY IN THE INDIGENOUS COMMUNITY OF IXTLAN

The indigenous community of Ixtlán is notable for its capacity to negotiate favorable agreements with external agents, including FAPATUX, and for its long history of community participation in developing industrial forestry. Its skill at handling external and internal matters has brought important results: an efficient sawmill, community businesses cooperatives, economic and social benefits for cooperative members, and conservation of biodiversity in its forests. The community is developing a mutual trust with the government, which places them in the vanguard of cooperative work and enables them to better face the challenges of the global economy. The magnitude of those challenges and how the recent national economic crisis and monetary instability threatens the survival of community forestry is demonstrated below.

Overview

The community Ixtlán de Juárez is located in Oaxaca's Northern Sierra, 62 kilometers northeast of the state capital. A winding paved highway passing through steep mountains links the community with the capital. Ixtlán possesses 19,500 hectares of land, of which 13,425 hectares are forested, primarily with pine (*Pinus*) and oak (*Quercus*).[59] The community's production forest encompasses 8,081 hectares, and 5,344 hectares are under protection.[60] Approximately 5,000 hectares are used for agriculture: corn and wheat in the highlands; corn, fruit, and livestock in the lowlands. The communal land is legally recognized under the 1961 Presidential Decree to Recognize and Title Communal Property (*Resolución Presidencial de Confirmación y Titulación de Bienes Comunales*). That decree gave the community full jurisdiction over its communal lands, except to transfer title.

Most of the community's 421 *comuneros* live with their families in Ixtlán, the municipal and district seat. In 1994, the total population of 3,000 (55 percent women) included 200 families who settled without rights to communal land. Most of the population is indigenous and of Zapotec origin and language.

The exploitation of Ixtlán's forest

Ixtlán's forest was only for domestic use until 1940, when a logging company began to exploit it commercially. The company provided salaried jobs for the *comuneros* as its only compensation for the wood it extracted. When it left in 1956, the company took all its tools and machinery, but the *comuneros* had gained experience in logging and in running a sawmill.

That experience might explain Ixtlán's preferential treatment from FAPATUX when it received concession rights to some community forests in 1958. The company agreed in 1974 to install one of

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[59] The most abundant pine species are *Pinus patula*, *Pinus ayacahuite*, and *Pinus oaxacana*, which exist with two types of fir. The most common oak species include *Quercus crassifolia* and *Quercus benthamii*. Other broadleaf timber species are *Liquidambar styraciflua*, *Alnus acuminata*, *Persea americana*, and *Phoebe helicterifolia*.

[60] The protected area includes 4,344 hectares of cloud forest and other areas set aside to protect rare and endangered species and prevent erosion. Rare species include *Taxus globosa* and *Trichopteris schiendeana*. Species protected because they are overexploited or near extinction are *Chamaedorea ernesti-augustii*, *Tillandsia imperialis*, *Encyclia vitellina*, *Pinus chiapanensis*, *Abies hickelli*, and *A. guatemalensis*.

its sawmills on community land to be managed by the *comuneros* of Ixtlán, Calpulalpan, Xiacuí, and La Trinidad. The mill would sell exclusively to FAPATUX. In 1977, when FAPATUX drew up a 17-year cutting plan for government approval, Ixtlán convinced the company to formally recognize an area of protection forest that the community had traditionally conserved. In 1981, Ixtlán and Xiacuí, with FAPATUX support, created a forestry organization, the José López Portillo Production Forestry Organization (*Unidad de Producción para Aprovechamiento Forestal José López Portillo*).

After concessions were terminated, Ixtlán continued its dynamic path. In 1988, it independently established the Ixtlán Communal Forestry, Agrolivestock, and Services Organization (*Unidad Comunal Forestal, Agropecuaria y de Servicios de Ixtlán*, or UCFAS), a cooperative enterprise to manage logging, the sawmill, and forestry activities, as well as economic and social services for the community. In 1992, UCFAS secured from the government the right to independently contract technical forestry services.[61] It immediately initiated a study for a 10-year integrated forest management plan. Based on that study, the Ixtlán *comuneros* introduced a seed tree silvicultural system in 1993 in addition to selective harvest of commercial species.

Until recently, UCFAS produced some 22,000 cubic meters of round logs per year. Gross sales, including for sawn lumber and finished products, had been approximately 3.9 million new pesos (more than US$1.3 million in 1994 dollars). The annual net profit rate has been approximately 6 percent of sales. Capital assets totaled 9.5 million new pesos at the end of 1994 (over US$2.8 million in 1994 dollars). In the sawmill alone, capital assets totaled 680,000 new pesos, with a working capital of 360,000 new pesos (approximately US$203,000 and US$107,000, respectively). The forestry enterprise employs 421 *comuneros* in 210 permanent or part-time jobs. UCFAS has used profits from the forestry enterprise to purchase agricultural machinery and implements, since shortages and high rental costs had frequently caused the peasant farmers to lose crops, forcing them into temporary jobs. UCFAS rents its machinery at cost to *comuneros*. The enterprise has also invested profits to establish community sewing workshops, bus service to the capital and other nearby towns, a gas station, and vehicle repair service.

Forestry resource management and bio-diversity

Beginning in 1977, Ixtlán implemented a forest management plan for selective harvest of commercial timber. In 1992-93, it formulated a 10-year management plan that allows a total cut of 513,015 cubic meters of pine, 198,978 cubic meters of oak, and 23,359 cubic meters of other broadleaf species. The plan utilizes both selective harvesting and the above-mentioned seed tree regeneration system, which has been successfully applied in other parts of Mexico.[62]

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[61] Gaining that right was a major step for forestry communities, since only the federal government was authorized to mark trees for harvest. The government allowed concessionaires to hire private foresters.

[62] When that silvicultural system method was proposed for Ixtlán, rumors circulated about the risk of harming the forest. *Comuneros* discussed the matter in the general assembly and sent delegates to view the system in other areas. In 1993-94, they implemented the system experimentally in a forest stand of 952 hectares. They assigned 35 percent of the area for their usual selective harvest system and 5 percent for the seed tree system (*Arboles Padre*). To implement the latter, they selected strategically-located, healthy seed trees (not less than 20 years old) with desirable phenotypic characteristics. Leaving the seed trees, they cleared all other vegetation in the compartment to create favorable conditions for seedling growth. In the remaining 60 percent of the experimental area, they simply thinned young and overstocked stands in preparation for either of the two systems. After one year, pine seedlings

UCFAS manages the community's commercial forestry and guides domestic use of the forest. Domestic use permits (primarily for firewood and building materials) are granted by the *comisariado* according to a disciplined plan coordinated by UCFAS forestry technicians who designate the place, time, and quantity of timber to be extracted. The plan coordinates domestic use with commercial logging and allows permits for available non-commercial species, waste, etc. In that way, the community has prevented clandestine logging.

The crisis of declining competitiveness

By 1991, UCFAS recognized the need to consolidate and strengthen the enterprise, but encountered difficulties in implementing new projects. The *comuneros* sought ways to improve economic and silvicultural efficiency by using small-diameter trees, branches, and log waste left in the forest. FAPATUX considered it uneconomical to transport such small, odd-sized pieces to the industrial plant. The *comuneros* began to manufacture wooden stands, which they sold to a Tuxtepec beer exporter for nearly three years. Yet, because they could not reduce production costs, they lost that contract to Mexican competitors near the end of 1994. UCFAS also decided to manufacture wood chips from the waste, thereby adding value through first-step processing before selling to FAPATUX. It purchased the necessary industrial machinery, covering 75 percent of the cost through a government subsidy and the remainder with enterprise earnings. Yet, just as the chipping plant was to start operations, FAPATUX stopped buying from regional producers and shortly thereafter closed its plant, causing a major setback for UCFAS' consolidation plans. The new equipment has remained idle since then. A second sign of approaching crisis was UCFAS' mounting inventory of round logs and lumber, displaced in local markets by US and Canadian imports.

Trade liberalization since the early 1990s had flooded Mexico's markets with wood imports, culminating Mexico's gradual but inexorable role reversal from exporter to importer. During the 1940s, Mexican producers exported timber to North America but were displaced in the post-war era by modern industrial wood producers in the US and Canada. Mexican producers continued to earn large profits in their expanding domestic market, protected by high transportation costs from the northern countries to Mexico and their own comparative advantages (abundant natural resources and low cost labor). While exploiting those advantages to extremes, they wasted the opportunity of "hot house" conditions and lost precious time during which they could have modernized technology and managerial skills. In the 1970s, North American wood companies challenged them in Mexican markets. To prevent the timber industry's collapse, the Mexican government erected import barriers (taxes and bans) during the 1970s and, particularly, the 1980s. Since 1990, it has dismantled such trade restrictions, thereby easing trade wars and satisfying wood-dependent Mexican industries that needed the freedom to buy cheap wood imports to meet foreign competition.

That same problematic process is now underway in Oaxaca. For many years, local wood prices were higher than in most of the nation because of high transportation costs. The concessionaires and the community forestry enterprises which succeeded them exploited their market niche without significantly advancing technology or managerial approaches. FAPATUX began in 1991 to buy raw materials outside the Oaxaca niche, using the recently-completed modern national road system to

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had sprouted in the seed tree compartments. The community has steadily expanded the percentage of forest under that management system. UCFAS's Technical Director, a peasant farmer native to the community, facilitated the process.

attempt to meet competitors' low paper prices, but saved itself only for a short time. The difficulty of making up for lost time in restructuring is clearly demonstrated in Ixtlán. In 1993-94, UCFAS resisted cutting prices to sell the mounting inventory, even though that year's 15 percent profit margin on sales would have allowed it. *Comuneros* feared that once they cut prices they could not raise them again. Instead, they used their talents to negotiate external support to remodel the sawmill, and they secured a promise of 1.2 million dollars, part as credit from a development bank and part as co-investment by the National Solidarity Program. The investment project was expected to dramatically increase UCFAS' profits, but it did not come to fruition.

Mexico's financial crisis at the end of 1994 shook Ixtlán and the world with unexpected intensity (the "tequila effect," as it has been called in the international press). The Mexican peso was devalued 40 percent against the dollar, and bank interest rates rose to an annual rate of 70 percent. Initial estimates of the impact of these changes on UCFAS concluded that, without the planned investment, sawmill earnings would be reduced to less than half the previous year's level. That estimate, however, was based on optimistic assumptions (that the volume of sales would remain constant and that wood prices would increase by 10 percent). Such assumptions are questionable given Mexico's deepening recession, which necessarily reduces demand for wood, and continued foreign competition. Wood imports have nearly tripled over the past five years.[63]

Perspectives

This negative prognosis does not imply that the Ixtlán *comuneros* should abandon attempts to strengthen UCFAS. It is imprudent, however, to expect they can resolve problems only through the conventional route of improving technology and economies of scale. They enter that strategy late compared to their more advanced competitors and with additional difficulties: interest rates and production costs have risen; the expected net profit from the sawmill investment project has diminished by at least a third. What is worse, the level of investment for this project is clearly outside the reach of the government units that offered to support it, since 90 percent of the equipment would be imported. Finally, their volume of sales in April 1995 was 40 percent less than one year earlier.

Despite these setbacks, the *comuneros* did not abandon the plan to restructure their enterprise. Redirecting their investment proposal from the sawmill to the forestry operation, they plan to utilize timber by-products, previously unmarketed species, and return to manufacturing wooden stands, reducing their production costs with a relatively simple, low-cost machine manufactured by the communal forestry enterprise of Nuevo San Juan in Michoacán. They may begin producing oak wood chips for export to Japan, and they are selling wood to a paper factory in northern Mexico. FAPATUX may also resume operations. The *comuneros* are actively seeking technology that requires low investment in imported equipment and are defining new lines of production for export markets. For example, exporting first class boards to the US is an attractive possibility, given the low parity of the Mexican peso to the dollar. They are planning a careful adjustment of their drying operation to bring that option within reach.

