

Programmes and Projects

Andean Countries: A Strategy for Forestry
Case Studies - Volume II of V

BOLIVIA



FAO/World Bank Cooperative Programme
Latin America and the Caribbean Service
Investment Centre Division



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PROGRAMMES and PROJECTS

ANDEAN COUNTRIES: A STRATEGY FOR FORESTRY

Case Studies: Volume II of V BOLIVIA

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**FAO/World Bank Cooperative Programme
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List of Acronyms and Abbreviations

ASL	Local Social Association
BOLFOR	Project of Sustainable Forest Management
CDF	Center of Forestry Development
CFB	Bolivian Forestry Chamber
CFB	Bolivian Council of Volunteer Certification
CFO	Forest Certificates of Origin
CNF	National Forestry Chamber
EAP	Economic Active Population
FAO	Food and Agriculture Organization of the United Nations
FES	Economic and Social Function of the Land
FMP	Forest Management Plan
FONABOSQUE	National Forestry Development Fund
GDP	Gross Domestic Product
INRA	National Institute of Agrarian Reform
MDSMA	Ministry of Sustainable Development and Environment
MDS	Ministry of Sustainable Development
NTFP	Non Timber Forest Products
PES	Payment for Environmental Services
PLOT	Land Use Plan at the Plot Level
PLUS	Land Use Plan
POAF	Annual Operating Plan
POT	Territorial Plans
SERNAP	National Service of Protected Areas
SF	Forest Superintendence
SFM	Sustainable Forest Management
TCO	Indigenous Community Land
UDAPE	Unit for Economic Policy Analysis
UFM	Municipal Forest Unit

I. INTRODUCTION

1. This study has two overarching goals. First, it provides a critical review of the main features, threats, and challenges faced by forests and forestry in Bolivia regarding the provision of goods and environmental services, and their implications for economic growth, and people's well being. Second, it offers some key elements contributing to the formulation of a national strategy aimed at sustainable development of Bolivian forestry. By so doing it provides inputs for a blueprint strategy of the World Bank that seeks to determine which might be the critical actions for helping to achieve sustainable forestry management in the Andean countries. The World Bank forestry policy, launched in 2002, provides general guidelines for the World Bank's investment support in the forestry sector. This policy, however, needs to be complemented by some country-specific strategies. This document helps to such effort by assessing the Bolivian case.

2. The specific objectives of this document are: (1) to carry out an initial assessment of the forest resource-base in the country, and the dynamics underpinning forest management, (2) to critically examine the contents of current forest policy and their implications, and some inter-sectoral linkages, (3) to offer an assessment of the main obstacles impeding the achievement of sector policy objectives, (4) to examine forest policy priorities as stated in the country's development strategies, and other related legislation, and (5) to suggest relevant areas of interventions harmonizing them with the World Bank priorities. It is expected that the sum of these different objectives will contribute to the design of alternatives for forestry investment in the country that could play an effective role in stimulating an environmentally sound and equitable economic expansion to contribute to poverty alleviation in rural areas.

3. This work adopts a broad perspective to assess both forest and forestry in Bolivia, in several different ways. It attempts to embrace the different types of forests existing in the country by focusing not only on the lowland tropical humid forests. It also seeks to expand its interest towards forest instead of merely focusing on forestry, and hence recognizing the diversity of forest users involved in the different aspects of forest activity, embracing some linkages with other sectors of the economy. Furthermore, this work recognizes explicitly that forests provide a range of goods and services, and constitute a key piece for both economic growth and poverty alleviation. These issues are factors lying at the core of the World Banks' forestry strategy.

4. Bolivia is a landlocked country. It belongs to the group of the poorest countries in Latin America, since its development is constrained by several structural factors economic and political which make difficult for the country to overcome such a condition. It has a small economy with relatively low population density, and an unequal distribution of income, which in turn influences a high prevalence of poverty, mainly in the country side. Bolivia's economic growth has extensively relied on extractive economies such as mining, gas and forest extraction. There is a dual agriculture sector with both a modern and a traditional side, and industrial development is precarious. The formal contribution of forest to the country's economy is restricted to the supply of valuable woods linked to an expanding processing industry mainly tied to external markets, with some impact on employment generation, and forests' informal contribution is unknown, although it is expected to be larger because their role in local people's livelihoods. Much of the rents obtained from forestry in the past did not benefit to the local people in which forests were placed. These dynamics are being reverted to date,

although forest is not necessarily at the center of the national agendas for development and poverty alleviation.

5. The realities of the Bolivian highlands -which comprises the plateau and valleys- in opposition to the lowlands embracing the sub-tropical and tropical areas—are quite contrasting, and hence become difficult to compare them. They differ in the characteristics of the vegetation cover, their process of territorial occupation, and the emerging nature-society interactions. While the highland constitute an area of relatively old human occupation by indigenous societies, it underwent an intense pressure over the forest resources, mainly for fuelwood, and forestland conversion due to the expansion of community-based agriculture and pasture. The lowlands, instead, which traditionally were occupied by groups of hunters and gatherers, they were opened for agricultural frontier expansion since the mid-1950s as part of a strategy of state integration of its territory. This process led to a slow but progressive growth of agricultural lands, and pasture for cattle raising in areas that were previously covered by forest. While some fragmented forest areas remain in the highlands, it is important the area covered by primary forest in the lowlands.

6. The overall contribution of forest to the economy has not yet made visible mainly those coming from non-timber products collection and trade, and environmental services. Firstly, because non-timber products are often marketed locally in small volumes and fragmented markets, and secondly because environmental services' values are not realized in the markets. It is often argued that forest resources, mainly non-timber products, constitute a key piece to help local populations in order to fight poverty. Indeed, even though forest resources may not constitute a way out of poverty, both forest use and conversion contribute, in different extent, to an important portion of the lowland population as a safety net. It is beyond the scope of this work to estimate the full contribution of forests to the economy, but its primary interest consist of pointing out what are the opportunities and constraints to expand such contribution in order for policy makers to be fully aware of the role that forests play and might do in the future.

7. This work suggests that economic forces are strongly working against forest management, at least of the sustainable type, in spite of the fact that Bolivia holds one of the largest areas of certified tropical forests. It is little the comparative advantage of timber products exports comparing with neighboring countries, and domestic market for such products is relatively small. Nevertheless, further processing may tend to increase competitiveness of forest products in foreign markets, particularly those products made with certified wood, though it may not be evident in all cases due to structural factors limiting the forestry sector's competitiveness. Furthermore, non timber products -but Brazil nuts- are not financially attractive, and are not still produced in the volumes and quality conditions demanded by the markets either domestic or international. Anyhow, most markets for non-timber products -except some few products that may become industrially processed- are small, and tend to be locally encapsulated.

8. The Bolivian current forest policy has largely focused on introducing good forest practices through law enforcement. As result, forest management seems to be much more sustainable than in the past, although forestry's formal contribution to the overall economy has increased little, and there is still an important although unknown portion of illegal acts in the forestry sector ranging from timber extraction to processing and competing land-uses are threatening forest resources conservation. The latter is mainly due to relatively high costs of forest norms' compliance, particularly for small-scale

forestry operations which face with a large number of constraints to profit from forest resources, and to the fact that the forest agency face several difficulties for enforcing the law. The demanding forestry standards, along with the growth of demand for certified timber has helped to a portion of timber producers -mainly those operating through large and vertically integrated enterprises- to expand their supply of certified timber, mainly from processed products as a way to improve their position in the markets.

9. The underlying factors that work against forest management are still the insecure property rights, weak market chain integration, and excessive regulation, among others. In this context, on one side, greater law enforcement will likely tend to increase the costs for industry in the short run, and could impact largely over small-scale forest users. On the other side, the high standards for forest management which timber producers have to comply with included in the forest regulations, has to some extent helped to launch the process of forest certification in the country, and certified products can have in the mid-run more opportunities to compete in the international markets, but this process is somehow biased against small-scale forestry operations since these type of timber producers cannot merely pay for the costs of certification. The capacity of the forestry agency to enforce the law is limited in spite of the effort invested in reforming the public forest system. This is mainly because forest fees, from which this system depends on, are not enough to finance the activities of monitoring and vigilance, and due to the difficulties to eradicate corruption, although currently these acts are much lower respect to the past.

10. This work consists of six parts including this introduction. The second part introduces the forest resources in Bolivia, and their main economic, social and environmental attributes. The third part provides a critical analysis of forest policies stressing some inter-sectoral linkages. The next part focuses on assessing some main problems and potentials of the sector, mainly those linked to institutional weaknesses, failures in forest policy, lack of competitiveness of forest activities, the limited success of non-timber forest products and illegal forest clearing and logging. The fifth part synthesizes the strategic actions recommended to overcome some of the main problems identified in the three previous sections, and to amplify the contribution of forests to poverty alleviation while maintaining forest environmental services. The last part focuses on the role of international agencies in promoting and supporting the suggested lines for action.

II. THE FOREST RESOURCES-BASE AND MAIN TRENDS

A. The Forest Resources-Base

11. Bolivia is a landlocked country located in South America, comprising an area of 1,098,581 sq. km, which are distributed in disparate eco-regions. It has a contrasting topography and a diversity of landscapes, and forest vegetation. Bolivia's topography ranges from over 5,000 meters above sea level in the highlands of the Andes mountains (plateau), through the inter-Andean valleys, to the plains of the Amazon and Chaco lowlands less than 500 meters above sea level¹ This diverse topography produces extreme variations in temperature and rainfall from the low temperatures in the highland to the hot temperatures and high rainfall in the lowlands. About 70% of the country area is located in the lowlands. In contrast to what is commonly assumed, a large portion of the country is covered by forest vegetation. The country's total forest area is about 534,000 sq. km (48.6% of the country's total area) (MDSMA 1995). About 80% of the total forest area occurs in the Bolivian lowlands, and the remaining 20% is spread out in the highlands, mainly the inter-Andean valleys, and there remain some relicts of the original vegetation in the plateau, which presents one of the most degraded vegetations due to human action (Fig. 1).

12. About 33.5 million hectares out of the total forest cover have been declared, by decree launched in 2001, as lands of permanent forest production. Approximately 14% of these areas are protected lands, and the remaining 28.7 million hectares have been classified for sustainable forest production. The lands for forest production are areas already considered as of permanent production forest in the country's previous legislation, and encompass other public forest that, based on their land use potential, have been classified for forest production. The fact of declaring these areas for predominantly forest uses is, however, an administrative act aimed at legally protect an important portion of the lowlands' productive forest that still remains in the country. Nevertheless, the fact of declaring a portion of land for forest uses has not halted the expansion of agricultural uses within these forest areas, as it will be discussed below. The causes for that to happen do not lie on the legal framework but rather on a complex set of political and socio-economic factors, the most relevant of which are addressed below in this report.

13. There are no detailed studies about the condition of the forest in Bolivia. Hence, it is not possible to know what is the proportion of primary, intervened forest, and secondary forest. As mentioned above, approximately one-fifth portion of Bolivian forests is located in the highlands. These are forests placed in the mountains over 800 meters above the sea level. They encompasses different forest formations ranging from scattered bush formations in the plateau, to inter-Andean dry forest, dense and short forests in Yungas, and open dry forests in the Chaco Serrano. There is no potential for commercial logging in the Andean forests due to the low commercial value of the timber occurring in such forest formation, their often reduced size, as well as other factors such as their location and high fragmentation (Rham and Dam 2005). Unfortunately, there are only few inventories of the potential of the highlands' forest formations in the supply of timber and the provision of environmental services, due to the fact that ongoing research

¹ Most of the Bolivian lowlands is comprised by the departments of Santa Cruz, Beni and Pando. The northern portions of La Paz, and Cochabamba also belong to the Bolivian lowlands. The plateau is encompassed by the departments of La Paz, Oruro and Potosi, and the valleys by Cochabamba, Chuquisaca and Tarija. Hereafter, the plateau and the valley zones are labelled indistinctly as highlands

has put greater attention in the lowlands Bolivia. Nevertheless, the Andean forest have a critical role in preserving the provision of water, supplying resources for fuelwood, charcoal, and other non-timber products, mainly medicinal plants for people's domestic uses.

14. As noted, 80% of forests are located in Bolivian lowlands, where there are four major zones: (1) the humid and evergreen forests of the Amazonian lowland located in northern Bolivia, (2) the Beni plains, characterized by natural savannas and small patches of gallery forests, much of which are seasonally flooded, (3) the Chiquitania region, whose semi-deciduous forests are typical of slightly drier areas, (4) the semi-arid Chaco region, with lower and less productive forests but adapted to a dry climate (MDSMA 1995). These regions have several common species such as verdolago (*Terminalia sp.*), tajibo (*Tabebuia spp.*), yesquero (*Cariniana sp.*), and bibosi (*Ficus sp.*). Nevertheless, the major differences occur between drier regions (i.e., Chiquitania) in opposition to weather regions (i.e., Amazonia). Forests in weather regions present not only larger species abundance, but also higher volumes of commercial species (Dauber *et al.* 1999). Yet, the real logged volumes depend mostly on location factors. For example, only most valuable species are extracted in the northern Bolivia due to higher transportation costs and, in contrast, larger number of species are logged in areas with better access to forest like in the Chiquitania.

15. A study estimates that the species abundance for timber production is between 240 to 303 species among six different forest formations in lowland Bolivia, though the principal species logged range only from 14 to 22 (Dauber *et al.* 1999).² According to this source, the most valuable timber species such as mahogany (*Swietenia macrophylla*); cedar (*Cedrela sp.*); and oak (*Amburana cearensis*) are the least abundant since they have been highly intervened species by logging activities in the past. Conversely, the less valuable species such as curupaú (*Anadenanthera colubrina*), momoqui (*Caesalpinia pluviosa*), ochoó (*Hura crepitans*), bibosi (*Ficus sp.*), and verdolago (*Terminalia amazonica*), among various others, are the most abundant.

16. In general, there is limited information about the forest condition and stages of degradation of the Bolivian forest, but some quite localized studies. This is more acute in the Andean forests, although anecdotal evidence suggest that these forests have been highly intervened for fuelwood extraction, charcoal production, and fences construction. In this regard, Ibisch (2002), mentions that about 60% of the Andean forests have been intervened in some way, and that 77% of these forests range from a critical to a regular state of conservation.

B. Dynamics of Public Forestland Occupation

17. The condition of Bolivia's lowland forest is the result to a large extent of the dynamics of occupation of the forestlands, and their intervention for timber extraction. The most intervened forests have been those located in the department of Santa Cruz, since it was in the vicinities to the capital-city of this department from where began the frontier occupation of forestlands in the late 1950s. By that time, there were issued some

² These information is based on 68 forest management plans encompassing an area of 3.5 million hectares. It considers only the trees with diameter at chest height (DCH) higher than 20 centimeters. It classifies six regions: Chiquitania, Bajo Paraguá, Guarayos, Chore, Preandino-Amazónico and Amazonia

governmental policies (i.e., road construction, colonization projects, and cheap credit for agricultural production) that motivated the development of the agricultural frontier. Since the early stages of frontier occupation there were close interactions between agricultural frontier and forest frontier expansion, though the latter was focused on the extraction of the most valuable species (i.e., mahogany) (Pacheco 2005b).

18. Timber was also logged from the cleared areas for agricultural production by both medium- and large-scale landholdings in Santa Cruz, and small-scale farms in colonization areas, located mainly in Santa Cruz, north of La Paz, and Chapare (Eastwood and Pollard 1985). In most of the cases, there were in place strong synergies between the expansion of forest fronts, and the emergence of new settlements, deeper into the forest, taking advantage of the timber roads built by loggers (Thiele 1990). The exhaustion of mahogany in the forest frontiers of Santa Cruz motivated a move from the timber companies to the southwest of Beni, and north of La Paz in the early 1980s, and from there to the department of Pando in the early 1990s. These regions still constituted important reservoirs of this specie, and other valuable species such as cedar.

