BOLIVIA SUSTAINABLE FOREST MANAGEMENT

BOLFOR FINAL REPORT

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PREFACE

This report was prepared by Chemonics International with contributions from BOLFOR staff and persons working in partner organizations. The primary author was Dr. Preston S. Pattie, BOLFOR Chief of Party (COP) during its final phase. Specific sections were drafted by Ing. William Cordero, Lic. Hugo Franck and Dr. Ivo Kraljevic, all of Chemonics/BOLFOR, and by Lic. Peter Cronkleton with the Center for International Forestry Research (CIFOR), and Dra. Marielos Peña, Bolivian Institute for Forestry Research (IBIF).

Although many BOLFOR documents were relied upon in preparation of this report, of particular use was the "End of Tour Report" of the BOLFOR Chief of Party from 1993 to 2001, Ing. John Nittler. Material from "Forest Science and the BOLFOR Experience" by Francis E. Putz, et al, was drawn upon heavily in preparing the section on forestry research. Additional information was obtained from José Luís Urioste of the Forest Superintendence, Henry Moreno of CFV, Gerd Resnikowski of CADEFOR.

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CONTENTS

ACRONYMS

ASLs	Agrupaciones Sociales del Lugar (Local Social Groups)
BOLFOR	Bolivia Sustainable Forestry Project
CADEFOR	Amazonian Center for Forest Enterprise Development
CDF	Centro de Desarrollo Forestal
CFB	Cámara Forestal de Bolivia
CFV	Consejo Boliviano para la Certificación Forestal Voluntaria
CIFOR	Center for International Forestry Research
CIMAR	Centro de Investigación y Manejo de Recursos Naturales
DAP	Design and Perform
FS	Forest Superintendence
FSC	Forest Stewardship Council
GOB	Government of Bolivia
IBIF	Bolivian Institute for Forestry Research
INRA	Instituto Nacional de Reforma Agraria
ITTO	International Tropical Timber Organization
MDS	Ministry of Sustainable Development
PANFOR	Pando Sustainable Forestry Project
SBDA	Sociedad Boliviana de Derecho Ambiental
FMT	The Forest Management Trust
TR&D	Tropical Research and Development
USAID	United States Agency for International Development
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

The Bolivia Sustainable Forest Management Project (BOLFOR) was created by the U.S. Agency for International Development (USAID) and the Government of Bolivia through the Ministry of Sustainable Development and the PL 480 Program. Chemonics International Inc. and a group of partner organizations implemented the project under a Design-and-Implement (DAP) contract over a ten-year period ending in 2003. USAID has developed a successor project, BOLFOR II, which is scheduled to continue for an additional six years.

This summary provides a four-page overview of the project. It is intended to broaden the reader's perspective beyond the implementation of specific activities to encompass the general environment and the possible long-term impacts of the project.

What we faced

Until the mid-1990s, Bolivia's forest sector was not unlike that of other countries that shared the wealth of the tropical forest in the Amazon basin and the need for major management reforms. The forest sector found itself in a quagmire due to highly selective but uncontrolled logging, an antiquated and poorly enforced legal framework, increasing land conversion for agricultural expansion, spontaneous colonization, and widespread corruption.

The Bolivian forest sector in particular was discredited. Fewer than 200 companies had been given legal rights to the timber on 20 million hectares of public and private lands. All others operated outside the law, forming an informal sector that obtained

timber and other forest products without regard to established user rights. The relationship between forest regulators and users was widely perceived as a "get-rich-quick" partnership with no concern for the sustainability of forests. The public sector had no institutional capacity to perform anything but the minimum and perfunctory regulatory and tax collection functions.

With a few notable exceptions, wood products industries were dedicated to selling the timber from a few high priced species–primarily mahogany (Swietenia macrophylla), Spanish cedar (Cedrela spp.) and tropical oak (Amburana cearensis)–to international buyers that provided cash advances to fuel the operation. Driven by market demand, timber companies with legal contracts and informal loggers cut trees as long as the supply lasted. The system could best be described as one of mining the forest.

The crisis in this produced widespread consensus of the urgent need for legal, regulatory, and institutional reform. As a first step, a five-year moratorium on new timber contracts was declared pending legislative review. During this period, new environmental, biodiversity and forestry laws would be enacted, and governmental institutions would be overhauled and new ones created.

But when the BOLFOR Project began in 1994, little progress had been made in enacting new legislation and even less in overhauling the nonfunctioning regulatory agency, the Center for Forestry Development (CDF). We found a demoralized and marginalized corps of forestry professionals, both in the public and private sectors, who were poorly trained in the management of tropical forests.

Besides the absence of any new policy framework, institutional vision, or regulatory systems, in Bolivia there was little scientific knowledge globally about forest ecology and the impact of logging in the tropics. There was even less scientific knowledge about Bolivian tropical forests. In fact, the feasibility of managing natural forests with multiple species and immense biodiversity was in debate. Early attempts had focused on managing a single species within the forest, as had been done in temperate climates. No model existed for natural forest management in tropical conditions, and no system was in place for international voluntary certification.

What we did

Due to the stigma attached to funding activities that directly affect tropical forests, donors decided that the project should focus first on research, policy, and forest management, before investing in activities related to product development and

marketing. The fear was that, without a firm policy base, increased demand for forest products would mean even greater pressures on a poorly managed forest resource.

The flexible project design did not obligate BOLFOR to work through an established public institution. Instead, BOLFOR established itself as a provider of services to timber companies willing to try sustainable forest management practices. BOLFOR filled many needs and became involved in virtually all activities, working directly with the private sector, including indigenous groups. Through these activities, a team formed within the BOLFOR project that included a mixture of Bolivians, other Latin Americans, North Americans, and Europeans, all oriented toward defining sound practices that could become a model for natural forest management in the tropics.

At the same time, the prevailing view in international circles was that managing natural tropical forests with their wide diversity was impractical. BOLFOR promoted debates on this issue that included the most notable international forest scientists and practitioners. With participation of the University of Florida, Wildlife Conservation Society and others, BOLFOR also began research activities that focused on ecological impacts of logging.

Damage to other plants is minimized when directional felling practices are used to harvest trees.

Human resource development was the main focus of the project. Through on-the-job training, courses, workshops, seminars and scholarships, we helped form a critical mass of professionals — foresters, biologists, economists, ecologists, and others — who shared a vision and possessed the skills to implement a new model of forest management. With this trained cadre thinking and acting in the same direction, it became more feasible to turn to institutional development.

Early, tangible results brought credibility, and national leaders soon identified the forest sector as fertile turf for reform. BOLFOR was called upon to help develop a new Forestry Law for the country. After its passage, new efforts were required to

help develop the capabilities of the newly formed Forest Superintendence (FS), the Ministry of Sustainable Development, and municipalities. BOLFOR helped create a number of NGOs and spun off activities to them. These new institutions continue to provide important specialized services.

BOLFOR followed a dual approach. On one hand, we worked to strengthen a system of voluntary certification, which, in contrast to the coercive power of the state, relies on market forces to induce sustainable management. At the same time, we worked with the public sector to put in place a forestry regime that grants forest-use rights on the condition that the operator manage the forest following established norms and standards.

What we accomplished

The model for sustainable management of natural forests in the tropics was created by drawing on experience from around the world and assembling a series of procedures based on concepts such as land use planning and rotational harvesting. Other important aspects such as prohibition of hunting and application of silvicultural treatments form integral parts of the model. BOLFOR was able to gain acceptance of sustainable forest management in the tropics by demonstrating these practices in various settings, and with the participation of industrial companies and indigenous communities.

The Forest Stewardship Council (FSC) certification system was created to protect tropical forests and ensure access of products derived from sustainable sources in world markets. BOLFOR helped develop standards for timber and non-timber products acceptable to FSC, and instituted the certification system in Bolivia, which continues to be the world leader in certified natural forests in the tropics, with 1.2 million hectares certified. By the end of 2004, this number is expected to reach nearly 2 million.

The new Forestry Law created a comprehensive regime, which relies on long-term forest concessions on public lands rather than harvesting contracts, and which ties forest use to land ownership on private lands. (Prior to this, land could be owned by one party while a second party was given contracts to harvest timber.) Other major changes included: payment of area-based rather than volume-based user fees; transparency in forest rights and participation; and a restructuring of public sector institutions charged with implementing the new model.

As provided in the new law, BOLFOR helped develop regulations and technical norms based on principles and criteria similar to as those of the FSC. Nearly nine million hectares are now under forest management plans approved by the FS. Two million hectares are managed by community groups. In fact, community forestry is the fastest growing component of the forest sector in Bolivia. BOLFOR helped strengthen forest users–individuals, firms, and community groups — not only in forest management, but also in organization, administration, processing and marketing.

New institutions were created and strengthened to continue implementation of the forestry regime. Notable among these are the Forest Superintendence, without which the forest regime itself would not flourish. However, public regulation could not be sustained without the solid support of the private sector. BOLFOR helped strengthen the few existing private organizations and was instrumental in creating NGOs and foundations in areas such as environmental law, forest management, forest enterprise and marketing, and forest monitoring and research, as well as sectoral committees at the municipal level.

What difference it made

Perhaps the most significant result of the new forestry regime has been to help restore legitimacy to a productive forest sector. The industry is no longer seen as a negative force that mines and exports the country's natural resources while leaving little benefit for the Bolivian population. It is increasingly viewed as a productive sector that produces jobs and income based on sustainable primary production originating in communities, private properties and concessions. The wood manufacturing industry, along with brazil nut processors, employ thousands of workers in rural and urban centers and compete in international markets, based in large part on the positive reputation earned from sustainable forest management and certification.

The FS is an outstanding example of responsible public administration that other government institutions in Bolivia should follow. Forming the hub for foresters in the country, the FS has been key to rebuilding a base of professionalism among technical personnel.

Forest areas under management are largely protected from degradation caused by land clearing and fire — the greatest threats to tropical forests throughout the world. Biodiversity is protected and enhanced. Of the nine million hectares in managed areas, nearly one million are set aside as ecological reserves where human activity is

restricted. FSC certification in 1.2 million hectares verifies compliance with rigorous international standards through annual audits. Five-year audits are mandated by the FS on all managed areas.

The forest sector as a whole generates nearly $100 million annually in exports, roughly seven percent of the country's total exports. Exports of forest products have shifted from green lumber of select species to manufactured products derived from a larger mix of species. Some abundant species virtually unknown a few years ago are now in common use, including in local markets. Exports of manufactured wood products have doubled every four years since adoption of the new forest regime, from less than $10 million at the outset to $40 million annually. Certified exports now surpass $13 million. Meanwhile, exports of sawn lumber have decreased to about $20 million. A projection developed by BOLFOR shows that, given the right policy framework, forest product exports, including brazil nut and other non-timber forest products, could increase to $360 million annually or more in ten years.

BOLFOR has demonstrated how forestry can be economically viable for companies and for communities. Forests cannot rely only on local populations operating in harmony with natural environment. Rural residents demand jobs and income. The term "community forestry" can be misleading, as single communities assisted by BOLFOR have attained annual sales of over $100,000, much of this paid to community members in wages.

Finally, BOLFOR successes have contributed significantly to a change in the tropical forest policies of international organizations. BOLFOR has helped demonstrate that managed forests are not incompatible with biodiversity protection and can help alleviate poverty. Entities such as the US Congress and World Bank were reluctant to support tropical forestry because they feared it might be viewed as causing destruction of forests. Now it is seen as a productive sector that is kind to natural resources and that has desirable economic impacts. Tropical forestry is also an alternative to as illegal crops in forested areas.

I. INTRODUCTION

BOLFOR was an integrated conservation and development project dedicated to reducing degradation of Bolivia's lowland forests and protecting biodiversity by fostering natural forest management as both a source of income and a conservation strategy. The U.S. Agency for International Development (USAID) provided over $25 million, and the Government of Bolivia, through its PL 480 Program, contributed an additional another $8 million. The Ministry of Sustainable Development was designated as the primary organization to represent the Bolivian Government in determining overall direction of BOLFOR. The project was planned and implemented by Chemonics International Inc., a Washington, D.C.-based consulting company, under a Design and Perform contract. Several other organizations participated in the project, including Tropical Research and Development (TR&D), Conservation International (CI), Wildlife Conservation Society (WCS), and, at a later stage, the Forest Management Trust (FMT), the University of Florida (UF), and the Center for International Forestry Research (CIFOR).

Timing of the project coincided with a series of sweeping reforms to decentralize and modernize government and public administration in Bolivia. However, project implementation also took place amid the global economic downturn that affected the Latin American region in the late 1990's, potentially undercutting the assumption that property owners and forest concessionaries would value a well-managed forest resource for its productive capacity.

Over the project's 10 years of operation, from December 1993 to December 2003, BOLFOR staff members were involved in a wide range of issues related to forestry.

For example, BOLFOR assisted in the formulation and implementation of the 1996 Forestry Law, contributed to the establishment of a system of voluntary certification, provided extension services to rural communities and forest industries, granted fellowships to Bolivians for post-graduate study, hosted international students and scientists and carried out applied research.

Besides developing a model for sustainable forest management, BOLFOR was charged with building the "capacity to develop and implement programs for sustainable, certifiable forest use." The approach was to develop a critical mass of qualified professionals focused on natural forest management in the tropics, then use project support to develop institutions alongside this emerging leadership. This mechanism allowed BOLFOR to create or strengthen a complete set of organizations in both the public and private sectors to carry on activities ranging from regulatory control to research.

A year before the project ended, USAID planned a second six-year phase, maintaining the same overall goals. Implementation of the second phase has been awarded to The Nature Conservancy, which will carry out project activities with many partner organizations formed under the BOLFOR project.

The BOLFOR project cannot be summarized in a few pages. Thus, this final report is organized into 12 stand-alone "capsules" containing substantive information on technical topics or components. Each section briefly describes the history and experience, reflects on lessons learned and current activities, and recommends further efforts or actions.

Because each section is meant to stand alone, there is an intentional redundancy among sections, and each section will not necessarily flow into the next.

We have tried to employ a minimum of acronyms specific to Bolivia and a minimum of technical terms. We hope that this document will be useful to readers from many disciplines working in other countries and regions. In particular, we hope it is useful to USAID officers or officials from other donor agencies, as well as government officials, who might be considering development projects that involve natural resource conservation, while also responding to poverty by stimulating productive enterprise.

On behalf of all the people and institutions that participated in the design and the implementation of BOLFOR, Chemonics expresses its appreciation to USAID/Bolivia for the foresight in planning what is now a widely recognized

successful project. We thank the Ministry of Sustainable Development, USAID and the Executive Secretariat of PL 480 for their support of the project throughout its ten years. Finally, it goes without saying that the achievements reported in this document represent the work of the entire forest sector of Bolivia. While USAID support through BOLFOR was important, no development project can take credit for the Bolivian decisions and actions that created the new forestry regime.

The next chapter begins with four substantive "capsules:" managing biodiversity, voluntary certification, community forestry and wood products industries. Chapter III includes three sections on human resource development and research. Chapter IV addresses policy implementation and institutional development. The final chapter focuses on general project impacts and draws out key lessons learned.

II. SUSTAINABLE FOREST MANAGEMENT

Managing Biodiversity in the Tropics

Origins of the Natural Forest Management Model

Because of the many doubts that surrounded the concept of sustainable management of natural forests in the tropics, the BOLFOR team saw the urgent need to show tangible results quickly. Some argued that sufficient knowledge was not available about tropical forests, implying that no action should be taken until all desired information becomes available. While information was certainly limited, and much more needed to be learned, BOLFOR felt that it would be unwise to dedicate its efforts only to research. Direct action was clearly justified as unmanaged forests are subject to uncontrolled logging, fire and land clearing. At the same time, BOLFOR was aware of the limitations of current knowledge, and that silvicultural practices can have negative impacts on ecosystems. Constant monitoring of the response of the forest to management operations was always emphasized.

Given this perspective, the concept of sustainable forest management was never viewed as an absolute state, but instead as a process that implies successive improvements made through systematic incorporation of practices based on experience and knowledge generated by research. Experiences from other tropical countries in the Americas such as Peru, Venezuela, Colombia, Surinam and Costa Rica and from others in Africa served to determine which methods seemed to be working and which had not brought desired results. One of the early lessons from all these countries was that, given the enormous biodiversity of tropical forests it is impossible to manage a single species. In contrast to conditions in temperate

climates or tree plantations, management of natural forests in the tropics must take into account the entire group of species and their differing characteristics.

Enough was known to begin with application of a few known practices, with the emphasis on planning and rotational cutting. To start, BOLFOR offered assistance to timber companies interested in resolving a range of problems. Because these companies were vertically integrated, BOLFOR was able to assist in all parts of the production chain, from the forest through milling and product development to marketing.

Evolution of the process in Bolivia

Some of the principal ecological practices by BOLFOR in relation to forest management arise from ecological issues; others are derived from purely practical concerns, as described below:

Maintaining the forest structure: The forest structure is a the product of the ecosystem, especially conditions of soil and climate, and biodiversity is key to stability of that ecosystem. Therefore it was thought that the effects of human interventions should be reduced to the minimum possible. Rotational cutting and removal of only a portion of each commercially valuable species helps achieve this objective by maintaining the size and age structure and mix of species in the forest. This is in stark contrast to logging of forests in temperate climates, where the entire mass of mature trees are removed at the same time. When clear spaces are created by logging activities in tropical forests, it was believed that they should be as similar as possible to natural clearings produced when trees die out naturally.

Silvicultural Treatments: Logging carried out in natural forests constitutes a silvicultural treatment per se. The amount of products removed should not surpass the capacity of the forest to restore its structure. The application of other treatments, such as vine cutting or eliminating non-commercial trees, was not initially promoted because of a lack of information about the ecological impacts and benefit/cost to the operator.