The experience of Mexico's most successful community forestry enterprises suggests that such actions alone, even if successful, are insufficient to win the protracted struggle against competitors

[63] NAFTA delineated steps to ease into opening the wood market at the end of this decade. None of those measures have been applied.

who are reducing wood prices in national and international markets at a faster rate than Mexican producers can reduce costs. But such actions, along with obtaining government subsidies and NGO support, buy time in order to attack the problem at a deeper level. Information our research team has collected on competitors suggests that resolving the problem includes (but goes beyond) achieving economies of scale, incorporating technology, and opening new markets, including "green" markets. It centers on restructuring business management itself. For cases like UCFAS, we propose that forging an entrepreneurial approach to make up for its late incorporation into the competitive race requires restructuring the management scheme in the entire community of Ixtlán.

Recovering lost competitiveness involves action to recapture the community's history; for example, the decline in agriculture must be reversed through new projects, such as flower production. Ways to articulate the forest with *comuneros*' agrolivestock production must be sought, and the trust agreements and commitments that underpin the communitarian social pact must be reformulated. Action must be taken to renew ties with *comuneros* who have emigrated from Ixtlán to urban centers and abroad and who still wish to support the community. Such links could be vital to connect UCFAS' investment effort to others in the wood business. Over the past decades, Ixtlán's *comuneros* have developed the necessary skills to become social protagonists. Their survival as a community now depends on reformulating those skills to cope with the new conditions of economic globalization.

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VI. THE SOCIETY OF *EJIDO* FORESTRY PRODUCERS OF QUINTANA ROO

by

Miguel Lanz Herrera, Alfonso Argüelles, and Francisco Montalvo

Translated by Jennifer Morgan

1. INTRODUCTION

Community forestry in the state of Quintana Roo has been particularly effective in curbing the destruction of tropical forests. Prior to the spread of community-based management, private loggers were rapidly destroying the region's forests. Local peasants driven by poverty also cleared significant forested areas to sell timber and cultivate crops. The success of community forestry in Quintana Roo is primarily due to two factors: 1) federal and state governments' timely intervention to terminate forestry concessions; and 2) the *Plan Piloto* (Pilot Plan), which has provided a highly-qualified advisory team and internationally-funded technical assistance. The Pilot Plan has strengthened community participation in forest conservation and in the harvest, processing, and marketing of forest products. Yet, the development of community forestry in Quintana Roo has been characterized by gradual and uneven progress and has been swayed by internal and external factors that often have intertwined.

2. HISTORICAL BACKGROUND

For centuries, Quintana Roo was one of the least populated areas of Mexico. Access was difficult, given its distance from urban centers and the almost impenetrable jungle. The region's dense forests provided refuge for persecuted indigenous Mayans who fled there after unsuccessful uprisings against the Spanish colonial government. In the second half of the nineteenth century, during the War of the Castes, Mayan rebel groups established a military post near Santa Cruz (now Felipe Carrillo Puerto). They maintained that stronghold until 1899, when it was gradually abandoned. Groups of 10 to 15 families retreated inland to the densest parts of the forest, where they survived because of the area's isolation and rich soils.

From the time of the Spanish Conquest, precious wood has been extracted from coastal areas in Quintana Roo. Exploitation intensified after national independence, when a

group of ex-soldiers settled in Bacalar. When Quintana Roo was established as a territory in 1902, President Porfirio Díaz distributed large landholdings among his allies who selectively logged mahogany using the brutal *monterías* system. Indigenous people and political prisoners, controlled by soldiers and a *montero* (foreman), worked in 60-80 member crews as forced laborers, often until death. The *monterías* depleted mahogany-rich areas and moved on. Confrontations between indigenous people and these "timber companies" increased when they indiscriminately began to exploit territory used by Mayas. Although it was not until 1914 that revolutionary unrest spread to Quintana Roo, the major target of local discontent was the *monterías* system.

During the 1930s, President Lázaro Cárdenas initiated a series of economic and political changes in Quintana Roo, including agrarian reform, the formation of chicle workers' cooperatives, and the development of an infrastructure. The agrarian reform established forestry *ejidos* (collective landholdings) which provided each member with sufficient land to collect chicle latex (for chewing gum) from *chicozapote* trees (*Manilkara zapota*).

After 1936, settlements sprang up along the banks of the Rio Hondo. Indigenous people from the region and peons from other parts of the country were attracted by jobs with the chicle and timber companies. During this period, labor organization of chicle collectors advanced somewhat while it progressed more slowly among timber workers. Agricultural and commercial activity expanded along the rudimentary roads of Chetumal-Peto (Yucatán) and Chetumal-Escárcega (Campeche).

The peasantry's economic activities centered on raising maize and other products for home consumption; occasionally this included a small number of livestock. Yet, these endeavors neither produced enough for adequate subsistence nor for entrepreneurial development, given the lack of economic surplus for capital investment. Therefore, households had to cover part of their basic needs by working for the companies extracting chicle and timber in the region. The precarious peasant economy was a boon to companies that secured forestry concessions during the 1940s since they were guaranteed an adequate supply of labor.

Thus, an interdependence developed between agriculture and forest exploitation, which to some extent survived the economic, technical, and social changes of subsequent decades. For example, chicle latex collection is seasonal (latex flows only during the rainy season) and provides peasants with vital subsistence income during the period before crops can be harvested. Traditionally, the chicle companies advanced loans to the latex collectors that had to be paid back with a certain amount of product collected that season.

The formation of chicle cooperatives after 1935 shifted that relationship somewhat. The chicle workers continued to depend on advance loans, but these were now provided by the cooperatives. Furthermore, the cooperatives were able to mediate, more or less successfully, between latex collectors and the market, sometimes by dealing directly in the international market. Occasionally, the cooperatives were able to sell the product for a price

that exceeded the original contract agreement and pass the benefit onto members of the cooperative.[64]

The timber industry in early stages linked itself to agriculture as well, advancing loans to cover peasant households' costs at critical times for maize production. Until the mid-1940s, the timber and chicle industries maintained similar production arrangements with workers, probably because the same companies often contracted for both products. Each timber worker agreed to deliver a quota of logs which would be cut and hauled at the worker's own expense. The workers, however, were directed by the company *montero* who selected trees for harvest. They also depended on the company administrator to distribute monetary advances along with required equipment.

As logging became more mechanized, the company and workers developed relations more characteristic of industry. Management and labor became more specialized. Labor was relegated to felling timber, cutting, and skidding, leaving the loading and transport of logs to specialized workers (usually from outside the area) that were contracted by the company. The custom of advancing loans continued as before, only now in the form of salary advances rather than for repayment in product.

In 1954, the company Industrial Forest Products of Quintana Roo (MIQRO) displaced its predecessors and won exclusive rights to a 551,567 hectare forestry concession. That tract currently constitutes most of the land of the ten *ejidos* that form the Society of *Ejido* Forestry Producers of Quintana Roo (*Sociedad de Productores Forestales Ejidales de Quintana Roo, S.C.*; hereafter referred to as the Society). MIQRO generally followed traditional patterns of labor relations, despite its status as a parastatal company. It deviated only in using an affiliated company to load and transport logs.

In 1974, the territory of Quintana Roo became a state, its economy propelled by expanding tourism and federal programs, including a large colonization program to help satisfy the millions of land requests from peasants throughout the country. A number of federal programs were inaugurated to strengthen the region's older *ejidos*, among them the numerous forest *ejidos* in Quintana Roo and Campeche and those that today make up the Society. The program was financed through the National Fund for the Improvement of *Ejidos* (FONAFE).[65] With that support, the forest *ejidos* received technical assistance and acquired basic logging equipment such as trucks, "tree-farmers," and, in some cases, machinery to saw

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[64] By 1939, there were 46 chicle cooperatives in Quintana Roo. In 1940, the cooperatives formed a federation that successfully mediated between chicle producers and the market. With the collapse of the natural chicle market after World War II, the cooperatives became fairly corrupt and inefficient.

[65] One of FONAFE's purposes was to serve as the depository for stumpage fees that concessionaires paid to forest *ejidos* in accordance with the forestry law. To withdraw those funds, the *ejidos* had to present their investment plan for FONAFE approval. Peasants frequently complained about the bureaucratic difficulties they had to overcome.

logs. Thus, they began to function in ways that until then had been reserved for concessionaire companies. Oral history interviews with *ejido* residents indicate that the concessionaires did not oppose government assistance to the *ejidos*, probably because MIQRO continued as the exclusive buyer of *ejido* timber, and logging practices continued along customary lines.

Despite government support, the majority of the emerging community forestry enterprises did not succeed. When the programs were terminated, most of the equipment remained idle for a number of years. The collapse of that early initiative can be explained by the scarcity and premature termination of technical assistance and financial support. The failure was not complete, however, since the *ejidos* gained valuable experience on which some of them would later draw.

By far the most important event in the history of the region's forests was the massive colonization program of the 1970s which provoked destruction of forest resources, nearly to the point of ecological disaster. Massive clear-cutting was carried out to establish the "New *Ejido* Population Centers" for colonists. That deforestation and the subsequent failure of planned production programs created overwhelming negative effects.

The colonization program's land use development plan focused on intensive, mechanized, large-scale, high-cost, and high-yield agrolivestock production, primarily rice, sugarcane, and cattle. Tens of thousands of hectares were cleared for this purpose. Planners did not take into account the destructive effects on shallow tropical soils caused by clear-cutting and leveling the land. Nor were they concerned with the loss of significant quantities of precious wood that was burned or rotted after the clear cut.

For the most part, the attempts to introduce new crops failed. Private companies that were to demonstrate the viability of the new crops generally did not carry out their contracts. The peasants were left to their own devices. Many turned to traditional agriculture and maize production. This provoked yet another onslaught of forest-cutting, since *ejidatarios* often refused to accept land cleared for mechanized agriculture either because it had not proven adequate for growing crops or because it had become useless after a few growing seasons. That problem also occurred on their newly cleared land, since fallow cycles were too short.[66] Population growth increasingly restricted peasants' access to land.

The economic pressure on peasants was heightened because they had significant debts to repay. The new agricultural programs had been administered by the colonization program and carried out by private companies, but the cost was borne by the new *ejidos* themselves

[66] Fallow cycles (cultivating the land one year and allowing it to rest for the next three, four, or ten years) are a vital part of the traditional Mayan practice of shifting cultivation for growing maize. The indigenous Mayans successfully used that system for many generations prior to and after the Spanish conquest.

through loans advanced by the National Program for Timber Clearing (*Programa Nacional de Desmontes*) and/or the National Bank for Rural Credit.

Timber companies, including MIQRO, purchased part of the precious wood felled through the peasantry's continuous deforestation, a practice that compounded their own destructive use of the forest. MIQRO's forestry concession was slated to end in 1979. At that point, the national forestry law mandated that the president could either cancel the concession or renew it for another 25 years. Although the concession ran out, the company continued exploiting forest resources until 1983. By that time, the magnitude of forest destruction had become alarming. The critical question was how to end the continuing devastation of the forest resources.

In 1983, state officials convened a group of foresters from the Ministry of Agriculture and Hydraulic Resources (SARH[67]) to make recommendations. That group did not limit itself to opposing the renewal of MIQRO's concession. They also proposed enlisting the *ejidos* in caring for the forest by enabling them to use forest resources for their own benefit.

3. THE FORESTRY PILOT PLAN

The Pilot Plan was initiated in 1983 as a combined effort among the state government, SARH, and twelve *ejidos* from the south-central zone of the state. The forestry technicians responsible for developing the Pilot Plan proposal eventually formed the technical assistance team.

3.1 Planning

The principles guiding the Pilot Plan's efforts to promote *ejido* participation were the following:

- halt destruction of forest resources by making the forest more economically profitable to the *ejidatarios* than alternative economic uses that would eliminate the forest;
- achieve the above goal by using the forest in such a way so as to provide a source of capital for the *ejidatarios* as well as to supplement the household economy through salaries and profit sharing;
- allow the *ejidos* to produce wood for their own benefit;
- integrate *ejidatarios*' existing knowledge into the forest management system and convey new knowledge to them;
- analyze and systematize forestry operations in order to implement measures to perfect it; and

[67] SARH (Ministry of Agriculture and Hydraulic Resources) is the government office responsible for forest management nationwide.