19. Much of timber extraction during that time was carried out through short-term contracts issued by the state forestry agency (*Centro de Desarrollo Forestal*, CDF), and without forest management plans. In the early 1990s, timber companies held about 20.7 million hectares of forest. Only 6 million of them were allocated within areas of reserve for forest production, and the rest was granted in public forest, but mostly over private properties, indigenous territories, or protected areas. This administrative decision was justified by the fact that the state held the ownership rights over all the country's forestlands. This situation produced recurrent land struggles between timber companies and colonist, indigenous people, and other private landholders. Furthermore, it stimulated to indigenous people to claim for ownership rights over their territories (Navia 1989), beginning in the department of Beni in the early 1990s and expanded to the entire lowland indigenous territories during the same decade, reaching roughly 20 million hectares the forest land claimed by such groups.

20. The arrival of timber companies to the northern Amazon, in the department of Pando, underwent in the first half of the 1990s. In 1994, only three companies had contracts of forest extraction over a total area of 253,000 ha (Mancilla 1994). Nevertheless, in July 1995, the CDF approved 17 more contracts as part of the so called "Sovereignty Plan" by which rights for timber logging were granted by the state in the Bolivian northern borders with Brazil. Most of the areas in this region were occupied since the last century for non-timber forest extraction, mainly rubber tapping, and brazil nuts collection through a territorial unit of forest resource use labeled "barraca"³. There were only marginal conflicts between forest contracts and *barracas*, since the first were placed in areas scarcely connected with roads, and in areas relatively isolated from populated areas. A major part of the loggers were only interested in highly valued species such as mahogany, oak, and cedar, as a way to economically justify logging in this region.

21. There are strong interactions between forest frontier and agricultural frontier expansion, although such interactions have changed to the extent that forestland becomes scarce. In the past, there was a trend to deplete forestlands as the easiest way to justify

³ Formerly equates to the territorial area of a 'rubber estate'. Nowadays corresponds to the unit of forest exploitation yielding various forest products under the control of a *barraquero* or *patron*. In a more restricted sense constitutes the control center of an estate, synonymous with *barracão* (portuguese).

land ownership, and to introduce agricultural activities. This dynamic was in part stimulated for a separation of ownership rights between the land which was granted as private property, and the forest cover whose ownership rights was retained by the state. In Santa Cruz, Chapare, and north of La Paz, particularly in the areas with better access to infrastructure, the expansion of forest frontier has led to an active dynamic of implantation of agricultural activities, once the timber valuable species were exhausted. The forest conversion has been much more aggressive in areas occupied by medium- and large-scale commercial agriculture (i.e., the Integrated Area and the Expansion Zone in Santa Cruz)⁴, where the landscape has massively been converted to agriculture and pasture. Conversely, in areas in which there is some prevalence of smallholders, the landscape is relatively more complex since agriculture and pasture areas are interspersed with patches of primary forest and secondary regrowth (i.e., northern Santa Cruz, and northern La Paz). Land-use change is, therefore, differentiated in these two types of frontiers (Pacheco forthcoming).

C. Distribution of Lands and Forest Rights

22. One of the main distinctive features of the Bolivian agrarian structure has been an unequal distribution of land resulting from a bimodal allocation of public lands. Hence, a large portion of public land was granted in favor of medium- and large-scale landholders when a small part was given to smallholders or communities (Muñoz 1996). A more equalitarian access to the land predominates in the plateau and valleys (highlands) due to the predominance of rural communities, and a large number of smallholders in these regions. However, these areas are characterized predominantly by land fragmentation since land is given by heritage to the new generations. In contrast, much more land concentration underwent in the lowlands since public lands -of which some were forestlands and other grasslands- were used as a political patronage mechanism (Baudoin *et al.* 1995). Unfortunately, it is not possible to know what the proportion of land that was granted through legal means, and what the portion that was appropriated in many cases through illegal means. It is likely to assume, however, that the functioning of the land markets has often led to legalize the landholdings acquired through illegal means.

23. In the mid-1990s, a process of land sanitation and registration began—which will be described with some detail below in this report—that has tended to regularize the landholdings with insecure ownership rights by issuing land titles to formalize land tenure. This mechanism questioned little the way in which lands were originally acquired (MDS 2005). As of 2002, about 47 million hectares were granted to medium- and large-scale farmers, 90% of which are located in the lowlands. On the other side, approximately 18 million hectares were held by small farmers, individually or through communal ownerships systems, of which 32% are located in the lowlands. Much of small-scale agriculturalist located in the lowlands result from settlements projects sponsored by the state, and spontaneous colonization underwent in the north of Santa Cruz and Chapare, and to lesser extent in the north of La Paz (Pacheco 1998) (Fig. 2).

24. Some other events have also tended to modify the land tenure situation in Bolivia, particularly in the lowlands portion, since the early 1990s. The first is related to the emergence of territorial claims demanded by indigenous groups to the different

⁴ The Integrated Area is the area located to the west of the Rio Grande, close to the city of Santa Cruz where the commercial agriculture evolved in the 1960 and 1970 decades. The Expansion Zone is the area located to the east of the Rio Grande where the agricultural frontier has expanded since the mid-1980s.

governments. The second is related to the approval of new regulations by which a system of forest concessions replaced the forest contracts mechanism for granting logging permits in public lands, and private landholders are granted rights over their forest resources. The third event is linked with the creation of municipal forest reserves that are areas granted in ownership rights to municipalities to be allocated as social forest concessions to local forest users. The last event is related to the creation of a system of protected areas with some institutional and financial support for this purpose.

Table 1. Bolivia: Land Tenure and Forest Rights

<u>Land distribution by type of owner</u>	<u>Area in thousand ha</u>		<u>With approved FMP (a)</u>
	<u>Highland</u>	<u>Lowland</u>	
<i>Forest areas in the country</i>			
Total forested lands (b)	8,900	44,500	
Permanent production forest areas (c)	4,018	24,682	8,500
<i>Private lands by actor</i>			
Medium- and large-scale farmers (d)	4,381	43,249	1,078
Small-scale farmers (d)	1,323	3,744	
Community lands (d)	10,678	2,151	
Indigenous areas (TCO) claimed and admitted (e)	12,111	19,516	723
Indigenous territories (TCO) titled areas (e)	749	4,249	
Number of indigenous demands (e)	178	56	
<i>Forestry rights in public lands</i>			
Forest concessions (f)	0	5,399	5,399
Forest concessions for non-timber products (g)	0	2,500	
Municipal forest reserves (h)	0	2,200	906
Long term contracts and research concessions (f)	0	488	488
Protected areas (i)	4,237	14,096	

Notes: a) areas in lowland Bolivia with an approved Forest Management Plan (FMP) in 2003. Information based on annual reports of the Superintendencia Forestal (SF), taken from Terrazas (2005), b) areas with any type of forest cover taken from MDSMA (1995), c) areas declared for sustainable forest management according to DS. 26075 of February 2001, d) correspond to land distributed by INRA and INC from 1953-2002, based on Balderrama (2002), e) based on INRA, f) adapted from SF (2005), g) personal communication from Director of Land Sanitation, INRA, h) data obtained from Dirección Forestal, MDS i) quoted in Bojanic (2005) based on SERNAP.

25. The first event has reverted somehow an unfair land distribution. It has been possible by the legal recognition of indigenous rights over the land they had traditionally occupied. As result, 29% of the country's total surface has been claimed as indigenous territories (*Tierras Comunitarias de Origen*, TCOs) in both highlands and lowlands. In the lowlands, most of the indigenous groups have claimed lands as TCOs, a portion of which has been formally admitted by the state to be titled (19,5 million hectares), but only a small fraction has already been titled (4.2 million hectares) (Table 1). Although it is likely to assume that a major part of the land claimed by indigenous people will be titled as indigenous territory, this process prove to be highly bureaucratic and expensive since it depends of a broader effort of land sanitation carried out in the whole country by the

National Institute of Agrarian Reform (*Instituto Nacional de Reforma Agraria*, INRA). There is not a real estimate about when all titles for TCOs will be issued, but according to informal sources it could take another decade or more to be completed.

26. The second event is associated to the reduction of the areas held by timber companies for forest extraction from about 20 million to 5.4 million hectares in 1996. The devolution of areas back to the state was the result of changes in the forest legislation. The previous legislation implanted a volume-based forest fee which, along with the lack of monitoring of forest extraction, stimulated a large concentration of areas for logging. The new Forest Law passed in 1996 replaced the forest fee to an area-based system, and instituted a system of forest concessions along with more strict norms of forest management. These measures led to the drastic reduction of forest concessions in hands of timber companies. Furthermore, given the fact that previous forest contracts had a lot of overlapping with private properties, indigenous territories, and protected areas, the reduction of forest concession areas led to an important decrease of overlapping rights. Furthermore, the forest legislation also granted rights over forest resources to private landholders in both community lands, and individual landholdings.

27. The third factor mentioned is related to the creation of municipal forest reserves. This was included in the Forestry Law of 1996 as well, in order to provide formal and regular access to forest resources to small-scale loggers or chainsaw operators (labeled in Bolivia as *piratas* or *motosierristas*), which in the past carried out their operations within areas held by timber companies. The municipalities, under the new regulations, are in charge of delimiting and granting forest concessions to local forest users organized in associations. Yet, the delimited areas have to be ratified by the Ministry of Sustainable Development (MDS), previous report of the state agency for agrarian reform (INRA). A total of 2.2 thousand hectares have been claimed by municipalities, but a large portion of them are still in process of approval. Numerous bureaucratic issues halt a faster process of municipal reserves' creation. Nevertheless, there are several local groups that are currently carrying out forestry operations in the municipal reserves.

28. Finally, the last event that shaped the current land distribution in Bolivia is the establishment of a system of protected areas. Beginning in the 1970s, and particularly since the mid-1980s, the portion of the country incorporated as protected areas has become quite significant. By the early 2000, an area equivalent to 17 % of the country's total area had been assigned some form of protected status, although the legal designation of 1.9 million hectares of this land had not yet been specified, and only a small fraction of the total had been effectively protected (Pacheco 1998). These areas have a different status of protection as shown in Table 2. Approximately 12% of these areas are affected by some type of human action, which varies depending on the location of protected areas due to the fact that areas closer to roads, and expansion frontiers tend to face greater encroachment pressures. There are some protected areas that were also declared indigenous territories. An institutional framework was devised to support this system, though recurrent financial needs to implement the management plans of the different areas constitute a critical factor to guarantee an effective protection (World Bank 2000).

29. It is important to stress that mountain forests in the highlands are placed in areas held by rural communities and smallholders, which traditionally have occupied these regions, though a relatively significant area—in relation to their current size—is within protected areas (i.e., the Amboró National Park in Santa Cruz). There have not been radical changes in this region's land tenure, though due to a relatively high population

density, landholdings have tended to fragment, which in turn increase the likelihood that forest can be threatened by intense pressures due to people's growing needs for agricultural lands and energy sources (Rham and Dam 2005). Nevertheless, besides growing pressures from population expansions, some studies suggest that pressures over mountain forest do not necessarily originate in local populations demand to fulfill their needs mainly of fuelwood but in third parties, particularly middleman that take advantage of forest located in communal or public areas, which in fact constitute common pool resources.

Table 2. Bolivia: Protected Areas and Status of Protection

	<u>Total area</u>	<u>Area affected by human action</u>	<u>Status of protection</u>
National park	2,660,250	150,044	Strict protection. Prohibited the use of natural resource except for research, eco-tourism, and subsistence activities of local people.
National park and TCO	1,200,000	180,000	Zones of strict protection but in overlap with indigenous territories.
National park and ANMI	7,019,700	233,868	Combines zones of strict protection with zones of multiple forest use.
Historic National Park	17,000	-	Not allowed natural resources use; aimed at the preservation of samples of natural habitats, and species.
National reserve	3,440,200	1,438,034	Areas in evaluation. Prohibited natural resources use, human settlements, and concessions.
Biosphere reserve	535,000	140,250	Consist of a core area protected by buffer zones in which activities such as research, and tourism are allowed.
Natural Area of Integrated Management (ANMI)	3,461,700	-	Permits a mosaic of activities including traditional uses, zones of multiple use, and of strict protection.
TOTAL	18,333,850	2,142,195	

Source: Taken from <http://www.areas-protegidas.org/> based on SERNAP.

30. In summary, the total area owned by private landholders and community lands is equivalent to 65 million hectares, and about 31 million hectares are claimed to be titled as indigenous territories, and 18 million hectares have been declared under protection. Unfortunately, it is not possible to know what is the proportion of forestland within private landholdings. Approximately 5.4 million hectares of the public forest are allocated as forest concessions, 2.2 correspond to municipal forest reserves, and 2.5 million hectares will likely be granted as concessions for non-timber forest products extractions,

mainly Brazil nuts. There still persist some overlapping rights mainly between protected areas and indigenous territories, and indigenous territories and communities with forest concessions, mainly areas claimed for concessions to non-timber forest products, but information to support this is slim. According to own estimates, over a total of 60 million hectares in which there is some existing or claimed tenure right, the total area with some sort of overlapping rights achieves 7.8 million ha (13%).

D. Contribution of Forestry to the National Economy

31. The formal contribution of forest to the economy is relatively small. Table 3 shows that the silviculture sub-sector, in which is included primary forest extraction, only contributes with a small proportion to the country's Gross Domestic Product (GDP), and that proportion has changed little over time. The latter reveals that there forestry sector has grown to a relatively low rate, in spite of the progress that has been made in the regulatory framework, and the adoption of good practices of forest management. There is a mention that the contribution of the forest industry to the GDP would equate to 3% (US\$ 220 million), although the methodology supporting such estimate is not provided (Jordan *et al.* 2002).

Table 3. Statistics of the Bolivian Forestry Sector, Selected Years

	1985	1995	2003
GDP silviculture (million US\$) (a)	43.9	67.5	76.7
GDP silviculture / GDP total (%) (a)	0.91	1.14	0.94
Forest area allocated to forest concessions (million hectares)			
(b)	22	22	4.6
Forest area under sustainable management (million hectares)			
(b)	None	None	8.5
Area of forest plantations (thousand ha) (c)	NA	20	27-46
Number species exploited, and percent of production (d)	3, 90	12, 75	30, 75
Timber extraction (thousand m ³) (e)	320.5	448.7	599.1
Total national exports (million US\$) (f)	675.2	1,181.2	1,650.6
Exports of primary forest products (million US\$) (g)	5.8	67.6	23.3
Exports of processed forest products (million US\$) (g)	3.0	38.3	87.0
Exports of non-timber products (million US\$) (h)	1.9	26.3	37.6
Total exports of forest products (million US\$) (g)	8.8	105.9	110.3
Total exports forest products / Total exports (%)	1.3	8.9	6.6
Imports of forest products (million US\$) (f)	16.5	41.4	47.5
Commercial balance forest products (million US\$)	(7.7)	64.5	62.8

Sources: a) Taken from UDAPE (2004), b) Based on Superintendencia Forestal (2005), includes areas under control of indigenous peoples and other local forest users, c) Quoted in Bojanic (2005). Data regarding to 2003, the maximum range correspond to Carneiro (2002) based on FAO estimates, d) Based on statistical reports of the Camara Forestal de Bolivia, e) Based on CNF (1996), and Superintendencia Forestal (2005), f) Based on Instituto Nacional de Estadísticas (2005), g) Taken from CFB(2005), the processed products includes non-timber forest product exports, h) Corresponds to brazil nuts, natural rubber, and palm heart, though brazil nuts exports largely predominate in the total.