Utilization of a wide range of species: Forest inventories form the basis of forest management plans. Inventories show the abundance of the species of interest to the forest operator. It is important to work with the greatest possible number of species so that the harvest of timber is not overly concentrated on one or two "favorites." Forest management based on one or two species in the diverse natural forests of the tropics is rarely sustainable, either ecologically or economically. The ideal is to harvest proportionally based on the abundance of every species. Of course, the

operator can only strive toward this ideal to the extent markets are found. Therefore forest management is linked with development of the sector as a whole.

Other ecological considerations: These were related to rare species and wildlife protection. Hunting in managed forests was discouraged (and later prohibited by law), and special ecosystems were identified for preservation.

Twelve practices were identified for initial application in forest management plans. Their implementation signified that the operator had initiated the process of sustainable forest management. These were complemented by another 20 practices that could be incorporated into the management plan over time. The table below presents the 12 initial practices recommended by BOLFOR.

Forest Management Practices Initially Introduced by BOLFOR

1. Selection and marking trees for harvest above minimum diameter.	7. Several commercial species in the managed area harvested and marketed.
2. Preparation of a forest management plan defining long term objectives and actions that will be applied to the entire area under management.	8. Harvest levels according to rates of growth and yield based on the best information available.
3. Appropriate maps prepared and used in planning.	9. Implementation of best industrial practices that contribute to improved product quality.
4. Forest inventories to provide an information base for planning.	10. Concrete actions for integral and efficient utilization of forest resources, both in the field and in mills and factories.
5. Planning harvest and silvicultural activities for area of annual cut: preparation and implementation of operative plans based on commercial census of trees.	11. In case of conflict over use of forest resources, actions taken that tend toward resolution.
6. Limits on multiple entry into the same area of annual cut.	12. Prohibition of hunting and capture of wildlife.

Once forest management were required by law, these practices were incorporated into technical norms, and BOLFOR's role in facilitating adoption naturally accelerated. For example, had it not been introduced earlier, the incorporation of the census of trees in the area authorized for annual cutting would have required a

longer time through demonstration and training to gain acceptance as a normal activity of forest operators.

Throughout the ten years of project implementation, the forest management model was applied in various forest types, from the dry forests of the Chiquitanía to Amazonian regions of northern Bolivia. Management plans were first developed on private concessions held by individuals and lumber companies (previous logging contracts converted into forest management concessions), then on other forest operators including community groups, attaining a total of nearly 9 million hectares by 2003. The various situations where sustainable management is practiced are detailed below:

- Concessions held by private companies
- Areas managed for scientific endeavor
- Individual private properties
- Indigenous communities in private lands or territories
- Concessions to Local Social Groups (ASL).

BOLFOR played a key role in training the technicians and professionals used in application of this set of practices. While many operators complied with the minimum possible, others went beyond that level to adapt practices and methods to their conditions, implying translation of principles into a focus on sustainable forest management.

Lessons learned in forest management

1. Forest management can be initiated without the benefit of complete knowledge of all aspects of the ecosystem. Continued monitoring of the response of the forest and interpretation of results from research allow the operator to adjust management plans.

2. Forest inventories provide information on the abundance of different species in a given area. Inventories form the basis for preparation of the management plan, which constitutes a vital part of the business plan of forest companies—including industrial firms, communal enterprises, private properties and other kinds of enterprise.

3. Costs of management planning, especially forest inventories and censuses, can be reduced with practice and experience. Training of technical and support personnel, streamlined data processing, better preparation and use of maps, and application of other techniques all result in improved efficiency.

4. A forest census is the best tool for planning and marketing. The census permits the operator to plan not only the supply of forest products, but also to implement a silvicultural system to enhance productivity. The census should be carried out at least one year in advance to allow time for negotiation with possible clients and adjustment of plans according to market demand.

5. Training is fundamental for success of forest management. Personnel at all levels need to understand basic principles as well as procedures for preparation and implementation of management plans.

6. Improvements in living and work conditions stimulate better performance. For example, incentives for quantity and quality of products harvested from the forest and produced in mills could be provided. Improved living quarters and food services, as well as emphasis on worker safety, show a desire by the firm to maintain a stable work force.

7. The fundamental base for investment in productive enterprise and sustainable forest management is secure land tenure.

8. Forest management reaches beyond application of technical norms. One of the crucial aspects is enterprise management and marketing. Only when forest management is commercially sound, can it be seen as a competitive activity that attracts interest by both industrial and communal groups.

Voluntary Certification

From concept to reality

One of the key results expected in the first phase of the project was the establishment of an internationally recognized mechanism to certify the sustainable production of timber and non-timber forest products. Certification is a system for verifying that forest enterprises are complying with international performance standards. It implies independent evaluations of forest management operations based on ecological, social and economic standards aimed at achieving sustainable forest management. The system also includes chain-of-custody certification to identify

products throughout the processing and market chain, verifying their origin from well-managed forests.,

The mandate of BOLFOR to help create such a system reflects the enlightened attitude of those who participated in the initial phase of the Design and Perform contract. At the time, the Forest Stewardship Council (FSC) was in its infancy and there were few indications that it would play such an important role in international markets.

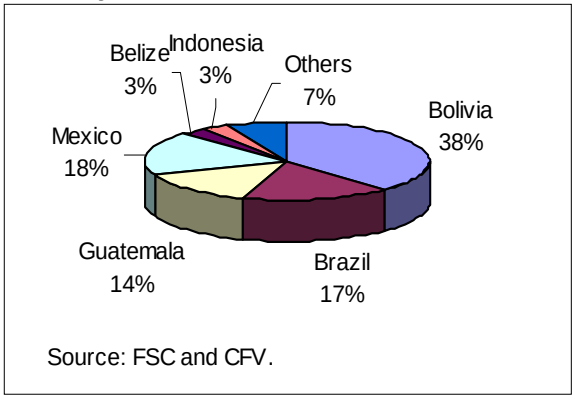
BOLFOR began promoting certification in 1994 when key stakeholders named a steering committee to initiate the certification movement in Bolivia. Under BOLFOR's leadership, the steering committee evolved into the Bolivian Council for Voluntary Forest Certification (CFV). Established as a foundation in 1995, CFV was the second country initiative to be recognized by FSC. It has been responsible for developing and gaining FSC approval of region-specific standards for timber and non-timber products based on internationally accepted principles and criteria. BOLFOR provided resources to the CFV, and key BOLFOR staff have served on its board.

At the same time, BOLFOR facilitated and monitored the technical assistance and training provided by the U.S.-based and internationally recognized SmartWood organization of the Rain Forest Alliance. SmartWood conducted Bolivia's first certification of the Indigenous forest operations of Lomerío. Shortly after, SmartWood established a regional office in Santa Cruz to provide certification services in Bolivia and other parts of South America. Other organizations have also explored possibilities of providing services in Bolivia.

Direct activities implemented by BOLFOR staff to help forest operators achieve certification included:

- Mapping of areas of interest.
- Improvements in field operations and preparation of documentation.
- Preliminary evaluations for certification and preparation of reports.

Certified Natural Forest in Tropical Countries February 2004



Source: FSC and CFV.

- Economic support to carry out final evaluations for certification.
- Adjustments to meet preconditions identified in evaluations.
- Training and information for technical and support personnel.

Parallel with certification of forest management operations, chain-of-custody certification guarantees that products carrying the "FSC" emblem originate in forests that comply with international standards. Of the 17 operations certified with chain of custody in Bolivia, 14 are industries manufacturing products such as parquet, furniture, doors, windows and component parts, two are artisan workshops, and one is a commercial warehouse. These industries have confirmed that there are greater export opportunities for timber from certified forests.

BOLFOR has clearly contributed to the certification process worldwide. Today, Bolivia:

- has more certified tropical natural forest than any other country in the world,
- holds one of FSC country initiatives, the second to be recognized worldwide,
- was second only to Sweden in obtaining FSC approval of its standards, and
- has obtained approval for standards for an important non-timber forest product (brazil nut) in coordination with Brazil and Peru.

By 2001, with one million hectares certified, Bolivia had established itself as the world leader in certified natural forest management. In recognition of this important achievement, World Wildlife Fund (WWF) presented the prestigious "Gift to the Earth" award to the National Chamber of Forestry at an international convention in the Netherlands and marked the event at an international trade fair in Atlanta. FSC Certification is becoming a recognized trademark of the Bolivian lumber industry.

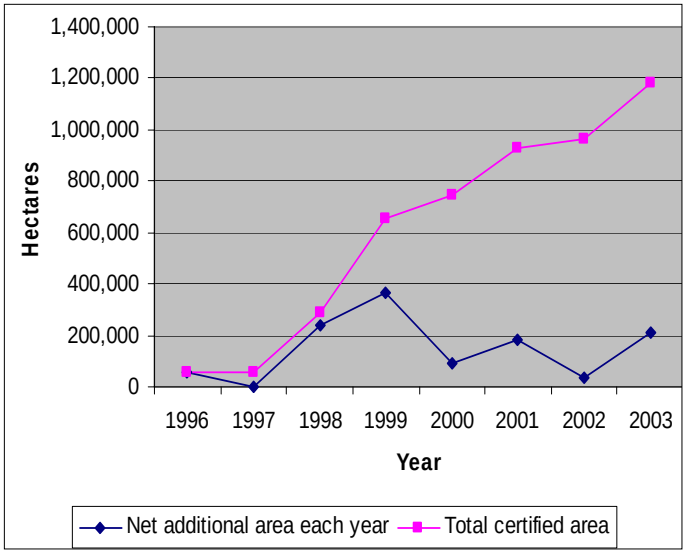
From one million hectares to two

The area under certification had risen rapidly between 1997 and 2001, but slowed until recently. Several factors intervened:

1. One of the obstacles to certification had been the slow process of "sanitizing" land rights (see Section IV). Fortunately a decision was made to proceed with FSC certification without requiring sanitization.

2. High forest-use fees or royalties caused many concessionaries to doubt the economic viability of natural forest management in the tropics. The Government of Bolivia resolved this issue by applying the fee only to areas of annual cut and creating a "regulation fee" that concessionaires could afford to pay.

3. With the recent surge in interest of forest operators, the pace of certification was also slowed by a shortage of personnel at Smartwood, the only certifying agency operating in Bolivia. During the dry season when field work is carried out, Smartwood is often booked months in advance. This obstacle remains.



The Forest Superintendence recently provided additional impetus for certification by renewing concession agreements with certified concessions without requiring a five-year audit, demonstrating continued Bolivian Government support to the forestry model.

With the removal of two of the three obstacles, and the positive signals from the market, several forest operators, including private property owners, indigenous communities and concessionaires, have advanced into the final stages of certification. Bolivia has passed the 1 million hectare mark and is now on its way toward 2 million. CFV reports that area of forest officially registered under FSC certification, plus operations that have met preconditions and are very near certification, totals 1,855,670 hectares.

Certification and community forestry

Lomerio was the first forest area to be certified in Bolivia, and the Indigenous group successfully complied with certification standards throughout the five-year cycle. After that time, forest operators must re-apply for certification, beginning again with a full process of evaluation. Lomerio initially chose to allow its certification status to lapse, but recently took the initiative to re-apply for certification. The growing

demand for certified wood by companies such as INPA Parquet near Concepción may be the primary reason for this decision. Three additional certification applications were recently initiated by Indigenous communities: Salvatierra and Cururú of the Guarayos group and San Pedro of the Tacana group. Preliminary evaluations have shown positive results. WWF is scheduled to provide technical and financial support.

The certification process for the Indigenous groupYuqui in the Chapare of Cochabamba has been supported by BOLFOR in cooperation with several organizations: FAO, CETEFOR and WWF. BOLFOR intervention was crucial to the decision by the Indigenous community. Now, having gone through two years of positive experience, this indigenous forest enterprise should continue with minimal additional assistance. Final FSC certification could be attained in 2004.

By the end of 2003, eight community enterprises organized as "Local Social Groups" or ASLs had demonstrated interest in certification. The first concrete action was the recent signing of a contract between a lumber company, San Luís, and one of the ASLs called Asaí. Under this contract Asaí will sell six species of timber to San Luis for processing. San Luis will provide logging services and technical assistance to initiate FSC certification processes. San Luis will also absorb the cost of obtaining certification. As a result, we expect Asaí to become the first ASL to obtain certification in Bolivia.

Without this type of medium- or long-term contract between communities and lumber companies, promoting certification can become an empty and unproductive exercise. Certification requires additional effort and costs that could be expended in vain if the community forest enterprise does not find buyers interested in certified products.

Recommendations

Demand from international markets seems to be outstripping the capacity of tropical countries to deliver. Industry must be careful to avoid promoting what it cannot produce. The challenge is a basic one: the industry must deliver sufficient quantities of timber at the right price while meeting minimum quality requirements. But supplying volumes of consistent quality of timber from natural forests in the tropics is difficult. It takes time for entities in the supply chain to develop mechanisms of cooperation. Although community enterprises are important, they still are not the main suppliers. It would be wise to help the commercial chain move in larger volumes among established companies so communities can jump aboard.

Certification may not be an appropriate step for community enterprises that are just now entering the market. Only when the market provides clear signals that certified forest products are in demand, will community forest enterprises decide to certify their forest management programs. However, given recent expressions of interest, we expect an increasing need for technical and financial support to community groups interested in certification. Private enterprise interested in sources of certified wood will help, but development assistance may also be needed. Certainly the amount of subsidization should be controlled to the minimum necessary.

Community Forestry Enterprise

Villages, local groups and freelance loggers

Training local social groups to formulate forest management plans.

Management of natural forests by community forest enterprises was a primary focus of BOLFOR during its final phase, 2001-2003. This form of "community forestry" has a very brief history, as most existing enterprises were formed during these past few years. Today more than 90 community forestry enterprises are in different phases of development. Perhaps 60 percent have forests under their control and are organized to begin operations while the remaining 40 percent are still in the process of formation. Community forestry enterprises are the main contributors to the expansion of the sustainable forest management model in Bolivia, having reached

two million hectares of land under management by the end of 2003. It is projected that this area will double in another five years.

Community forestry enterprises owe their existence to the new law that opened various avenues of access to forest resources. First, property owners, including communities and indigenous groups, now control the forest resource on their land. Second, groups can organize to request a forest concession from municipal forest reserves. In fact, municipal forests are set aside specifically for this purpose. As a result, community forestry enterprises arise from three social settings:

- indigenous groups
- local social groups (ASL)
- rural communities.

Few rural communities have yet opted to manage forest lands; most enterprises are of the first two categories.

Indigenous groups are given private property rights to their territories, which often include large amounts of land classified for forest use. The ethnic group is represented by a central organization that holds title, but the territory can be made up of many communities, each with forests. Therefore several community forest enterprises can be formed within a single indigenous territory.

Participant in training course

The model of ASLs is a novel approach created by the forestry law, and is still in evolution. The provisions to set aside up to 20 percent of public forestlands in each municipality for ASLs was designed to incorporate freelance loggers into the legal system and sustainable management model. By forming a group of at least 20 local residents and applying for status as an ASL through the Municipal Government, the loggers obtain access to the municipal reserve through a forest concession. Today nearly 2000 members participate in ASLs in major regions of the country including northern La Paz, Beni and the Chiquitanía of Santa Cruz. Many of the members of ASLs that participate in

sustainable forest management in concessions today were the illegal loggers of yesterday.

In 1999 the first four community forest enterprises became operational with approved forest management plans (both long-term management plans as well as annual operating plans for the specific area of authorized cut for the year). By 2001 the number of community forest enterprises had risen to 24. By 2003, 55 enterprises had obtained approval of management plans and 28 of these had completed sales, usually in the range of $20,000 to over $100,000.

Assistance tailored to needs

BOLFOR supported this movement with technical and financial assistance. For most social groups, the technical and administrative procedures involved in forming an organization, determining areas of productive forest to place under management, defining means of participation and decision making, and forming an enterprise, all at the same time, appeared beyond reach. Even governmental entities and development organizations were challenged to define functional systems and provide support to social groups faced with these challenges, especially without usurping authority and responsibility.

The Community Forestry Unit of BOLFOR provided technical assistance in four areas:

a) sustainable forest management,

b) organizational development,

c) administrative processes and

d) marketing.

Regional offices were formed in six locations: San Ignacio de Velasco, San José de Chiquitos, Santa Rosa del Sara, Asención de Guarayos, Ixiamas and Cobija. At different times BOLFOR also had personnel in Riberalta, Lomerío and other locations.

An earlier experience served BOLFOR well. In Lomerío we had devoted substantial resources to improving operations at the sawmill owned by the Indigenous community, which was seldom run at a profit. We learned that owning a sawmill is

only one small component of a broader strategy for capturing the "added value" of semi-processed timber.

Our priority with community forest enterprises became, therefore, forest management. Logging and sawmill services could be obtained, if necessary, through contracts with existing, specialized companies. Ideally, sales would be made of standing timber or fallen trees or logs. But in some cases, making significant sales required community enterprises to deliver logs to the sawmill and in a few cases to deliver lumber to the market.

Through this commercial activity, many social groups became responsible for handling fairly important amounts of money for the first time in their history, and many obtained benefits in the tens of thousands of dollars. With little or no banking and accounting services, and some cases operating out of modest homes in remote rural areas, the challenges mounted rapidly. Therefore, in this early phase, our main priorities were management planning, organization and participation, following through with sales agreements, administration of funds, and the like. Investments in machinery and equipment are an option considered by some groups, but not something necessarily encouraged by BOLFOR.

Financial support took the form of subsidizing about 30 percent of the costs of preparing management plans, which require an extensive inventory of the forest, and annual operating plans, which required a detailed census of trees in the area of annual cut. These initial subsidies were designed to help social groups make their first sale. Funds from the sale needed to be accumulated for the group to carry on with activities in subsequent years without further subsidies. BOLFOR maintained this strategy and extended it to technical assistance. Accounting assistance, for example, was offered for one year only. After that, the community forest enterprise must contract services or manage as best it can with an elected treasurer or other appointed member of the group.