- integrate forestry with household agriculture and livestock production, while maintaining forestry as the economic focal point.

The technical assistance team was aware of two potential difficulties from the start. The first concerned how to organize a sectoral economic activity in the *ejidos* without falling into the rigid administrative forms used for the agrarian reform, which subjected proposed actions to numerous administrative rules that agrarian reform officials could interpret broadly, and required all decisions to be ratified by the community assembly and *comisariado* (an executive council consisting of a president, secretary, and treasurer). The second difficulty involved finding an operating mode that would improve the technical assistance team's understanding of the actual conditions peasants faced and, at the same time, encourage grassroots participation.

3.2 Building commitment

The Pilot Plan's technical assistance team, appointed by the state government and SARH, decided to start its work with the *ejidos* through technical training in log scaling and record keeping. That focus was deemed important since the peasants had already gained logging experience by working for the concessionaires and had developed their own knowledge during the 1970s when FONAFE supported community forestry. Information exchange was mutual, since the technical assistance team also benefitted from the peasants' practical expertise. The next priority was to increase *ejidatarios*' knowledge and involvement in marketing timber. At the same time, however, the technical assistance team established arrangements for collective sales, since having individual sellers face the market was untenable.

One of the technical assistance team's most urgent goals was to build a commitment within the *ejidos* to delimit and respect a permanently forested area dedicated exclusively to the sustainable use and conservation of the resource. Such a commitment would prohibit any land use other than forestry. The technical assistance team believed that such an agreement would be effective only if it were adopted voluntarily by the *ejidos*. *Ejidatarios* at the grassroots would have to clearly appreciate the benefits, and profitable marketing was assumed to be the way to make benefits tangible.

Thus, during the Pilot Plan's first stage (June 1983 to May 1986), activities in the priority areas listed above were guided by a common purpose: to build a trust relationship between the technical assistance team and the *ejidos*.

3.3 Progress in the first stage

The main achievements in each of the priority areas interrelate. The technical assistance team and the *ejidatarios* had to broaden their mutual understanding of the forestry problem and the Pilot Plan communities. They accomplished it through a diagnostic effort that included observation, interviews, and community meetings to discuss findings. Toward the

end of the first stage, FAO experts joined those efforts. Together they systematized *ejido* accounting records and constructed a model of the stages of development of the peasant forestry organizations.

As the technical assistance team conducted extensive training for *ejidatarios* in log scaling and record keeping, the *ejidos* gradually realized the need to establish permanently forested areas. Each Pilot Plan *ejido* eventually signed an agreement to maintain such areas. In addition, they began to reassess MIQRO's harvesting plan, which defined annual cutting cycles on the basis of a 25-year rotation and minimum diameters for harvest. They initiated forest inventories in areas to be harvested. Each *ejido's* forest was considered a separate management unit. In 1985, with funds from Mexico and Germany's cooperative program (GTZ) channeled through SARH, the technical team began growth and yield studies for forest management planning and established a computerized data base. The peasants began to get involved in such studies by participating in sampling.

As noted, the principle goal at this stage was to achieve optimal wood marketing. In 1982, the *ejidos* that were to participate in the Pilot Plan produced approximately 40 percent of Quintana Roo's precious wood and had approximately 60 percent of the state's estimated inventory. The state government played a critical role in improving marketing by facilitating direct negotiations between the Pilot Plan *ejidos* and MIQRO, a change that transformed the company's purchasing policy. Previously, MIQRO and other concessionaires had selectively exploited the forest, taking only precious wood like mahogany (*caoba—Swietenia macrophylla*), *cedro* (*Cedrela odorata*) *guayacán* (*Guaiacum sanctum*) and *siricote* (*Cordia dodecandra*). MIQRO agreed to buy 2 cubic meters of common tropical wood for each cubic meter of precious wood, an accord of fundamental importance. In wood markets, a large number of tropical tree species are routinely designated as common tropical wood.[68] That practice encouraged intensive harvesting of a few species and increased the likelihood of depletion. Furthermore, it limited opportunities to increase forest-based income and new employment. The agreement with MIQRO diminished both tendencies and increased incentives for the *ejidos* to maintain permanently forested areas.

Improved marketing created a surplus that was channeled to household economies through the customary loan advances.[69] Change, therefore, had taken place without altering the traditional manner in which the *ejidos* operated. Purposeful changes were introduced to

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[68] There is no technical reason for that designation, since the quality of the wood is excellent according to conventional parameters for evaluation and, in addition, can be exceptionally beautiful.

[69] The loan advances agreed upon with MIQRO were given in three stages: 1) on the eve of the December holidays; 2) at the start of agricultural cycle for traditional crops sown by the *ejidatarios*; and 3) when all the contracted timber was delivered to the concessionaire, generally right before crop harvest time. Most of the advances were distributed to individual *ejidatarios*, while a small portion was reserved to cover operating expenses. It should be noted that this payment schedule did not correspond to the work cycle in the forest but rather to the needs of *ejidatario* households.

gradually reorganize the way Quintana Roo's forests were managed, constituting the final segment in the Pilot Plan's first stage.

The first change was the proposal that each *ejido* assembly designate two marketing delegates, just as they had appointed a *jefe de monte* to supervise logging and a *jefe de maquinaria* to oversee machinery during the concession period. The marketing delegates' duties were different in two important ways. First, they could only advise the *ejidal* assembly and *comisariado* on prices and terms of sales contracts; decision-making power remained with the assembly. Second, rather than operating individually, the delegates carried out their work through a collective body representing the *ejidos* in the Pilot Plan.

The technical assistance team channelled a good part of its efforts through that collective body. The first task was to inventory *ejido* resources and determine the costs involved in the entire operation of harvesting timber for sale. The goal was to determine a reliable point of departure from which to negotiate with MIQRO. With that information, the *ejidos* were ready to deal with the company as a united front of sellers. Ultimately, each *ejido*, rather than the marketing delegates, finalized the sale contract following guidelines established through the collective negotiation. Furthermore, a rule was established to rotate marketing delegates every two years to avoid concentrating power in their hands.

Little by little, such changes created a new concept of forest administration and implanted a sectoral industry (forestry) within the *ejido* structure. The transformation of the group of marketing delegates into the Assembly of Forestry Delegates, in which each *ejido's comisariado* also participated, increased the group's responsibilities beyond debating production costs and marketing strategies. The assembly gradually began to deal with broader problems of forest management. The first move in that direction was the "two for one" accord with MIQRO, which eventually helped establish the permanently forested areas.

The Assembly of Forestry Delegates was actually becoming an intermediary body with power to negotiate with different government units. In that capacity, it arranged various unsecured loans[70] from the state for working capital, including funds to purchase logging machinery and vehicles. The state government also supported the assembly's efforts to obtain similar loans from MIQRO as well as to lease equipment from wood buyers on favorable terms. Such linkages were important because all Quintana Roo *ejidos* lacked adequate logging equipment and had to rent such equipment from companies at high prices, which impeded capital accumulation and became a major obstacle to reaping greater benefits from the forest. The favorable loans secured by the Plan Piloto communities helped break that cycle.

Expertise gained through participation in the collective Assembly of Forestry Delegates also was transmitted to each *ejido*'s assembly, thereby improving the effectiveness of those decision-making bodies. Furthermore, the technical assistance team held meetings on a

[70] The governor granted these *creditos a la palabra* to the communities simply on their verbal promise to repay the loans.

regular basis with *ejidatarios* responsible for supervising the logging operation and machinery. (Those jobs were structured much as they were during the concessions, but now *ejidatarios* served on a rotating basis.) The meetings provided an opportunity to discuss solutions to problems as they arose. Such preliminary work facilitated rational decision-making in the *ejido* assemblies.

Some *ejidos* even created a consulting council to rapidly analyze and solve problems. Such an intermediary body was similar to the traditional council of elders (*consejo de principales*). Thus, it was possible to give forestry delegates, and those in charge of forest management, roles that were both flexible and well-defined, without overriding the authority of the *comisariado* and the *ejido* assembly. Moreover, those arrangements enabled *ejidatarios* to participate.

The duties of the Assembly of Forestry Delegates had been consolidated and expanded to the point that the assembly was ready to take on its own institutional identity. The creation of the Society initiated the second stage of the Pilot Plan. To discuss it, it is helpful to explain the government support given to the Pilot Plan.

3.4 Institutional support

The Pilot Plan enjoyed exceptional government support compared to other community forestry organizations in Mexico. Yet, assistance did not come automatically but derived from the capacity of the technical assistance team and the communities to seek assistance and use it productively. The Pilot Plan was created because the state governor recognized the need for concerted action against regional deforestation in the early 1980s. He expedited loans for the Pilot Plan *ejidos* and facilitated negotiations on favorable terms with the wood-buying companies. He facilitated state purchases of stocks in MIQRO to shift company policy toward buying common tropical species with low market demand. Frequently, the governor assisted in solving problems with other government units, such as the Agrarian Reform Agency. He also provided material resources in the form of economic support for the management team, official vehicles for the team and assembly delegates, and public services for the *ejidos*. For its part, SARH gave the technical team the freedom it required, and reduced bureaucratic red tape in selecting trees for harvest and in dispensing permits to transport logs. SARH channeled funds to the Pilot Plan from the FAO and the Mexico-Germany cooperative agreement, facilitated domestic and international travel for the Pilot Plan personnel to other successful forestry projects, and promoted site visits by outside experts to carry out evaluation and consultation.

By the end of the first stage in 1986, the problem of ecological destruction was clearly under control in the Pilot Plan's zone of influence. As the *ejidos* took over management of the forest, they began to view it as more than a source for cash advances, its traditional function. They could see that a rationally-managed forestry enterprise could produce profits that could be divided among individuals and among communities for improved public services.

4. THE TRANSITION PERIOD

The development of community forestry from the Pilot Plan's initial operations to the creation of the Society was propelled by special circumstances external to the *ejidos* and by particular internal conditions. To this point, the Pilot Plan's successes have been emphasized and not its problems.

Problems for the Pilot Plan *ejidos* emerged in mid-1986, during the annual negotiations with MIQRO. The communities demanded that the selling price for *ejido* wood should cover their production costs, while MIQRO argued that mahogany prices were lower on the open market. As a consequence of that stalemate, MIQRO reneged on its earlier agreement with the *ejidos* to purchase a two-to-one ratio of common tropical wood to mahogany, shifting to a less than one-to-one ratio. The communities, however, had already cut wood on the assumption that the earlier formula was operative. Their inventory began to rot.

Two factors motivated MIQRO's decision. Guatemalan mahogany was flowing into Mexican markets, and the Mexican government had renewed imports of railroad ties from Africa rather than buying those locally-manufactured from common tropical wood.

The *ejidos*' problems were not solely due to external circumstances, however, since they needed a solution for low efficiency in logging and industrial processing. The crisis of 1986 was only a prelude to the difficulties that would arise later as a result of policies promoting trade globalization. In addition, they needed to be protected against a potential decline in political support, since elections for state governor were about to be held.

Despite problems, the transition period was also marked by positive developments. The Assembly of Forestry Delegates had reached a high level of maturity and required an institutional arrangement that would allow it greater independence. Thus, SARH allowed the Pilot Plan *ejidos* to be the first in the nation to control their own technical services for forestry. SARH was responding to the nation-wide debate over the new forestry law and the social mobilization of forestry communities which demanded fewer bureaucratic restrictions over forest management. Until that time, SARH controlled technical services, allowing communities to take on that duty only if they were a legally constituted body that could contract both with SARH and the technicians it would hire.

5. RENEWED PROGRESS AND PRESSING PROBLEMS

The primary information gathered during the first stage provided a basis to estimate the inventory in the forest production zone and to make preliminary decisions for rational management of the forest, that is, to delimit the boundaries of the permanently forested area and identify sites for the first annual cuts. The growth and yield studies required technical precision and were the first step in developing a comprehensive silvicultural management strategy. To carry them out, the *ejidos* needed expert technical assistance. They also needed to tap into local knowledge, since most silvicultural experience from other areas was drawn from forests unlike those of Quintana Roo. The relatively equal participation of government institutions, the technical assistance team, and the *ejidatarios* in this phase was an important sign of progress.