32. It is estimated that the forestry sector is directly responsible for 90,000 jobs and an additional 150,000 jobs indirectly (STCP 2001). Other sources, however, mention that

these numbers are equivalent to 40,000 and 120,000, making a total of 160,000 jobs, or 4.1 of the Economic Active Population (EAP). None of the two sources explain the way in which such data was obtained (Rodrigues 2005). The small contribution of the forestry sector to the national economy is in part the result of the little growth of timber extraction. Although volumes of logged timber have recovered since 1985, when there was a contraction of the sector due to the acute economic crisis that underwent a peak in the mid-1980s, the levels achieved in 1995 (448 thousand m³), were almost equivalent to those reached in 1980 (445 thousand m³), though they were a little higher in 2003 (500 thousand m³). The logged timber is relatively low taking into account that the potential of extraction for the whole country is estimated in 20 million m³, which would be the amount of wood that grows each year in the lowland forest (Jordan *et al.* 2002).

33. Only a reduced number of non-timber forest products are used commercially, the most important being Brazil nut production in the Bolivia's lowland area, and eventually palm heart, and some medicinal plants. Nevertheless, likewise wood production, only 40 to 60% of the Brazil nut production that falls to the forest floor are actually collected. Furthermore, although there are no statistics about forest resources employed to fulfill subsistence goals, it could be significant the number of products that local communities withdraw from the forest (i.e., medicinal plants, building materials and fibers, among others), to complement their social and economic needs (Pacheco 2001). Additional research is required to fill these gaps of information.

34. As mentioned, timber extraction has shown an oscillatory trend since the 1980s, though it has surpassed their previous levels in 2003. It is noteworthy that the type of species intervened has changed dramatically due to the over-harvesting of the most valuable species (i.e., mahogany, oak and cedar). The latter process took place since it has been proved to be economically more efficient to increase harvesting rates, and due to the fact that the area-based forest fees have tended to stimulate the extraction of secondary species (SF 2003). Table 2 shows that only three species accounted for 90% of timber extraction in 1995, a trend that has reversed in the following years. In 1995, 12 species accounted for 75% of the total production, and they were 30 in 2003.

35. There is not reliable information about primary manufacturing capacity of timber. It is estimated that there are approximately 300 sawmills scattered around the major forested areas (with the highest concentration in the state of Santa Cruz and Cochabamba). About 70% of the sawmills are classified as very small (< 1.000 cubic meters/year) or medium (1.000 – 15,000 cubic meters/year), with no single large sawmill dominating the industry (Jordan *et al.* 2002). Most of the sawmills are labor intensive and use outdated machinery. There are approximately 45 dry kilns with a production capacity of about 50,000 cubic meters of sawn wood, which does not even meet the current underutilized sawn wood capacity. With few exceptions, dry kiln designs are inadequate to produce an efficient and consistent supply of quality lumber. Few mills have invested in kiln drying equipment, limiting expanding markets beyond rough lumber (Jordan *et al.* 2002). Wood drying is one of the main bottlenecks in Bolivia's commercial forestry.

36. In the last years, there have been sustained efforts to increase the secondary manufacturing, particularly in the production of furniture, furniture components, doors, and flooring. Approximately 50% of value-added products are sold domestically, and most of the remained furniture is exported to North America. An undetermined amount of the rough lumber and planks are re-sawn by secondary processors for the manufacturing sector. Most of the value-added businesses are family-owned companies that have

developed in the last four decades to serve the domestic market and limited international market (Jordan *et al.* 2002). The problems that face the secondary manufacturing are the inefficient use of material, the lack of industrial security, and a weak quality control of the process. It is noteworthy that value-added products are expanding quickly in the country's wood exports. Although there is no data, apparently value-added exports from the Bolivian industry can compete in some niches of low-volume and high-value, mainly those that are using certified timber in the fabrication of wood products.

37. About 40% of the total timber production is exported, and 60% is consumed within the domestic market (CFV 2002). The total export values from forest products, including round wood and processed products, has increased notoriously in the last 20 years. The exports have grown resulting from an economic policy which has privileged exports. Forest products exports were equivalent to US\$ 8,8 million in 1985, and they increased to US\$ 110,3 million in 2003 (Table 3). Furthermore, non-timber forest products—primarily Brazil nuts—have increased their share in the total of forest exports reaching about US\$ 37,6 millions in 2003. Furthermore, the weight of wood processed products has grown in the composition of exports over time. For instance, 64% of forest exports corresponded to sawn and semi-processed wood in 1995, while the proportion of processed wood products increased to 79% in 2003 (Chávez *et al.* 2003). In spite of that, the performance of forest exports has not been much better than that of country's total exports. In 1995, they represented 8,9% of total, and that proportion was of 6,6% in 2003.

38. Almost all the wood production originates from primary forest located in the Bolivian lowlands since areas with planted forest in Bolivia are quite small. Furthermore, there are no reliable estimates about what forest production is occurring in the Andean portion of the country. It is supposed that small-scale wood exploitation is depleting the original mountain forests together with the local extraction targeted to fulfill subsistence needs of charcoal and fuelwood. There is a total of 27,000 hectares of forest plantations, of which 17,700 hectares were sponsored by development programs located in the departments of Cochabamba and Chuquisaca, and there is an additional area of 10,000 hectares of private plantations (CFB 2000). There is no completely reliable information about forest plantation. Teran and colleagues (2005) suggest that they would be in the order of 26,186 thousand ha (Table 4). In turn, FAO suggests that planted forest area is equal to 45,600 hectares, of which 41,000 hectares are eucalyptus (Carneiro 2002).

39. As noted, most forest plantations and reforestation was stimulated by projects, and private initiative, although several projects only continued the actions initiated by the departmental development corporations—currently extinct—, the national forestry service, and the prefectures. A large portion of the existing plantations have been implanted in the early 1970s, each of the projects or private initiatives following their own objectives. Most of the plantations, with some few exceptions, are small-sized plantations lacking from silvicultural treatments, and scattered geographically. Thereby, they do not have production objectives, and their environmental functions are also questionable. Furthermore, their management respond to local demands, and hence their impact in timber production and employment generation is quite low. The forest plantations sponsored by the state, they were implanted in community lands, and to less extent in individual plots stimulating them through in-kind incentives (Teran *et al.* 2005).

Table 4. Statistics of Forest Plantations in Bolivia

<u>Department</u>	<u>Planted area (ha)</u>	<u>Period</u>	<u>Main species</u>
Chuquisaca	7,163	1969 -1998	Pinus radiata; Pinus patula; Eucalyptus globulus; native species
Cochabamba	12,289	1970 -1998	Pinus radiata; Pinus patula; Eucalyptus globulus; native species
Tarija	1,092	1978-1998	Eucalyptus grandis; Eucalyptus globulus; Pinus radiata; Pinus patula
Potosí	642	1990-1998	Eucalyptus globules; Pinus radiata; native species
La Paz	1000	1970-2000	Eucalyptus sp.; Pinus sp.; Cupresus sp.
Santa Cruz	3,900	1990-2002	Schizolobium parahybum; Melia azedarach; Pinus radiata, P. caribaea Eucalyptus globulus; Grevillea robusta; Leucaena leucocephala
Beni	100	1985-1995	Swietenia macrophylla; Eucalyptus sp.
Total	26,186		

Source: Taken from Teran and colleagues (2005), based on statistics from SIFORBOL 2001.

40. The rate of forest plantations growth, and their quality is variable. The current assessments showed that there were high rates of mortality in the plantations' initial stages due to the employment of not recommend practices, use of inappropriate species, wrong selection of the location, and poor genetic quality of the seeds. In spite of that, the forest plantations have generated some positive environmental impacts mainly reflected in soil and watersheds protection in areas previously deforested, particularly in those areas with steep slopes, or degraded soils in which there is not likely to implant crops in a profitable fashion. Furthermore, in some projects there were spent efforts in producing seed trees, and adapting species (Teran *et al.* 2005). Unfortunately, there is little information about the economic feasibility of plantations.

E. Quality of Forest Management and Administration

41. In 2003 there are about 8,5 million hectares, out of 28,7 million hectares (29%), of forest classified as permanent production forest under sustainable management -or at least with an approved management plan- although this number tends to grow over time as shown in Table 4. In 2003, most of the managed area still corresponds to concessions allocated to medium- and large-scale logging companies. Yet, it is comparatively important the amount of forestlands (1.6 million hectares) that is being managed by what is labeled as community forestry initiatives. This process occurs either within indigenous territories or social concessions in municipal forest reserves, and there is still some potential for its expansion, particularly within indigenous territories (Fig. 3). The area under forest management within private properties has reached an important amount (1 million hectares). These data, however, does not make possible to distinguish what proportion corresponds to small-scale forest operations. The area corresponding to long-term forest contracts is relatively small, since this type of forestry rights is something that remains from the older system of forest administration (Table 5).

**Table 5. Areas Under Forest Management by Type of Actor
in Selected Years (Thousand hectares)**

	1997	1999	2001	2003
Concessions to logging companies	5,498	5,330	4,972	5,399
Concessions to local groups (a)	0	0	407	906
Indigenous territories	0	141	444	723
Private properties	0	199	238	1,078
Long-term contracts	361	294	112	225

Source: (a) refers to Asociaciones Sociales del Lugar, ASLs. Adapted by the author from Cámara Nacional Forestal (CNF), based on annual reports from the Forest Superintendence.

42. In theory, most of the areas with approved forest management plans must follow strict regulations and norms for forest management (i.e., cutting cycles, extraction of trees with authorized diameters, appropriate road construction within management areas, etc.), which should allow for the forest regeneration of the intervened species. Nevertheless, first, nothing secures that such practices are being implemented in practice in the areas with approved management plans, and second, there is not enough evidence about what are the implications of carrying out a more intensive system of forest extraction. In this line, the change from a silvicultural system that removed low volumes per hectare of only few species -like the one that predominated in the past- to other that removed three or four times more volume and number of species raises questions about its potential impacts on the forest's structure and ecology (Jordan *et al.* 2002).

43. It is widely known that selective logging has led to the extenuation of valuable species such as mahogany in the older forest frontiers (Jiménez *et al.* 1996). A study, however, which assess the trend of forest regeneration in intervened areas mentioned that about 80% of commercial timber species were not regenerating at the needed levels to replace the trees that had been removed, and that better silvicultural practices should be introduced for stimulating forest regeneration (Fredericksen *et al.* 2003). In this regard, if reliable techniques for achieving adequate regeneration of species have not yet been developed, the risks involved in more intensive exploitations could be higher than those targeting a few species (Jordan *et al.* 2002).

44. There is not enough empirical information to sustain whether there are significant differences between the forest management carried out by logging companies, and even if this may have better quality than that practiced by small-scale forestry users. In theory, there should not be significant differences among logging companies and these with operations of local forest users, since both groups would attempt to follow the norms and forestry regulations. In practice, however, there are some differences which to some extent are influenced by the location of the forestry operations, and these groups' availability of forestry services. First, in areas distant from urban centers or timber markets—like in the northern Amazon—forest users' still privilege valuable species such as mahogany, reproducing the old system of forest extraction. This situation differs in areas closer to roads and markets, in which less valuable timber is logged. Second, local forest users much of the times are not able to take advantage of all commercial species since they cannot agree about appropriate conditions for marketing their timber.

45. It is noteworthy that forestry operations in the field do not necessarily follow what it is prescribed in the management plans, and the Forest Superintendence (SF), which is the entity in charge of monitoring forest management, do not have the resources and capacity to monitor the compliancy of such plans. There is some scope for disobeying those plans in the practice, which leads to the proliferation of illegal logging which looks as legal forest management. There is some anecdotal evidence suggesting that the likelihood for this to happen is larger in private properties areas—since private owners can obtain a logging permit in small-sized areas—due to the more flexible norms ruling forest management in private landholdings (Cronkleton and Albornoz 2003). These practices endanger even more the regeneration of more valuable species. In this direction, there is not any compliance with forest management rules in areas that still remains as public forest, in which there are no allocated forestry rights, but that are intervened illegally. Furthermore, much of the use of the Andean forest tend to be predatory since it is very intensive and only little forest regeneration is allowed due to the absence of forest management practices. Forest uses are primarily for domestic consumption (Rham and Dam 2005).

F. The linkages Between Forests and Rural Poverty

46. About 1.3 million people are estimated to rely on forest resources for at least part of their livelihoods, though this is only a rough estimate that represents about 40% of the country's rural population in 2001 (Table 6). Of them, 180,000 to 200,000 indigenous people depend heavily on forests. Also, 25,000 to 30,000 families live in or next to dense forests in the northern Amazon, and rely on agro-extractive systems, and the seasonal collection of Brazil nuts as the main source of income. Some 500,000 to 600,000 people are colonist or small-scale farmers settled in Santa Cruz, Chapare, and Yungas, which withdraw some subsistence goods from forests (i.e., fuelwood, wood for building, fodder, fruits, etc.), and obtain indirect benefits from forests such as land for other uses, environmental services and watershed production (Pacheco 2001). Furthermore, about 400,000 people are family peasants in the temperate valleys of Cochabamba, Tarija and Chuquisaca, which use forest resources for subsistence needs. Main uses are fuelwood and charcoal mainly for domestic consumption, as well as for dwelling and fences construction.

47. The relationship between forest cover and rural poverty are not evident. There are several studies mentioning that forestry is prevalent in areas with dominance of forest vegetation. On one side, forest resources constitute a safety net since they provide with several resources for food consumption and other uses fulfilling crucial needs of local people such as medicinal plants, and construction materials. On the other side, it is little likely that local people will improve their livelihoods, and cash-income, from forest resources, thereby they might create a poverty trap (Angelsen and Wunder 2003). In Bolivia, when looking at the whole country, it is notorious that the highest poverty levels are found in the highlands according to data processed at the municipal level contained in INE-UDAPE (2004). The poverty incidence in Bolivia, considering the poverty line, reaches 71%, and it is 88% in the rural areas. Taking the rural area, the highest incidence of poverty occurs in the departments of Potosí, Chuquisaca, Cochabamba, and Oruro, which are also the departments that embraces most of the Bolivian highlands. In contrast, in the national score, the departments with lowest incidence of poverty are those located in the lowlands, but there are also important differences within this region about the distribution and magnitude of poverty.

Table 6. Population in Municipalities with Remaining Forest Cover

	<u>Municipalities with forest cover (> 10% of their total area)</u>	Population in thousands			<u>Rural (in %)</u>
		<u>Total</u>	<u>Urban</u>	<u>Rural</u>	
Yungas	9	106	12	93	7.44
Chapare	6	173	25	148	11.82
Llanos crucenos	10	1,378	1,239	139	11.07
Chiquitania	15	276	122	154	12.27
Northern Amazon	19	181	121	60	4.79
Llanos benianos	17	246	152	95	7.54
Chaco	14	251	122	129	10.25
Andes	38	1,426	990	437	34.81
Total forested areas	128	4,037	2,782	1,255	100.00
Total country (a)	312	8,274	5,166	3,108	
Forested /country (%)	41.0	48.8	53.9	40.4	

Note: a) Considers municipalities in 2001. Based on data provided by UDAPE.