Technical assistance focused on increasing capacity through training and introduction of technical and administrative practices. Besides the step-wise processes involved in preparation of forest management plans, enterprises were encouraged to prepare "organizational strategic plans", another term for business plans. Another innovation developed with the cooperation of the Peace Corps was a methodology for self-evaluation of forestry operations by community enterprises. This tool promoted greater responsibility and adjustment of operations and administration to better serve external demands, especially those in the marketplace.

Despite their co-existence with the forest, many indigenous peoples have never been involved in forestry activities except hunting and fishing. Even identification of commercial species was not a common skill among members of most groups. Some of the limitations we encountered were:

- Organizational systems of community forest enterprises often do not take on the kind of entrepreneurial vision and attitude expected by the market and demanded by potential clients.

- Procedures to make decisions can be very slow when internal consultation and consensus building is required, as is the case with indigenous groups. On the other hand, decisions are often considered non-transparent and arbitrary in local social groups when controlled by a few persons.

- Capacity to adapt, implement and adjust administrative and operational procedures is slow, possibly due to lack of education, or limited experience with commercial activities.

- The capacity to make initial investments and accumulate funds for future needs is limited. Distribution of benefits can become equally complicated.

- Access to market information and ability to promote and market products are limited.

New phase, new challenges

The future of the sustainable forest management model adopted in Bolivia rests heavily on the success of community forestry. First, the different mechanisms for accessing forest resources for productive purposes reduce pressure on loggers to seek sources of timber from unmanaged forests. Second, like other property owners, communities are more likely to see the forest as a productive resource to be conserved, reducing pressure to convert land to other uses. And third, management by communities provides additional legitimacy to the model and demonstrates to different factions of the Bolivian population that participation in the forest sector is open to all. The days when the forests were controlled by a small group of the privileged and powerful have come to an end.

The magnitude and state of advancement of community forest enterprises in these short years is encouraging. However, the model it still in its early stages. Most

community forest enterprises are still in the process of formation and planning, having yet to experience productive, commercial operations.

Oddly, one of the greatest challenges to the formation of new enterprises comes not from the market, but from the Government of Bolivia. Local Social Groups face onerous legal and administrative procedures before they can hope to be awarded an area of forest. Incredibly, the very organization charged by law with the responsibility to advance the model of sustainable forest management — the Ministry of Sustainable Development — seems to be faltering in favor of distribution of forest lands for agriculture activities. This attitude is apparently shaped by concern about recent civil disturbances in La Paz that caused the toppling of the previous government. But it would be a mistake to assume that distributing forestland to peasant farmers in the eastern and northern lowlands would reduce urban social conflict.

Fieldworker taking measurements for forest inventory.

Bolivia has succeeded in developing a very healthy and successful model based on sustainable management of productive resources. Donor support, especially that of USAID through BOLFOR, has been enthusiastically provided over the past decade, and will continue through BOLFOR II. We hope and expect that the Government of Bolivia will overcome its current difficulties and recognize the importance of community forestry.

More important than the volume of sales and net benefits is the generation of employment produced by community forest activities. Members of community enterprises often express that the most direct and desirable form of participation is when they work for regular wages in forestry operations. The effects of community forestry on income distribution are evident from casual observation in some rural areas. Fore example, the vibrancy of rural centers such as Ixiamas in the tropical forests north of La Paz notably shrinks and swells with wood cutting activities of Tacana communities.

Recommendations

BOLFOR provided direct support to community forest enterprises, assuming a role as direct service provider. We believe this model should change for several reasons. First, we believe community forest enterprises can be viewed as any other sector operating through small productive units. Typically in a competitive environment, some businesses might succeed at any one time, while others might fail and eventually be replaced. It would be a mistake to protect a few groups and ensure their success as "clients" of a project. BOLFOR, instead, intentionally spread its resources thinly over as many groups as were interested. While some groups may not be successful in their first attempts, the overall model shows positive results.

After community enterprises have reached the point of making their first operations and sales, having received support in management planning, organization, administration and marketing, the next phase of assistance should pull back from day-to-day support and concentrate on developing capacity through training. A good example has been the experience with the Foundation Jose Manuel Pando, which supported or implemented all BOLFOR activities in Cobija.. Other direct providers of services should be developed and receive support, such as independent foresters, accountants, and local development organizations, as well as middlemen, saw millers, loggers and truckers that buy products from community groups.

Forest Products Industry

One of the premises behind the establishment of BOLFOR was that governmental regulation is not sufficient to save tropical forests. Individual property owners and concessionaires need to take interest in conserving this resource because they see an economic return from the forest. If natural forest management offers good business opportunities, landowners will enpand sustainable forest management. On the other hand, if grazing and agriculture offer greater returns, the conversion of much of the tropics from forest to other uses is inevitable.

Development of the forest sector in Bolivia is directly tied to the prospect of increased exports. National markets for lumber are limited, as most buildings use masonry as the primary construction material. Local markets for non-timber forest products are also weak. Virtually all brazil nut gathered in the northern part of the country is exported through well-established commodity channels. Therefore the only route for expansion of the sector is through improved competitiveness in international markets.

BOLFOR contributed to improvement of products and positioning in markets in three important ways:

1. BOLFOR provided support in product and market development, and formed an international NGO to continue providing support in this area.

2. The products and markets component became an indispensable complement to the approach of managing the entire forest resource rather than single species, as it stressed use of a wider group of species at the time that traditional species such as mahogany were logged out.

3. Sustainable forest management and voluntary certification have improved the image and visibility of Bolivian forest products.

BOLFOR's product and market development activities began in the third year of the project and continue through the spin-off of an NGO organized to assist the private sector in product development and marketing. It was felt that a permanent organization that could raise revenues by charging for its services would best serve the industry. The result was the formation of the Amazon Center for Forest Enterprise Development (CADEFOR), which provides assistance to the forest-management companies through training and technical assistance in their processing facilities, as well as in establishing market contacts. Training and technical assistance have largely focused on administrative management and marketing, and also on production quality control, so that companies can manufacture quality products in a responsive manner at reasonable costs.

Bolivia is the largest producer of brazil nut, dominating the market for shelled brazil nut worldwide. The northern region of the country depends heavily upon this one activity. Quality control is very important to maintain access to international markets. Recently international prices took a drastic nosedive because of problems encountered with in-shell nuts originating in Brazil. Protection of the market is synonymous with protection of the Amazon forests of Bolivia. Therefore BOLFOR assisted in establishing a quality control system based on technical capacity already in place. The system involves certification of each lot of brazil nut from the time it leaves the processing plant until it reaches the market, usually in Europe.

Unfortunately, at critical junctures of reprogramming BOLFOR activities, the Government of Brazil was reluctant to see resources go towards industrial development, and favored more activities directly with community groups. Government officials failed to see the connection between a vibrant industry and

market entry opportunities for community forestry enterprises. Despite limitations, several companies have developed new products and markets with lesser-known timber species, as witnessed by the shift of species and product composition of exports.

Top Ten Species Harvested in Bolivia each Year, 1998- 2002

	Species	Vol.*	Species	Vol.*	Species	Vol.*	Species	Vol.*	Species	Vol.*
Number	**1998**		**1999**		**2000**		**2001**		**2002**	
1	Ochoó	123	Ochoó	75	Cedro	64	Ochoó	118	Ochoó	63
2	Roble	122	Cedro	56	Serebó	62	Roble	34	Tajibo	44
3	Cedro	104	Roble	36	Roble	53	Cedro	32	Roble	39
4	Mahogany	38	Cambará	25	Ochoó	51	Tajibo	23	Sujo	21
5	Tajibo	33	Yesquero	25	Yesquero blanco	40	Yesquero	21	Yesquero blanco	21
6	Mara Macho	30	Serebó	21	Mara Macho	25	Almendrillo	21	Cedro	20
7	Yesquero	29	Mahogany	20	Mahogany	24	Bibosi	18	Soto	15
8	Serebó	21	Tajibo	19	Yesquero	16	Serebó	17	Mapajo	14
9	Mapajo	21	Almendrillo	15	Mapajo	13	Curupaú	17	Bibosi	9
10	Bibosi	20	Yesquero blanco	14	Palo María	10	Cambará	15	Almendrillo	7

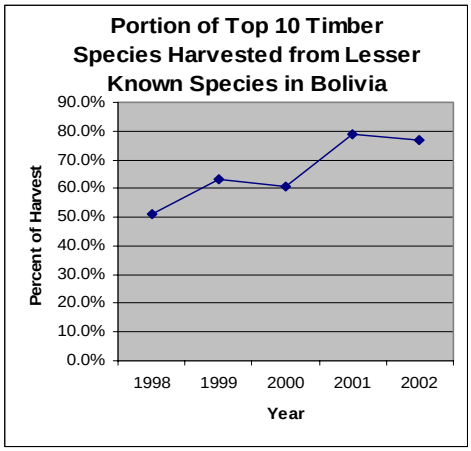
* Volume is in thousand of cubic meters of logs.

High value species: Mahogany (*Swietenia macrophylla*), Spanish Cedar (*Cedrela spp.) and* Tropical Oak *(Amburana cearensis*).

Lesser known species: Ochoó (*Hura crepitans*), Tajibo (*Tabebuia spp.)*, Mara Macho (*Cedrelinga catenaeformis)*, Yequero *(Cariniana spp.)*, Serebó *(Schiziobium parahyba)*, Mapajo *(Ceiba pentandra)*, Bibosi *(Ficus cs. boliviana)*, Cambará *(Erisma spp.)*, Almendrillo (*Dipteryx micranta or Dipteryx alata)*, Yesquero blanco *(Cariniana ianeirensis)*, Palo María (*Calophyllum brasiliense)*, Curupaú *(Anadenanthera colubrina*), Sujo (*Sterculia apetala)* and Soto (*Schinopsis brasiliensis).*

The volumes shown in the table demonstrate the earlier concentration in a few species, with the top three totaling over 250 cubic meters, while in 2002, for example, the top three species did not reach 150 cubic meters. As the figure below demonstrates, the volume harvested from less-known species has risen from 50 to 80 percent in recent years.

But the shift to new species has not been substantial enough to provide the economic impetus to carry much of industry through the current economic recession. The forest sector has suffered a contraction in recent years, reflected in lower exports of wood. Much of the decline is due to the depressed international economy. Argentina alone represented an export market of nearly $40 million just a few years ago. Since the recent financial crisis that sent the Austral from 1:1 parity



with the dollar to a ratio of $2.85 Australes per dollar, and delays in availability of exchange to make payments, this market contracted to only $1 million in 2002.

Despite the overall decline, however, a closer inspection reveals a positive restructuring of the industry. Whereas Bolivia had been up to now a source of raw material in the form of sawn lumber, exports of manufactured wood products now dominate. In fact, exports of manufactured wood products doubled in value from their average of $10 million annually in the period 1990-93 to an average of $20 million in the period 1994-97 and again doubling to $40 million between 1998-2001. This rise in manufacturing was accompanied by a dramatic decline in exports of sawn lumber, causing overall exports to decline in recent years—from more than $67 million in 1997 to less than $21 million in 2002.

This shift suggests that the Bolivian forest sector is no longer a major supplier of raw material for wood processing in other countries. Rather, it is evolving into a productive industry, based on sustainable forest management and capable of generating significant employment in rural and urban industrial areas.

Source: Estadísticas de Exportación y Ventas Internas de Productos Forestales e Nivel Nacional. Cámara Nacional Forestal. 1996. Estadísticas de Exportación de Productos Forestales, SIFORBOL y Cámara Forestal de Bolivia. 1998, 2000, 2001.

This new sector profile is a result of private sector investment in productive processes defined along product lines: veneer, doors and windows, flooring, decking and furniture, including outdoor garden furniture.

Whereas the traditional lumber company sought to market the species available in its concession, the modern wood industry provides products sought by the market.

Effective demand for certified forest products continues to develop. For instance on a recent visit by U.S. Ambassador David Greenlee to a lumber company in Pando, two buyers were on hand, both sourcing certified wood products for U.S. buyers. More companies in Bolivia have obtained chain-of-custody certification allowing them to handle certified products all the way to export markets. With these defined commercial channels for certified products, the market is providing the correct signals to forest operators. The principal bottleneck often lies in overcoming the obstacles to meeting buyers' requirements for quantity, prices, quality, and timing of shipments.

The economics of shifting from the old "cut and run" approach to the new paradigm has major cost and financial implications. Sustainable forest management as prescribed in Bolivia is profitable, although probably not as profitable as the previous uncontrolled system. Costs are reduced on a volume basis through better planning and operating on reduced areas, but the introduction of lesser-known species brings lower prices than mahogany and other sought-after woods. Major improvements in entrepreneurial capacity and increased investments in technology are crucial for most companies to face this new scenario. Joint ventures to facilitate acquisition of capital, technology, managerial know-how, and markets appear to be an increasingly important and viable option.

III. HUMAN RESOURCES AND RESEARCH

Development of Human Resources

Learning by Doing

Today, discussions abound among different actors in the forest sector of Bolivia regarding cutting cycles, growth and yield, sustainability, and other aspects of forest management. But many years of hard work were required before these concepts became adequately interpreted and more years still for their implementation on the ground.

Management plans prepared under the former forestry regime consisted of theoretical summaries from tropical silviculture textbooks available at the time. Most practices referred to plantations, as that was the most commonly recommended silvicultural treatment. Yet even these practices were virtually never applied in the field. Management plans were not designed for long-range planning; they were simply documentary requirements of the Center of Forestry Development. Forest operators and technicians scarcely understood the concepts of tropical forest management, and did not actually apply the plans in practice.

Forestry schools in the country concentrated studies on plantations, often coupled with watershed management. Forest development projects were dedicated to the same themes. The forestry school in Cochabamba, with assistance from the German government, was the first academic entity to train forest technicians and forest rangers focused on tropical areas.

First BOLFOR Chief of Party John Nittler talks with lumber worker

Very few professors entered the field of tropical forestry. The few that participated in forest inventories were among the first to gain experience in logging and silviculture in the tropics. Professionals with international training, as well as foreign experts, presented information on silvicultural systems implemented in Asia and Africa. These presentations raised interest on the part of Bolivian professionals and students, as well as forest operators; but the application of these concepts was not easily undertaken.

Forest operators constantly expressed the need for professionals with experience with logging in tropical forests, and doubted the feasibility of implementing a management program. They placed their trust in contracted loggers, foremen and sawmill operators who had actual experience in field conditions.

Emergence of a New Culture

Given these circumstances and normal resistance to change, it was difficult to imagine the creation of a culture oriented toward sustainable forest management. The essential element was providing information and training to a broad range of actors: authorities at the level of decision making, company executives, professionals, and managers plus operators responsible for field practices. Additionally, it was necessary to develop a series of tools and procedures for carrying out forest management in practice.

BOLFOR was fortunate to have initiated its activities in two areas where logging operations were carried out. One was a timber company and the other was a group

of indigenous communities. In these two areas the first forest management practices were attempted. These included taking forest inventories, preparing management plans, taking a census of trees in areas of annual cut, evaluating logging operations, estimating costs and yields in logging and sawmilling, evaluating impacts of logging on wildlife populations, silvicultural treatments, installing permanent monitoring plots, mapping of forest areas for different purposes, and using of instruments such as GPS. All of these practices were developed by BOLFOR personnel, including consultants and in forestry sciences and biology students.

Seventeen Bolivians were also fully funded to attend graduate school abroad in various disciplines, including forest economics, ecology, wildlife, and forest management. To date, all recipients of these fellowships returned to Bolivia when their studies were completed and now occupy prominent positions in government and non-governmental organizations; many are still involved in research. The table below provides a glimpse of the positions held by these students. In fact, , it is difficult to find professionals in the Bolivian forest sector that are not alumni of BOLFOR training programs.

Positions Held in 2003 by Graduate Students Whose Scholarships Were Financed by BOLFOR

Position	Organization
Superintendent in Institutional Development	FS
Director of Regional FS Office in Tarija`	FS
National Director of Technical Studies	FS
University Professor and General Secretary of Association of Foresters, Santa Cruz	Universidad Autónoma Gabriel René Moreno
Independent forestry consultant	Self employed
Coordinator, National Project for Controlled Fires	CARE
National Coordinator, Food Security Program	European Union
Project Coordinator, Madidi National Park	Wildlife Conservation Society
Consultant	FS
Director	WWF/Bolivia
Coordinator, Unit for Support of Public Sector	BOLFOR
Forest Manager	INFORCASA
Technical Superintendent	FS
University Professor and Independent Consultant	Universidad Autónoma Gabriel René Moreno

National authorities and private sector leaders gradually became aware of the possibility of sustainable forest management in the tropics. But a fundamental change occurred when BOLFOR was asked to help in preparation of a new forestry law and, later, draft its regulations and technical norms. By that time BOLFOR had ample experience with forest management practices, having formed a solid theoretical and practical base, plus a core of trained technicians.

BOLFOR's initiative to facilitate field visits by national authorities and members of congress to witness silvicultural practices under planned and organized forest management provided a crucial boost toward passage of the forestry law and supporting the new sustainable forest management model.

Surge in demand

Once the law was in place, a new phase of training was set in motion to help forest operators prepare and implement forest-management plans. There was a surge in needs for training in mapping, inventories, censuses, management plans, directional felling, monitoring, milling, drying, classifying, marketing and other activities. Training was directed primarily at forestry professionals working for lumber companies. Professors from various forestry schools also participated.

Training was carried out in classrooms as well as the field. In-service training was another appropriate method to reach operators at the same time they were carrying out day-to-day activities, particularly on topics such as directional felling.

International and Bolivian students also benefited from BOLFOR research grants. A competitive grants program invested nearly $400,000 in research stipends to interns, graduate students, and post-doctoral researchers from 15 institutions in 12 countries. In addition to conducting their own research, international research grant recipients served as mentors to Bolivian undergraduate students, many of whom worked on parallel projects of their own. Researchers from the Center for International Forestry Research (CIFOR) became more actively involved in BOLFOR during its final years, which strengthened the social science research program and provided the project with a broader international scope.