Yet, for this progress to continue, there needed to be an improved analysis of the problems facing the forestry project. Management of the community forestry enterprises in the early stages followed the logic of the peasant economy, modified somewhat by experience gleaned from the logging companies. Obviously, there are profound differences between productive management of traditional agriculture versus a modern forest industry. The first mode is not necessarily inferior, although that could be concluded from the poor record-keeping by field supervisors and equipment overseers during the Pilot Project's first stage. Rather, each management system has standards and parameters that do not readily apply to the other. Since they are not transferrable, the use of peasant management logic to run an industrial firm necessarily had poor results. At the end of the first stage, that inefficiency was targeted as a problem to remedy in stage two.

An additional problem in this area was the *ejidatarios*' tendency to give the new forestry enterprise subordinate status compared to daily agrolivestock activities. FAO's 1986 evaluation of the Pilot Plan revealed that forestry simply subsidized the *ejidatarios*' agricultural and small livestock production. This subsidy was ultimately passed on to the small number of intermediaries who controlled commercialization of farm products. From a broad economic perspective, forestry should be the economic motor for the Quintana Roo *ejidos*, though, at least up to 1986, that was not the view of *ejido* members. Changing that perception became the greatest challenge for the project after 1986.

Forestry's secondary status with *ejidatarios* was demonstrated in their decision to distribute profits and advance payments (loans) during the year. In neither case was sufficient attention given to necessities such as maintaining equipment, creating a fund to provide for depreciation and reinvestment, or even day-to-day operations. Those costs formerly might have been covered with additional loans from the state government or MIQRO; however, after 1986, this became another large challenge to the success of the enterprise.

An additional problem was the enterprise's irregular supply of labor, which followed the agricultural cycle and shifted according to irregularities in the weather. Also, resources

and policies followed the dynamics of agriculture rather than the administrative and financial requisites for sound development of the forestry enterprise.

The progress up to 1986 was important in the sense that the *ejidos* voluntarily incorporated new approaches to forest management. Differences were resolved through dialogue and by testing different ideas, and the *ejidos* were aided by what had been learned from their experience with the concessionaire companies.

Nonetheless, the 1986 negotiations with MIQRO revealed organizational problems that contributed to inefficiency and high production costs. The significant external subsidies enjoyed by the *ejidos* had masked those problems. A number of areas required priority attention, including:

- Job rotation. The custom of rotating jobs imposed serious limitations on training the *ejidatarios*.[71] While there is danger of concentrating power if people remain in jobs indefinitely (particularly in supervisory positions), it is also true that frequent job rotation makes it difficult to build knowledge, experience, and a spirit of professionalism that generates personal commitment to work and team effort.

- Salary structure. The uniformity imposed by the *ejidal* assembly on all salaries acted as a disincentive for those who carried out the most difficult tasks, particularly those of leadership.

- Consensual decision-making. Concentrated authority is often necessary for agile and efficient entrepreneurial management. That, however, cannot be fully achieved in the *ejidal comisariado*, which has a broad range of responsibilities, or in the *ejidal* assembly, a large collegial body which is unspecialized vis-à-vis the needs of a forestry business.

6. FORMULATING A MASTER STRATEGY

Ultimately, a strategic plan must be formulated that is capable of orienting the *ejidos*' daily activities with the complexities of making the forestry enterprise productive. The Society has made incremental advances in solving this and the other problems described above. The regional impact of that progress has multiplied, since three other *ejido* forestry organizations

[71] Rotation of community government positions is customary in *ejidos* and indigenous communities. The *ejidos* hold *comisariado* elections every three years, while the Society holds elections each year. However, the rotation of tasks pertaining to forest operations varies in the *ejidos*. Many positions, such as fellers, markers, sawmill operators, are specialized.

have formed and developed in other parts of the state.[72] Currently, the state's mahogany production is in hands of the peasantry; they have replaced the concessionaire companies and those who formerly had depleted precious wood. The result is a dramatic reduction in the harvest. In 1983, 40,000 cubic meters of mahogany were cut in Quintana Roo, while ten years later the cut was 37 percent of that volume. The economic effect of that reduction on community incomes was offset by the rise in wood prices resulting from breaking the monopoly of the market. More importantly, processing precious wood at six stationary and three mobile sawmills doubled the selling price of that wood. The added value passed entirely to the *ejidatarios*. Salaries in logging and in the sawmills also have increased.

Despite successes, the *ejidos* face two challenges: subsidies, which had been liberally applied since the start of the project, have been reduced; more importantly, national markets have been opened to imports. The latter has intensified the factors that caused difficulties in 1986. Therefore, the primary challenge appears to be in shifting the emphasis from precious wood toward common tropical wood. To prevent extinction of precious wood species, there is no other option than to pace harvesting to the long reproduction cycle of these species. *Ejidatarios* in the Society summed up that fact by pointing out that with precious wood it was possible to buy only a brief amount of time for a transition to widespread exploitation of common tropical wood. The technical and marketing problems that must be solved are not trivial. Success depends on superseding the problems enumerated above; their solution, or lack thereof, depends on how much time there is for a transition.

7. CONCLUSION

Success for this forest conservation project requires that, in the eyes of the *ejidatarios*, forestry becomes a more attractive economic alternative than other land uses. That, however, is especially difficult at this time, given the reduction in forest inventories of precious wood and the increase in *ejido* populations.

Developing a forestry enterprise with diversified and integrated silvicultural practices, industrialization, and marketing is the Society's pending task. Yet, the *ejido* forestry enterprises currently confront serious problems, given their declining inventories and low market demand for alternative species. It is unrealistic to expect that the increasing population can survive on forestry alone. It is equally unrealistic to expect that the *ejidos* can subsist through traditional agricultural practices. We suggest developing a diversified and integrated economy by re-articulating ejidatarios' forestry and agrolivestock activities, which could mutually reinforce and capitalize each other. Achieving such synergy presents an enormous

[72] The Organization of Forestry Ejidos of the Mayan Zone (*Organización de Ejidos Forestales de la Zona Maya, S.C.*), the Society of Indigenous Forestry Communities of Quintana Roo (*Sociedad de Pueblos Indígenas Forestales de Quintana Roo, S.C.*), and the Organization of Forestry Ejidos of Quintana Roo (*Organización de Ejidos Forestales de Quintana Roo, S.C.*) have followed a somewhat similar development process.

challenge. To face it, we believe it is useful to build on the organizational linkages that the enterprise has created between the technical experts and peasants, to introduce economic alternatives compatible with forest conservation, and to integrate these with the diversified activities of the peasants themselves.

The 1994 initiation of the Pilot Plan for Chicle Production, which restructures nine chicle cooperative within the member *ejidos*, marks a first step. The Ministry of Social Development (*Secretaría de Desarrollo Social*) invested risk capital as a stock holder. With that support, the cooperatives have begun to gather chicle latex independently, thereby displacing intermediaries.

The *ejidos* of the Society have completed a highly-detailed inventory of the flora and fauna in their forests. The search for new forms of rational use of these resources has proceeded through conservation activities at the household level and through an ecotourism initiative in the *ejido* of Tres Garantias. These first steps indicate that the *ejidatarios* can confront new challenges. Their future depends on expanding and deepening such efforts to diversify.

APPENDIX: TOWARD A NEW STRATEGIC PLAN

The Society has initiated growth studies of diverse species; these studies are essential in formulating a new strategic plan for forest management. The first results of studies on the region's most valuable species, mahogany, are becoming available. At the same time, the Society is accumulating experience with enrichment plantings and establishing a network of plots for permanent monitoring. In a few years, when the permanent monitoring plots are reinventoried, the Society will have available basic data on mortality and growth. With that, a sustainable annual cutting rate can be calculated.

Forest use that is both diversified and integrated cannot concentrate solely on precious wood but rather must include the use of common tropical wood. Among the latter, 119 species have been identified as having potential for commercial exploitation. Marketing additional species requires experimentation in silvicultural treatments, renewal cuts, thinnings, etc. It implies learning how to organize those tasks within the context of an *ejido* forestry enterprise as well as precisely defining operational costs. The Society has made some advances, successfully working with 12 different species of common tropical wood, but those advances need to be extended. That process will be facilitated by the recent agreement for technical cooperation between the Mexican government and the British Overseas Development Agency.

Diversified and integrated forest use depends also on developing technologies for sawing and adding value to common tropical wood. Consumer demand for such species must be developed. The sawmills in the *ejido* enterprises are designed for processing soft wood. Yet, some have made preliminary adaptations to increase their sales of common tropical wood, both regionally and beyond.

The wood industries in the region have developed plywood production using soft and hard tropical wood, but their demand for local raw materials is very limited due to the fact that the mills continue to use machinery that dates from the beginning of the century. This machinery was designed for processing large diameter logs rather than the size of most common tropical species from the region. The only company with modern technology that might use species from the region is the Quintana Roo Floors and Floor Coverings Factory which manufactures laminated parquet floors. Currently, however, their raw materials are from the US and Canada. Nonetheless, they are experimenting with the sawn wood that the *ejido* forestry enterprises are beginning to produce.

The Society has begun to export decorative hardwood to Europe, the US, and Japan. This was achieved with the support of wood sellers dedicated to the promotion of "green markets." The Society has obtained the necessary certification as an enterprise practicing sustainable forest management.

The *ejido* forestry enterprises in the Society have concentrated until now on selling wood in traditional dimensions for boards and veneer. They must begin manufacturing other resawn products, moldings, etc. and, above all, start drying hardwood.

To promote exports, the Society must establish a marketing commission to promote products produced by the *ejido* forestry enterprises. That effort should also include promoting sales of species that strengthen forest management, principally species from intermediate strata in the forest that do not grow to large diameters (10 to 25 centimeters). Such wood is useful for posts, rustic buildings, etc. The possibility of establishing more sophisticated silvicultural treatment systems depends on finding options to use wood that today is considered waste.

With institutional support, the Society carried out an economic feasibility study to utilize common tropical wood on a large scale in the construction of moderately-priced housing. Unfortunately, the project has not moved ahead, due to resistance from powerful interests in the construction industry.

There is a need and interest to conduct research to develop technologies and markets for common industrial hardwood. It is unrealistic to expect the *ejido* forestry enterprises to take on the high costs of research, including modifying the forest management system. That is beyond the capacity of the communities, despite their notable success in training community technical teams and in carrying out specialized assessments. The scarcity of government support for this type of enterprise is demonstrated by the fact that in 1993 funding totaled only 400,000 new pesos (approximately US$133,000), while, that same year, government expenditures for forest protection in the Sian Ka'an Biosphere Reserve was on the order of 6,000,000 new pesos (US$2,000,000).

VII. THE FORESTRY ENTERPRISE OF THE INDIGENOUS COMMUNITY OF NUEVO SAN JUAN PARANGARICUTIRO, MICHOACAN, MEXICO

by

María Angélica Sánchez Pego

Translated by Daniel Jaffee and Sara Krauskopf

1. INTRODUCTION

The history of Nuevo San Juan is the history of an indigenous forest community that, in the course of a decade, has been able to develop a diversified agroindustrial timber enterprise. This situates the community as one of the most advanced in Mexico in terms of its use and transformation of forest resources, its organizational model, and the development strategy with which it is confronting the challenge of free trade.

Nuevo San Juan is located in the Purépecha Plateau, a region where the forests have been irrationally exploited. Today, only 20 percent remains of what several decades ago was one of the richest forested zones in Mexico. Nuevo San Juan is an anomaly, clearly distinguishing itself as a refuge amidst such destruction. It is one of the few communities in the state of Michoacán that have gained control of their forests. Along with rational management of its forests, Nuevo San Juan is building a large communally owned and operated timber industry. Despite the critical situation now confronting the forestry sector in Mexico, this enterprise is operating with a profit margin that, while declining, allows it to invest in a modernization program to combat the effects of global competition on Mexico's wood products market.