48. Figure 5 shows the relationship between forest cover and poverty line according to certain thresholds. Municipalities with forest cover consist of those in which forest cover more than 10% of the municipal jurisdiction. They are differentiated in two groups: the ones with forest area less than 50% and those with forest area more than 50%. They were also divided in two groups according to the incidence of poverty, those with more and less than 75% of poverty incidence. As the figure shows, there is no a linear relationships between poverty incidence and forests given that high poverty incidence can take place in both municipalities with and without forest cover. Yet, there is a large portion of municipalities with an important forest cover in which incidence of poverty is greater than 75% (light green), and a smaller group of municipalities with relatively important forest cover in which incidence of poverty is lower than 75% (dark green). The last group of municipalities corresponds mainly to the region labelled northern Amazon.

49. There is a slightly different situation when instead of poverty line it is considered population's monthly consumption (in 2005 US\$) as a proxy of welfare. It is assumed that the better off people are those which consume an amount greater than US\$ 20 per month. When looking at the relationship between consumption and forest cover, it comes up that people living in the lowlands tend to be in a better situation that those residing in the highlands, more of which consume monthly less than US\$ 20. Nevertheless, within the lowlands, and in the municipalities with important remaining forest cover, municipalities in which population tend to have a higher consumption level are those located in the

northern Amazon (consistent with the data showed above), those located in the *llanos cruceños* in where there is a relatively higher development of agriculture, and those in the eastern Santa Cruz, covering a portion of the *chiquitania* (Fig. 6).

G. Threats to Forest Driven by Deforestation Expansion

50. The data about land-use change in Bolivia, and specifically forest conversion to other uses is full of uncertainties, though it tended to improve over time. The total forest surface has been estimated, on one side, by the forest map in 53,4 million hectares in 1993 (MDSMA 1995), and in 53,960 million hectares by the Agrarian Superintendence as of 2001 (Superintendencia Agraria 2001). Other sources mention that the total forest surface was 53,068 hectares in 2000 (FAO 2001), or 51,383 hectares in 2000 (Rojas *et al.* 2003). The only study that attempts to differentiate other land-cover in Bolivia is the Agrarian Superintendence which mentions that acreage for extensive pasture reaches 12.7 million hectares, and that for agriculture is about 3.7 million hectares. Much of the extensive pasture areas, therefore, may actually correspond to areas devoted to seasonal agriculture since they are hard to separate in remote sensing analysis.

51. Deforestation has grown exponentially, primarily in lowland Bolivia. There have been produced different estimates of deforestation. While the estimate provided by the Agrarian Superintendence (2001), and FAO (2001) tended to underestimate annual deforestation, estimates from the Project for Sustainable Forest Management (BOLFOR) overestimate it (Rojas *et al.* 2003). This is due to several methodological assumptions adopted in the studies—see Pacheco (forthcoming) for a complete description of the available dataset, and their main shortcomings. The most consistent dataset is that provided by the University of Maryland (UMD), updated by Conservation International (CI) and published in Matsuzaki and colleagues (2005). The latter is based on a wall-to-wall analysis of digital satellite data MSS, TM, and ETM+.

52. Table 7 shows the deforestation data mentioned above. The main conclusion to derive from these estimates is that deforestation has grown extensively over time. According to this source, deforestation was relatively low until the mid-1980s, approximately 46,000 hectares/year at a rate of 0.10% year. It increased significantly between the mid-1980s to mid-1990s to 160,500 hectares (0.33% per year), and it was located in 158,000 hectares between mid-1990 to 2001 (0.34% per year). However, there has been an important increase in annual deforestation between 2001-2004 —only considering the department of Santa Cruz— reaching an annual average of 250,000 hectares/year at a rate of 0.55% per year. Nothing suggests that deforestation will ameliorate in the near future, given the persistent pressure over forests from the agricultural frontier expansion for grains cultivation and pasture for cattle ranching.

Table 7. Estimates of Deforestation in Bolivia (Thousand hectares)

<u>Years</u>	<u>Forest Cover</u>	<u>Deforestation in the period</u>	<u>Annual deforestation</u>	<u>Deforestation rate (%)</u>
Pre-1976	49,448	877	-	-
1976-86	48,981	466	46.6	0.10
1986-91	48,179	802	160.5	0.33
1992-01	46,755	1,424	158.2	0.34
2001-04	46,002	752	250.9	0.55

Notes: Based on Steininger and associates, and updated by MHNNKM published in Matsuzaki et. al. (2005); include the whole country's forests area, the forest area considered in d corresponds to the areas with > 1000 mm yr⁻¹ precipitation, below 1500 m elevation and north of 19° S. Deforestation in the period 2001-04 includes only the department of Santa Cruz.

53. Indeed, although agriculture is considered the main proximate cause of deforestation in Bolivia's lowlands (Hunnisett 1996, Pacheco 1998), there are not accurate data to evidence what is the importance of forest clearing for agriculture versus pasture. Deforestation information used here consists of binomial data discriminating only forest from non-forest. This fact impedes to identify the emerging land uses from forest clearing, as well as the conversion from agricultural uses to pasture. In the lowlands of Bolivia, it is known that some forestland originally cleared for large-scale agriculture has been converted to pasture like in the integrated area (Arrieta *et al.* 1990), and more recently in the southern expansion zone. In colonization areas, pasture is likely becoming the main proximate cause of deforestation, but there is a slim evidence supporting this argument (Urioste and Pacheco 2001). Furthermore, two are the areas in which pasture has traditionally been the dominant land use, these are: the north western Amazon close to city of Cobija and the *Chiquitania* zone in which there are soils suitable for pasture (Pacheco 1998).

H. Forests and Environmental Conservation

54. In the line with other tropical countries, Bolivia has one of the richest biological heritages worldwide. Both endemism and species richness are high in the country, much of which is associated with the existence of its varied eco-regions. Bolivia's biodiversity is one of the most diverse in the world, with 2,500 known species of vertebrates and approximately 18,000 vascular plants. Nevertheless, the true numbers are likely higher due to the fact that Bolivia is one of the least studied countries in the neo-tropics. For example, a few months ago was found a new specie of monkey in the protected area of Madidi, in northern La Paz. Endemism is also high, especially in the isolated valleys of the *Yungas* where bio-geographic islands have been formed. The country ranks in the eighth place worldwide regarding bird biodiversity, tenth for butterfly endemism, and fourth for butterfly biodiversity (World Bank 2000).

55. This wide range of biological diversity is actually threatened derived from diverse pressures that may lead to the destruction of habitats as result of agricultural frontier expansion, and collateral effects of burning and timber extraction. Other factors that can contribute to this are the selective extraction of species and illegal hunting. On one hand, the tropical area is considered as more resilient, characterized by having species with a wide distribution. On the other hand, some Andean zones have species with more

restricted distribution coinciding partially with areas of high human pressure. The zones that have been more affected by human intervention are the Andean plateau and the valleys due to the largest population pressure over time. The population displacement to the eastern Andes is also affecting some hydroclimatic processes due to the conversion of vegetation which in turn has critical functions in preserving the quantity and quality of water (Mérida *et al.* 2003). A study based on terrain characteristics, vegetation cover, and population density has identified that the watersheds that should be prioritized for forest conservation and/or forest cover regeneration in the eastern Andes are Coroico, Mizque, Pirai, Alto Yapacani, Acero-Grande, Parapetí, Grande Tarija and Bermejo (Müller 2005).

56. Several are the environmental effects of the agricultural frontier expansion in the *llanos cruceños* and *chiquitania*, mainly those linked with soil degradation and local climate change. There is no data about abandonment of crop lands after some years of cultivation. Yet, there is an unknown portion of land that has been converted to low productive land-uses—such as extensive cattle ranching—after some years of intensive mechanized production in the mentioned zones, which paradoxically are the areas with better productive infrastructure. Furthermore, the likelihood that climate risk—due to both spatial and inter-annual variability—in the department of Santa Cruz is too great to justify soybean cultivation has led to the increase of other drought tolerant grains such as sunflower, and sorghum. Areas deforested in the southern part of the Expansion Zone⁵ have largely been converted to pasture, and a still unknown area has even been abandoned. The availability of wet areas in the so labeled new north has attracted mainly to medium-scale producers to expand some crop areas in there (Pacheco forthcoming). The use of fire for cleaning pastures is another threat for soil nutrients reduction and forest degradation, mainly in the departments of Santa Cruz and Beni (Matsuzaki *et al.* 2005).

III. CRITICAL ANALYSIS OF CURRENT GOVERNMENTAL POLICIES

A. Assumptions of the Land and Forest Legislation

57. There was an important shift in forest policies since the approval in 1996 of the new Forest Law No. 1700. Several works have already characterized what was the legal and institutional framework ruling forest management until the mid-1990 (Contreras and Vargas 2001, Quiroga and Salinas 1996). The factors that stimulated the move from the pre-1996 conditions to the current scenario, shaped by the new forest legislation, had to do with the emergence of grassroots collective action, mainly from indigenous people, and small-scale operators, demanding legal access to forest resources. Also, a need to overcome an excessive weakness of the national forestry institutions prone to political influences, and the absence of sustainable management criteria in the use of forest resources (Pavez and Bojanic 1998).

58. In response to this pressure, and in an effort to remove constraints to the local control of natural resources, the government set in motion a process of policy reform, which lasted for several years until some consensus was achieved, intended to promote sustainable forest use and to democratize the access to forest resources. This process took place within a broader institutional and political reform, such as: the agrarian reform; the political decentralization of the country with a related institutional restructuring; and the approval of technical norms for forest management and mechanisms for enforcing

⁵ See Note 4 for a definition of Expansion Zone.

management standards. These factors will be approached in the next section. Most of the issues shaping the new forest policy are contained in the new Forest Law, but also in a Law of Agrarian Reform passed by the Bolivian Congress in 1996 as well. Afterwards, some specific norms and regulations have been issued, which complement and/or adjust the mentioned policies.

59. The main assumptions lying behind the new Forestry Law are the following:

- *The belief that there was enough public forest to be granted as forest concessions:* the law designers made the assumption that there was going to be an important acreage of land that could be allocated by auction as forest concessions to logging companies. If this assumption might have become true, it could have led to a more competitive process of public forest allocation, and might have increased the level of forest rents captured by the state.
- *Forest concession is the most efficient way for timber exploitation:* at the bottom-line of the forest legislation is the idea that forest concessions constitute an efficient mechanism for land allocation devoted to forest uses due to a larger scale of forestry operations, entrepreneurial administration, and potential for forest fees collection. This notion was strongly linked with that mentioned previously about the availability of public forests.
- *Secure land tenure would make of forest management a more attractive land use option:* this assumption is at the core of the new forest policy since insecure ownership has been blamed as the main cause to disincentive investments in long-term investment, as well as favor conversion of forest to agricultural land-uses as a way to justify land ownership.
- *Concessionaries would operate profitably with the imposed forest fee:* the new forest regulations made the big assumption that changes of forest fees collection from a volume-based to an area-based system would constitute the best way to collect forest taxes, while at the same time it would allow forest concessions to operate in a profitable basis.
- *The national forestry agency was going to have enough resources to operate:* this assumption was tied to the notion that public forest allocated to forest concessions might constitute an important source of resources -through the collection of forest fees- to finance the public system in the forestry sector. Even more, it was assumed that such resources should finance forestry units in the departmental, and municipal levels to comply with a new set of functions that were transferred to such levels in both monitoring and extension services.
- *Twenty-year of cutting cycles may ensure natural forest regeneration:* based on some ecological research there was made the argument that twenty-year cutting cycles might constitute enough time to allow for a second harvesting in areas previously intervened.
- *Municipal reserves could provide the way to formalize small-scale timber operators:* the creation of forest reserves under the administration of municipal governments, as areas that should be granted in concession to

previously informal small-scale loggers, was devised as the main mechanism to formalize such groups, under the assumption that it could be enough public forest in the municipalities for formalizing and enlarging the access of local groups to forest resources. Yet, this has not always been the case.

60. The forestry legislation was elaborated based on these main assumptions. Much of the failures of this policy implementation, as we will see below, have been linked with the fact that most of these assumptions were not right. The following section focuses on explaining the main contents of the forest policy and legislation, and some of the missing issues. The main policy and institutional failures linked to the new legislation will be approached further in this work.

B. Main Contents of Forest Policy and Legislation

61. It is widely agreed that main obstacles for the development of the forestry sector were rooted in poor incentives to sustainable forest management, the imperfect system of forest fees, the prevalence of illegal acts, the poor stimulus to local community management of forests, and the weak institutional framework. Despite not being comprehensive, the Forestry Regime that emerged from the approval of the new Forest Law, addressed many of such issues through a combination of policies aimed at devolving property rights tied to political decentralization, establishing a more rigid fiscal system, and introducing instruments to guarantee sustainable forest management (Contreras and Vargas 2001). Main issues are assessed below.

Decentralized Framework for Forest Management

62. The whole public institutional system of the forest sector has been substantially altered. The Ministry of Sustainable Development (MDS) is now constituted as the ruling entity. The Forestry Superintendence (SF) is the regulation entity, and the National Forestry Development Fund (FONABOSQUE) is the financial entity. The SF is a central piece of this system because it is in charge of carrying out most of the operational actions that support forest management such as granting forest concessions; authorizing logging permits; approving management plans and raw material supply and processing programs; monitoring forest products transportation; confiscating illegal timber; and supervising the activities of forest management.

63. The new system has sought to decentralize some of the functions related to forest management, particularly the ones linked to monitoring of illegal crime, and the provision of public services to forest users. The whole new system is financed with recourses coming from both forest management fees and clear cutting fees, which are explained in detail below. A relatively important number of functions have been transferred to lower levels of government such as Prefectures and municipal governments in which there are forest resources. These lower levels should create technical units to implement their new functions, and have been granted for that a portion of collected forest fees. Prefectures were delegated basic functions of forestry research and extension, and strengthening municipal forest units. Municipal governments are in charge of delimitating and allocating concessions within municipal forest reserves, monitoring illegal logging and deforestation, and helping local users to carry out their forestry operations.

64. Municipal governments have also been involved in other tasks linked with local development and conservation, which directly or indirectly are linked to forest management. On the one side, they have to develop participatory plans of municipal development in order to make a more efficient allocation of public spending considering the local people's needs. On the other side, they participate in local committees aimed at accompanying the implementation of protected areas' management plans, in those municipalities in which there have been established conservation units. Furthermore, they have some voice in territorial planning, participate in the resolution of conflicts involving territorial overlapping rights, and are involved in land struggles. Nevertheless, main decisions regarding still are made at the central level (i.e., land allocation and forest fees collection) with little voice of municipal governments (Pacheco 2005a).

Improving Local access to Forest Resources and Titling

65. In the past, land ownership was separated from forestry rights, and hence the state kept the right to allocate logging contracts or permits even within private properties. The last issue created several overlapping rights between timber companies with logging permits and indigenous people, and also with private landowners. The current legislation, in contrast, merged landownership and forestry rights, hence private landholders have also the right to use exclusively the forest resources located within their properties—though forest are still property of the state. In the same line, indigenous people who have gained access to extensive forestlands have benefited from exclusive rights to use and manage the forest resources located within their jurisdictions. To large extent, merging rights under land and forest have led to reduce the struggles over forests.

66. Another way to improve local access to forest resources has been the recognition of municipal forest reserves in an extension up to 20% of the remaining public forest in the municipalities, afterwards the devolution of forest areas from logging companies back to the state. These forest reserves, which vary in extension according to the municipality, have to be allocated to local forest users grouped in associations of forest operators. The municipalities are responsible for delimitating the borders of the reserves, and proposing them to the MDS, which is in charge of their final demarcation based on a report issued from INRA. Local governments are also in charge of formulating a plan for granting forest concessions in such areas. It is noteworthy that there has been an excess of demands from local groups to access concession within municipal reserves due to the short supply of land for such reserves (Pacheco 2000).