Training involved funding and supervising Bolivian university students pursuing thesis projects, sending Bolivians abroad to obtain graduate degrees, teaching short-courses and hosting workshops on selected topics in forestry, and producing publications on research techniques. During the BOLFOR project, 171 students — 127 men and 44 women — received stipends to complete their undergraduate

degrees in forestry and related disciplines. BOLFOR staff played an important role in guiding these students and training them in research methodologies and analysis of results. Undergraduate students benefited from BOLFOR short courses on topics including silviculture, harvesting, biodiversity protection, research methods, dendrology, statistics, and experimental design.

Within the institutional framework of the new forestry model, new actors appeared besides the new Forest Superintendence, such as municipal governments and prefectures.. As Municipal Forest Units were formed, another set of actors was needed to support ASLs and other community groups in forest management. A special team was formed to support work with municipalities and Local Social Groups (ASL). At that point the BOLFOR training program became even more diverse because the ASLs not only needed technical orientations on forest management but also assistance in areas such as organization, administration and marketing. The number of training events multiplied as new ASLs were formed in different parts of the country.

Education is an important part of forest management. Here, a BOLFOR educator leads a course for trainers to train indigenous communities in forest management.

The new forestry law also gave private property owners access to the forest, so that indigenous communities had the opportunity to manage forest areas. Despite their long experience in forested areas, these indigenous communities had little knowledge of commercial species and logging. Training these groups created a special challenge as their members generally had little formal schooling. However, they demonstrated some advantages compared over ASLs; for instance they were accustomed to making decisions and working in community groups.

Indigenous communities were often less motivated to enter into commercial activities compared to ASL members, but began forest management by gradually gathering information, participating in technical training and organizing. After initial efforts with some communities showed success, a base was formed to publish practical handbooks and transfer experience to other groups. Two indigenous technicians were employed by BOLFOR to help facilitate the transfer of information

to more communities. The capacity developed by various indigenous groups and the successful experience gained to date makes certification of indigenous forest operations a viable option for the near term.

Installed capacity, further needs

In the 10 years of project implementation BOLFOR, conducted an estimated 504 in-country training events averaging nearly one week in duration. A total of nearly 8,000 persons were trained, of which about 1,300 were women and 6,700 were men. BOLFOR is leaving behind a culture that is oriented toward forest management and that has the knowledge and skills needed for orderly planning and implementation of sustainable forest management. This experience has come to be highly regarded in other countries of the region such as Peru, where much of the technology and experience gained in Bolivia are being replicated.

Planning procedures in forest management are now very well understood; academic institutions now offer graduate courses in this area. But more training is required beyond forest professionals to reach chainsaw and skidder operators, sawmill administrators, logging crew foremen and other personnel. Training these personnel can make the difference between complying with basic standards and truly advancing toward sustainable production and preservation of biodiversity. Another aspect in need of more attention is business administration at all levels of forest companies: medium and small scale firms as well as large scale.

Forest Monitoring and Research

How, What, Where: A Steep Learning Curve

In the early 1990s, when BOLFOR was being planned, forestry activities in lowland Bolivia typically consisted of extensive harvesting of a few valuable species: mahogany (Swietenia macrophylla), Spanish cedar (Cedrela spp.), or tropical oak (Amburana cearensis). Annual cutting areas were not designated and many concessionaires had untrained and poorly supervised logging crews dispersed over very large areas. With low harvest intensities, direct impacts from logging were minor. However, field crews were expected to hunt for much of their food, so logging operations had serious indirect impacts on biodiversity. In the absence of operational timber harvesting plans or designated annual cutting areas, logged stands were re-entered whenever they could be harvested at a profit. Virtually nothing was done to enhance regeneration of the commercially valuable species or to otherwise sustain timber yields

Research sponsored by BOLFOR was primarily directed towards developing information about ecological processes, the silvics of tree species being harvested and approaches to forest management that were ecologically sound. Although there were a variety of options and potential partners available, BOLFOR chose to concentrate its research efforts in just a few sites. The hope was that by having researchers concentrated in a few places where they would have access to basic infrastructure and baseline data, collaboration and other synergies would result. At field sites, researchers camped, provisioned, and cooked for themselves, often under difficult conditions, including seasonal scarcity of water. They were supplied with modest stipends, transportation, and basic research equipment.

Following guidelines from USAID, BOLFOR researchers could not make silvicultural recommendations without first determining their biodiversity impacts. Our initial approach to this challenge was to conduct research in forests that were as close to pristine as possible. One site that met many of the criteria for selection was identified in the Bajo Paraguá Forest Reserve.

Hands-on training helped enrich the knowledge of timber professionals.

Initial research focused on determining baseline conditions and exploring conventional timber harvesting practices. Along with establishment of permanent sample plots for growth and yield studies, diagnostic sampling was conducted in forests logged 2-10 years previously to determine stocking levels and to establish priorities for silvicultural interventions. In the process, we helped develop the mensuring methods that were later adopted under the implementation guidelines of the 1996 Forestry Law. The low harvestable volumes of high value species recorded in our sample plots, coupled with the scarcity of regeneration of these species, highlighted the need to focus management on a greater number of species and on methods for promoting regeneration.

The remoteness of the site in Bajo Paraguá, which initially made it attractive, also meant that the logistics of access and communication were very difficult. After years of frustration, BOLFOR suspended research at the site. A second research effort was established in the Chiquitano forest of Lomerío, a region of dry forests and savannas near the town of Concepción. Research focused on improving timber harvesting efficiency and in using harvesting to promote regeneration of commercial timber species.

As in Bajo Paraguá, hunting activities often exceeded levels considered sustainable. Nevertheless, our Chiquitano research partners emphasized that hunting is an important part of their culture and bushmeat represents a critical source of protein. BOLFOR wildlife research in Lomerío therefore focused on building a basis for management, which included describing wildlife community composition, estimating population sizes and growth rates, determining patterns of habitat use, and identifying keystone resources and their availability. We conducted this research in a participatory manner with a core group of hunters from several communities in Lomerío.

At our third location in La Chonta, while continuing the focus on the biodiversity impacts of logging, research was also carried out on advanced regeneration in logging gaps and other timber stand improvement treatments. This work was extended in 1997 at INPA Parquet, where the team addressed concerns about the costs and impacts of reduced-impact logging compared with conventional logging, using a large (100 ha) single replicate of each treatment. Most logging damage was associated with roads, skid trails, and log landings. Harvest planning effectively reduced the ratio of road density to volume extracted, and reduced the amount of marketable wood left in the forest.

The general concern about the deleterious impacts of logging caused the research unit to initially focus on timber harvesting practices. We were to discover that the restriction on mineral soil exposure, which was a component of the reduced-impact logging (RIL) methods being promoted, might not be appropriate in lowland Bolivia, given the regeneration requirements of many of the commercial timber species. Over time it became apparent that concerns about RIL should be greater in the wet, steep and intensively harvested forests of world regions such as Southeast Asia than in the dry forests of Bolivia on level terrain. Furthermore, it became clear that silvicultural interventions in addition to logging are often needed to regenerate many commercial tree species.

Like many other groups of forest scientists around the world, BOLFOR Project researchers became increasingly aware that many forests considered pristine were actually shaped by former human occupants. Researchers encountered pottery shards and soil charcoal in all study areas, which we first disregarded as "interesting," and only started detailed studies on ecological history late in the project in La Chonta in 2001. The distributions of several tree species useful to humans, including some timber species, appear to be related to the distribution of terra preta and the less radically altered soil we refer to as terra moreno. Such findings suggest that mimicking the disturbances that created this forest might require silvicultural practices that increase disturbance. Such a strategy is almost diametrically opposed to management philosophies of minimizing intrusion into tropical forests in the name of biodiversity protection and reduced-impact logging.

Evolving Strategies

The vision of the research team evolved substantially during the first few years of the project. The initial emphasis on making comparisons with undisturbed control plots began to seem misplaced, or even naïve. As our ecological knowledge of the lowland forests of Bolivia grew, we became aware of the difficulties in distinguishing factors related to hunting, land use, fire history and previous human settlement.

The BOLFOR team promoted and facilitated international debate through events such as the International Symposium on Possibilities for Sustainable Forest Management in Tropical America organized by CIFOR and the International Union of Forestry Research Organizations (IUFRO). Midway through this phase of the project the forestry law and regulations had been approved with a set of mandatory best-management practices, such as specified cutting cycles, diameter limits, and seed-tree retention. These limits were established based on general understanding of tropical forests, still without the benefit in-depth knowledge of the ecology of Bolivian forests. Little data were available on tree species growth rates, regeneration, silvicultural systems, or the impacts of tree harvesting on forest ecosystems.

Provisions were incorporated into installation and monitoring of permanent measurement plots in each managed forest. The permanent plots or conventional plots were to provide data on tree growth rates, forest stand conditions, and the impacts of harvesting; data that are necessary to calculate cutting cycles, diameter limits, and for determining the regenerative potential of harvested forests. These data were to be used to refine management plans in the next planning cycle (5 years).

Unfortunately the strategy to have representative permanent plots in every forest was overly ambitious. Few forest companies or communities managing forests had the technical or scientific capacity to install and measure plots or to process information obtained from them. The few instances where usable plot information was obtained occurred when companies received the cooperation of forestry research and management projects, such as BOLFOR, PROMAB or PANFOR with trained technicians and scientists to install and measure the plots.

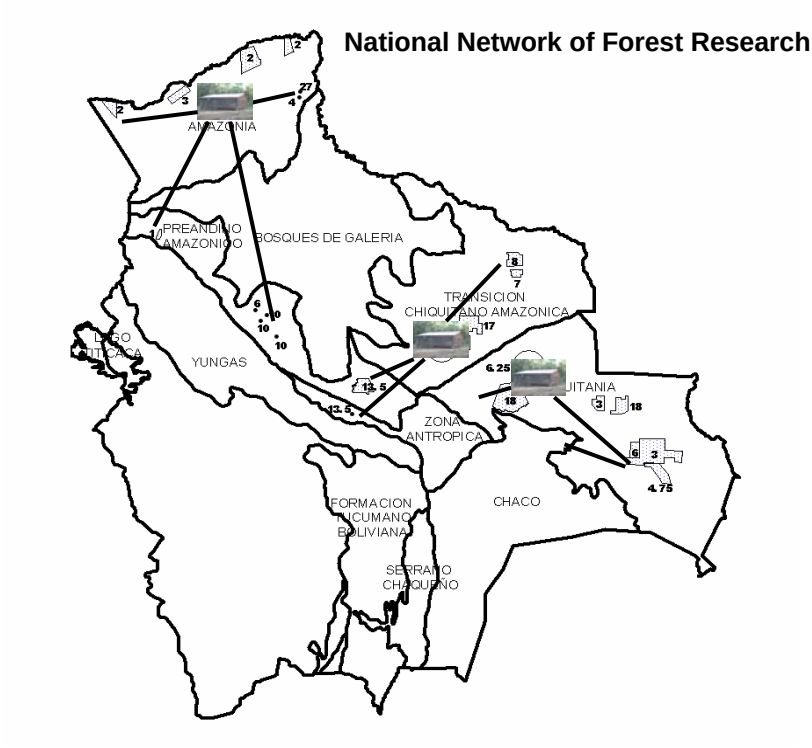
While the size of conventional plots (1 ha) was adequate for obtaining growth and yield information for the most common species, it was grossly inadequate for monitoring other processes that occur on larger scales, such as gap sizes, areas of soil disturbance by skidders, costs and benefits of logging methods and silvicultural treatments, forest species composition, changes in forest stand condition and impacts of logging on fauna and flora. For this reason, BOLFOR initiated a program to install experimental plots (20 to 27 ha) with sufficient replicates to measure the impacts of silvicultural systems on forest growth, regeneration, and other processes. More than 600 hectares of experimental plots have been established at three locations representing the most important forest types for timber production.

Each established site is equipped with a simple screened research building with bathrooms, work tables, and storage areas. Most researchers tent camp near the main building where they have access to solar power, running water, and a weather station. The facilities are located within a few kilometers of all of the research blocks.

Network of research plots

Based on accumulated experience, in 2001 BOLFOR concluded that the key to future research programs is the maintenance of a system of forest research plots—a combination of experimental plots and conventional plots. As a result, our focus shifted to the establishment and implementation of a national network of research plots that adequately represents the conditions of different forest areas. This network became the essential platform from which to monitor and adjust sustainable forest management practices on a permanent basis.

The map shows the various eco-regions of the country and identifies the location of the three centers with experimental plots and as well as the managed forests with conventional plots. The numbers indicate the area of conventional plots in hectares.



Protecting investments

The network of research plots, including the maintenance of databases, would require infrastructure in the field and logistical support from cities such as Santa Cruz and Cobija. Discussions therefore turned to long-term institutional arrangements that could assure the continuity of ongoing research.. Key issues included strengthening local research institutions while creating a system capable of implementing and maintaining research plots, and coordinating diverse research programs. The identification of an adequate institution for meeting these needs was a continuing stumbling block. Eventually a proposal emerged that, while representing a departure from earlier thinking, could meet the needs and satisfy other institutional stakeholders.

Just as BOLFOR spun off its other activities, the Bolivian Forest Research Institute (IBIF) would be a spin off of BOLFOR's research program. The idea was not to displace other institutions that are conducting research but to provide a common platform through the network of research plots. The network, as well as the data it generates, forms an excellent base for attracting funding and participation of scientists from around the world. Because this institution would be responsible for the system for monitoring through research plots, it would not only assure full implementation but also continuity in the long-term.

Because of its pivotal role in maintaining the research capability in the country, IBIF can best assume the mandate of coordinating the research needs of industrial and community stakeholders in Bolivia, as well as respond to the objectives of national and international scientific communities. By taking a broad view of forestry research, IBIF can contribute to programs in areas such as botany, zoology and ecology and also contribute to socio-economic and policy studies.

Objectives of Instituto Boliviano de Investigación Forestal

1. Monitor the network of forest research plots throughout Bolivia and expand the network where necessary to provide for adequate representation among the forest types and forest ownership classes in the country.
2. Maintain the data base obtained from measurements and perform data analysis.
3. Coordinate with national and international organizations and institutions who wish to conduct or fund studies within the plots.
4. Provide an annual report to the MDS and the FS summarizing the results of data collected within the plots and their implications for forest management.

With its contacts, infrastructure, databases and logistical support, this institution should attract considerable attention from scientists, research institutions and funding sources wishing to work in Bolivia.

Application and Dissemination of Research Findings

Based on accumulated knowledge derived from work in experimental plots, four basic management practices were reviewed. These were: 1) determination of ecological reserves, 2) maintenance of seed trees, 3) cutting cycles and 4) minimum diameters. For many species the best seed trees are below the minimum diameter for cutting, so leaving 20 percent of larger, older trees as currently practiced is not necessary. Practical recommendations allow forest operators to separate species into

four categories and adjust the number of seed trees to be preserved according to the difficulties of seed production and regeneration.

The issues of cutting cycles was more difficult, as some tropical species have slow growth rates. A statistical model developed to calculate cutting cycles showed that some species would not replace their original volumes for perhaps 40 or 80 years. However there are many viable options for the forest operator. With only 2-3 species harvested in the first cycle, and options for use of lesser-known species increasing every year, it appears that logging cycles of 20-30 years can still be appropriate. A second set of species would be harvested in the second intervention.

Silvicultural treatments applied to future crop trees have a relatively low cost, while the economic benefits are very high. The cutting of lianas growing on future crop trees increases the growth rates of the trees. Marking of those trees with paint results in reduced damage by logging. Results so far suggest that these treatments should be applied not only for ecological reasons but also for economic and social ones.

Dissemination of the results of BOLFOR-sponsored research was always among the project's explicit objectives. To meet this challenge, all researchers were required to file reports that were published in Spanish, and also loaded on an active web site (http://bolfor.chemonics.net). BOLFOR also published a newsletter in Spanish that was mailed to about 400 people and institutions in Bolivia and around the world. A series of books on topics ranging from directional felling to interpretation of the 1996 Forestry Law, as well as a series of silvicultural guides, were published by the project. To reach international audiences and to assure research quality, BOLFOR researchers were also encouraged to publish in peer-reviewed journals; during the project's 10 years, nearly 100 articles appeared in regional and international journals.

The national forest research meetings held in 2002 and 2003 are among the most compelling indicators that research in sustainable natural forest management will continue in Bolivia. Each of these 3-day long events was attended by more than 200 researchers, industrial representatives and policy-makers. Over 100 papers and posters were featured on topics including silviculture, biodiversity, rural sociology, economics of community-based forestry, and sector policy. A decision was made to have forestry research meetings on a yearly basis and Tarija was chosen as the venue for next year. While there is still a great need for more capacity building in Bolivia, the culture of the research community, as well as the culture of the entire forest sector, seems to have changed for the better in Bolivia during the past decade.

Recommendations

Our vision for IBIF is an institute that operates from offices in Santa Cruz and Cobija, extending to field stations in at least three locations, with access to macro experimental parcels and smaller growth and yield plots. To operate this system IBIF must have offices, computer systems, vehicles, and field equipment. Its core budget must cover a minimal scientific, technical and administrative staff to operate the research network and create an institutional presence. Over time, the institute will continue to accumulate information in databases and published studies that will attract even greater attention of scientists from around the world. The mission of the Bolivian Institute of Forestry Research (IBIF) will be achieved through a five-point strategycomprising forest research, data analysis, results dissemination, institutional relationships, and administration.

To assume this pivotal role, IBIF should be officially recognized by the MDS as the institution responsible for maintaining the national network of permanent forest plots, and funds should be assigned from FONABOSQUE to cover the core budget. Having its core budget covered by a permanent funding source generated by the productive sector and channeled through a public entity like FONABOSQUE will enable IBIF to reach out to other funding sources. In addition, IBIF should charge international scientists and students for use of its infrastructure and access to research plots and accumulated data.