2. LAND TENURE SYSTEM: ACCESS, CONTROL, AND DISTRIBUTION OF LAND AND RESOURCES

2.1 The community: forest access

The community of Nuevo San Juan Parangaricutiro formed after the eruption of the Paricutín Volcano in 1943 forced residents to move their village from the base of the volcano to a new location 15 kilometers from the city of Uruapan, an important commercial fruit and forestry center and the second largest city in Michoacán.

The community of Nuevo San Juan forms part of the Purépecha Plateau, which is along the Neovolcanic Corridor. It is within the *municipio* (roughly equivalent to a county) of Parangaricutiro, in the western part of Michoacán, with altitudes ranging between 1,600 and 2,500 meters above sea level. The temperature averages 18 degrees Celsius and the mean annual precipitation is 1,561 millimeters, making it one of the wettest areas in the region. This optimal precipitation and altitude, combined with excellent soil conditions, allows one of the highest tree-growth indices in Mexico.

Nuevo San Juan is an indigenous community of Purépecha people. The town holds title to 18,138.33 hectares of communal land granted by the Spanish Crown in 1715. Yet, only in 1991 was the community successful in organizing to secure from the Mexican state legal recognition of their rights to communal land. The previous lack of organization among *comuneros* (see footnote 39) had provoked conflicts over community resources and for years prevented the community from fully controlling its forest. Under such conditions, the community was unable to satisfy its basic needs through use of the forest. The 1991 presidential resolution legitimized the community's title, but decreed that it legally covers only 14,600 hectares.

Since the turn of the century, sawmills run by Spanish and Italian immigrants, and later by owners from Mexico City and Uruapan, harvested timber from the region. Until as recently as 1976, they logged and processed pine without building up an infrastructure in the mountains or in the communities near the mills, leaving the original forest proprietors a legacy of misery and ignorance.

Private logging companies came to Nuevo San Juan's hillsides in the 1950s before it had organized to legally control logging. These businesses demanded deeds or legal documents from the communities in order to obtain access rights to the land. Since the communities did not have them, the businesses negotiated with individual *comuneros* for select pieces of land as if they were private property. In Nuevo San Juan, some *comuneros* obtained illegal individual titles and began selling land, particularly in the flatter zones and temperate areas. Many of those who purchased land were wealthy, powerful politicians who today still own avocado groves within the communal lands.

The logging companies commonly obtained deeds for 10 hectares of land but cut timber on 100 hectares—bribing officials to avoid protests. The resulting cut was exhaustive and destructive.

In all, 3,538 hectares were converted to private property—approximately the same amount excluded from the 1991 title. Recognizing the impossibility of a quick agreement with the putative owners of these inholdings, the community accepted the 14,600 hectares designated by the presidential resolution. It was more important to establish boundaries with the neighboring indigenous communities and *ejidos* (collective landholdings; see footnote 39 for a fuller description). The perimeter of the original 1715 land grant still holds; the zones of conflict lie within communal territory.

While accepting the presidential resolution, Nuevo San Juan continues the fight to recover its lost lands. It has held settlement talks with inholders while pursuing parallel legal action; it has also purchased property directly, offering just compensation for the land.

The majority of these inholders (60 percent) are community members with forest land. These holders cooperate with the communal forestry enterprise, allowing their land to be included in the forest management studies and harvest plan. Those who do not belong to the community make up the remaining 40 percent; they hold lands in the valleys and primarily cultivate avocados.

2.2 Formation of the communal forestry enterprise

In 1976, after years of watching outsiders profit from their forest resources without giving anything back to the communities, a group of towns in the region organized themselves to utilize the forests collectively. Nuevo San Juan became part of this group of 26 communities that called itself the Luis Echeverría Alvarez Union of *Ejidos* and Communities of the Purépecha Plateau. Although Nuevo San Juan owned approximately 11,000 hectares of forest, few forestry jobs were available for its members. Many migrated to the US, and the rest extracted pine resin and created wood handicrafts to supplement low-yield corn subsistence agriculture.

The central objective of the union was collective management and marketing of community forest resources. In May 1979, the union obtained the first logging permits for the community forests. Yet, despite the union's good intentions, the new peasant administrators in charge of wood sales used techniques similar to those of the former logging companies. This lack of change alienated Nuevo San Juan. The town left the union in search of alternatives.

After searching for a form of autonomous organization, Nuevo San Juan opted for its own communal forestry enterprise in 1981, making the communal assembly the governing body. The enterprise took control of the forest resource and within a few years had developed a large timber industry. Jobs were eventually created for 800 *comuneros* in all aspects of production, including reforestation, forest technical services, logging, transport, industrialization, and administration. The communal enterprise created a successful dynamic that balances private and community interests.

2.3 Distribution of resources: communal and private in the design of business strategy

Combining community and individual interests and properly resolving conflicts between those interests have been keys to the success of the communal enterprise. The flexible vision among the founders of the enterprise as to what constitutes communal interests has its roots in the governance structure and the land tenure system of the indigenous community. For years the communal forest resource has been divided among its members to

improve the defense and protection of the resource. Each member of Nuevo San Juan is responsible for a parcel of forest.

The division of forest into individual parcels began in the early 1950s with the creation of *cuarteles* (districts) for resin-tapping. Each *cuartel* owner harvests resin for personal income. This practice could have been an obstacle to communal logging; however, the negotiations between the enterprise and the community members were very successful and generated benefits for both parties.

The community forestry enterprise permitted individual *comuneros* using the land to establish agreements with the new business on the following terms.

At the individual level:

- each member could retain his/her property within a part of the forest;
- each member continues resin extraction on his/her *cuartel*; and
- each member periodically collects a stumpage payment whenever the enterprise harvests wood within the *cuartel* as part of the cutting rotation in the forest management plan.

At the community level:

- the enterprise created employment for 800 of the 1,228 *comuneros*; and
- the entire community benefits from the profits generated, which are reinvested in productive activities and public services for all communal residents.

The legal, political, and economic aspects of these negotiations allowed the initiators of the organization to build consensus and cohesion among community members around the forestry enterprise project. Later, we will discuss the rise of this catalyst group and the role it plays in the business.

The enterprise functions in a flexible manner. In addition to working for the communal interest, it also provides support for individual initiatives. The most tangible example is the 23 packing crate workshops run by individual households. The enterprise supports them by supplying wood at reduced prices and mill by-products for free.

The other activity driven by the enterprise is cargo transport. The forestry enterprise signs as guarantor so that an individual can secure a loan to purchase a vehicle. By this method, approximately 60 individuals have acquired trucks or semi-trailers. The enterprise gives these truckers an exclusive concession to its primary delivery routes and provides them credit and support in finding cheap spare parts. The primary routes are from Nuevo San Juan to the Cellulose and Paper Enterprise of Michoacán, S.A. (CEPAMISA) located in the city of Morelia, from Nuevo San Juan to Uruapan, and from Nuevo San Juan to Mexico City. Wood buyers cover the routes to Guadalajara, Jalisco, Monterrey, Nuevo León, and other locations.

Product	Market
Chips	CEPAMISA: Morelia, Michoacán
Furniture	Mexico City
Kiln-dried lumber	Mexico City, Guadalajara, Veracruz, San Luis Potosí

The existence of private shops, truckers, and resin-tappers does not interfere with the community-based concept of the enterprise. To the contrary, it permits an equilibrium of forces within the community that support individual initiatives without affecting communal interests. The truckers and small shops are independent of the enterprise but are subject to the decisions of the assembly, which at times supervises their work and regulates their revenues.

The rest of the enterprise's activities follow the sui generis agroindustrial model that operates as follows:

- All *comuneros* are partners in the enterprise.
- The assembly is the highest authority and determines the lines of work. The assembly meets monthly. Every year it conducts a technical and financial evaluation and decides where to reinvest profits.
- The assembly elects a directive council in charge of the technical and administrative aspects of the operation.
- The profits belong to the partners and are reinvested into productive activities. By agreement of the assembly, profits are fully reinvested (with the exception of 1983, when 50 percent of profits were distributed to partners).

The business is run like most private enterprises, with the goal of maximizing revenues. However, each aspect of the work combines economic, ecological, and social criteria. The well-being of the population remains the highest concern, taking precedence over technical and production criteria. For example, the enterprise pays salaries two to five times the minimum wage; this is far higher than the regional average and includes work incentives and benefits. Also, though the traditional practice of resin extraction reduces the volume and quality of wood, it continues because of its social and cultural importance, and it brings a weekly income to many community members.

In only 13 years, the enterprise has created 800 permanent jobs and a high number of indirect jobs (resin, small shops, transport). These jobs guarantee a satisfactory income to

a high percentage of the community. At the same time, the intense activity of the forestry enterprise generates strong economic spin-offs for the population. Many living in the community have developed commercial services: grocery stores, clothing stores, pharmacies, restaurants, etc. To create additional employment opportunities and to raise incomes, the commercial forestry enterprise initiated agricultural and livestock activities on communal lands. The combination of these activities has raised the standard of living for members of the community.

Comuneros' satisfaction with this process has translated directly into the communal assembly's decision year after year to reinvest profits into the enterprise and new ventures. Continual modernization and increased efficiency in the industrial plant adds value to the processed wood and allows the community to maintain the cutting rate stipulated in the forest management plan.

3. CONSERVATION OF ECOLOGICAL PROCESSES AND BIODIVERSITY IN EXTRACTION FORESTS

3.1 The regional context

The experience of Nuevo San Juan Parangaricutiro is not representative of the region. The rest of the *ejidos* and neighboring communities within the *municipios* of Tingambato, Cherán, Nahuatzen, Paracho, Uruapan, and Nuevo Parangaricutiro underwent a different development. Despite the formation of a union to develop collective forest management, none of the other 25 members has the same level of consolidated organization as the Nuevo San Juan enterprise, much less engages in rational exploitation of the resources.

Little forest remains in most of these communities. In most cases, the forest was clearcut without benefit to the population. Some communities still have significant intact forests, but they are gradually being depleted due to poor control by the collective. This inadequate and irrational forest management causes soil erosion and the disappearance of wildlife, lowers water tables, and degrades agriculturally viable land. Of the 26 communities, only three properly balance resource use and conservation.

Nuevo San Juan does not participate in any regional peasant or indigenous organizations. It does, however, serve on the governing body in one national-level community forestry organization.

3.2 The community's land, forest, and natural resources

The 18,138 hectares of Nuevo San Juan Parangaricutiro are distributed as follows.

Land use	Hectares
Reforested area	900
Production forest	10,464
Forested area; watershed protection zone	488
Cultivated area	2,707
Orchards	1,972
Grassland	24
Sand	443
Area covered with lava	1,140
Total Area	18,138

Both mixed and single species tree stands exist in pine-oak, pine-broadleaf, and pine-*oyamel* (Mexican sacred fir) associations. The distribution is 77 percent pine, 12 percent oak, 6 percent *oyamel*, and 5 percent other species.

Dominant Commercial Tree Species

Pine:	*Pinus pseudostrobus*	Oak:	*Quercus candicans*	Other:	*Abies religiosa* (*oyamel*)
	Pinus leiophylla		*Quercus laurina*		*Alnus arguta* (*aile*)
	Pinus michoacana		*Quercus rugosa*		*Betula sp* (*madroño*)
	Pinus montezumae				*Clethra mexicana* (*petula*)
	Pinus douglasiana				

Because of Nuevo San Juan's forested location, the livelihood of its inhabitants traditionally depends upon the use of forest resources. The forest provides building material, firewood, roof shingling, food for game, mushrooms, water, and resin for sale.

The community enterprise extracts timber for manufacture and sale of wood products such as boards, furniture, molding, and flooring. Wood chips are made from branches and become cellulose and paper, while small wood pieces are sold for packing crates. Until 1990, *comuneros* sold resin to commercial distillers. In 1991, the community enterprise opened a distilling plant to produce turpentine and gum resin. From 1986 to 1990, the community exported oak charcoal to Germany. The people themselves use wood for house construction.

The community regulates cuts for domestic use and sells community members wood at cost to prevent illegal cutting.

Watershed protection zone. The community designated 488 wooded hectares as protected in order to maintain the Cupatzitzio river watershed and guarantee recharging of the aquifer. They recently finished construction of four tanks with a capacity of 11 million liters to catch and store water from rain and springs. These will allow the development of irrigated areas for agriculture, fruit orchards, and cattle.