67. Efforts to facilitate the different forest users' access to forest resources is, however, conditioned to the progress made in a process of land sanitation initiated in 1996. This process is aimed at regularize land ownership of private owners by assessing the effective compliance of the rural property's socio-economic function. This is a very costly and slow process which INRA has delegated to private companies (MDS 2005). To have some referential information, INRA has spent US\$ 72 million in 8 years, from 1996 to 2004, to regularize only 14 million hectares (of which have been formally titled only 7 million hectares), although there are 37 million hectares in process of being regularized. There are US\$ 43 million additional committed by international donors to support the process in the next years (INRA 2005). The main outcomes of this process are, on the one hand, the titling of those properties which comply with all legal regulations, and on the other hand, the identification of public forests—with no overlapping rights—which should be allocated for agricultural or forestry uses. Furthermore, the agrarian legislation dictates that all existing public land should be preferentially allocated to landless people,

although there are some constraints for land-use conversion according to some zoning criteria.

Fiscal Measures for Forest Rent Capture

68. The forest management fee in Bolivia was set up in 1 US\$ per hectare over the whole forest concession area for forest concessions. The Forest Law stipulates that an area of 30% of the total concessions can be classified as protected area, which is exempted of the forest fee payment. The same forest fee applies for private landholders indigenous territories but only over the area intervened every year. Forest fee for ASLs is regulated by the DS. 25422, which determines that forest fees are paid based on a formula considering as reference the minimum forest fee, and adjusting it based on parameters of ecoregion, forest richness, location, and concession size (Carden 2003). Furthermore, the forest fee can be paid by volume—like in the older system—in cases in which prevail long-term contracts for logging in public lands, when secondary forest products are exploited, or in private properties larger than 200 hectares with POAFs.

69. In the same way, clear cutting operations require formal authorizations based on cutting annual plans, which, in turn, have to be formulated based on land use plans at the parcel level. The clear cutting fees are equivalent to fifteen times the forest tax (US\$ 15 per hectare), plus the equivalent to 15 percent of the logged timber's value. Furthermore, clear cutting operations up to five hectares, accumulated over time, are exempted of fees payment. This means that once any single landholders exceed the five hectares deforested in its plot, it will begin to pay clear cutting fees. The regime to be applied to non-timber forest products (NTFP) is quite similar to the one defined for the timber products, with the exception that they have to pay a lower fee. The forest concessionaries can subscribe contracts with third persons for NTFPs use. Forest concession can be allocated for NTFPs only in forest areas where they are predominant; in this case NTFPs fee is equivalent to 30 percent of the forest tax (US\$ 0.30 per hectare/year). These products have to be regulated by management plans in the same way that it applies to timber products.

70. The forest management fees, this is those fees originated from any forest management operation, are distributed according to the following criteria: prefectures receive 35%; municipal governments get 25%, FONABOSQUE receives 10%, and The SF gets the remaining 30%. The distribution of clear cutting fees is slightly different. In this case, prefectures receive 25%, municipal governments get a 25%, and FONABOSQUE 50%. The SF does not get any income from clear cutting fees. The forest management fee was reformulated by Decree No. 27024 in May 2003. According to the new scheme, it applies only to the annual intervened area whatever the case (forest concessions, small-scale concession within municipal forest reserves, or forest management in indigenous areas), plus a cost of forestry regulations which goes to the SF (Pattie and Rojas 2003). The cost of forestry regulation is determined as an additional tariff for forest users to pay measured in an index labeled House Foment Units (UFV)⁶ according to the next scale: concessions pay 35 UFV, ASLs 20, and indigenous people do not pay such tariff.

⁶ This consist in a referential index, created in December 2001, which measures the daily evolution of real prices. It is calculated by the Central Bank based on the Retail Price Index (IPC). This unit was equivalent to Bs. 1,13591 (US\$ 0.1405) at the time when this report was written.

Promotion of Sustainable Forest Management

71. A different set of measures have been approved to stimulate the introduction of sustainable forest management (SFM) regardless of operation scales. This is expected to be achieved through the compliance of forest management plans. Non-commercial forest uses do not require authorization, and a forest management plan is an essential requirement for all types of commercial activities. Both forest concessionaries, including ASLs, as well as private landholders are compelled to elaborate such plans—including forest inventories—as an instrument to regulate commercial logging activities. Forest management plans have to comply with many technical requirements, mainly: a minimum cycle of 20 years between logging operations on the same area, a minimum cut diameter, restrictions to cut less abundant species (less than 0.25 trees/ha), and the mandate to leave 20% of the harvested trees as stand trees to guarantee a security margin for the specie preservation. These practices have to be registered in the forest management plans, as well as the measures to be taken to open and maintain roads within the concession areas, as well as other infrastructure such as bridges, and the protection of streams and other water sources. Guidelines for forest management are contained in a set of technical norms.

72. The forest regime implementation has confronted different obstacles which are explained in detail in this work's section 3. As a way to promote a gradual adjustment of forest users to the norms, the SF has approved some additional measures called "exception regimes". Three main exception norms have been issued by the SF: (1) one allowing forest logging in private properties equal or less than 200 hectares, by which land owners could log timber exempted from the management plans, (2) one allowing small-scale farmers, those holding areas less than 50 hectares, to log in areas less than 3 hectares without the presentation of land use plans at the parcel level, and (3) one approving small-scale timber producers to initiate their forest operations only with a logging annual plan, and within areas not formalized yet as municipal forest reserves due to the bureaucratic steps required to set them up (Pacheco 2004b).

73. In regard to the first, the 200 hectare operating plans were to be quickly phased out until late 1998, however, under pressure from loggers they persisted until now. It was supposed that private landholders could log timber only once in their properties without a FMP, but this rule has not been enforced in practice. According to the second exception, permits for logging in areas less than three hectares (ITE No. 087/2000, March 2000) were approved as a way to facilitate that small landholders could extract timber from their lots without having to elaborate a forest management plan but an inventory of the commercial species to be exploited. The only constraint was that these permits would be issued only one time for each rural landholding. The approval of the permits for logging timber in three hectares was quite straightforward. The third exception measure allowed ASLs to undertake their forest operations without an approved FMP, as well as within areas not formally constituted as municipal forest reserves (ITE No. 09/98, June 1998), was aimed at correcting some problems arising from the slow and bureaucratic process of creation of such reserves, because of the problems arising from the identification of public forest as result of the slow process of land sanitation carried out by INRA.

Measures to Combat Forest Crime and Corruption

74. The new forestry regulations include several mechanisms to combat forest crime their effectiveness to achieve their goals will be discussed further down. The basic

information for monitoring is provided by forest management plans -including census and inventories- and operation plans. The veracity of such plans is responsibility of the forestry engineers working with the forest users in their formulation. Based on the information reported in the annual logging plans, the SF authorize the extraction and emits Forest Certificates of Origin (CFO) which are used to control the transportation of raw material. In the same direction, the SF demands from processing centers both annual and quarterly reports regarding raw material processing. The SF is able to carry out inspections anytime at its own initiative, at the request of municipal governments, or at the request of any interested third party denouncing an illicit act. Furthermore, it can carry out inspections at roads, based on a checkpoint system, forests, at timber stockyards, and sawmills.

75. It is stipulated that forest concessions should carried out an independent forest audit every five years in order to maintain their forest use rights. Also, it is stipulated that certified concessions do no longer need to pay for such forest audits. A large number of sanctions have been included in the legal texts for cases breaking the law such as the confiscation of illegal timber and imprisonment. The confiscated forest products and equipment has to be sold through public auction, and FONABOSQUE should benefit from the resources obtained. There are other instruments that should point to higher transparency in the forest administration. The SF is compelled to call to public hearings every year to inform about their actions, its budget allocation and spending, and the impacts achieved. The shift from a volume-based to an area-based forest fees contributed also to provide larger transparency to fees collection. This only measure reduced drastically the discretionary power of likely corrupt forest officers.

Multi-Scale Territorial Planning

76. The concept and practice of territorial planning have been introduced in natural resources management policy since the early 1990s, with the approval of the Environment Law in 1992, and of some specific norms regulating territorial planning in Bolivia. It basically consists of a set of instruments of zoning at multiple scales, whose implementation should harmonize land-use change with the optimum use for which land is suitable, according to their physical capacities and potential. The suitability of soils for determined land uses—particularly agricultural and cattle ranching expansion, and forest uses under different systems of management—is determined and defined through the so labeled land use plans (PLUS), which classify optimum soils uses at a departmental scale. In Bolivia, PLUS have been performed at a 1:250,000 scale. As of 2005, about 95% of the total country's territory has a study of territorial planning. Yet there are still pending of approval the PLUS of the departments of Cochabamba and La Paz.

77. It is expected that, taking as an umbrella the departmental PLUS, should be elaborated Territorial Plans (POT) at the municipal levels, which are in practice a municipal PLUS, and a plan for municipal territorial occupation. Undertaking a process of territorial planning at the municipal level has not been an easy task due to its high costs, and because of the fact that it does not constitute a prioritized issue at the local level. By today, about 12% of municipalities have completed their POT studies, while not all of them have been formally approved, and 10% of them have carried out some steps to complete a POT. Much of those activities have been supported by NGOs with external funding (Unidad de Ordenamiento Territorial 2004). There are several cases, however, in which POTs completed have not been enforced in practice due to the lack of enough participation in their formulation, and the lack of political willing of local authorities.

78. A third level to guarantee that land is used according to soils aptitude are the land use plans at the plot level (*Plan de Ordenamiento Predial*, POP). This instrument should help to rural private owners to determine the units of productive use -either for agriculture and forestry- and conservation within their landholdings based primarily on the main soil's constraints (Andaluz 1998). POPs are approved by the Agrarian Superintendence (SA) previous evaluation of the SF. In the legal texts, any property with a size larger than 50 hectares should have an approved POP in order to obtain permits for clear cutting. Hence, legal conversion of forest is only justified by the existence of a POP. This regulation, in the beginning, was applied to all landholders settled in lowland Bolivia, but afterwards smallholders were exempted.

C. Relevant Missing Issues in the Agenda

79. Based on the review of the main forestry policy and legislation, it is likely to mention that decision-makers put a lot of emphasis on helping the introduction of good forest practices in forest management with the explicit goal of preserving the natural capital on which forestry activities rely on. The latter by making possible the conservation of threatened species, protecting less abundant species, and facilitating the natural regeneration of intervened species. The notions supporting this reasoning were rooted in the belief that sustainable forest management is feasible in tropical forests. Furthermore, there has been a somehow strong influence of an ideology of conservation more concerned with the maintenance of the environmental services that forests provide, such as biodiversity conservation and watersheds protection. Consequently, much of the productive vision of the forest—represented by timber producers—was relegated to a second plane, probably because of the massive degradation of forest resources that deteriorated the image of logging companies when the law was negotiated (Pavez and Bojanic 1998).

80. The fact is that little emphasis has been put on improving the performance of forests as a productive sector, which would lead to improve their contribution on the regional economic growth, and poverty alleviation of extensive social groups that depend to some extent on forest resources to make a living. Some studies have been carried out to study the economic performance of the forestry sector (2001, Boscolo and Vargas 2002, Gutierrez *et al.* 2003, STCP 2001). They have pointed out some crucial factors that impede the development of this sector (i.e., insecure land tenure, high transportation costs, illegal logging, lack of financing, etc.). Nevertheless, forest policies have stressed little these factors that affect sustainable development of the forestry sector. As Contreras and Vargas (2001) pointed out, this subject was not explicitly considered in the new forestry regimen, in spite of the fact that there is a need for coordination and harmonization since regulations affecting the management of the resource will also affect the operation of industries that utilize the resource. This debate will be addressed again further down.

81. Furthermore, community forestry progressively became one of the main issues in forestry in Bolivia, due to their increasing participation in forest products supply. The greater contribution of communities and local association of forest users to the sector, posits new challenges to the forestry regime since these type of producers have growing needs to implement with success their forestry operations. Nevertheless, in spite that some projects are targeting to small-scale forest users (i.e., *Jatun Sacha* AD/BOL/97/C23, and BOLFOR I and II), little has been done to help such communities and local

associations with primarily the following issues: multiple forest management, valuation of forest resources, linking local with regional market circuits, provision of markets information to forest users, help to small-scale forest users to benefit from environmental services, and supply of financial resources to help them to certificate their forestry operations, among others. Even more, little progress has been made to link local forest user needs with municipal territorial planning, and by so doing directing public resources to strength forest management initiatives as a key step to build also local development based on forestry.

D. Exploring Main Inter-Sectoral Linkages

82. There are visible increasing competing dynamics between forestry and agricultural land-uses in lowland Bolivia. They aggravate to the extent that land becomes scarce and frontier expansion takes place in areas more distant from the main urban centers. Furthermore, agricultural expansion, particularly, has benefited from policies implemented since the mid-1980s, aimed at developing a modern agricultural sector based on grain production, particularly soybean. Financial resources from the World Bank—through the implementation of the Project Lowlands—were targeted to create conditions for the development of an export-oriented agricultural sector in the expansion zone in Santa Cruz, to the east of the Rio Grande, in one of the country's most fertile lands (Baudoin *et al.* 1995). The ongoing process of land sanitation -which was mentioned earlier in this work- has also prompted the expansion of the agricultural frontier since most landholders have converted forest areas to agriculture in their owned landholdings, or over recently occupied new areas, only to justify land ownership.

83. Another type of agricultural frontier expansion is that prompted by peasant economies evolving in colonization zones more articulated to domestic markets. Main cause of growing pressures is the steady arrival of new migrants looking for opportunities to enhance their livelihoods through small farming, particularly in the north of Santa Cruz. This to some extent has enlarged the conflicts between medium- and large-scale landholders which, particularly those with no consolidated ownership rights, are vulnerable to land invasions. Migrations are also stimulated by an agrarian law which privileges public land adjudication to small farmers, even if that land is suitable for forest activities. By today, this constitutes one of the main contradictions between the agrarian and the forestry law, in terms of what to do with the available public forestlands.

84. The expansion of agricultural frontier is, to a large extent, motivated by roads expansion, mostly from what are called endogenous roads in the most active frontiers of the north part of Santa Cruz and Chiquitania. It is noteworthy that the state has not been able to spend large amount of resources for roads building since the economic collapse of the mid-1980s, except by the road paved from Santa Cruz to Trinidad, and from northern La Paz to Riberalta and Cobija. Nevertheless, recent agreements with international donors have made available the resources to pave the road from Santa Cruz to Puerto Suarez in the border with Brazil (642 km), and to improve the corridor north (La Paz – Riberalta – Cobija), which presently consists of 1,500 km of dirt road, of which several sections cannot be used during rainy seasons. These road improvement will be funded by the International Development Bank (IDB). The first road will have impacts on three major ecosystems -the tropical forests of the Chiquitania, the deciduous forests of Chaco, and the wetlands of the Pantanal-. Without adequate safeguards, the roads will lead to the conversion of primary forests and wetlands. Also, it is likely that by providing cheaper access to the Waterway and Atlantic ports, it will stimulate unsustainable logging,

mining, and large-scale agricultural development (BIC 2000). Similar effects are likely to expect with improvement of the corridor north, although there are not enough resources yet to pave this highway.