Social Science Research and Gender

Social Science research and gender became more prominent during the final phase of BOLFOR with the increased emphasis on community forestry. It was important that project actions build local capacity so that the community forestry initiatives would continue after BOLFOR support ended. This was not just a matter of disseminating technical information; local groups would need to develop management institutions — rules, practices, relations, responsibilities, organizational strategies and norms to manage conflicts — that will allow them to maintain the forest operation within their livelihood systems. BOLFOR would need to assure that project information and capacity building opportunities were broadly available and not restricted just to sub-groups, which, if that were the case, could lead to inequities, mistrust and conflict. Finally, the community would need skills to continue to learn and improve their capacity. To help orient BOLFOR's community forestry initiatives toward that end, CIFOR's Adaptive Collaborative Management program (ACM) joined BOLFOR's research unit. In addition, BOLFOR embarked on an effort to integrate gender considerations throughout its programs. Both initiatives would help

BOLFOR better tailor technical assistance to community context and help local residents develop management institutions that could function autonomously without external assistance.

Adaptive Collaborative Management

CIFOR's ACM program is a comparative research project that builds on two prominent forestry development approaches: Adaptive Management and Collaborative Management. Adaptive management is a strategy to continuously modify and improve resource-use decisions in light of new information and observations. Given the complexity, change and uncertainty inherent in environmental, social and economic systems, perfect management systems rigidly following set plans are not realistic. Instead, the goal should be the best possible management derived from observations, discussions and decisions in order to adjust practices in response to acquired knowledge and experience. Collaborative management is an approach in which stakeholders reach negotiated agreements or maintain consensus on resource use in situations where multiple interests are involved; for example, agreements between neighboring forest user groups, between communities and timber buyers, or simply between local men and women. In community forestry it is common to find several stakeholders making claims to forest resources, usually with conflicting rights, differing levels of dependency, and variable degrees of economic and political power. Lack of coordination or agreement could have deleterious impacts on forest resources and could lead to conflicts or unjust exclusion. Collaborative management approaches attempt to help distinct groups find common ground, or at least agree to respect each other's interests.

By combining these two approaches, ACM attempts to identify conditions under which adaptive and collaborative processes occur, and to test methods that could be used to facilitate adaptive and collaborative behavior. Methods-testing in ACM is done primarily through participatory research with community stakeholders. ACM's research agenda closely corresponded to BOLFOR's interest in emphasizing gender.

Gender: A Key Component of Community Forestry Organization

While Bolivia's forestry law offered opportunities for community-level actors to practice commercial forestry, such endeavors could potentially shift patterns of income distribution, access to resources and control of territory within rural communities. The impacts of these changes do not fall evenly. Some segments of local populations, such as women, the elderly and the young, can be disproportionately affected.

BOLFOR programs would provoke change, and it was necessary to understand the implications of modifying such things as household labor allocation, access to knowledge or income patterns. Since change was already taking place, the technicians needed to see how it was occurring and attempt to avoid introducing negative impacts or reinforce the marginalization of segments of local populations.

The first biologist hired by BOLFOR conducted a study of indigenous use of forest plants for medicinal purposes.

Awareness of gender concepts and issues was fundamental to understanding local social dynamics and would play an integral part in developing stable, functional management institutions with potential for long-term continuity. Rather than working with individuals, BOLFOR technicians dealt with people embedded in networks of social relations that are culturally defined and malleable, and which define what is acceptable social behavior. Management arrangements that were being introduced would be more successful if the process for defining them considered the opinions and needs of all members of the family. With these issues in mind, BOLFOR defined a gender policy that cut across project activities and guided efforts by project staff to work with community groups. Understanding the significance of gender issues in forestry development allowed regional staff to put in practice simple techniques to guarantee that information related to forest management was broadly distributed. The impact of this shift in approach could be seen in general activities implemented by BOLFOR regional offices but more specifically in the results of

participatory research carried out by a field team consisting of ACM, BOLFOR, Peace Corps and IBIF staff.

Using Participatory Research to Improve Local Management Capacity

The applied social science research conducted by the CIFOR-BOLFOR team used participatory methods to build local skills. The consideration of gender issues played a prominent role in both research design and analysis. Because of its importance for social stability and for meeting the expectations of community members, ACM research concentrated much effort on systems for benefit distribution. For example, is Guarayos, villagers were unfamiliar with complex financial transactions, so misunderstandings and conflicts were likely. If community forestry activities did not provide equitable benefits, or were perceived to treat some segments of the population unfairly, opposition to the activity could have developed. Avoiding such situations requires a high level of participation and transparency. Including women is not only a question of equity; it is crucial for stability and for promoting local control, since husbands and wives share many household decisions.

Initially, the research team helped community leaders develop a simple monitoring system to control wage payments for residents that participated in forestry activities. The system consisted of recording on a large wall chart the days worked, payments made and balance due to each individual. Once timber was sold, payments were made publicly. Each resident could see how much was paid and how much was still owed to all members that had worked. With this information residents could be sure they were going to get their fair share and that others would not receive more than they were due.

The system was transparent, easy to understand and it worked. Villagers understood the transactions and were interested in the system since it held obvious benefits for them. By adopting this system, villages were able to get through a complex, confusing process without major conflict.

Once the monitoring system was introduced, other methods, like Future Scenarios, were tested to help villagers reach consensus on the plan for future use of communal funds. Exchange visits were organized to take Guarayo villagers to visit IBIF research plots in La Chonta and observe sustainable logging operations. More than half of those participating were women, many of whom had never visited a logging site before. To follow up on the exchanges, we facilitated trips to allow female residents and adolescents to visit the village forest management areas. This first-hand experience gave participating women greater confidence and increased their

participation in discussions. More recently, CIFOR and IBIF personnel developed additional activities with Guarayo villages to expand collaborative monitoring to track logging impacts and the forest's response. This activity began with workshops to discuss the need for forest monitoring, during which the villages selected commissions composed of resident men, women and adolescents to visit their forest and make simple observations. The commissions gathered information on natural regeneration, damage to future harvest trees and the condition of seed trees. As expected, many of the commercial timber species were not regenerating, logging had damaged numerous future harvest trees and seed trees were in poor condition or far from clearings. The commissions reported these findings to their respective villages. Villagers wanted to know what they could do to limit these problems, which generated interest in the silvicultural research conducted by IBIF. Both villages are now collaborating in multidisciplinary research. In one village they are testing the viability of marking future harvest trees in logging units, while in the other they are testing the viability of enrichment planting of mahogany within their managed forests to assist regeneration.

Impacts on Local Management Capacity and Participation

The experiences in Guarayos described above show that communities can be quite active in monitoring their forest management plans and thus more involved in the decision process. Facilitation methods were key to assuring that communities understand how and why monitoring should take place and that the points of views of all residents are considered when collecting and evaluating information. Also, when encouraging monitoring activities it is important to target issues that are priorities for villagers because this increases their involvement and the chances that the activity will continue into the future..

The facilitation of monitoring and evaluation can help local people to learn how their management plan is functioning and is an effective capacity- building tool. However, it is best to start with simple, short-cycled experiences where participants can easily observe cause and effects of their decisions, rather than have them monitor phenomena with longer time frames.

Communities that participated in these processes gained confidence in decision-making and working alone. The activities broadened the understanding of forest management within the villages by including women and adolescents. They also created opportunities for women to participate in management decisions. Transparency is an abstract concept, so activities must be designed to allow residents to experience and understand them. As a result of these practical exercises, the

participating Guarayo villages learned techniques to make information available, developed expectations for such open record keeping and are distributing benefits without debilitating conflict. There were misunderstandings but they were easier to manage because of transparent record keeping.

The approach toward gender has broadened the spectrum of community members participating in forestry activities, particularly women, and increased their understanding of management efforts. While only a small number of Guarayo women have chosen to work in the forest to earn wages, meetings of the management organization are now filled with women. Their participation was accomplished not by forcing the group to allow women to participate, but instead by stressing that the decisions and actions of the local management organization would

Entire families attended informational meetings. As more women participated in these meetings, the management of the ASLs improved markedly.

affect entire families. Therefore, it was important that both men and women understand what was occurring and why, so that they could participate in decision-making.

In general, refocusing BOLFOR's CFM program to emphasize gender concepts appears to have had a positive effect and has increased our understanding of how local forest management organizations are functioning. BOLFOR hosted several interns from the Global Graduates Program coordinated for Latin America through Oregon State University to help document the social dynamics of local forestry management organizations assisted by BOLFOR.. An intern who worked in an ASL with one-third female members commented: "BOLFOR played a vital role in the involvement of women in 'El Cedro.' Regional personnel promoted participation of

women in the formation of the ASL, and stressed the high level of responsibility and organizational skills that women possess. This advice led to involvement of the wives of some of the members and helped to create a space in which women could have their voices heard, be respected, and hold positions of power in the institution." Indigenous communities often have a tradition of broad participation, including men, women, young and old. Another intern working in an indigenous community reported: "Decision making is transparent and with a good deal of social control, as decisions and monetary transactions occur within plain view of everyone."

Participation as such, however, is not always a panacea. One intern reported that members of an ASL complained that family members outside of the ASL's ranks interfered with its organization and caused conflict. Divergent opinions and opposing interests are common in social organizations. Conflict is a natural part of human interaction, varying widely in scope and intensity, but unavoidable. By considering gender dimensions in this context, we have a better understanding of what is taking place. It is important that programs such as BOLFOR assure that participation is open to all (women, men, young and old) but they should also be aware that change can also bring unintended consequences.

In ASLs, simply making it clear that participation was not limited to males created space for women to play a role in these groups. Today more than 10 percent of ASL membership is made up of women, and at least two actively operating ASLs are headed by women. Indigenous communities where BOLFOR has worked have witnessed a dramatic expansion in women's participation in meetings, decision making and even forestry activities. While the majority of wage earners continue to be male, there have been increases in the number of indigenous women earning wages directly from community forestry initiates. Our initial concern that forestry activities could actually increase the domestic burden on women by drawing male labor away from the village appears to have been overblown. For example, women in the Guarayo village of Cururu reported that not only were they satisfied with the increased household income but were even more satisfied that their husbands no longer needed to migrate outside of the community in search of wage labor. More importantly, the participation of both spouses in decisions of community enterprises has usually led to greater organizational stability and effectiveness. It has led to more administrative transparency and social control. While in the short term the inclusion of women may have generated heated internal debate, in the long-term broad participation is likely to lesson conflict intensity because project decisions will better reflect the views and desires of all residents.

Recommendations

Gender is a key element of community forestry that should be considered from the outset. Because community forestry takes place within a social context such development activities need broad participation to assure that they reflect local needs and capacities. If women do not have access to information about forest management, they cannot participate effectively or contribute to decision-making.

To help communities develop forest management plans and learn to improve their management activities, forestry development projects should actively promote collective monitoring and evaluation so that communities can better understand their management system and plan accordingly. If the technicians implement forestry activities for the clients with scant local participation in or control over decisions, the long-term impacts are likely to be negligible. Helping communities learn may be slower but it will have a greater impact.

It is crucial that forestry technicians working with communities receive training in facilitation techniques. They need to listen to and observe local clients in order to tailor information and assistance to community needs. In particular, they need to be aware of how their words or actions can discourage participation by some segments of local populations (especially women) or strengthen discriminatory stereotypes.

IV. POLICY AND INSTITUTIONAL FRAMEWORK

National Policy Implementation

Context

BOLFOR began promoting a model for sustainable forest management amid widespread discontent with the performance of both the timber industry and the Center for Forestry Development (CDF), the sole government institution charged with regulating the sector. The consensus was that Bolivia's forest resources were not being efficiently used or equitably distributed.

At the time there were a number of policy changes ongoing in Bolivia that furthered both the need for and basis on which to structure a new forestry model. The Government had passed a law to decentralize government, assigning increased responsibilities to departmental and municipal governments. Through the Popular Participation Law of 1995, this vesting of powers in municipal governments was strengthened by allocating 20 percent of the government's budget directly to municipal governments for their programming and execution.

Another sweeping reform that accompanied privatization of major industries was the creation of a system for the regulation of important services such as banking and telecommunications and key resources, such as hydrocarbons and electricity. The regulatory system was to have independent budget authority and to be free from political pressures, thereby providing an important alternative to the corrupt and ineffective central government. Land reform was also underway and the Agrarian Reform Law was passed in 1996.

Meanwhile the forest sector continued to deteriorate. After several years of heated debate efforts to pass a new forestry law had stalled. Fortunately, BOLFOR's ongoing efforts to promote sustainable forest management had begun to pay off, and the proposed model was brought to the attention of ministers, parliament members and opinion leaders. Interest groups reached consensus on the need for change and the reformist government of the time embarked on a major effort to implement sweeping reforms to the forest sector.

Paradigm shift

The result was the Forestry Law approved in 1996, which introduced a comprehensive forestry regime. Its purpose was "to regulate the sustainable use and the protection of forest resources and forest lands in order to benefit current and future generations…" Departing from the premise that all forests were the property of the state, the intent of the law was to:

- Promote sustainable and efficient forest use that contributes to the social and economic development of the nation,
- Achieve sustainable yields while guaranteeing the conservation of ecosystems, biodiversity and the environment,
- Protect and improve watershed management, prevent forest degradation and soil erosion, and promote reforestation,
- Promote and disseminate forest and agroforestry research to promote production, conservation and protection of forest resources,
- Facilitate access to forest resources and benefits under strict adherence to the norms and standards of sustainability, and
- Promote knowledge and awareness of responsible management of watersheds and forests among the general population.

To achieve these objectives, the State was to grant citizens user rights to forests on public and private lands. Holding concession rights on public lands required payment of a royalty to the State of no less than $1 per hectare per year. These user rights could be withdrawn at any time if there was evidence of misuse of the resource, or non-application of the required forest management norms and standards.

To put the new forestry regime in place, the law assigned roles and functions to the public and private sectors and to civil society:

- For the public sector, the law proposed a novel institutional framework centered around three separate national institutions performing normative, regulatory, and investment functions. These functions were to be facilitated by, and in some cases delegated to, municipal and departmental governments.

- For forest users, the law set technical norms and standards that must be met to obtain and retain forest use rights. It was up to the private sector to find the best way to meet these standards and remain in business.

- The law provided for oversight by civil society through mechanisms to aid in the implementation and enforcement of the new forestry regime.

Consistent with the democratization and decentralization of the country, departmental and municipal governments were to play an important role in the implementation of the regime. Moreover, in keeping with a major shift of public policy towards a more equitable society, for the first time in the history of the country, the law recognized the legitimate rights of indigenous groups to access and use of forests.

Hindsight

Perhaps the characteristic that most distinguishes the new forestry law from its predecessor is the incorporation of innovative, practical tools for its implementation. The work of the MDS and the FS can best be described as developing and applying these tools. Most have yet to be developed.

Weaknesses were naturally discovered in the law and in the forest management model. Some of these are:

- Land titles were at first required for approval of forest management plans, limiting participation of private property owners.

- The means of applying of land classifications were not clear. It was naive to think that the central government could simply decree land use based on a "broad brush" approach and expect thousands of actors in rural areas to adjust their behavior and activities accordingly.

- Transaction costs for approval of land clearing are high, while fines are low. Fines are similar for land clearing in agricultural areas where conversion of use is environmentally acceptable and for forest reserves, where no land clearing should occur.

- Departmental Prefecturas receive resources from the sector, but are not service organizations supporting sector development.

- The law formulates a mandate for municipal governments to collaborate with regulatory processes, but provides little incentive to do so. Municipalities can perform other useful functions more in line with local interests.

- Centralization of some functions was not necessary, especially recognition of Local Social Groups and approving concessions plans to these groups. These functions could be handled more expeditiously by municipalities and the FS.

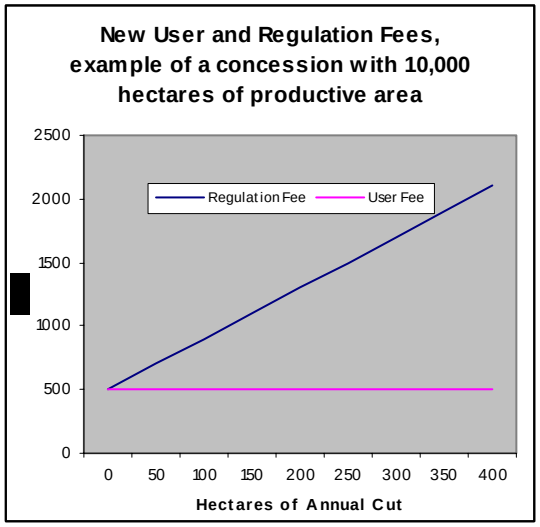
Experience of the first six years also shed light on the serious problems created by the concept of user fees or royalties. The $1/hectare royalty was applied to the entire productive area of the concession, even though the operator is permitted to cut only a small compartment each year. The rationale for setting this level was in all likelihood to obligate companies with logging contracts to reduce their forest areas, making forest lands available for other users. The user fee may have had a psychological impact on companies to reduce areas, , but in retrospect, the costs of forest management would have produced a similar effect. The costs of developing forest inventories, management plans, conducting annual censuses and plans, and complying with controls cost more than $1/hectare annually.

BOLFOR was crucial to preventing the eminent collapse of the concession model by presenting a conceptual and economic analysis showing that the financial condition of the sector did not justify this level of fees. The primary production phase of the timber industry consists of forest management and logging operations, delivering logs to the sawmill or other market. Measured in these terms, the total value of timber produced from managed Bolivian forests (excluding timber from land clearing) is estimated at about $20 million annually. This amount is available to cover the costs of road building and logging (around $15 million), leaving only $5 million for forest management, administration, financial costs and taxes. Adding user fees of $6 million renders the sector as a whole economically impractical

Once again, BOLFOR was key in developing a change in this concept. Royalties to maintain forest concessions were being applied as if they were stumpage fees based

on the sale of standing timber. This concept would apply to lands managed by the state, where an organization similar to a forest service had brought the forest into production and mature trees were ready for harvest. The Bolivian model is different. Forest operators assume the responsibility for conserving the forest and applying sustainable management practices, maintaining the productive capacity and protecting biodiversity.