Agricultural area. There are 2,707 hectares suitable for agricultural production and 1,972 hectares for fruit cultivation—approximately 25 percent of the land in the community. In 1990, 13.5 percent of the available agricultural lands were cultivated. This year the farming area will be able to expand with the increased irrigation potential.

The area planted to corn has not increased because local productivity levels are low. Without fertilizer, production varies between 800kg/ha and 1 ton/ha. Twice the production is possible with fertilizers. Older residents continue to plant corn for subsistence use. The remainder of the population buys grain, as it is less expensive than planting.

Crop	Ha. planted (1990)	Ha. planted (1994)	Principal use
Corn	500	500	Domestic use
Potatoes	50	100	Domestic use and sale
Avocado	100	150	Sale
Peaches	30	150	Sale
Total	680	900	

Area covered by lava and sand. The eruption of Paricutín Volcano in 1943 left a large area covered with lava and sand. In the last few years, community members began collectively to reforest and rehabilitate areas previously unsuitable for planting. The work began in the early 1990s, and the plantings are now beginning to show progress.

The community is also establishing orchards in areas covered with volcanic sand. An intensive system of pits more than 1 meter deep are dug to reach underlying fertile soils with adequate moisture. Forty individuals have now planted 100 hectares of peach trees at the base of the volcano by this method.

3.3 Forest management plan

The citizens of Nuevo San Juan began logging in 1978 when they obtained their first authorization to cut infested wood. In 1979, they were awarded permission to cut indefinitely. In 1986, they signed an accord with the Ministry of Agriculture and Hydraulic Resources

(SARH, the government office responsible for forest management nationwide) regarding assistance, coordination, and co-responsibility for technical services.

The following year the community's 16-member forestry technical directorate conducted the first silvicultural study, which was reviewed and approved by SARH. The study, costing approximately 2 dollars (US) per hectare, established a forest management plan based on the Silvicultural Development Method. This method involves five treatments for a given tree stand over roughly 50 years: three thinnings (the final with an improvement cut), one regeneration cut, and one release cut in which the trees that were left to provide seed are harvested. Currently, the community also removes old, poorly-formed trees for cellulose production during the first thinning.

Treatment	Age of trees
1. Thinning	15-25 years
2. Thinning	25-35 years
3. Thinning (with improvement cut)	35-45 years
4. Regeneration cut	45-55 years
5. Release cut	55-65 years

In August 1988, upon signing a pact with SARH, the communal enterprise obtained a concession to provide technical services for its own forest production unit, the critical step in achieving community control. At that point, the community began the forest management plan. Nuevo San Juan's forest was divided into ten 1,040-hectare blocks, one of which would be worked each year. When a block is worked, individual tree stands are given one of the five treatments. It is expected that when the method is fully operative, the treatment areas will be roughly equal (that is, one-fifth of the block for each). *Comuneros* with rights of usufruct within a forest block must agree to the management plan. Each year since 1988, the community has harvested approximately 100,000 cubic meters of pine, oak, and broadleaf species from a given 1,040-hectare block. The annual harvest rate has been strictly followed to this date. It is important to note that growing conditions are excellent in Nuevo San Juan; the average increase of 1 centimeter in diameter per year permits rapid regeneration.

When cutting began, many *comuneros* lacked confidence in these silvicultural methods. However, faith has grown in the past few years as good results have become obvious to all. The 1990 opinion of the Michoacán Forestry Subdelegation confirms this. It praises the infrastructure and human capital investment in the industry, the success of the silvicultural methods, and the low incidence of fire (kept low by the community's readiness, equipment, and know-how). Nuevo San Juan is also praised for its vigilance in preventing illegal logging activities. Reforestation projects also have been very successful. 198,689 trees were planted on 84 hectares during the first semester of 1990 with the help of 19 groups and 602

comuneros. The regeneration of the sand-covered lands below the volcano is continuing ahead of schedule. Between 1987 and 1990, the people reforested 400 hectares of sandy soil. The goal is to reforest 135 hectares per year. A system of terrace nurseries nurtures one million seedlings of *Pinus pseudostrobus*, a good producer of resin and wood.

3.4 Non-wood products: resin extraction

The people of San Juan are resin-tappers by tradition. Since their relocation in the 1940s, one of their basic activities has been the extraction and sale of resin. This provided a major source of income for peasant families.

Resin is extracted from trees aged 20 to 50 years, after which time the tree is cut for saw wood. Resin collects in one-liter cans placed below incisions made in the bark. Each tree can withstand three incisions. The parcels of land held by each *comunero* for resin collection are measured in units of 500 incisions. Each "owner" can decide how much resin to extract. A tree must be scratched weekly and harvest occurs every 22 days. An average of 2.5 kilograms of resin can be extracted per tree.

Extraction can slow the growth rate of trees by up to 0.5 centimeter per annual ring. Wood quality is also reduced, affecting both hardness and resistance. The people and the enterprise realize that from a technical point of view, resin extraction decreases wood production. If extraction were discontinued, wood quality would improve. However, approximately half of the people collect resin. It provides steady income throughout the year, making it very difficult to discontinue.

In 1990, the price for resin stood at 910 (old) pesos/kg. Tappers could earn an average of 379,000 pesos/month (approximately US$126) for each parcel. Some community members chose to rent out their parcels or extraction rights, allowing others to collect resin on their land. Many landless households in Nuevo San Juan collect resin in this way.

Until 1990, the entire resin crop was sold to three regional factories; thereafter, all resin went to the new communal plant in Nuevo San Juan. This increases the value of the resin for the tappers and guarantees a buyer throughout the year. The enterprise is currently trying to intensify resin extraction to meet the capacity of the distillation plant. A new plan, to be coordinated with the timber harvesting program, will increase the number of incisions for selected trees in a given area. In the past, owners have extracted what resin they could and at their own pace. This has created supply problems for the plant, which has had to buy resin from other communities to maintain the proper level of raw materials.

Under the new plan, the enterprise and the community intend to use salaried workers to handle the increased resin collection. Parcel owners will be paid by the enterprise according to the parcel's yield. This more intense extraction will affect the final wood products. Intensively tapped trees must be cut within three years in order to prevent serious deterioration in wood quality.

3.5 Sustainable natural resources management program

In 1987, a silvicultural study of Nuevo San Juan was conducted with the help of the Subsecretary of Forest Development of SARH. In 1990, the community completed an integrated management study. All natural resource studies were conducted by the enterprise's own technical team—composed of both professionals and practitioners. Some specialized work required the assistance of other institutions, universities, and independent consultants. However, all work is based on the knowledge and practices of the community members.

Historical documentation is scarce, but what little there is has helped the community's practical work over the past decade. Recently, aerial photos were taken to help realistically assess the distribution and condition of the community's natural resources.

In 1988, the community created an agrolivestock commission to expand and diversify the activities of the forestry enterprise. It is currently working on diversification and land-use planning, assigning specific areas for water catchment, corn-cropping, peach and avocado orchards, pasture, reforestation, and other purposes. Decisions were made in accordance with the characteristics of the land and with the help of technical studies.

In 1994, a commission was formed to study and later implement the "Sustainable Natural Resources Management Program." One of the program's objectives is to consider the interaction of forest resource use with soil, vegetation, fauna, and scenery—resources not previously valued. It also aims to reduce pressure on the forest through diversification and development in agrolivestock and fruit production, forestry, and industrial processing. The program includes actions to:

- promote integrated use of natural resources through technologies that increase productivity without degrading the environment;
- increase farming and livestock activities that are ecologically sustainable and financially profitable and that generate employment and strengthen the internal organization of the community;
- establish new fruit orchards with regional species, such as peach and apple;
- increase avocado productivity through well-targeted use of fertilizers;
- introduce new, potentially productive, and high income-generating species, such as blackberry and raspberry;
- introduce cultivation of ornamentals—taking advantage of niche markets with high prices;
- support the cultivation of basic crops, especially corn, needed for self-sufficiency and forage;
- establish pastures and plant oats and other crops for forage;
- increase cultivation of potatoes for commercial sale;
- increase the efficiency of water use; and
- find uses for sawmill by-products and waste, using them to create organic fertilizers for agricultural land.

The draw of the forest and the area's scenery for tourism has not been developed but is currently under consideration by the community. Tourists already make pilgrimages to the town to visit the "Santo Señor de los Milagros," the patron saint of the community. Some service-oriented businesses profit from these religious pilgrims. Additional tourism for more ecological reasons could further benefit the residents.

Independent of tourism, the community built a visitors' cabin. This little house in the forest accommodates approximately 20 people and has a deer nursery pen. Until now, the cabin has been used only for visitors and invited guests of the enterprise. However, there is the possibility of establishing an ecotourism project at the site as a new income source.

4. INTEGRATION OF FOREST PRODUCTION WITH SOCIOCULTURAL, ECONOMIC, AND POLITICAL STRUCTURES OF THE COMMUNITY

4.1 The importance of *braceros* in the operation of the communal enterprise

The relocation of the community due to the eruption of the Paricutín volcano transformed its social relations. The basic productive activities were modified: tourism, artisan activities, and resin-tapping had been primary, but commercial logging, contract labor in the avocado groves, and migration to the US as *braceros* (farmworkers who migrate seasonally) became the mainstays of the community. The scarcity of employment in the region and the lack of an organized effort by the community to utilize its forest resources had already led to a massive seasonal migration to the US. Beginning in the 1950s, contract labor on farms in the US became the main source of income for the residents of Nuevo San Juan. This remained the case until the early 1980s, when the community organized itself to begin to manage its forests.

For many communal members, returning continually to work in orchards, farms, and agroindustry in "el Norte" served to increase their experience, and many rose to the level of supervisor. In this way, they became disciplined in their work and gained familiarity with the organization and processes of agroindustry. These people returned to Nuevo San Juan trained in organizational structures and personnel management for large-scale private farm operations. When the community began to organize to manage its forest resources, these ex-migrants were able to shape the entrepreneurial-orientation of the community forestry enterprise.

The proximity of Nuevo San Juan to the city of Uruapan allowed a group of 10 to 20 *comuneros* access to technical university training. These community members constitute the group of advisers that from the beginning has been at the head of the community's forestry efforts. In addition, Nuevo San Juan's location places it in a strategic position relative to the major wood markets in the state: Uruapan, an important consumer of packing crates for avocados, and Morelia, the main buyer of wood chips, boards, and resin.

4.2 The community: social, cultural, and economic parameters

According to census figures, the indigenous community of Nuevo San Juan has 1,127 trained *comuneros* with legal rights to communal land. Most *comunero* families live in the village itself, as do other households without rights to land. *Comuneros*' age distribution is shown below.

Age	Percentage
50 years or older	30
30 to 49 years	50
18 to 29 years	20

Seventy-one percent of the economically active population works in forest-related employment, including logging, lumber and furniture production, resin-tapping, and transport. Another 12 percent also harvest fruit crops, principally avocados and peaches. Subsistence corn agriculture employs about 10 percent of the labor force, and the rest of the population works at livestock production, handicrafts, and in other businesses and services.

The village has a potable water system, electricity, sewers, mail service, sport facilities, and public transportation to Uruapan. Many of these improvements and services were made possible with forestry enterprise profits. The enterprise also leveraged government financing for others, such as the sport facility that is shared with other towns.

Nuevo San Juan is connected with Morelia and Uruapan by paved roads. Public buses and microbuses provide service day and night. Uruapan also has air service, with flights to Morelia, Mexico City, and Tijuana. The communal enterprise provides public transport services (microbuses and taxis) which carry workers from the village to the wood and resin-processing site, a 3 kilometer route, with service designed around the enterprise's work shifts.

The enterprise also has a fleet of 25 vehicles for technical and administrative purposes: development of new markets, client visits, financial and administrative business, bank transactions, technical supervision in the forest, etc. Two pickup trucks allow the enterprise to patrol and protect the forest; each day they carry a group of *comuneros* who take turns patrolling the roads in the forest to prevent the illegal extraction of wood or resin.