E. Achievements of the Forestry Legislation

85. There is no doubt that the new forestry regime in Bolivia has achieved important goals in reforming qualitatively the forestry sector, which were hard to think about several years ago. Main achievements are linked with several areas. In the institutional side, it is evident the progress made with the restructuring of the forestry public systems - including the creation of the SF, involving the participation of lower levels of government in forest management-. In relation to forest conservation and management, it is relevant the gradual adoption of good practices of forest management, which indirectly contributed to the expansion of forest certification. In the social side, indigenous people, and small-scale loggers and chainsaw operators, which were discriminated before, have expanded their access to forest resources, and this is more secure than in the past. These groups have also increased their participation in decisions that affect them.

86. Main institutional achievements are the consolidation of the SF, which even though the financial problems it face with -which will be approached below- it constitutes a more efficient institution, with more motivated staff, higher transparency, and lower levels of corruption in relation to the previous state agency for forestry administration (CDF) (Chávez 2000). Furthermore, the efforts undertaken toward decentralization have involved more actively to prefectures and municipalities in several issues regarding forest management, such as the monitoring of illegal activities and the support to local forest users in different ways. Indeed, prefectures and municipalities have been spending more resources on the forestry sector. This is undoubtedly an step forward respect to the past, although persist several criticism to the way in which things have been evolving. Main criticisms suggest that there are tensions among the different levels of government, that the whole system lack of financial resources, and that the most significant decisions remain at the central level (Pacheco 2005a).

87. Another outcome of the new forestry regime is the progressive adoption of good practices for sustainable forest management, which is reflected in the notorious progress achieved by forest certification, which underwent a boom after the approval of the new forestry regulations (Pacheco 2004a, Quevedo 2004). As of early 2005, there are 2,274 thousand hectares of certified forest. The certified areas range from 60,000 to 180,000 hectares, and only one company has certified three forest concessions. Furthermore, there is one indigenous community that has certified its forestry operations, and other that was not able to renovate its certification contract after five years of operation (CFV 2004). It is noteworthy that the success of certification lies in the fact that companies hold large areas in forest concessions, but certification of small-scale forestry operations run by local communities is still difficult given its relatively high costs.

88. The third achievement of the new forestry regime is what is commonly labeled as the democratization of forest access. On one side, this is the outcome of agrarian regulations that have gradually recognized land ownership in favor of indigenous people, and some local communities, and on the other side, to the new forestry regulations that devolve to these communities the exclusive rights to use their forest resources. This has made possible for local people to get organized to run their own forestry operations, and to actively begin to make partnerships with forest companies in better conditions than in

the past (Cronkleton and Albornoz 2004). Although larger and more secure access to forest areas is an enabling factor for community forestry to evolve, nothing guarantees that these experiences will succeed in the future, given the fact that several other factors contribute to explain success (Scherr *et al.* 2002).

IV. MAIN PROBLEMS AND POTENTIALS OF THE SECTOR

A. Institutional Weaknesses and Tensions

89. There has to be a certain harmony between the prescription of the law and the institutional capacity to carry it out, otherwise the law will only make sense in paper. The Bolivian experience has faced serious problems of implementation rooted on institutional weaknesses and tensions among different levels of government, which are described below. Main factors are linked to (1) the difficulties to formulate a strategic vision for forestry development, which could translate into specific actions and investment projects, (2) discrepancies between responsibilities and capacities for law enforcement, (3) the absence of an efficient system of check and balances, (4) limited financial resources for financing the public system, and (5) a lack of collaboration between forestry agencies and other public institutions like the judiciary and the police.

Difficulties to Formulate a Strategic View for Forestry Development

90. While a paradigm of sustainable development has been adopted in the official discourse, there are two competing views in Bolivia about what is the best way to use forestlands, and it becomes quite hard to harmonize them in the short run. On the one side, there is an agrarian perspective of development, by which land and financial resources should be allocated to agricultural production, given their relatively higher contribution to regional income. On the other side, it is in place a forestry-based view of development which considers that forests should be protected from clearing through increasing their profitability against other land-uses, and making visible their contribution to poverty alleviation. These two views are embodied in the Agrarian Superintendence (SA), the first; and the Forest Superintendence (SF), the second. In practice, the former seems to fit better with reality since agriculture constitutes by far a more dynamic sector than forestry, but it is likely that converted areas will face degradation to future.

91. The supremacy of the agrarian view has led the state to spend important institutional efforts and public resources to support aggressively the expansion of agricultural frontier, not only through colonization but also by sponsoring a large-scale intensive agriculture⁷, in order to secure food provision for the domestic market and to expand exports in order to increase state earnings (Kaimowitz *et al.* 1999). While several attempts have been made to regulate agricultural expansion through the zoning process - with important amount of resources spent in the elaboration of departmental zoning plans - there have been issued some legal safeguards seeking not to constrain frontier expansion. Hence, forest conversion for agriculture is possible to be justified through POPs, even within areas classified as permanent production forest based on arguments of soil

⁷ The World Bank financed a project labelled Lowland Project, which lasted for about a decade between the mid-1980s to mid-1990s, to support the expansion of the agricultural frontier in the expansion zone, Santa Cruz. It embraced several components from credit for forest clearing, to infrastructure development.

aptitude. Deforestation is currently being legalized through this mechanism, and as was showed in section 1.6, there is an ongoing trend of expansion over time.

92. There are problems related to the fact that the Ministry of Sustainable Development, has been unable to obtain a proper coordination both internal and with other institutions of the public sector such as the prefectures, and municipal governments, as well as with private sector to formulate a consistent vision for the forestry sector's future. This issue is discussed in more depth in section 4. The forestry sector is in charge of a Direction within the Ministry of Sustainable Development (MDS) with little resources and personal. Although some prefectures (i.e., Santa Cruz, Cochabamba, and Pando) have attempted to build regional strategies for forestry development and conservation, most of such strategies are only in paper since they have not been supported with further development investment plans and resources, and hence they have been quickly relegated. In the same line, only a small number of municipalities have tried to explicitly formulate a municipal forest policy, and achieved successfully such endeavor.

Discrepancies Between Responsibilities and Capacities for Law Enforcement

93. The capacities of law enforcement are to a large extent related to the availability of financial resources for monitoring forest operations, wood transportation, and processing activities. In Bolivia, even though the SF is the state agency in charge of law enforcement, these functions should involve to municipal governments as well. Other factors that influence on the conditions that constrain monitoring and forest crime control, beyond the availability of financial resources, is the existence of incentives for forest officers to do so, either through isolated actions or in collaboration with other levels of government. Law enforcement in the forestry sector has improved substantially regarding to the past situation, but problems still persist. The main problem originates in the fact that resources financing the forest system come exclusively from forest fees, which are not as high as was initially expected. Tax volumes tended to decrease since the base for taxes payment (1 US\$ per ha) was modified in May 2003 as mentioned earlier. This has led to a decline in the amount of forest fees collection, which was not too drastic for the SF but for prefectures and municipalities. This is so because the SF does not share with prefectures and municipalities the portion of forest fees accounting for the costs of regulation⁸.

⁸ This work's section 3.2 discusses with more detailed the new system of forest fee collection.

Table 8. Distribution of Forest Fees, 1998-2004

	<u>1998</u>	<u>2000</u>	<u>2002</u>	<u>2004</u>
Total forest fees (millions US\$)	9,905	4,272	4,068	6,086
<i>Forest fees by institution in thousand US\$</i>				
Forest Superintendence (SF)	3,305	1,410	1,555	3,415
Prefectures	2,986	593	883	942
Municipalities	2,182	1,166	774	752
FONABOSQUE	1,433	1,102	856	977
Forest Superintendence / Total in %	33.4	33.0	38.2	56.1
Average received per municipality (thousand US\$)	21.0	10.0	6.9	6.9

Sources: Superintendencia Forestal (2005). Adapted by the author.

94. The arrears from forest concessionaries put the SF in a difficult situation, and a portion of FONABOSQUE money went to support it.⁹ Yet, the new fiscal regime helped the SF to collect the necessary funds to operate, even to levels reached in the early years of the new forestry regime's implementation. Indeed, less total money is being collected but a large proportion of the total is going to the SF in detriment of prefectures and municipalities (Table 8). Most of the SF budget is spent in monitoring activities, which is not the case in both prefectures and municipal governments. There is anecdotal evidence that prefectures have diverted their resources from forest fees in actions that are not necessarily forestry-related. Furthermore, only few prefectures (i.e., Santa Cruz and Cochabamba) have tried to do something linked to forestry such helping local governments in equipping their forest offices, but such actions have been limited not only by the lack of political will but also due to the predominance of other priorities.

95. Municipal governments' intervention in forestry is quite diverse due to the fact that some municipalities have become active players in promoting forest management and local conservation initiatives, but others do not merely have enough incentives to spend efforts in forest-related issues (Pacheco 2005a). The latter makes that municipal government's responses to decentralization of forestry are in practice quite diverse. Other factors influencing on this issue is related to the local political economy, the importance of forest economy in people's livelihoods, and the motivation of authorities. Municipal governments spent their portion of forest fees in a diverse set of actions (i.e., covering operational costs, financing monitoring actions, maintenance of roads, and helping local forest users to develop their management instruments). Yet, as was mentioned before, critical issue is the absence of actions of forestry extension to support local forest users' efforts due to the inaction of municipalities which has been partially fulfilled by community forest projects, mainly in the Chiquitania, Guarayos, and Chapare areas.

Weaknesses of Related Public Agencies for Policy Implementation

96. The actions from the SF often become harder since there is a weak support from the judiciary and the police. There is a complete lack of attention to environmental issues in general and to forest-related issues in the judiciary, and judges are not well trained to deal with environmental crimes which reduces the risk for these types of crimes to be penalized. Furthermore, the support of police to SF, which is in charge of departmental governments or prefectures is often very weak, and there is a lot of anecdotal evidence in which field personal from the SF has been threatened by illegal loggers. This indirectly led to disincentive the local staff of the forestry agency to monitor forest crime. There are

⁹ Another portion of FONABOSQUE resources went to finance land regularization in Pando.

some cases, however, in which collaboration for controlling illegal crime has taken place involving local offices of the SF, municipal forest units, and the police. This is more often to happen when there is a need to control illegal smuggling of wood to neighbor countries such as Brazil and Peru.

B. Failures of the Policy and Regulatory Environment

97. Diverse are the factors associated with failures of the regulatory framework, or the way in which they have been implemented in practice. The forest actors, however, are not willing to modify the rules of the game since they had to pay a high costs linked to the uncertainties originated from a slow process of approval of the new Forest Law. Main policy failures that are cause of problems in guiding sustainable forest management are linked to: uncertain property rights in forestlands linked to a slow process of land sanitation, unrealistic forest norms and regulations, excessive regulatory burden which difficult forest users to become and remain legal, and -in the perception of forest users- somewhat “unfair” policies and regulations.

Weak or Conflicting Property Rights

98. Land tenure is still insecure, and struggles for forestland persist, most of which arise due to an acute competition for timber and land for agricultural expansion. The most typical cases of land struggles are among large-scale agricultural entrepreneurs, which attempt to expand their landholdings over indigenous areas either by buying or renting indigenous areas, or merely by encroaching them (i.e., indigenous territory of Guarayos). The second typical situation is reflected by land struggles between colonists and indigenous people due to the pressures that the first exert over lands claimed by the second (i.e., indigenous areas in TIPNIS and Yuracaré). A third situation occur between indigenous communities and *barraqueros* in the northern Amazon, due to the expanding demands of the first, and finally between colonists with logging concessions (i.e., el Chore, and Guarayos). A major part of land struggles between colonist, large-scale landholders, and indigenous people arise due to a growing scarcity of public land. This struggle is taking place is because not only the different actors are fighting to enlarge their own occupied areas but also since a portion of land has been put under protection. It is noteworthy that protected areas -mainly those closer to agricultural frontiers- face also with increasing pressures.

99. The undergoing land sanitation process has not ameliorated land struggles and to some extent has led to intensify them. Main legal shortcomings are the following: (1) a complicated procedure to justify the social, and economic function claimed by landholders (*función económico-social*, FES), particularly in forest areas, and clearing out the forest is still the best way to justify land ownership, (2) a difficult technical procedure in the filed to delimitate landholdings’ borders, which in turn slow down the land titling process, and increases their final costs, (3) and finally, the process of land regularization face with lack of transparency, and limited social control—with some few exceptions like in Pando (MDS 2005)¹⁰.

¹⁰ The Agrarian Law of 1996 norm that the land sanitation process should finish in 2006. According to INRA (2005) only 13% of landholdings have been titled, and there is other 35% in process, and another half in which there is no progress at all. As of 2005, US\$ 72 million have been spent in land titling (US\$ 54 million coming from the international cooperation, and US\$ 16 million from the National Treasury). INRA assumes that there is need for additional seven years, and there would be US\$ 43 million committed to it.

100. For instance, the lack of control of the INRA over the enterprises contracted to develop land sanitation has increased the corruption in formalizing land ownership and, in turn, decreased significantly the likelihood of finding public lands for distribution to landless people. As result, there is a never ending titling process of indigenous territories (only 21% of total claimed area has been titled), and an unknown but probably large portion of land acquired through illegal means has been legalized, not necessarily to those who need more the land to put it in production but to land speculators. It is likely to assume that most of such land is going to end up in agricultural uses if forest use remains as low competitive. It is worthy to mention, however, that in the cases in which land sanitation has been completed, forest management activities have emerged as an option to enhance the livelihoods of indigenous people. This has led to multiply the community initiatives of forest management, even in a context of severe economic constraints.

Unrealistic Laws and Regulations

101. It was already mentioned in section 3.2 that Bolivia's policy framework has been adjusted to respond to perceived problems or loopholes in the norms, and in some cases due to the pressure coming from specific interests groups. Such modifications indicated a positive process of adaptation along as a greater understanding of the problems undergoing in the forestry sector, thus allowing the system to keep functioning. The problem is that apparently a beneficial modification can have unintended consequences with negative impacts on the system or, taken together, it may gradually cause decision-makers to lose sight of the goals and the rationale that originally guided the system. This is the case of the uniform requirements demanded by forest management plans, which have progressively been undermined by temporary mechanisms introduced as exceptions regimes, as a response to the needs of specific actors.

102. For example, when the new forestry law was first enacted there were numerous small logging companies that did not have legal access to forest, since they were too small to gain concessions or had little chance of participating in an ASL. The solution was to approve small-scale annual harvest plans in private properties prior to approval of full management plans. A special measure applied to operating plans with areas less than 200 hectares, which required a simplified process approved at regional offices. As mentioned earlier, the 200 hectares operating plans were to be quickly phased out, however, under loggers' pressure, they persisted and in some region (i.e., Pando) they have become one of the principal forms of logging outside of concession areas, and there are not guarantees in there that the forestry operations will follow norms of sustainable management. Although there is much concern about the sustainability of this type of logging within private landholdings, it still is an attractive option since it allows loggers to avoid most of the transaction costs of preparing a general management plan (FMP).

103. Another mechanism was created to combat the misuse of land clearing permits. Since it is very easy to get a land clearing permits, increasing numbers of land owners, including smallholders, were using these to access timber on their land, even though they had to pay a higher volume based fee that, however, is cheaper than preparing and approving a forest management plan. In response the SF created a mechanism for operating plans less than 3 hectares. This extremely simplified process, available one time per property, was intended to allow small producers to harvest timber without clear cutting if they respected the improved silvicultural practices dictated by the law. The 3 hectare operating plan targeted small-holder and intended, as a first step, to allow them to

develop a general management plan. The problem is that since few smallholders know the mechanisms to be applied, it has been arbitrarily used by logging companies—since there are indications that volumes harvested have been inflated allowing them to buy wood from illegal sources. At the bottom line it persists the problem of to what extent more flexible norms of forest use may have unintended consequences on forest conservation. The answer for this is rather institutional than technical.