Another BOLFOR study showed that nearly half of Bolivian forests are not currently harvested intensively enough to turn a profit with user fees of only $0.30/hectare per year. Therefore there was a need to vary fees according to intensity of harvest. However there was a strong desire to maintain an area-based system, rather than volume-based, permitting transparency and ease of verification. Through proposals developed with the FS and the Bolivian Chamber of Forestry, the concept was of "stumpage fee" was changed to a combination of royalty or user fee plus "regulation fee". User fees are fixed in value, independently of harvest, and regulation fees increase with area of annual cut, as shown in the figure.



Solid Agenda

BOLFOR presented final recommendations to the MDS and others regarding measures that need to be taken to consolidate the sustainable forest management model in Bolivia. The first step in this six-point agenda relates to adjusting areas of existing forest concessions to eliminate splinters or awkward triangular areas of "no-persons" land between parcels. The proposal is for the MDS and FS to adjust concession boundaries to absorb these areas in existing concessions.

The second point is recognition of traditional forest users as stated in the Forestry Law — a provision created for brazil nut operations in northern Bolivia, but one that has not yet been put into practice. A change in regulations is required for this purpose. A final version of the Supreme Decree was officially submitted by the MDS to the Ministry of the Presidency for action by Cabinet.

A third point emphasizes proceeding with measures to establish municipal forest reserves and issuing concessions to Local Social Groups.

Fourth is promotion of forest management by property owners, including indigenous communities. The methods currently used by the FS to approve forest operations on small parcels amounts to legalizing wood harvested in areas where no meaningful forest management is taking place. This problem came into clear focus through a recent study conducted by CIFOR, and requires further work in the next phase of BOLFOR.

Fifth is auctioning new concessions through open bid or other means. As discussed above, land area available for new concessions is much less than expected, amounting to perhaps only around 2 million hectares in total throughout the country.

The sixth recommendation concerns land use, particularly control of land clearing. Clearing land rather than abiding by the stringent requirements of sustainable forest management can be more profitable in the short run. BOLFOR developed methods and international interchange of information for interpretation of satellite imagery for detection of land clearing. Findings showed that most land clearing occurs without proper permits. While deforestation rates are much higher than expected throughout the country, managed forests remain virtually intact.

Bolivian law is overly optimistic in terms of what the Government can and should do about land use and deforestation. Different efforts by the FS and municipalities, with support from BOLFOR, have ended mostly in frustration. There is little effective control in the field. Our solution to the problem would recast the institutional environment through the following steps:

- Clarify authority for land use planning: national versus municipal.
- Clarify purposes and means of application of land use classifications.
- Define separate jurisdictions for regulatory bodies based on land classification.
- Decentralize control of deforestation to local level, while providing technical support by national entities.

Although some of the proposals initially presented by BOLFOR met with polarized opposition, further efforts to control land clearing are unlikely to change the course of human behavior and activities without first clarifying authority levels, jurisdictions, institutional roles, operational and administrative procedures and technical support. Additional work on these topics is required. Fortunately, leaders in the agricultural sector, in both public and private organizations, have been open to cooperating with environmental interests on these topics in recent years.

Finally, the forest sector is poised to take a prominent position in national development strategies. BOLFOR supported the MDS in preparation of a Integrated Program for Development of the Bolivian Amazon as part of the economic development program for the country. Unfortunately the MDS changed ministers four times in 2003, twice under pressure from violent protests. This proposal remains stalled, pending further action.

Current Conditions

Bolivia has set in motion a path-breaking paradigm shift in the management of its forest resources. But circumstances outside of the forest sector — including the macro political, economic and social influences — are much more important than what is happening inside the sector. Implementation of the new paradigm needs to stay focused on both the forest and the trees. While the government has attempted to extend reform efforts into the much needed areas of judicial, customs and civil service reform, implementation of key elements of the Forestry and Agrarian Reform Laws may falter due to political influences. The recent economic crises of Bolivia's neighbors — initially Brazil and Argentina — have had major impacts throughout the Bolivian economy, including the forest sector. Economic uncertainties, signs of wavering political will, lack of forward movement on land tenure security, and continued corruption have led to reluctance to invest further to strengthen the competitiveness of Bolivian forest products industries.

The hard shell of a brazil nut can be opened by few animals—one, the acuti, a native rodent, is responsible for the natural seeding of the brazil nut tree. When the acuti was heavily hunted, the numbers of new brazil nut trees were sharply reduced.

Control and use of natural resources has increasingly become a "flashpoint" issue

within Bolivian society (e.g. water use in Cochabamba, brazil nut harvesting rights in Pando, land disputes in the eastern lowlands). Different factions of Bolivia's political and economic framework need to listen carefully to the concerns being expressed and develop modern, transparent institutions capable of defining rights and resolving conflicts.

Finally, information is key to decision making, and unfortunately the forest sector is weak in this area. For example, the SF cannot report volumes of timber cut from different forests—indigenous territories, private properties and concessions by forest types and locations. The connection between volumes and origin is the basic ingredient to answer many important questions about sector behavior and performance. This information is available through certificates of forest origin (CFO), but systems for tabulation and reporting break down for lack of clarity of purpose. Another example of the problem is that the National Institute of Statistics barely reflects the forest sector. Employment levels in forestry, for example, are little more than guesses.

Public Administration: Regulation and Beyond

Reforms and new leadership

The forestry law established the institutional framework for the public sector by assigning roles and functions to a number of central, departmental, and municipal institutions. The law placed the policy direction for the sector, including the development of norms and standards, under the Ministry of Sustainable Development (MDS), regulation under a newly created Forest Superintendence (FS), and investment under a new National Fund for Forestry Development (FONABOSQUE). In addition, as stipulated in the Popular Participation and Administrative Decentralization Laws, a series of implementation functions were assigned to Departmental Governments (Prefecturas) and Municipalities.

Created shortly after the Law was enacted, the Forestry Superintendence, located not in La Paz but in the lowlands in Santa Cruz, moved quickly to establish itself as a highly capable and respected institution. Its leaders set out immediately to define its agenda with the objective of creating a new style in public administration based on:

- Institutional development
- Honesty and credibility

- Financial and political stability

Creation of a capable institution included development of a client base made up of forest operators that needed to convert logging contracts with the Government into managed forest concessions. The FS took the attitude that it should facilitate this process, rather than raise bureaucratic barriers. BOLFOR provided support in crucial areas, such as delimitation of areas using global positioning systems for specific boundary references and use of maps. BOLFOR also facilitated an independent group of consultants to review compliance with logging contracts and formulate recommendations on eligibility of different firms applying for concessions.

From this process early in the life of the new forestry regime, the FS set a style of regulation that went beyond policing and collection of fines. Its leadership never lost sight of the institutional vision of the FS oriented toward conservation and sustainable use of land and forest resources (see box). The leadership was also aware that public regulation alone could not bring about the changes in human behavior needed to achieve this vision. From the inception of the forestry regime, the approach has been on stimulating voluntary compliance.

Vision and Mission of the Forest Superintendence:

Conserve the natural heritage of forests and forestlands in Bolivia as a source of economic development, employment and conservation of the environment and biodiversity to improve the quality of life of the Bolivian population and mankind in general.

Promote, regulate and control the sustainable use of productive forest lands of the country, as established by the national forestry regime.

The Superintendent was known for his capable leadership and strong convictions regarding responsible public service, and this vision was explicitly projected as an example to all FS personnel. The only previous model known to Bolivian foresters was that of the CDF, where mismanagement was rampant. But with new leadership and a positive institutional setting, professionals began to behave differently. In fact, the FS forms the focal point for Bolivian forestry professionals and technicians, who are rightfully proud to be an outstanding example of responsible public administration.

In addition to being apolitical, the Forest Superintendence has been proactive in promoting transparency in its decision-making. One example is the emphasis on public hearings held at every opportunity in various parts of the country. The style was to engage in open, frank discussions and frequent interchange of information with interested individuals or representatives of different groups of the population.

BOLFOR assistance

BOLFOR provided extensive technical assistance and other facilitation in the development of technical standards and procedures for forest management. Several commissions were formed with inter-institutional representation to develop norms related to forest management in areas over 200 hectares, land clearing, forest management by Indigenous communities, and many others. In 1997 BOLFOR facilitated the first meeting of FS staff from around the country in order to present the new norms and discuss their application, as well as define regulatory approaches. Annual meetings were held to review progress and address problems encountered.

BOLFOR was fortunate to be able to offer the services of one the most prominent legal counsels in Latin America in the area of natural resource conservation. The MDS and the FS benefited greatly from the continual support provided by this expert advisory service. A transfer of BOLFOR's expertise also took place when several key staff members left the project to join the FS. This positive transfer of skilled personnel was made possible by the competitive salary scale established in the regulatory system of the Bolivian Government.

At a later stage, BOLFOR provided funding for operation of several Operative Forest Units, which provided a platform for experimenting with different approaches for control of illegal logging, as described below. Our approach was to work from the bottom up: e First, we helped the Operative Units develop and test methods for monitoring and control, then we facilitated evaluation and adoption among Operative Units across regions, and gradually helped incorporate the practices in official strategies at the national level.

Other activities were carried out with the FS and other organizations in relation to prevention and control of forest fires. An Early Warning System for detecting forest fires was developed by BOLFOR, and is now operated within the FS. Property owners and concessionaires need to take greater initiative in this area, with some support from public sector.

Illegal Logging

The U.S. President's Initiative Against Illegal Logging is composed of four branches:

- Harnessing Technologies
- Empowering Communities

- Strengthening the Rule of Law
- Energizing Market Forces

All four are addressed in the Bolivian forestry law, with various mechanisms for their implementation. Interestingly, while the FS has improved its systems of control over time, the amount of illegal products confiscated has diminished. For example, only about 500,000 board feet of lumber were confiscated in 2002, compared to nearly three times that amount in 1998. This reduction may be due to many factors, such as lumber companies learning to operate within the regulatory system, formalizing their operations with the FS. However informal operators first put the system to the test. Only when they found the regulatory body to be serious in its commitments and competent in carrying out its mandate did many cease these activities. Others have been incorporated in the formal system by participating in ASLs with forest concessions in municipal reserves.

The FS is authorized to take drastic action against loggers and truckers detected with products extracted from unauthorized areas, such as confiscation of equipment used in such activities. However, authorities in the FS were sensitive to social and political realities of the country, averting a direct confrontation with powerful groups capable of forcing the hand of central government against a single regulatory entity.

While the FS continues to exert pressure by seizing illegal lumber and timber, and by confiscating equipment for several days or weeks, the most successful means of protecting forests from such activities continues to be responsible forest management, encouraged through the market. BOLFOR studies show that managed forests have generally been protected from pressures of illegal logging, as well as fire and deforestation. Although the industry first resisted the new forest regime, private sector leaders came to understand that international market forces were fast becoming oriented to sustainable management and certification.

Continued work is needed to identify the sources of illegal logging and curtail unsustainable practices through many different means, including regulatory control. But the FS should continue to focus on expanding forest management. The area under management should increase from 9 million currently to perhaps 18 or 20 million hectares.

Summary

Of the several initiatives defined in the forestry law regarding public institutions, only the Forest Superintendence is functioning satisfactorily. All other institutions are either non-functional or have yet to be established. The MDS suffers from the classic problems of public sector institutions in Bolivia: lack of continuity in policies, absence of a civil service, lack of transparency and lack of accountability. Departmental governments, which receive a substantial share of the forest user fees, have accomplished little. FONABOSQUE was established as an account to receive the user fees assigned to it, as well as monies generated from fines and auctioning of illegal products. However, the Fund has yet to function.

Another recent perception is that the central Government is no longer interested in development of the forest sector. Instead, the MDS tends to delegate responsibility to the Forest Superintendence. It would be unfortunate if this were the case, just when the sector is gaining in prestige. At the moment. agriculture has replaced the forest sector as the primary venue for conflict over land rights.

The basic institutional concepts promoted by FS leadership should be adhered to; the MDS should define policy while Superintendence should focus on regulation. Also, the system of appointing Superintendents to five-year terms with smooth transitions to new appointees is coming under question because of inoperability of congressional leadership. The remaining challenge is to get the central government to assume its essential, normative role and to protect the independence and autonomy of the Forest Superintendence so that implementation of the new paradigm can proceed.

Decentralization and Municipal Government

Decentralization Reforms

Just prior to the reform in the forest sector, one of the most profound changes was instituted, called "Popular Participation," or decentralization of government to the municipal level. The 1994 Popular Participation Law created 311 local governments and allocated 20 percent of national income to them. Two fundamental concepts of this reform were:

- Municipal government should respond to its constituency, rather than carry out mandates from national government.

- Civil society participation can best interface with municipal government through territorial units based on communities and barrios for planning and control.

Municipal boundaries are coterminous, meaning that municipalities usually include an urban center plus rural areas with scattered population. Initially, upon implementation of the decentralized system, most municipal projects were limited to the urban center — the seat of municipal government. But over time, rural interests are becoming better defined and expressed.

Another reform was to decentralize to the regional or departmental level. While Departmental Development Corporations were eliminated because they ran counter to the new economic model of non-intervention of government in production and market chains, Prefecturas were given greater autonomy and resources.

The Forestry Law attempted to complement the decentralization reforms by assigning a proportion of funds from user fees to both municipal governments and Prefecturas. Unfortunately, Prefecturas have been used primarily as platforms for political parties, and contribute little to development. Despite the mandate prescribed by law regarding responsibilities of Prefecturas, the forest sector has seen very little benefit from the millions of dollars contributed.

Seeking a Fit with Popular Participation

BOLFOR's support to municipalities can be divided into three phases:

1) Implementation of the Forestry Law;

2) Strengthening of Municipal Forestry Units, and

3) Organization of the local forest sector.

With the enactment of the forestry law, BOLFOR undertook a campaign to inform municipal leaders about the opportunities for participation by establishing municipal forest reserves and forming community groups to receive concessions. Constant changes in municipal authorities and staff were at first seen as a frustration because of the need for continual repetition of informative meetings and seminars. Over time, however, we began to see the positive effects of reaching a larger portion of the population. BOLFOR published and distributed thousands of copies of the new forestry law and its regulations, and helped instruct the population in the model of sustainable forest management.

Principal activities of the first phase focused on delimitation of municipal forest reserves, forming and qualifying Local Social Groups, proposing concession programs to the MDS and forming Municipal Forestry Units.

In the second phase, strengthening Municipal Forestry Units to fulfill the role prescribed in the Forestry Law was carried out through training and technical assistance. Frequent staff changes and assignment of unqualified personnel to forestry activities frustrated serious efforts to create real institutional capacity. Alternatives were needed, and BOLFOR entered into an agreement to create a special unit under the Mancomunidad de Municipios de la Gran Chiquitania. The purpose was to create a permanent mechanism to provide support to Municipal Forestry Units in the 14 municipalities of the Chiqutanía region. The agreement was to span three years. In the first year, BOLFOR was to assign a professional to be responsible for the unit, covering salary and operating costs. In the second year, BOLFOR would continue supporting 50 percent of operating costs. By the third year, the unit would be totally dependent on the Mancomunidad.

To increase the effectiveness of this support, the base of operations was established in San Ignacio de Velasco as a strategic point of convergence of municipalities in the region. To overcome lack of attention from the Mancomunidad, the unit was later moved to its offices in Santa Cruz. However BOLFOR still encountered little commitment, and the agreement to support the unit was suspended. Meanwhile, BOLFOR continued to work directly with Municipal Forestry Units as before.

In the third phase, another attempt to find a mechanism for supporting municipalities was made, this time with marked success. An agreement was signed with the Association of Municipalities of Santa Cruz (AMDECRUZ) to carry out a series of workshops with the hope of uniting the forest sector at the local level to identify demands for services from the Municipal Government. The idea was to build on the concepts of Popular Participation in Bolivia, where municipal government reacts to demands of local constituents, rather than to edicts or priorities defined by central government. As municipalities receive funds from forest user fees or royalties paid by the productive forest sector, local representatives of the sector should have a say in how these funds are used.

The methodology was developed with the help of the USAID project called Democratic Development and Citizen Participation (DDCP) where workshops were scheduled to coincide with the annual planning and budgeting cycle of municipal governments. The workshops were a great success. In virtually all 18 municipalities covered in Santa Cruz, the sector was effectively included in Municipal Annual

Operating Plans and budgets. Later, the same exercise was carried out with the Association of Municipalities of Tarija (AMT) and the Association of Municipalities in Pando (AMDEPANDO). The response was again very positive; demands identified by participants reflect the felt needs of the forest sector.

Building on this success, an additional step was taken with AMDECRUZ. The earlier effort had resulted in the formation of Municipal Forestry Committees, which had begun operating and expressed interest in further support. AMDECRUZ presented a proposal to assist in preparation of development projects in support of the forest sector. Nine project profiles were prepared and presented to authorities in eight municipal governments for incorporation in Annual Operating Plans and budgets for 2004. The profiles were recently requested by the Prefectura of Santa Cruz to seek additional financing. AMDECRUZ also intends to send the profiles to the Fundación PUMA for consideration in the next round of projects to be evaluated.

We are excited about the results obtained through the Associations of Municipalities. With the formation of Municipal Forestry Committees, a viable mechanism for channeling support to the forest sector at the local level has been set in motion. The forestry committees represent the first productive sector to be organized at the municipal level, providing an opportunity for municipal governments to form partnerships with the private sector. A healthy partnership between municipal government and forest sector can create wealth and employment for the local populations, and should serve as a model for other sectors. The local forest sector enriches and strengthens the capacity of the local government to provide needed services to improve the quality of life of all citizens. It also strengthens the emerging civil society structure and its role in better governance. Finally, local forestry committees should be helped to develop sectoral representation, not only to address local issues, but also national policy issues.