The Transport Workers' Collective of Nuevo San Juan is made up of 60 *comuneros* who work with their eight- and 17-ton trucks or 30-ton semi-trailers to transport wood, chips, furniture, boards, and resin from the enterprise to the various markets. This group, while independent from the enterprise, is subject to the decisions of the communal assembly, which assigns and regulates the number of trips per driver and assists drivers in obtaining credit and low-cost spare parts.

Medical services are available at a community clinic of the Mexican Institute of Social Security (IMSS), which attends all community residents. All employees of the forestry enterprise are eligible for hospital care in Uruapan from IMSS as well.

The indigenous community has public schools for its children, beginning with preschool, nine primary schools, a middle school, and a high school. Higher education is available at centers in Uruapan and Morelia, which have awarded degrees to the young people from Nuevo San Juan that now form the management team for the forestry enterprise. During the past decade, many young people, pushed by their families, entered professional school as a way to broaden their life options. They were a moving force behind the communal organization and the enterprise. The current generation of young people is less interested in following this path, however, preferring to work in the enterprise and earn a good salary rather than pursue higher education.

Bearing in mind this new generation, most of whom are interested neither in resin-tapping nor in studying for a profession, the enterprise has provided loans for other activities: new industrial development, such as the distilling plant for resin; expansion of the land area dedicated to agriculture and orchards; growing fodder for cattle; a soil analysis laboratory; a communal store; fertilizer mixing and distribution; and other measures that diversify the options for employment and relieve the pressure for jobs in the enterprise itself.

The role of women has so far been limited to administrative and secretarial positions in the offices and service jobs in the enterprise's cafeteria. Women workers number no more than 20; nevertheless, they form a nucleus that is defining a new role for women in the community, a role that had been restricted to domestic work.

A significant achievement of the enterprise is the continual development of permanent jobs for *comuneros*. In 1983, there were 150 workers; by 1994, the total had risen to 800. For the *comuneros* this is a tangible reminder that their enterprise, although it does not pay a share of profits to workers, does reinvest 100 percent in projects, creating more jobs. The most immediate effect of this policy has been to reduce migration. Before the founding of the enterprise, some 1,000 heads of family migrated temporarily from Nuevo San Juan to the US each year. In 1990, only ten people went to the US to work, and they soon returned. In the past few years some have left but not out of necessity. Compared to the difficult situation faced by undocumented immigrants in the US, permanent employment in the community forestry enterprise is a far more desirable option.

4.3 The forestry enterprise and the political structure of the community

The communal assembly is the supreme governmental authority of the indigenous community of Nuevo San Juan. Traditionally, it is the assembly that discusses and decides the political and social issues affecting the community. Since 1981, the assembly has also

determined the direction of the communal forestry enterprise, and it conducts an annual social and financial evaluation of the enterprise. It also decides how the profits will be used and outlines new areas for investment. Some of its other functions are:

- to promote new industries within the community in order to add value to forestry, agricultural, fruit, and cattle production;
- to discuss and approve monthly and annual reports from the communal authorities and from coordinators of productive areas within the enterprise;
- to authorize agreements and contracts between the forestry enterprise and government agencies or private firms;
- to approve letters of credit to members of the community; and
- to appoint the members of the communal council.

The communal council defines and develops forestry activities within the community. It is composed of respected *comuneros*, representatives of the six *barrios* of Nuevo San Juan, and the coordinators of the different areas of the enterprise. The council serves as a mediator between the community and the enterprise: it analyzes the enterprise's proposals, goals, and projects, which are then put before the assembly. The council does not have decision-making authority, but it is responsible for forging a consensus in the assembly.

The community forestry enterprise is directed by a team of *comuneros* with professional technical and practical training who head all of the work areas in the forest and the industries. These *comuneros* gradually learn the work in each area of production. Only in rare cases is it necessary to hire outside experts who stay with the enterprise for a finite period (one to two years) until the communal staff are trained in that specialty. Outside experts have included a chemical engineer hired to advise on the resin-distilling plant and, in the first years of the enterprise, an administrative accountant.

At the head of the enterprise is the technical director who is hired by the assembly to manage the harvests and the industrial plant; this person fills the role of a general manager, the position of highest responsibility. The technical director is responsible for the entire productive process and makes technical, administrative, and financial decisions, supervises the operation of the various areas of the enterprise, designates area coordinators, and, along with the communal authorities and the coordinators, determines the salaries for all enterprise staff. To hold this position, it is necessary to have worked a minimum of three years in the enterprise, which guarantees greater experience and capacity for administration. The post is not held for a specified term, but previous technical directors have served three to five years.

In Nuevo San Juan, then, two authorities exist side by side: the communal assembly, in charge of the political and social aspects; and the enterprise, which administers the forest resources. In the final analysis, however, the enterprise is subject to the assembly, which is the highest communal authority.

4.4 The communal enterprise: integration, reinvestment, and diversification

Since the genesis of the forestry enterprise, one of its most notable elements, besides the rational use of the forest, is the integration of forestry with the industrial transformation of those wood products. The people of Nuevo San Juan have developed a timber industry at an unusually rapid pace. The principal aim of this industry has been to add greater value to the raw material, thus gaining a greater return for the enterprise and the community.

The enterprise is divided into several production units: 1) debarking and sawmill; 2) drying kilns and patios; 3) shop for machine maintenance and industrial design; 4) chip mill; 5) charcoal ovens; 6) workshops for furniture, moldings, paneling, wainscoting, and flooring; 7) resin-distilling plant; 8) heavy machinery design center.

The horizontal growth of the enterprise has had as its main objective the optimal use of the forest resource, from the hillside where the tree is cut to its eventual transformation into a finished product. The enterprise's development strategy since 1981 follows.

During 1981-82, under the direction of Salvador Mendez Uribe, 18,000 cubic meters of wood were harvested and sold for cellulose, creating 140 jobs and generating a net profit of 1 million old pesos (approximately US$1,000). In 1982-83, the enterprise cut 30,000 cubic meters, of which 70 percent went for cellulose, 15 percent became packing crates, and 15 percent millable logs. The net profit that year was 3 million old pesos (approximately US$3,000), and 150 *comuneros* were employed.

With the profits obtained in 1981 and 1982, and with accounts receivable (4.5 million old pesos) from clients such as CEPAMISA, the enterprise bought the first sawmill at a cost of 7 million pesos. This began operation in June 1983. In 1983-84, 40,000 cubic meters were authorized and cut, and the sawmill processed 1.6 million board feet. That year, 230 people worked in the plant and the net profit reached 20 million pesos (about US$17,000). At this point, the enterprise decided to reinvest 50 percent of profits in machinery for moldings and furniture, and two drying kilns were installed. The remaining 50 percent of profits were divided equally between the *comuneros*. This experience with profit sharing was not very encouraging because the money was poorly used. From this point on, the communal assembly decided to reinvest 100 percent of profits in the enterprise.

In 1984-85, the community harvested 40,000 cubic meters of wood and realized a net profit of 45 million pesos (about US$25,000), which were reinvested the following year. In 1985-86, the cut rose to 85,000 cubic meters, and two more drying kilns were installed. From 1986 to 1990, the infrastructure continued to grow. With a base in reinvested profits, and with the help of government credits, the enterprise acquired a debarker, four more drying kilns, a second sawmill, a second chip mill, nine skidders, two bulldozers for roadbuilding, a front-end loader, two agricultural tractors, and 22 vehicles for personnel transport.

During 1988-89, profits rose substantially, and the enterprise was able to employ 800 *comuneros* in the entire productive process.

Economic balance sheet, 1989-90

Category	Pesos (old)	Dollars
Sales	14,991,422,497	$4,997,141
Costs	12,368,161,449	$4,122,720
Net profit	2,623,261,048	$874,421
Profit as percent of sales: 17		

Each of the products produced by the enterprise garners a different profit margin. In 1990, the net profits ranged from 15 to 35 percent, but most important for the enterprise is assuring an adequate average combined profit. The above review of the enterprise's financial history suggests that Nuevo San Juan's operations scheme, based on the optimal use of the forest resource, both on the ground and in the factory, and the key decision to reinvest all profits, has allowed the development of a sizeable, modern infrastructure. The enterprise was able to operate with a profit even in the current period of crisis affecting Mexico's entire forestry sector.

Favorable technical and economic conditions and the community's capacity to manage its resources effectively have allowed the enterprise to maintain a degree of profitability that, although diminishing, is still acceptable. The bold and enterprising character of the technical team has allowed the entire enterprise to face the risks and uncertainty of free trade and successfully undertake a series of modernization projects. However, despite the enterprise's focus on adding more value to timber and developing an efficient infrastructure to reduce costs, it has not been possible to maintain the profit margin: net profit has dropped from 17 percent in 1990 to only 5 percent in 1994.

5. Survival of the Communal Forestry Enterprise in the Open Market

"A private enterprise is what has allowed us to move forward. There is ambition to grow, the *comunero*-employees have the right to vacation, benefits, etc., like in a private enterprise, but they also have to do the work in a responsible manner." (Opinion of a *comunero* of Nuevo San Juan, September 1990.)

"We want a well-consolidated enterprise that is competitive, producing high-quality products. We are doing as well or better than private businesses, many of which have folded." (Opinion of the commissioner of the enterprise, October 1994.)

"The aim of the business is to operate in a quality niche market, where there is less competition." (Opinion of a *comunero* of Nuevo San Juan, November 1994.)

The *comuneros* are aware that the market opening means strong competition and that the costs of wood products on the international market are dropping faster than Nuevo San Juan is modernizing. Because of this, they no longer plan to build a cellulose and paper mill as had been considered in 1990 when it looked like a good business; the current goal is to reduce the costs of production through modernization and more advanced technology in all aspects of the productive process. This implies a very large investment, but the *comuneros* have made the decision to rise to the challenge.

The communal forestry enterprise makes optimal use of the forest resource. In Nuevo San Juan all the wood is used, from the prime quality parts to the last chip of the tree. Despite this, the net profit of the enterprise has fallen in the last four years from 17 to 5 percent, as mentioned above.

Raw material	End product	Market
1st/2nd class dried lumber	Furniture	Mexico City, Guadalajara, Veracruz, San Luis Potosí, Chiapas
1st/2nd class dried lumber	Boards	Mexico City, Guadalajara, Monterrey, Veracruz, Tabasco, Quintana Roo, Chiapas
1st class wood	Moldings, paneling	Texas, USA
Oak logs and seconds	Chips	CEPAMISA (Morelia)
——	Small boards	Community packing crate workshops
Oak seconds	Charcoal	Germany (until 1990)
Branches and sawdust	——	Fuel for drying kilns
Log edges	Broom handles	Regional
Resin	Gum resin, turpentine	Dupont (Mexico City, Guadalajara)

The sawmill. Logs are transported by skidders and trucks from the forest to the debarking machines, located in the receiving area of the enterprise's two sawmills. The debarkers have a capacity of 25,000 log feet per eight-hour shift, larger than the combined output of the sawmills. The machinery can debark pine, oak, and other species with very hard wood. The dimensions of the logs going to the debarker are from 6 to 36 inches in diameter and from eight to 24 feet long.

The debarking machine can only accept logs within these dimensions. Some logs, therefore, must be manually debarked. The waste from the process has been used to fill

muddy areas. In the short term, the community is considering converting the waste to sawdust for use as a fuel; it is also studying the possibility of making the waste into organic fertilizer.

Once debarked, the log passes through the circular saw where the sides are removed and sorted by size: the thickest are used for broom handles, and the rest are sent to the chip mill. The central part of the log is left for boards of different classes. First class logs are used for boards of one-inch thickness. The boards emerging from the sawmills are of three classes. First class lumber is treated with germicides, sent to the kiln, and then sent, dried, to the furniture workshop. Second class lumber goes directly to the kilns. Third class lumber is taken to the drying patios where it is stacked horizontally and left to dry in the sun.

About 15 percent of the lumber, first and second class, goes to make furniture. Despite advances in the process of integration and transformation of wood products, 85 percent of the sawmills' production still is sold directly as lumber. Prices for the lumber leaving the enterprise are set according to the wood's market value. Recently, the influx of imported lumber has caused these prices to drop considerably, cutting the profit margin from 15 percent in 1990 to 10 percent in 1994. Although lumber generates only a moderate profit margin, it is a significant money maker because of the volume of sales.