Costs of Implementing Management Plans

104. The goal of requiring FMP is to assure that forest use is well conceived based on forest's productive capacity, environmental realities, and that those submitting the plan have the capacity to implement and administer the operation. The burden of preparing a FMP is not as high for timber companies than for community initiatives. The problem is that it is not easy for many community level groups to comply with regulations and gain approval. Preparing management plan is complicated and demands high technical capacity. It requires carrying out systematic forest inventories, data analysis to determine species densities, developing maps of forest types and conservation areas, all presented in text description of which resources will be managed and how. If approved, a similar process must be repeated each year for an annual operating plan (POAF) based on a census of the harvest unit. These documents must be signed by a forester, but even if this would not be a requirement most local groups would need to hire a professional because forest harvesting requirements exceed their developed capacities.

105. Unfortunately, there is little information available about the cost of elaborating FMP, and even less about other associated transaction costs. Ramirez (2004), mentions that the elaboration of FMP and census for the annual plan have a cost of 0.54 US\$/m³ the first, and 0.85 US\$/m³ the second, making a total of 1.39 US\$/m³ the two of them. The total costs of the forestry operations reached a total of 10.39 US\$/m³. Hence, the management instruments entails about 13.3% of the total costs including roads construction and maintenance, operation expenses, managerial costs, and forest fees payment. Another estimate for a large-scale forestry operation mentions that the FMP costs is about 0.10 US\$/m³, and the census equates 4 US\$/m³, which represents about 9.4% respect to the total operation costs of a log put in the sawmill (STCP 2001). While FMP are elaborated only once for the whole cutting cycle, census have to be made every year. This is only referential data, and it is surprising the differences found in the two different sources.

106. The process of preparing a management plan can be comparatively expensive for communities which often do not have available resources for investment. They must cover the costs of food and material while preparing forest operation and must pay the professional that signs the plans and POAFs. Not only can this be a major investment of time, labor, and capital but also the approval process can be very slow. Communities must pay the cost of transportation and stays in urban areas to meet with the SF. The time since a group is organized and gathers initial forest information to when their plan is finally approved can take several months at the minimum and can stretch to over a year. Poor families are unable to make such risky long term investments. Given difficulty with legal compliance, many select non-sustainable practices either by cutting their trees without approved plans, or, as was mentioned before, many select to get approved forest clearing plans to justify timber extraction because their comparative lower costs. Hence, an over-regulated forestry sector seems to lead to failure instead of helping SFM.

107. As a result, the development of most community level plans has been subsidized by development agencies and NGOs, or it has been financed by timber companies or loggers in exchange for the timber to be extracted. Also, there is the case that communities and ASLs that got their FMP financed, they never carried out forestry operations since they had not access to capital to initiate such operations, or in some cases they were forced to sell standing trees. Besides technical assistance, community groups need to form new types of organizations to submit their plans. These groups need to marshal labor, carry out forest census, and reach agreement on how to participate and monitor harvesting. Indigenous and colonist communities lack of experience with commercial logging. On other side, members of ASL may know how to log but the requirements force them into unnatural organizations. Because the law states that ASLs must be comprised by 20 members, many groups are formed with collections of individuals that have little affinity and no history of collaboration, making difficult the process of starting-up. In some cases, ASLs are dividing the areas with annual plans among their members.

“Unfair” Policies and Regulations

108. Several are the norms contained in the Forest Law that may look like unfair in the view of the forest users, depending on the case. The first has to do with the area determined to be allocated to municipal reserves, which reaches currently up to 20% of the public forest within each municipal jurisdiction, though there is no any technical criterion to justify this decision. The second is related to the distribution of the forest fees independently of the functions that each level of government has to comply with (central, departmental and municipal government). Apparently, municipal governments have several responsibilities but little money to pursue them, and in contrast prefectures do much less work than they should do but get an important proportion of fees. The third is that linked to the prohibition of chainsaw use to small-scale forest operators, even though there is no enough information available to justify it. The fourth issue has to do with a flat forest management fee that does not distinguish forest quality and accessibility. Hence, it favors those areas that may be more easily harvested in terms of transportation. This situation generates pressures, which induce companies working in more difficult areas, to use their concessions to extract only the most valuables species like in the northern Amazon.

C. Lack of Competitiveness of Forest Activities

109. There are some structural barriers that make difficult for the country to compete in the foreign countries, and it also applies to the forestry sector. While some other sectors have been able to revert some of that conditions (i.e., like grains and gas production), this is a more difficult task for the forestry sector. Location factors, and transport costs, along with a weak articulation among extraction activities, with processing and manufacturing of wood products add some additional challenges to improve the efficiency of forestry activities. Like in any other sector, the small size of the national markets makes to reach external markets a desirable target.

Main Constraints of the Forestry Sector

110. The forestry sector in Bolivia is facing a trend of relatively low growth. That is because this sector is facing urgent problems, most of them rooted on structural factors. Main economic problems lie on the low competitiveness of forest activities associated to the lack of financing and investment, poor infrastructure, high transportation costs - estimated in about 60% of total production costs- and poor business practices. These factors are all often mentioned in different studies as the obstacles to the forestry sector's economic growth (Jordan *et al.* 2002). In turn, Chavez and colleagues (2003), assessing the factors that influence on forest production's weakness, mention that the people involved in forest management and commercialization often lack of training, and there is little knowledge of market information. Also, there are no credit lines for forest users to access to capital to finance their operations, or to expand their investments in forest management, and processing. Furthermore, the organizational development of forest users, mainly of the emergent associative and communal initiatives is still limited.

Lack of Competitiveness for Forest Exports

111. Competitiveness analysis of the forestry sector often points out that, in spite of the large international trade of forest products, Bolivia has been encountering difficulties in penetrating the traditional markets for tropical wood. Main rooting cause has to do with high production costs of sawnwood. A study carried out by STCP Engenharia de Projetos (2001), comparing sawnwood production costs of Bolivia and Brazil, mentions that total production costs in Bolivia is equal to US\$ 315.8 m³/hectares, comparing to 141.5 m³/hectares in Brazil. This data shows that there is a quite large difference in the productions costs in the two countries. According to the mentioned source, such difference in costs is due to three factors: (1) reduce average volume removed from forests in Bolivia (3 m³/hectares), (2) high cost of inputs such as fuel, oil and others that makes expensive harvesting and transportation costs, and (3) higher costs of transportation to the seaports. These factors work against sawnwood exports, since the only way for forest exports to compete is to incorporate some adding value through any kind of processing.

112. The last factor is critical when assessing forest exports performance. While distances to the ports are no longer than Brazilian ones (1,200 km in Bolivia versus 2,100 km in Brazil), transportation costs from the mills to export ports are about 80% higher in Bolivia (STCP 2001). These are even higher in the most isolated regions of Bolivia like the northern Amazon. Chávez (2000) comparing distances, and costs from Riberalta—in the northern Amazon—and Santa Cruz to the export port in Arica, in northern Chile, mentions that transportation costs from the first location are about 117 US\$/Tm from the first location compared to 71 US\$/Tm from the second, while distance are not significantly different from these two production zones (1,541 versus 1,537 km, respectively). This author suggests that another problem is the lack of interactions among logging companies, and among them with processing companies. Hence, there are no partnerships, or strategic alliances among companies for the identification of new markets, or for joint efforts of commercialization, in order to supply the volumes that external markets demand.

Structural Disadvantages And Forest Certification

113. According to this information, Bolivia does not have a comparative advantage for exporting forest products, with a variable disadvantage according to different types of products. In this line, it is not clear to what extent these constraints could be removed by more processing, and what kind of processing would have to take place. This means that processing does not automatically improve the competitiveness of the country, and even in the case of processed products these disadvantages may tend to persist. It is noteworthy that processed exports are tending to grow, and currently are the most important portion of exports. Much of the products exported use certified wood. It is widely extended in the Bolivian policy debate that the only way to expand exports is capturing some market niches demanding certified wood.

D. Limited Success of Non-Timber Forest Products

114. There is increasing attention been put in non-timber forest products, mainly because the potential that they have as a way out of poverty for forest dwellers. But, besides some very few number of non-timber forest products which have stable markets, there is a large list of others that are not attractive for investments since it is hard to profit from them. In contrast, many of them have a crucial role in people's livelihoods helping on food security and health. This is the case in Bolivia where Brazil nuts is a key non-timber forest products, which is exported overseas, and people can obtain important incomes from its extractions. There is a large list of other non-timber products, however, which become hard to commercialize in the domestic markets.

Brazil Nuts: The Champion of Non-Timber Forest Products

115. Most attention of non-timber forest products (NTFP) is devoted to Brazil nuts since this product, in association with rubber in the past, has historically supported the extractive economy of the northern Amazon, and it has make possible that this region has one of the most conserved forest of the whole country. In the late 1980s the region attracted some investments in Brazil nut factories where the nuts are shelled and the nuts dried for export to the US and Europe. This represented a dramatic change in the local economy since it expanded the demand for local labor, and made much more dynamic the Brazil nut extractive economy (Bojanic 2001, Stoian 2000). It is noteworthy than even thought the incomes in this region are among the highest of the whole country, it also presents the highest power index of the country. This suggests that there is an uneven distribution of income, much of which is generated by the Brazil nut economy.

116. In the last years the region underwent a growing trend of Brazil nut exports not only due to the ascending international prices of this product but to the expanding supply motivated by prices increase, which in some cases has aggravated land struggles (de Jong and Evans 2005). Brazil nuts exports skyrocketed since the late 1980s to 37 million in 2003 (Table 2). Another NTFP that showed to be promising in the northern Amazon was palm heart, but it underwent a rapid decline from 25 processing plants to 2 in the early 2000. This was the result of a dramatic drop in this product's international prices - equivalent to 60%- originated in some commercial sanctions imposed from the neighbor country of Brazil due to sanitary reasons (Chávez 2000). Anyhow, in contrast to Brazil nut collection, palm heart production was not a sustainable activity in the long run since the pace of extraction did not allow for this specie's regeneration.

Extraction And Commercialization Of Non-Timber Forest Products

117. There are few studies about extraction and commercialization of non-timber forest products in lowland Bolivia, though it is assumed that these products constitute an important piece in local people's livelihoods, particularly lowland traditional communities, and indigenous people. This, however, is not a verified statement since few case studies exist, besides Brazil nuts, documenting NTFP contribution to fulfill people's subsistence, or cash income needs. Several studies mention that NTFP are not a panacea for enhancement of people's livelihood due to the fact they have limited markets, and are easily substituted by other high quality products, yet criticism to such arguments arose based on empirical findings suggesting that there is a wider diversity of situation in practice (Alexiades and Shanyle 2004). While NTFP contribution to local people economies should not be underestimated, it is more likely that they play a key role in providing safety nets for rural dwellers rather than constituting an accumulation source.

118. In Bolivia, there were assessed -through participatory methods- some factors influencing commercialization successes of NTFP. Marshall and colleagues (2003) review 15 experiences of NTFP production and marketing constraints including a wide diversity of products (i.e., wild rubber, incense, wild vanilla, palm heart in northern La Paz; *jipi japa* palm, palm heart, lianas, and bamboo in Santa Cruz; and natural handicrafts in Beni). The authors identify more than 40 factors constraining successes of NTFP commercialization from production through sale. The most relevant factors are the lack of management capacity for marketing, low product price at market, and lack of road and transport infrastructure, as well as lack of access to market information. These results ratify the notion that enthusiasm for NTFP production is increasingly being tempered by a growing realization that many attempts at NTFP commercialization have failed to deliver the expected benefits. This issue demands to assess the different processes that NTFP involve, such as production, collection, processing, storage, transport, and marketing.

E. Incipient Compensation for Environmental Services

119. Payment for environmental services (PES) is also seen as another panacea for forest conservation while helping forest users to enlarge their forest-based incomes. The broad categories of forest environmental services that are currently commercialized on a relatively significant scale are carbon sequestration, watershed protection, landscape beauty and biodiversity conservation. In Bolivia, as in many other countries, there are emerging initiatives looking for implementing diverse ways of compensation for environmental services, since payment schemes are harder to introduce. The most publicized case has been the Noel Kempff Mercado Climate Action Project based on a carbon-offset payment mechanism. Although lesser known there are some other incipient compensation initiatives mainly targeting watershed protection, recreation, and biodiversity protection (Robertson and Wunder 2005). These authors conclude that, in practice, there are not really PES schemes in Bolivia but a lot of diverse mechanisms that provide some kind of compensation for environmental services.

Compensations for Carbon Sequestration and Watershed Protection

120. The most ambitious initiative by far is the Noel Kempff Mercado (NKM) Climate Action Project, in place since the mid-1990. Several studies assessed main social and environmental impacts of this effort (Asquith *et al.* 2002, Milne *et al.* 2001). It is based

on a concept of “avoided deforestation” in the 634,000 hectares expansion area of the NKM Park, by which the project paid logging companies for abandoning the area, and compensated three communities which lost access to the forest for subsistence-oriented extraction activities. The total project cost was US\$ 9.5 million which was used to pay to several components ranging from compensation payments to research activities. Robertson and Wunder (2005), as part of this project’s assessment, mention that this does not fulfill all the principles of PES since what loggers and landowners sold in a genuine *quid pro quo* deal was not the promise to continuously deliver an environmental service, rather they sold their fundamental rights to exist in the extension area. Hence it has been suggested that future project developers could consider a PES contract that directly links development benefits to limitations on the communities’ right to exploit forest within the project area and in the TCO, so as the best way to avoid leakage (Asquith *et al.* 2002). A still open question is who enforces these initiatives, and how effective becomes such enforcement.

121. There are some other efforts going on in Bolivia adopting some principles of PES linked to watershed protection, which is in fact quite controversial, due to the not verified watershed functions of forests (Kaimowitz 2004). This effort is developed in Los Negros River Watershed, involving the communities of Los Negros and Santa Rosa de Lima, the two in Santa Cruz, and the Sama Biological Reserve, in the department of Tarija. The first area targets ameliorating deforestation aim at watershed and biodiversity protection, by compensating some farmers (one beehive as a payment for enrolling 10 hectares of forestland), but potential downstream beneficiaries do not yet pay since the little money involved comes from external sources.¹¹ The second seeks watershed protection for drinking water, irrigation, and hydroelectric use. However, it do not use PES components but it has been raising money from institutional sources -mainly foreign donors- to carry out traditional conservation and reforestation projects. The second main factors constraining PES development are the lack of user’s payments, land tenure insecurity, and slow trust among actors (Robertson and Wunder 2005).

Other PES Initiatives: Landscape Beauty and Recreation

122. Robertson and Wunder (2005) enumerate some other initiatives seeking to use PES for landscape beauty and recreation (i.e., Chalalán ecolodge, Mapajo indigenous ecotourism lodge), and biodiversity protection (i.e., Beni Biological Station Debt-for-nature Swap, and biocommerce initiatives). The authors point out some cautions in relation to the fact whether natural oriented tourism constitute a PES case since landscape beauty is only embedded into a tourism operations, and not necessarily local communities retain the benefits from tourism operations. When locally managed operations were put in place, upfront investments or running subsidies to finance recurrent costs were provided by donors with a prime interest in biodiversity, although there was a variable degree to which these donor investments were instrumental in the start-up and operational success of the lodge. Pure biodiversity protection projects are in their infancy in Bolivia. Uncertain markets in the case of biodiversity premiums for products and uncertain legal land-tenure systems for conservation concessions are some of the key obstacles.