Need for Action

The processes of establishing municipal forest reserves and granting concessions to Local Social Groups are clearly mandated by the law and its regulations. BOLFOR invested considerable resources in helping the MDS, municipalities, and Local Social Groups implement these provisions. By the end of 2003, 23 municipal governments had identified and solicited nearly four million hectares for municipal forest reserves. Fifty-two Local Social Groups had formed or were in the process of forming. Forty-four Local Social Groups are managing more than 1.7 million hectares under FS-approved forest-management plans. With these figures, it would be temping to declare that the forest regime has succeeded as intended in achieving a more

equitable distribution of forest resources. Unfortunately, the reality is that, due primarily to inaction at the MDS level, the forest regime is seriously undermined. Paralysis by government bureaucracy is reflected in the following figures:

- Of the 3.7 million hectares solicited by municipal governments, only 1.1 million have been sanitized by INRA in six municipalities (of the 23)
- Of the 1.1 million hectares that have been sanitized, only 681,765 hectares have been officially declared as municipal forest reserves.
- Of the 681,765, hectares that can be given out as concessions, only 423,202 have been actually granted.
- Of the 52 Local Social Groups in existence, only 16 have been officially qualified by the MDS.

This gap between what is actually taking place and what the MDS has approved led the FS to take a the highly commendable step of provisionally approving forest management plans for Local Social Groups working in provisionally designated concessions within provisionally established municipal forests.

People who depend on the forest for their livelihoods, but who cannot operate legally because of government inaction, are likely to operate anyway. Illegal operators have little if any incentive to play by the rules or to observe the technical norms and incur the expenses that they require. Having lower costs, in turn, makes them more competitive, and forces legal operators to lower their costs, often by not meeting some of the technical standards, or by going underground themselves.

MDS inaction on its legal obligations is the start of a vicious circle that undermines the very law the Government is supposed to uphold. It may become necessary to convert temporary measures into permanent ones. The provisional solution that the FS has taken to preserve the integrity of the regime could be made permanent by decentralizing the functions now assigned to the MDS to the FS and municipalities.

Development of Private Organizations

Healthy framework: positive response

Besides developing a model for sustainable forest management, BOLFOR was to build "capacity to develop and implement programs for sustainable, certifiable forest

use." With the sweeping reforms instituted by the Government of Bolivia, the private sector needed to respond with activities such as: 1) greater participation and identification with the forest sector, 2) capacity to formulate policy proposals favoring overall development of the sector and conservation of forest resources, 3) involvement and support for research programs, 4) promotion of products derived from well-managed forests, 5) quality control programs, 6) market information services, 7) environmental education and others. In 1994, organizations providing support services of this kind could be counted on one hand:

- The Bolivian Chamber of Forestry (CFB—at that time CNF)
- NGOs involved in rural development — notably APCOB, which worked with Indigenous communities in Lomerío)
- PROMABOSQUE, a development project financed by the Swedish Government focusing on reforestation and later improvements in saw milling services.

Sector representation and lobbying were concentrated in the Bolivian Chamber of Forestry, a single organization with limited membership. The CFB had an effective staff, but could garner little credibility as a sector representative. It was widely known that a few well-off families had obtained concession rights to the timber in the country and attempted to exclude all other claims. Although private enterprise has reacted positively in recent years to the framework established by the GOB, to date the Chamber has not been able to broaden its representation.

A key organization was created with BOLFOR support to provide training and technical assistance activities related to civil participation, including activities aimed at municipalities and local NGOs. The Bolivian Society of Environmental Law (SBDA) was key in efforts to distribute the law and educate thousands of local actors. SBDA and BOLFOR staff worked together to actively promote forest management and the forestry law through continued training of politicians and other actors within the society that influence decision-making related to forest and land use. The SBDA led the movement to form nature reserves in private properties, was key in training judges in legal issues related to natural resources and participated in analysis of policy agendas related to land tenure and land use. During the final phase of the project, the SBDA operated independently with funding obtained from various sources.

There are many environmental NGOs in Bolivia. The better known organizations form part of a national association (LIDEMA). Although some of them had spoken out occasionally on forestry issues, none had assumed a leadership role in informing and motivating civil society to use the tools provided by the forestry law to monitor implementation of the new regime.

Meanwhile BOLFOR was able to assist the sector in gaining cohesion at the local level with the formation of two regional associations and a national association of Local Social Groups and more than 20 Municipal Forestry Committees. Organizations of Indigenous peoples, including the national organization, CIDOB, also became more involved with forestry issues. Additionally, BOLFOR supported organizations of brazil nut collectors, one based in Cobija and the other in Riberalta. Many of these organizations have already become involved in sectoral policy issues, often with sufficient presence to demand attention of national leaders.

Local Institutions to Support Certification

The Bolivian Council for Voluntary Forest Certification (CVF) was created early in the life of the project to establish: "an internationally recognized mechanism to effectively certify the sustainable production of timber and non-timber forest products." The CFV grew out of a workshop organized by BOLFOR in 1994. It has since become a key and important institution in the sector. The CFV has been responsible for developing national standards for timber and non-timber products and gaining their approval by the Forest Stewardship Council. CFV was the second "country initiative" recognized by FSC in the world. Several such initiatives now exist throughout Latin America.

The SmartWood label was placed on certified timber and timber products for export.

BOLFOR helped build capacity to carry out certification activities early in the life of the project by facilitating technical assistance and training provided by SmartWood, an organization of

the Rain Forest Alliance. SmartWood, paired with a university-affiliated NGO, conducted Bolivia's first certification of the Chiquitano Indigenous' forest operations of Lomerío. Between 1995 and 2001 these organizations carried out certification evaluations on more than one million hectares, and also carried out evaluations for several secondary processors in order to certify their chain- of-custody processes. In early 2001, SmartWood established a regional office in Santa Cruz, Bolivia to provide certification services throughout the region.

Research and Training

Institutionalization of training and research services was an equally challenging task. BOLFOR studied and proposed several alternatives. The Museum of Natural History Noel Kempff Mercado was an important research partner throughout the project. Eventually research in wildlife management was spun off entirely. But efforts to devolve forest monitoring and aspects related to productivity through a Forestry Research Program did not fit with the institutional mandate of the Museum.

When it became apparent that a national network of experimental plots was needed to monitor forest management and provide a base for research, the need for a specialized organization with national scope became clear. BOLFOR conducted initial appraisals, and determined that no such organization existed in the country. Upon further analysis, a group of interested persons was invited to form the Bolivian Institute for Forestry Research (IBIF).

Due to political changes during the final year of BOLFOR, with four Ministers of Sustainable Development and two major social uprisings, the institutional model for IBIF remains incomplete. The proposed model depends on development of another institution: The National Fund for Forestry Development (FONABOSQUE). This fund was created by law and financial resources are routinely deposited to its accounts. Bylaws have been approved by Supreme Decree. FONABOSQUE could become operational quickly, through the appointment of a Board of Directors. Without the need for staff or administrative costs, a percentage of FONABOSQUE resources could be assigned to cover the core budget of IBIF for maintenance of the forest monitoring system.

The approach to training was to strengthen existing institutions rather than create new ones. BOLFOR personnel helped conduct practical and theoretical courses at various universities, particularly the Forestry School of Cochabamba (ESFOR). A private university in Santa Cruz was also encouraged to establish a program in forest enterprise development and finance.

Service Providers

Service providers belong to at least three categories: independent forestry professionals, forestry consulting firms, and technical assistance NGOs. There are serious weaknesses in all three categories. BOLFOR addressed one of these areas with the creation of CADEFOR (Amazonian Center for Sustainable Forest Enterprise). CADEFOR allowed BOLFOR to spin off its activities that directly assist the private sector by charging fees for services. A grant from the USFS through the Forest Management Trust helped CADEFOR set up shop and develop its client base.

CADEFOR became fully operational as a Bolivian non-profit in 2000 with the goal of helping Bolivian certified forest enterprises become successful participants in the export market for products from sustainably managed forests. Clients include private sector concessions and community enterprises with titles to productive forests, as well as private enterprises engaged in value-added processing of products for the export and domestic market. Through its involvement in BOLFOR II, CADEFOR will continue to address the principal constraints limiting Bolivian participation in the market:

- Deficiencies in business structure, management and entrepreneurship
- Limited and outmoded value-added processing facilities
- Lack of adequate financing for expansion of forest management
- Lack of a robust market for products made from lesser-known species.

Another initiative was the formation of a special project to promote forest management in Pando. The region is rich in forest resources including brazil nut, an industry that has grown to over $30 million in annual exports. PANFOR received its financing from the International Tropical Timber Organization. At the end of the two-year project, regional leaders took steps to provide continuity by forming the Foundation José Manual Pando (FJMP) to promote forest management and development in the region.

Uncertainty in land tenure and rights to use of forest resources are common in the region. Disputes take an unfortunate flavor among political rivals, often derived from interests defined by players from other regions—La Paz, Santa Cruz and Riberalta in Beni. Although the local population resents these intrusions, immigration to Pando is

inevitable, and with it comes pressures on forests. The FJMP has been instrumental in facilitating healthy debate on these topics, while maintaining a positive, technical outlook and image.

During its final phase, BOLFOR operated through the FJMP to carry out management plans with community groups, establish large experimental plots, conduct a forest census to determine species of interest to Brazilian markets and other activities. The Foundation also obtained financing for projects in areas such as wildlife management and land use planning. During the transition to BOLFOR II, the private sector in Pando organized to provide funding to cover a portion of the core budget of the Foundation.

BOLFOR supported the National Association of brazil nut Processors (ABAN) in establishing a system for certification of quality of products consistent with requirements in international markets. This system is aimed at ensuring continued access to foreign markets, especially in Europe. An initial BOLFOR study recommended establishment of a quality control system . While industry reacted well and took a great many steps to improve quality, these individual actions needed to be channeled into an integrated system to provide guarantees to buyers.

Unfinished Agendas

The preceding discussion points to several crucial areas requiring continued effort. Completion of the institutional framework of IBIF should be a priority. More emphasis on various existing service providers is another area that should be given more attention in the future. As BOLFOR was a large, multifaceted project on the cutting edge of establishing a model of sustainable forest management, it naturally became a service provider in its own right. The transition to BOLFOR II offers an opportunity to redefine institutional relationships and promote other service providers that have emerged.

Another promising area of forestry law that has not yet been developed concerns the role that citizens can play, either as individuals or in associations, in ensuring that forests are managed sustainably and for the common good. Citizen participation and oversight are ultimately the best guarantees that both government and users will live up to their responsibilities and manage forests sustainably. To date, not a single environmental NGO has taken advantage of the provision in the law to inspect a forest operation to verify compliance with its management plan. If the new forestry regime is to achieve its full potential, getting civil society to more participate actively should be a priority task

The productive sector should have a united voice with increased protagonism at the local, regional and national levels. Currently, for example, concessionaries and many property owners are considered external elements at the municipal level. Although they consist of productive enterprises that generate employment, they do not participate in the formulation of attitudes regarding development priorities with the local population. Attempts to strengthen sector representation at regional level failed. The various local initiatives are gaining in importance, but these organizations will require support if they are to be pulled together around national policy issues that affect the forest sector.

Land Tenure and Titling

Framework

It should go without saying that the forest sector depends on security related to terms of access to natural resources. (This is one sentence whose meaning eluded me.) But there is pressure in to redistribute lands in the topical lowlands as a continuation of the Agrarian Reform of the 1950s. The agrarian reform brought social stability to Bolivia by distributing land to millions of rural Andean peasants. Later, colonization of the tropical areas was seen as a healthy extension of this process. But the road for future generations took a different turn with the massive migration of job-seekers to urban areas. Employment has become the main ingredient in social stability, not land.

Worn out slogans associated with agrarian reform continue to be heard in political

Certification contributed to the development of forest industry that adds value to forest products, rather than exporting raw timber. These two workers build doors and contribute to the local economy.

campaigns. However, the continuation of agrarian reform is having a different effect than in earlier times. Rather than alleviating poverty and social discontent, prolonged agrarian reform has created an atmosphere of insecure land tenure that reduces the incentives to invest and generate employment opportunities. Agrarian reform has become a destabilizing factor.

Forests are often most vulnerable to rural conflict, especially when located on public lands—that is, lands not claimed by anyone, lands that are pending eventual "distribution." In practice, the only way to obtain rights to these "left over" areas is to lay claim through agricultural activities, even in areas that clearly should be maintained with forest cover. Conversion of these areas to agriculture can lead to encroachment by opening beaches for road building and invasion of concessions by colonists. Environmental impacts can already be clearly seen in areas such as the rice-growing area in northern Santa Cruz, where the Chore forest reserve has been reduced to a small expression of the original dream. Rainfall in the area has declined, as the process of desertification progresses northward. Curiously, among the most affected are the colonists that migrated from other regions to open this area to rice cultivation since the 1960's. The impact will be to cause further migration from impoverished rural areas to cities in search of jobs.

A complicating factor has been the irresponsible, overlapping systems for recognizing rural (agrarian) land rights. Over many years land titles were issued by different government entities with only vague geographical references, usually with no consideration for current settlement patterns, occupation or land use. In 1996, the Bolivian Congress passed a new Agrarian Reform Law—an initiative parallel to the new Forestry Law—aimed at resolving ambiguities in land rights. The new National Institute of Agrarian Reform (INRA) was given a 10-year period in which to "sanitize" land titles and rights in the country.

Assistance to INRA

In addition to efforts in forest management, BOLFOR provided assistance to INRA for this process of "sanitizing" land rights in vast forested areas. One agreement was signed in 1998 and another in 2001 in which BOLFOR provided financial assistance and assumed the role of technical facilitator. Between 1998 and 2000 a simplified procedure was applied, but from 2001 to 2003 all sanitation processes required a lengthy and complex procedure, including:

- A determination of area to be sanitized with an Administrative Resolution.

- A resolution setting out the calendar of events and advising residents of the area that sanitizing is to begin.

- A public campaign to ensure full participation of local residents and property owners.

- Field work to determine location of properties with existing titles, other documentation and physical possession, and verify actual occupation and use (agricultural activities). Photos of property owners taken at boundary markers.

- Technical and legal evaluation and determinations regarding property rights.

- Public dissemination of results from the INRA. The public has the opportunity to point out errors made anywhere throughout the process.

- Adjustments in documents and boundary markers. Final resolutions are presented for knowledge and review of each property owner and community. The Bolivian Law requires pinpoint accuracy in field measurements, making this one of the more lengthy and costly steps in the sanitizing process.

- Final Resolutions that can be Administrative Resolutions when no land title exists and Supreme Resolutions when the owner presents a previously issued title. In both cases, the land must be occupied and effectively put to use. In practice only agricultural use is considered.

- Declaration of sanitized area, excluding parcels where disputes are still pending. Inscription of public lands in name of INRA in national registry.

It is easy to see how this process can become drawn out over years and expensive for both for the Government and for the landowner.

BOLFOR support for land titling or tenure sanitizing activities required hiring a technical coordinator to work at INRA offices in La Paz. The coordinator hired and trained teams of field staff and legal counsel as needed to follow through the steps described above. With the help of this team, under simplified procedures, INRA was able to complete sanitization of 3,785,323 hectares. Sanitization under normal procedures described above was initiated on an additional 5,639,048 hectares. Most of this additional area is advanced in the process. The breakdown of areas completely sanitized and well advanced in the process and by kind of land tenure is as follows:

Status of Lands in Sanitization Process with BOLFOR Support

Type of Land	Hectares under Sanitization
Private properties	724,546
Public lands with existing forest concessions	2,378,798
Public lands in Protected Areas and Reserves	736,702
Public Lands available for new concessions	4,075,864
Field work still underway	445,634
Total	8,361,546

Because of the need to conduct the sanitizing process by general polygonal areas, BOLFOR assistance has benefited forest users as well as non-forest land users, including property owners and rural communities. Upon reflection, the system of sanitizing land rights can only be effective when the rights of all properties in a given area are clarified at the same time. Sanitizing rights over a forest concession, for example, would not likely hold up if a neighboring property owner claimed part of the land where the concession is located.

Providing assistance to all owners and users of the land resource in priority areas, along with application of the complete set of procedures described above, has meant that the sanitizing process moved at a slower pace than hoped. Virtually all conflicting claims must be resolved before the process can come to a close in each of the polygons. Only then certain areas can be correctly termed "public forest lands" where concessions are situated and new concessions can be formed. The process has reached conclusion in areas where 34 forest concessions are situated and is in progress for another 35. Only 17 concessions are on lands where sanitizing activities have yet to be programmed.

Conclusions

Despite the progress made in forested areas with BOLFOR support, the process of sanitizing land rights throughout the country has been much slower than hoped. INRA became politicized and technical norms were not applied equally in all regions. In some areas, INRA regional directors adopted the vision of redistribution of rights in tandem with sanitizing existing rights. Pando was particularly affected. BOLFOR supported an MDS commission that investigated procedures applied by INRA in the Federico Román Province in Pando, and uncovered a series of problems.At this critical juncture, INRA is in virtual suspension, entering into a process of institutional reform initiated by the new government.

Although the cooperation agreements with INRA have produced the desired results – including institutional capacity in the form of trained personnel to continue this kind of activity — the future of sanitizing land rights is unclear. Some sanitized titles are already being questioned. It is our hope that the Bolivian Government and other actors in the forest sector can rectify the institutional framework and simplify procedures to continue with this initiative and complete sanitizing of all productive forest lands in the country.

V. PROGRAM IMPACTS AND LESSONS LEARNED

Program Impacts

Reduced Environmental Degradation

Within the lifetime of the project, the forestry regime placed nearly nine million hectares under forest management plans, with 1.2 million hectares certified and with renewed concession rights for 40 years. Areas under approved management plans in Bolivia are relatively well protected from illegal logging, land clearing, forest fires and hunting. Further, in each managed forest, ecological reserves are designated where minimal human disturbances take place. This amounts to nearly one million hectares under the care of forest operators for environmental protection.