Product	**Profit Margin**	
	1990	**1994**
Boards	15%	10%
Furniture	35%	15%
Chips	25%	no available data
Moldings	—	6%
Forestry Enterprise Total	17%	5%

It is important to note that since 1986 the enterprise has complied with the maximum annual cut established in the management study and each year harvests a volume of 100,000 cubic meters of pine, oak, and broadleaf species. In 1994, the enterprise had to buy timber from other communities because the area designated for harvest that year was dominated by oak and had few pines.

To reduce the costs of production, the community plans to modernize equipment to increase the volume and quality of the boards. The planned modernization will also improve the process of milling and storage through the purchase of the following machinery and equipment: a) a hydraulic crane for storing wood; b) another debarker; c) two recutters; and d) two automatic laser-guided carriages to load wood into the saw. The price of this equipment was 2.8 million new pesos (US$900,000) before the devaluation of the peso in

December 1994. In the current conditions facing the forestry sector, modernizing the plant is a necessity. What is unclear is where the resources will come from.

Drying kilns. The wood is dried in a structure with walls of adobe, brick, or other material, and a metal roof that can be lifted to control the heat. The kilns are fueled by sawmill wastes, sawdust, or chips.

The drying period varies according to the type and thickness of the wood; oak takes longer to dry than pine, and drying times range from eight to 30 days. In 1991, two kilns were installed at a cost of 40 million (old) pesos to better control drying, reduce drying time, and to improve wood quality. Currently the enterprise is considering installing two more kilns to process first class wood in higher volumes. This will allow more production of high quality boards and furniture, generating a greater return.

Furniture workshop. Each year the workshop increases its production capacity. It has a band saw, machines for moldings and other specialty cuts, and several small circular saws. The work areas within the furniture shop are for carpentry, design, assembly, varnishing, and moldings.

The workshop produces tables, chairs, dining room sideboards, kitchen furniture, desks, beds, etc. These are sold in Mexico City, where the principal buyer is *El Palacio de Hierro*. Other products include parquet and other flooring, paneling, wainscoting, moldings, and ornamentation for houses.

This is the area with the highest profit margin in the enterprise (35 percent in 1990). Nevertheless, the volume of sales, which had been on the rise, has reached its limit and may now be declining. The management of the enterprise believes that, in order for furniture production to be a viable business, they need to produce quality articles and have a quality market where there is less competition.

For this reason the design of furniture has been directed at upper middle-class consumers, who patronize prestigious showrooms, often change the decor of their houses, and can pay a premium price. For several years Nuevo San Juan has supplied *El Palacio de Hierro* with original designs from the communal workshop and those proposed by the client. When *El Palacio de Hierro* demanded an exclusive contract with Nuevo San Juan, the workshop had to terminate commitments to sell to other prestigious firms such as K2, Hermanos Vázquez, and Liverpool. In 1994, when the market had worsened, the enterprise took the position that if *El Palacio* did not buy all of Nuevo San Juan's furniture production, as it has until now, it would sell to other clients such as Sears and Liverpool who were waiting to sign contracts.

The enterprise attempts to situate itself in the market that pays best and consumes most. With this principle in mind, the enterprise sends it sales agents, all of them *comuneros*, to the main markets in Mexico City and Guadalajara, where they stay until they sign several clients. Through this strategy, Nuevo San Juan has managed to accumulate customers who,

once they get to know the quality products, become permanent buyers. CEPAMISA in the wood chip market and Dupont in the resin market are for Nuevo San Juan what *El Palacio de Hierro* is with regard to furniture.

Moldings have been exported to Texas, in the US, since 1990. The moldings optimize the use of smaller pieces of first class wood and garner a good price in a good market. Free trade, however, has reduced prices for molding, cutting profits to 6 percent, and sales were suspended for several months. Despite this, the enterprise has decided to hang onto the foreign market.

To modernize and reduce costs in the furniture area, Nuevo San Juan plans to acquire a multiple saw that will automate the process to increase the workshop's capacity and utilize a greater percentage of first class wood for furniture. Purchase of a finger jointer or an automatic packer is also in the works.

The chip mill. The most dynamic area in the enterprise, representing the key to financial success, is the chip mill. Besides generating a high profit margin (25 percent in 1990), it performs well in terms of volume and the use of by-products from other operations. The enterprise has two chip mills that process small logs, branches, log ends, and field waste.

The chips have a high demand and a secure buyer in CEPAMISA, which consumes all of the chips produced by Nuevo San Juan. In 1990, approximately 24 trucks, each hauling 17 tons of chips, left Nuevo San Juan daily for CEPAMISA. At a price of 140,000 (old) pesos (approximately US$46.60) per ton upon delivery in Morelia, sales averaged 250 million (old) pesos weekly (approximately US$83,300). Currently, 1,500 tons per month are sold, constituting approximately 40 percent of the gross profit for the entire enterprise.

Currently, with the price of cellulose falling, the market has tightened. Several pulp and paper mills have closed. A number of private and communal chip mills, which were started in the early 1990s when this was a good business, have folded. CEPAMISA was not immune to this crisis and stopped production for a time. This situation threw the communal enterprise into crisis, as cellulose sales to CEPAMISA was the pillar upon which the success of the enterprise rested, providing a considerable income throughout the year.

When CEPAMISA reopened a month later it cut back on the number of its suppliers and on the price it paid for chips. For many chip mills in the region this meant bankruptcy. For Nuevo San Juan, which has been the preferred client due to the consistency and quality of its product, keeping the contract with CEPAMISA meant survival, not only for the chip mill but for the enterprise as a whole. The enterprise did, however, take a 10 percent cut in the price it received for chips. The management made the decision to spread the impact of this change throughout the entire operation. Wages were reduced by 3 percent for all workers. The assembly decided that it had no other alternative; by the same token, when the price for a product rises, salaries will increase across the board as well.

The chip mill continues to be a key activity for the enterprise, not only because of profits and the high volume of sales, but because it means liquidity and a guaranteed income every week. Of the 700,000 new pesos required weekly to run the enterprise, 280,000 (or 40 percent) come from the sale of chips. For this reason the chip mill is regarded by the *comuneros* as "our daily bread."

Resin-distilling plant. The distilling plant was installed in 1990 to add value to the raw material of pine resin, to increase incomes for resin-tappers, and to create more jobs. It began operations in 1991.

Resin for the plant is provided by the resin-tappers of Nuevo San Juan and other neighboring communities. The plant produces gum resin and turpentine. Gum resin is used in 52 products, including glue, paint, soap, and chewing gum. Turpentine is used as a solvent and in pine oil, perfume, and cosmetics. The six workers in the plant were trained by a chemical engineer, hired temporarily, from outside the community. Currently the plant produces an average of 3.5 tons of gum resin per eight-hour shift. Each kilogram of resin processed yields of 700 grams of gum resin and 140 grams of turpentine. The gum resin is sold in 50 liter containers and production varies from 70 to 100 containers a day.

In 1994, the price of gum resin dropped. Mexico began to import the product from Venezuela at a lower cost, and the shoe industry shifted to these foreign producers. Nevertheless, the high quality of Nuevo San Juan's product has allowed it to keep its market. Despite the fact that cheaper gum resin is available, the demand for Nuevo San Juan's product has actually risen, and its current clients are asking for more volume. There are more potential clients on a waiting list.

The strategy of the plant managers has been to increase production and go from two to three shifts a day. This requires a steady flow of resin, but until now the supply has been inconsistent. It is hoped that the previously described plan to intensify resin extraction within Nuevo San Juan will meet the full demands of the distilling plant.

Other plans related to resin are the eventual production of varnish for the furniture built in the workshop which will reduce the cost of furniture production even more. For the moment, this project is beyond the capacity of the staff, as it requires a high degree of chemical expertise. But the distilling plant itself is a reminder that Nuevo San Juan can undertake highly sophisticated industrial projects and succeed.

6. CONCLUSION

"We want a well-consolidated enterprise that is competitive." With those words the technical director of Nuevo San Juan's communal forestry enterprise sums up his position toward trade globalization. Free trade has created crises in many of Mexico's productive areas and has caused bankruptcy for many businesses, private and communal. Nuevo San

Juan's forestry enterprise entered the crisis in a favorable position since its technical, social, and financial structures had been consolidated before the effects of globalization truly hit home. While it has not escaped the crisis, it has responded better than most enterprises.

Work began several years ago to raise declining profit margins through integration and diversification of productive activities. The *comuneros* believe this is the key to survival. Yet, the challenge of open markets is great and, alone, such strategies are probably insufficient. A number of projects to modernize production have been proposed. Their costs are significant (6 million new pesos; nearly US$1.8 million), yet there is great urgency to implement them.

7. POSTSCRIPT, JANUARY 1995

On December 22, 1994, the peso was devalued by 40 percent relative to the US dollar. The entire Mexican economy has been thrown into crisis. In this context, it is unclear how appropriate the development plans are for each of Nuevo San Juan's areas of production.

During the past year, development prospects in communal forestry enterprises were limited because of competition from foreign imports brought by free trade. Nuevo San Juan planned to meet such competition through various modernization projects. The crisis brought by peso devaluation calls for reassessing their future yet again.

This postscript updates material in the above text (written in October 1994). Nuevo San Juan has made considerable progress with its industrial conversion project, which permits the community to confront, on less unfavorable terms, the difficult national economic situation. Listed below are the areas of the enterprise where luck and the decision to finish projects before year's end have brought positive results.

Sawmill. In November 1994, a recutter for the sawmill was purchased in Spain, was installed, and is now functioning. This machinery has been almost entirely paid off.

Moldings. In this area revenues will increase since part of the production is exported to the US, bringing in dollars for the enterprise. Nevertheless, the finger jointer which would accelerate and improve production has not yet been purchased. Its price will be at least 40 percent higher due to peso devaluation.

Drying kilns. The two kilns intended to improve wood quality are well underway. This project, which uses Mexican technology and equipment, has been paid in full, with all contracts signed. Its completion, therefore, does not represent an additional expense. The decision to use domestic equipment is also positive in that it avoids dependency on imported spare parts.

Furniture. Furniture sales have not dropped, and the future looks bright. The devaluation has reduced demand for imports and has reactivated the domestic furniture market.

Resin. This area of production also has been favorably affected by the crisis. During 1994, the price *comuneros* received for gum resin dropped because imports from Venezuela and other nations were satisfying a large part of Mexico's demand. Early in 1995, imports ceased and the national price improved. Nuevo San Juan's goal is to increase resin production to meet demand in the domestic market; in fact, the next three months' product has already been sold. In light of this, the intensive resin-extraction project, described in the previous pages as only a proposal, is already underway.

The market situation for lumber, which constitutes the bulk of Nuevo San Juan's production, is still unclear. Imports appear to be on the decline, and the price of domestic wood will likely rise. Given this trend, the community hopes to transform the highest possible percentage of its lumber into finished products to increase its value. The new kilns will be essential for this.

Some areas have been negatively affected. The most significant is the machinery that has not yet been purchased: the finger jointer for moldings, laser-guided equipment for the sawmill, and other pieces. Purchase prices have risen by at least 40 percent. Also, loans recently negotiated with a private bank now carry an annual interest rate of 40 percent. In November 1994, a loan for 3 million new pesos (nearly US$900,000) was taken out for various projects, including fruit orchards, beef cattle, and forage crop expansion. The jump in the interest rate is not startling to the representatives of the enterprise, but it is a challenge that must be dealt with. They generally remain optimistic because they trust that these new agricultural activities are a critical part of the strategy of productive diversification. They expect these initiatives will succeed, as have so many of Nuevo San Juan's projects since the enterprise's inception.

The severe economic crisis that shook Mexico in the last days of 1994 sent tremors through all the productive sectors in the country, including forestry communities. Nevertheless, Nuevo San Juan began its move ahead with the eruption of the Paricutín volcano in 1943; now, more than ever, it sustains that forward momentum.