Hunting is prohibited in managed forests, and there is an abundance of wildlife, with increased presence of many species because of reduced hunting pressure. Studies of the impacts of logging and other silvicultural treatments on insects, amphibians, reptiles, birds, and mammals has revealed that impacts were modest, varied by species, and diminished rapidly once an area was left to regenerate. Most studies compared logged and unlogged forest, or forests logged at different intensities, all fairly low.

Contrary to popular belief, logging in an area of diverse tropical forest leaves the area virtually intact. Only a few trees are selected for removal. All trees below the minimum diameter are preserved, seed trees are left, and species that were not marketed remain as well. Logging in Bolivia is low intensity, usually between 2-8 cubic meters of logs per hectare of harvested forest (out of perhaps 25-50 cubic

meters of commercial species available in standing timber). Also, most firms do not log the total area allowed. Because of market or limited industrial capacity, they normally work only a portion of the authorized area each year.

To demonstrate the low intensity of logging in the country, the overall industry average shows an annual cut of around 500,000 cubic meters of logs derived from about 6,500,000 hectares of productive forest under management (excluding ecological reserves and areas for scientific activities and other purposes). The area of annual cut is usually between 100,000 to 150,000 hectares. Therefore the average volume removed per hectare of productive forest is less than one tenth of a cubic meter per year, or about 4 cubic meters per hectare where logging is carried out.

It is argued that selective, uncontrolled logging is just as environmentally friendly because the volumes removed from forests are also very low. However, uncontrolled logging implies removal of virtually all trees of select species, without leaving medium-sized trees and seed trees for future harvest and regeneration, causing these favorite, high value species to practically disappear. Once the forest is rid of high value species, it becomes of less interest to timber companies and the land becomes a target for conversion to pastures. The arguments in favor of uncontrolled, selective logging were formulated in the past, when population pressure was not as great as it is today. Deforestation rates were also believed to be lower. BOLFOR studies conducted in conjunction with the Forest Superintendence, using satellite imagery, have shown deforestation rates to be much higher than earlier thought. Not surprisingly, forests under management are virtually free from deforestation and are relatively safe from forest fires. So while perfection of the model of forest management is a useful target, "even mediocre forest management is preferred over excellent land clearing."

Economic Impacts

Adoption of forest management required timber companies to use a wider range of timber species. When natural forest management systems were first adopted, exports dropped, although it is difficult to determine how much of this impact was caused by the global economic downturn. In 2002 forest products represented over eight percent of the country's exports, valued at $88 million, consisting primarily of 64 thousand cubic meters of wood products and over 30 thousand tons of shelled brazil nut. Exports of Bolivian forest products reached more than 40 countries, with the United States and Europe the leading markets. The forest sector employs an estimated four percent of the economically active population, accounting for

approximately 100,000 jobs. Forest user fees amount to $2.7 million, not including other taxes.

Although exports have not yet risen above previous levels, income and employment in this sector may actually be greater today than earlier. Logging and exporting green sawn lumber, as was common in the past, used relatively little labor. But with 76 percent of current forest exports in the form of manufactured wood products, employment has likely increased. At the same time, impacts on income generation and distribution are clearly visible in some rural areas.

An example can be seen in the Guarayos Province in Santa Cruz, with a population of nearly 32 thousand inhabitants. Most the Province is made up of community forests belonging to the Guarayos Indigenous group. In 2002, with BOLFOR support, several communities entered into sales agreements with industries in La Paz, and delivered on contracts of over $500,000. A recent appraisal estimated that 190 villagers directly participated in forestry activities—161 men and 29 women. Direct employment was generated for another 600 persons in logging, trucking, and milling within the Province. In the provincial capital, Ascensión de Guarayos, community forest operations translated into lively economic activity. Local businesses such as hotels, restaurants, bars, shops and markets all reported greater demand and sales during the period of timber harvest.

Economic activities generated by community forestry also gave rise to a second regional commercial center, this time in the hub of one of the villages involved in community forestry—Urubichá. Commercial activity expanded from two corner stores to a thriving market center that supplies neighboring villages.

A recent study of 38 operating community forestry enterprises in Bolivia showed more than 4,000 persons benefiting from forestry activities. Out of the 959,000 hectares under management, logging was carried out in 21 thousand hectares and timber sold under 86 separate sales contracts. These figures are subject to rapid expansion each year as many other community enterprises are being established. For example, the same study indicates that the number of approved annual forest operating plans of these enterprises rose from zero in year 2000 to 6 in 2001, then to 14 in 2002; in 2003, 27 annual plans were approved.

Social Inclusion

Forest resources are now controlled by tens of thousands of property owners, communities and concessionaries around the country. Forest management by

individual property owners has received little attention, but is approaching 750,000 hectares. Community forestry is growing rapidly, with Local Social Groups managing nearly one million hectares of municipal forest reserves and projected to reach as much as four million. Indigenous groups currently manage an additional million hectares and can expand further as territories are allocated and interest in forest management increases.

The effects on income distribution and participation of community members, including women and persons of all ages are evident, is not well quantified. Members of ASLs include nearly 2,000 women and men seeking to improve their lives through legitimate, productive activities based on sustainable management of the resources in their region. Groups and communities of indigenous peoples form community forest enterprises for the same reasons. Municipal Forestry Committees are perhaps the best example of how far the forest sector reaches into the lives of the population in the topical lowlands of Bolivia, forming from community groups, property owners, freelance loggers, truckers, middlemen, lumber yard operators, sawmill owners, carpenters, foresters, and others.

Sustainability of the Model

While forest management in Bolivia needs to improve substantially before it will be generally sustainable, improvements over the term of the BOLFOR Project were substantial. The new paradigm in Bolivia remains a work in progress tipping this way or that in response to the latest economic, political or social pressures. Political and economic stability are not assured in a country like Bolivia, but there is good reason to expect that the new model will continue.

The investment in human resources is generating considerable returns and may ensure the consolidation of the forestry regime. Research will facilitate the continuing review of technical norms and standards based on scientific evidence and experience.

Pressure to convert land from forest to other uses poses a constant threat. An expressed premise of BOLFOR, however, was that governmental regulation is not sufficient to save tropical forests. Property owners and concessionaires must take an interest in conserving forests because they perceive it to be good business. The interest in maintaining forest concessions and in expanding area under management suggests that the government, indeed, has found a willing and effective partner in forest operators.

Perhaps the greatest threat to forests in Bolivia and perhaps some other Latin American countries is insecure land tenure. Tenure rights are usually improved when the land is cleared of forest and put to another use. While land distribution can become a political platform, land rights are ambiguous and sporadic invasions can become nightmares for those affected, these pressures does not seem sufficient to affect the sector as a whole.

Unfortunately, the region most affected by undefined land rights is centered in northern Bolivia where there are vast areas of Amazon forest with concentrations of brazil nut. Despite being the most remote and unpopulated region of the country, land rights have come into hot dispute as political agendas attempt to displace existing forest operators with colonization from the highlands.

The sector has resisted organizing and defending its interests through national debates. As a result, proposals to raise the profile of the forest sector in national development priorities are weakened, as is the process of policy dialogue. The government often feels alone in its efforts to keep the sustainable forest model alive and on track, while dealing with groups of the population sporadically to solve individual problems as they arise. Meanwhile the sector begins to perceive that, despite the law and authority of the entities such as the FS, the government does not really contemplate a decided policy for development based on forest resources.

The lack of presence and political pressure from the sector is noticeable by the inaction of the MDS in support of the forestry regime, specifically related to municipal forest reserves and concession plans for Local Social Groups. This impasse reduces faith in the law and governmental institutions, but forest users will continue to operate with or without legal recognition from their government. Meanwhile the FS has been able to act independently enough to temporarily accommodate the ASLs within the legal system, awaiting eventual action by the MDS. The tenacity of the ASLs again points to the power of economic incentives to maintain access to forest resources.

If national policy or political stability falters, it is economic motives that will guide many operators to stay the course; international markets will certainly increase pressure for conservation of tropical forests.

The primary reason to believe in the sustainability of the Bolivian forestry regime, however, may be the change in behavior on the part of foresters, concessionaries and communities and the expectations of the general public who now understand the need for responsible stewardship of the forest resource. National and regional

leaders and authorities increasingly take that view that the sector can provide opportunities for economic development based on sustainable management, certification and a positive international reputation.

Loading timber for export. The forest industry generates thousands of jobs with diverse skills

Lessons Learned

Among the most important conclusions that we are able to draw from the BOLFOR experience, we offer the following points:

1. Introduction of a model for sustainable forest management can be carried out in absence of a comprehensive legal framework prescribed by laws and regulations. In its early years, the BOLFOR team was able to interest various forest operators in sustainable management based on market forces, including the FSC certification system. Other efforts can be initiated in enterprise development, research and human resources development, while promoting the eventual establishment of a national forestry regime through legal reform. The foundation laid during the early years of BOLFOR helped gain credibility for eventual passage of the forestry law in Bolivia, which in turn accelerated adoption of management practices.

2. The economics of shifting from the old "cut and run" mining approach to the new paradigm has major cost and financial implications. Sustainable forest management as prescribed in Bolivia is profitable, although probably not as profitable as the previous uncontrolled system.

3. Cooperation among authorities across the forest and agricultural sectors is highly desirable. Although BOLFOR stood for conservations of natural forests, our philosophy was that rural development should be promoted through productive activities for generation of employment, both in forestry as well as agriculture and other sectors. All such productive activities should be based on sustainable management of natural resources within land use capabilities.

4. Costs of forest management, including forest inventories and annual censuses, fall within the realm of economic viability for most forest operators. These costs provide sufficient incentive for companies to reduce areas to the forests they intend to operate in the medium term, raising an important barrier against speculation. User fees or royalties should not be viewed as "stumpage fees" to gain extra rent for the State. Applying the concept of "regulation fee" to self-finance regulatory and other support services is more consistent with the model of natural forest management.

5. The abrupt enactment and application of the forestry law was a shock to the forest industry. Legislators resisted appeals to include a transition period to full application of the law, however its gradual application was inherent in its structure. A transition period would have induced elements within industry to seek a reversal or otherwise weaken the legislation, rather than focusing energies on its application.

6. When developing a forestry law, a key question relates to which provisions should be included in law (requiring act of Congress to change), versus bylaws or regulations (modified at Cabinet level), versus technical norms (approved by MDS). User fees or royalties and their distribution to finance services require continual adjustment and are better left to regulations.

7. New attitudes can be engendered through demonstration and training, but they are unlikely to endure and result in changed behavior unless accompanied by new institutions. One of the keys to success of the Bolivian forest regime was the establishment of the Forest Superintendence. Its success demonstrates that financial and technical resources may be necessary for creating effective and capable public institutions, but these resources are never sufficient without capable and determined leadership.

8. Forestry research requires a stable institutional framework, a system for maintaining research sites and plots, and clear objectives formulated with participation of forest operators. Through the Bolivian Institute for Forestry Research, the research system will be able to promote continuity of the research started by BOLFOR, help secure the continued participation of international

researchers, and improve the chances of securing continued funding from different sources. "Sustainable management is only as good as the science behind it."

9. Forest Stewardship Council certification becomes a solid advantage to future projects in natural forest management in other countries. Certification contributes to market penetration of some species and products, but does not necessarily translate into higher prices. Products must still compete in terms of quality, and be delivered in the volumes and times required and at competitive prices.

10. Obtaining certification implies extra effort on the part of forest enterprises, implying changes in behavior of managers and workers. Forest companies might not have taken an interest in certification if they had not already met the standards of the forest management model of Bolivia. Having met those standards, with forest inventories and management plans already prepared, the companies were well along on the path to certification.

11. Not all forest companies will benefit from certification. Just as new additional enterprises obtain certification, some others will exit from the system. Two have done so in Bolivia.

12. Certification has been key to improving aspects such as labor conditions, and accounting and administrative systems that fall outside the forestry law. For instance certified operations have improved occupational safety, conditions in logging camps, work schedules and social benefits.

13. To qualify for certification, different actors — indigenous communities, entrepreneurs, ASLs — are required to establish a relationship based on dialogue to reach common understandings and resolve conflicts in areas such as land tenure. Many such agreements would have never been attained in absence of the certification process.

14. Certification should be viewed as a means, not an end. In the view of BOLFOR, the objective was not to certify forest operations, but to use the process of attaining certification as a means of improving conservation and forest enterprise management. As with forest management, certification should be viewed as a process subject to change and improvement over time.

15. Community forest operations begin from a different framework than a business, one in which market-oriented development options are embedded within broader livelihood systems. In coming to terms with both realities, wide participation of

community members can be crucial. Active participation of both spouses has been key to success of many groups, as decisions in community enterprises affect family well-being. However, broad participation is not a panacea; interference by villagers who are not members of forest enterprises can have a debilitating effect. To assist each community or social group in determining the best form of organization, it is important to understand the factors that determine interpersonal relations in each case. No single model fits all.

16. The term "community forestry" can be misleading, as many enterprises in this category attain an economic scale and compete equally with other businesses in productive and market activities. Given the challenges of creating a commercial venture from a community setting, the focus should be kept simple, emphasizing natural forest management and sale of timber. Forest management is not made profitable by investing in logging or processing equipment. Each step in the production chain must generate a reasonable return to the operator. Vertical integration is just one option, but companies would often be advised to concentrate on what they do best.

17. Community enterprises, just as other small and medium-size firms, need mechanisms to ease entry and also exit from productive activities. Some enterprises will naturally fail, and need to find ways of being dissolved to make room for another. Modest and carefully managed subsidies can be useful to help communities maintain independence from buyers who would advance funds and thereby assume rights over the forest resource. But interest in forest management on the part of communities depends on: 1) their knowledge and understanding of the forest resource, and 2) the economic returns derived from forest management activities, including employment opportunities.

18. Much attention is paid by non-governmental organizations and donors to Indigenous communities that are seen as good stewards of the resource and worthy of social and economic assistance. But community forestry in Bolivia has also created space for others groups, such as "Local Social Groups," a new concept developed to permit access to municipal forest reserves based on responsible forest management. Other rural communities are just beginning to participate in natural forest management.

19. Saddling municipal governments with more responsibilities mandated from the central level can be an exercise in futility. At the same time effective implementation of many governmental programs depends on local action. A new model of decentralization needs to emerge where national and regional entities cooperate with

municipal government on programs of mutual interest. In the same way, new options are needed for public-private partnerships at the local level to create a favorable environment toward investment and job creation.

20. Private initiative is crucial, but a massive positive response from the private sector often depends on government to create a favorable environment for long-term investment. The private sector responded to the sweeping reforms instituted by the Government of Bolivia with policy proposals, support for research, promotion of forest products, quality control, market information services, environmental education and other measures.

21. A positive public image is important for the forest sector to gain support for policy implementation, especially when adverse conditions place pressure on the government to allow land clearing in forest areas. The sector's image is enhanced by disseminating objective information about the importance of the sector to economic growth, its benefits in income distribution, as well as favorable impacts on conservation and ecological diversity. Continuous monitoring and analysis is required, but information needs change over time.

Design Lessons

Should anyone be encouraged to design a forestry project after reading this final report, here are a few tips we feel important to consider:

1. The design-and-implement (DAP) modality was abandoned by USAID, apparently because of concerns about open competition. However we feel compelled to mention that the DAP approach worked well for BOLFOR, as it led to a highly participatory design, facilitating not only start-up, but also providing a useful blueprint for the first years of the project.

2. BOLFOR's pull-and-push approach through market forces and regulatory power to promote sustainable forest management proved to be not only critical for its success, but also an effective way to maximize project resources to build private and public sector capacity.

3. Perhaps the single most important design feature was that the project was not tied to a specific public institution. Projects of this kind should be free to work with industry, private sector organizations, communities, national and municipal governments, universities, and other development organizations as opportunities and needs arise.

4. One should carefully choose allies and battles. For example, rather than pump money into the public institutional black hole before the reforms of 1996, BOLFOR shifted its attention and resources to other institutions until conditions improved enough in the public sector to justify investments and make them more sustainable.

5. The project was not conditioned on bringing about legal and institutional reform, but such reforms were included among long term goals. Although BOLFOR was fortunate in seeing the relevant legislation passed relatively early in the life of the project, it was able to promote natural forest management even before the law was passed.

6. Performance indicators should focus on final results, not on steps that could tie the project to a specific strategy.

7. Use training (formal and practical, on-the-job) to create a critical mass of people, then follow with institutional development. Developing human capacity makes building institutions much easier, effective, and sustainable.

8. Start with existing understanding of best practices while at the same time conducting research to expand the base of knowledge. This approach generated a healthy and productive link between production-oriented foresters and the academically oriented researchers, which led to highly useful, relevant, applied research that should continue indefinitely.

9. Participatory approaches, which included dozens of institutions involved in work plan development gave the project legitimacy and fostered a sense of ownership among the participants. Accomplishing this kind of participation without converting the project into the central focus and intermediary in institutional relationships was not easy and did not always work smoothly. It requires concerted effort and organization.

Final Remarks

The greatest contribution of the BOLFOR project and the new forestry regime may have been to improve the image of the sector. Certification contributed in the sense that Bolivia is now projecting a global image focused on conservation through responsible use of forest resources. FSC certification is becoming a recognized trademark for presentation by the Bolivian lumber industry to potential clients in international markets.

Bolivia has yet to take full economic advantage of its position as a leader in natural forest management, due primarily to economic recession. But the future appears promising because Bolivia is endowed with large areas of productive forest to expand sustainable forest management and certification even further. Current harvest levels leave an important margin for expansion. Every possible effort should be made in this direction, as world markets will certainly increase pressure toward conservation of tropical forests. The steps already taken have prepared Bolivia to achieve results in world markets. Many unfinished agendas remain for attention of BOLFOR II.