¹¹ This is a small-scale initiative. Robertson and Wunder (2005) point out that it involved five farmers in 2003, and seven additional enrolled in 2004, while four of the five previous ones prolonged their contract for another year. This brought the total area under conservation contract up to about 1000 ha.

F. Persistence of Illegal Forest Clearing and Logging

123. One of the most surprising issues when looking at the Bolivian forestry is that in spite of the institutional efforts to change the way in which forest resources are managed, and the progress made with forest certification, there is anecdotic evidence that illegal clear cutting and logging still persist at important levels, although there is no information to support this assertion. While on one hand, illegal acts are paradoxically the result of strict regulations that tend to enforce good forest practices, on the other hand, they arise due to the lack of institutional capacity to enforce the forest law due to the several institutional constraints enumerated in a previous section.

Illegal Forest Conversion to Agricultural Land-Uses

124. As mentioned earlier, deforestation underwent a rapid increase in the last twenty years from less than 46,000 thousand hectares/year until the mid-1980s to about 250,000 hectares/year during the early 2000 decade. The forest removal is relatively localized in a few geographic areas as result of agricultural frontier expansion. Total accumulated deforestation by 2004 was about 4.3 million hectares. Three locations account for more than a half of total deforestation in Bolivia's lowlands. Most intense forest conversion has taken place in the following areas: (1) in the north western region of the department of Santa Cruz (18% of total accumulated deforestation) where a larger number of colonists have settled down; (2) in the so called integrated area close to the city of Santa Cruz (17%); and (3) in the northern expansion zone (19%) to the east of the Rio Grande, mostly driven by intensive agriculture (Fig. 4). Other areas with a relatively high pressure for forest removal are the northern expansion zone, Chapare, and Amazonia. From large, the higher deforestation rates are in the department of Santa Cruz.

125. Pacheco (2005b) typifies three different types of agricultural frontiers based on the predominance of a specific landholder type: dominated by smallholder colonists, medium- and large-scale intensive agriculture, and cattle ranching. This author mentions that 38% of accumulated deforestation has taken place in smallholder frontiers, 43% in medium- and large-scale landholdings, 5% in cattle ranching frontiers, and the rest in undetermined areas. It is noteworthy, that while contribution of colonist frontiers in total deforestation was greater until the mid-1980s, this trend has reversed in the recent past since medium- and large-scale agriculture contribution to forest removal has begun growing to faster trends. The latter result from the incentives to produce soybean destined to the regional Andean market. To date, about a half of total agriculture acreage in Santa Cruz is devoted to soybean cultivation (CAO 2004).

126. Illegal forest clearing is extensive. It was estimated that (2001) considering an annual deforestation of 250,000 hectares between the mid-1980s to mid-1990 (based on Steininger *et al.* 2000), illegal clear cutting for forest removal reached about 80% of total deforested area (Contreras-Hermosilla 2001). Other estimates mention that the annual rate of deforestation was about 191,000 hectares/year between the mid-1990s and 2000, but deforestation taking place in areas outside smallholdings -the one that needs a permit- was about 150,000 hectares during the same period (Pacheco forthcoming). Considering that the area with authorized permits for forest clear cutting was about 20,400 hectares in 1998, and 51,146 in 2004 (SF 2003), the total illegal forest clearing ranged from 66 to

86% during the two mentioned years, which is alarmingly high. This reinforces the fact that much of forest clearing in Bolivia does not have a permit.

127. Forest clearing is overwhelmingly concentrated in the tropical semi-deciduous forests. These forests, although of immense ecological value, are lower in biomass (20-100 mt/ha) compared with the 200-600 mt/hectares of some high areas of more humid forests to the north. The result is that forests in the department of Santa Cruz are easily and relatively cheap, since they are able to be cleared with heavy machinery (Hecht 2005). There is not much data available about cost and benefits of deforestation in the agricultural frontiers. Information for soybeans suggest that, in the mid-1990, an hectare for mechanized production of soybean/corn achieved a net present value of US\$ 1,500, while the environmental costs for the reduction in carbon sink resulting from forest removal was equivalent to US\$ 160-190 per hectare. Nevertheless, the costs related to biodiversity loss and soils erosion were not estimated (Davies and Abelson 1996).

128. It is noteworthy that not all deforestation is inappropriate since there is some forest clearing which contribute to economic growth, and enhance people's livelihoods (Kaimowitz *et al.* 1998). Appropriate deforestation is that which occurs in areas suitable for agriculture, like the one taking place in the Expansion Zone given the good physical quality of soils, but other is occurring in areas inappropriate for agriculture, and vulnerable to soil degradation. The Bolivian solution to regulate forest conversion to agricultural uses, as mentioned, was to elaborate land use plans in which clearly are separated areas for agriculture –with different aptitudes—from those which should be devoted to forest uses. The fact is that, however, these land use plans are not enforced, and there is increasing pressures of forest clearing over forest production areas. Furthermore, some deforestation can be appropriated when it takes place in areas of extreme poverty, and where lands for subsistence production are needed by poor smallholders. Increasingly there are some areas –like the Chore reserve, or some protected areas in northern La Paz- where smallholders struggle to have access to land for staples production.

Illegal Practices in the Forestry Sector

129. Illegal forest activities are widespread in Bolivian lowlands since extraction to processing. Cordero (2003), based on estimates for the year 2001 prepared by CAF, mentions that at least 50% of the domestic consumption of timber comes from illegal sources. According to this estimate, the average timber domestic consumption ratio could reach about 0,0546 cubic meters person/year which accounted for a total domestic consumption of 451,778 cubic meters in 2001, year in which the total timber extracted consumed domestically was about 224,134 cubic meters. It is noteworthy that the estimated timber domestic consumption is far below the one estimated in other countries (1,7 cubic meter person/year in USA, and 0,11 cubic meters in China).

Box 1. Illegal Practices in the Forestry Sector in the Bolivia Lowlands

Illegal Occupation of Forest Lands

- Encroachment of areas granted with some type of forestry rights either for communities (i.e., indigenous territories), or forest concessions (i.e., municipal forest reserves)
- Invasion of public forested lands without forestry rights for farming activities
- Farming expansion without complying with management plans

Illegal logging

- Logging within protected areas and outside concessions boundaries
- Logging within private properties within legal authorization
- Logging and farming in prohibited areas (i.e., steep slopes, and water catchments)
- No compliance with forest management practices (i.e., logging of protected species)
- Falsifying information in the elaboration of forest management plans
- Extraction of non authorized species and higher volumes than authorized
- Falsifying and/or selling documents for certifying timber origin (CFOs)

Illegal Timber Transport and Trade

- Transporting logs (legally or illegally harvested) without authorization
- Reusing non filled out documents for certifying timber origin (CFOs)
- Smuggling timber to Peru and Brazil from the northern part of Bolivia

Illegal Forest Processing

- Small sawmills operating without a processing license
- Using illegally obtained wood in industrial processing

Illegal Accounting Practices

- Evasion of forest fees payment primarily by large-scale forest concessions
- Manipulating volumes of timber processed to avoid taxes payments

Source: Taken from (Pacheco 2004b), which offers a detailed explanations of these illegal acts.

130. Box 1 shows the different illegal practices in the forestry sector in the Bolivia's lowlands. They adopt a diverse range of types. Illegal acts take place through illegal logging, transportation from timber without permits, processing of timber originated in non-managed forest areas, and illegal account practices. Unfortunately, there is not possible to determine the extent to which all of these illegal acts take place in practice, and there is only anecdotal evidence confirming their occurrence. The key question is why forest crime is still rampant in spite of the institutional reforms that were undertaken in the recent past. The factors that explain the persistence of illegality in the forestry sector are, at least the following: (1) unresolved access to land to informal forest users, (2) unrealistic rules along with bureaucracy in the allocation of permits, (3) transactions costs to implement good forest practices that make harder to pursue sustainable forest management, (4), institutional weakness for forest law enforcement and little vertical and

horizontal collaboration among the institutions of the forestry system, and (5) and the lack of information and of participation of civil society in controlling forest crime. In short, the total cost of complying with the law, in financial terms as well as in terms of bureaucratic tangles, and capacity of some to even understand regulations, tend to make more attractive to operate outside the law. Yet, as mentioned, the magnitude of illegal logging is still not well known.

131. Illegal logging has decisive implications on the forestry economy. An economic analysis of management alternatives in Bolivia's Amazon region revealed that unsustainable techniques are regularly more profitable. Sustainable forestry management, even when it can be highly profitable, simply cannot compete commercially with traditional unsustainable methods (Bojanic 2001). Unless the difference can be reduced by increasing the profitability of sustainable management and reducing that of non-sustainable alternatives, the propensity to return to traditional forms of forestry exploitation and management will still persist. Therefore, the differential cost created by the law between managed forests and illegal methods of exploitation produce an additional incentive for illegal operations (Contreras and Vargas 2001).

V. TOWARDS A FORESTRY STRATEGY IN BOLIVIA

A. A Review of Existing Strategies

132. As it was discussed in the previous section, even though the progress made in the past decade, there are still important challenges in the forestry sector to achieve development and conservation goals. Some of the main problems are rooted in the governance conditions of forest resources management, while others are related to the economic conditions of forest activities, and people's capacity to profit from forest resources while at the same time conserving them. In the governance side, the legal framework has some legal inconsistencies, and the capacity of forest institutions is way below the demands that the government imposed on them. On the economic side, the domestic market is small, and there is a weak position for exports to compete in external markets, but in some value-added products, and the full value of forest cannot be realized since markets for non-timber products are small and fragmented, and the existing efforts in the country to compensate for environmental services are still in their infancy.

133. The institutional and economic situation of the forestry sector tend to favor illegal forest clearing and logging, which have negative effects on forest conditions in the long run. But making enforcement more effective may tend to increase the costs of forestry industry, and also could tend to affect to marginalized groups which are burdened with the costs of forestry regulations. This issues posit important challenges for a national strategy aimed at promoting forest development by expanding economic outputs, while at the same time alleviating poverty for people who to some extent depend on forest resources to make a living. This is not an easy puzzle to solve. The strategies elaborated in Bolivia in the last decade, which are four, still reflect a more traditional perspective relying in a modern forestry sector linked to external markets, but as it was discussed in previous sections, this is not necessarily the best way to follow into, and more attention should be put on strategies for poverty alleviation, and the conservation of vulnerable areas. Probably, the pathway to follow is a combination of such three aims.

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Table 9. Summary of Available Strategies for the Forestry Sector in Bolivia

Topics	Bolivian Forestry Chamber (2000)	Ministry of Sustainable Development (2002)	Viceministry of Natural Resources (2003)	Departmental Council of Competitiveness in Santa Cruz (2004)
<i>Name of the Plan, Program or Strategy</i>	Strategic Plan for the Bolivian Forestry Sector Development	Policy and Strategic Plan for Forestry Development in Bolivia	Integral Program for Bolivian Amazon Development	Strategy for Integral Sustainable Development in the Bolivian forestry sector
<i>Proposed goals</i>	<ul style="list-style-type: none"> ▪ Creation and consolidation of the cluster system ▪ Improve competitiveness for the enterprises ▪ Making the country's economy more dynamic 	<ul style="list-style-type: none"> ▪ Consolidate the forestry regime in the country ▪ Promoting forestry-based economic development ▪ Improve competitiveness of the forestry sector 	<ul style="list-style-type: none"> ▪ Developing the regional productive base on, linking it with export markets ▪ Enhancing regional income and employment based on timber and non-timber forestry economies 	<ul style="list-style-type: none"> ▪ Promoting enabling conditions for investment in the forestry sector of the Amazon basin ▪ Contribute to creation of jobs and exports of products based on sustainable sources
<i>Expected outcomes</i>	<ul style="list-style-type: none"> ▪ 12 million ha under SFM, of which 70% certified ▪ 200,000 ha of plantations ▪ Expansion to 9 million m³ production of logs ▪ Removal of 15 m³/ha ▪ 15 large-sized sawmills using modern technology ▪ 40 modern remanufacturing 	<ul style="list-style-type: none"> ▪ 20 million ha under SFM, with 70% of certified forest ▪ 200,000 ha plantations ▪ Expansion to 9 million m³ production of logs ▪ Removal of 15 m³/ha ▪ 15 large-sized sawmills using modern technology ▪ 40 modern remanufacturing units, and 5 plywood mills ▪ 95% of low-grade production available to 	<ul style="list-style-type: none"> ▪ Forestry exports greater than US\$ 360 million ▪ New investments equal to US\$ 170 million ▪ Regularized 30 million ha of forest lands ▪ 15 million ha under SFM, half of it certified ▪ Creation of 90,000 new direct jobs and 	<ul style="list-style-type: none"> ▪ US\$ 1 billion in exports of forest products ▪ Creation of 370,000 new jobs ▪ Increase contribution of forestry GDP to 1.2 billion US\$ (10% of total national) ▪ 200 million US\$ paid to the national treasury as taxes ▪ 15 million US\$ collected by forest fees payment ▪ 28 million ha under SFM, 70% with forest certification

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Topics	Bolivian Forestry Chamber (2000)	Ministry of Sustainable Development (2002)	Viceministry of Natural Resources (2003)	Departmental Council of Competitiveness in Santa Cruz (2004)
	<ul style="list-style-type: none"> units, and 5 plywood mills ▪ 95% of low-grade production available to international market ▪ US\$ 1 billion in exports of forest products, US\$ 600 million ecolabeled products 	<ul style="list-style-type: none"> international market ▪ US\$ 1 billion in exports of forest products, US\$ 600 million ecolabeled products 	160,000 indirect jobs	<ul style="list-style-type: none"> ▪ 100,000 of plantations
<i>Proposed Budget</i>	570 million US\$	Not estimated	240 million US\$	240 million US\$
<i>Government actions</i>	<ul style="list-style-type: none"> ▪ Adjusting forestry law ▪ Tax and credit policies ▪ Applied forestry research ▪ Forest plantations ▪ Infrastructure rings 	<ul style="list-style-type: none"> ▪ Supporting decentralization ▪ Monitoring of policy implementation ▪ Guarantee tenure security ▪ Public forest protection ▪ Research and transference of technologies ▪ Information systems ▪ National program of reforestation 	<ul style="list-style-type: none"> ▪ Reorienting public and private research programs ▪ Interconnecting and maintaining international, departmental, and municipal road networks ▪ Expanding supply of electricity for industrial uses ▪ Setting up industrial parks 	<ul style="list-style-type: none"> ▪ Supporting forestry public institutions ▪ Fiscal incentives for imports of capital goods and subsidies ▪ Tenure security in areas with forest management ▪ Public investment in forestry and ecological research ▪ Credit for forest plantations ▪ Roads development

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Topics	Bolivian Forestry Chamber (2000)	Ministry of Sustainable Development (2002)	Viceministry of Natural Resources (2003)	Departmental Council of Competitiveness in Santa Cruz (2004)
<i>Inter-institutional actions</i>	<ul style="list-style-type: none"> ▪ Developing standards to improve quality certification ▪ Formation and retraining in business strategies 	<ul style="list-style-type: none"> ▪ Promotion of norms of quality and certification ▪ Developing a system to finance forestry production ▪ Enabling conditions for private investment ▪ Developing a platform for marketing of forest products ▪ Promoting basic local processing of products 	<ul style="list-style-type: none"> ▪ Creating financial mechanisms to promote private investment ▪ Promoting forestry clusters ▪ Setting up centers for entrepreneurial development 	<ul style="list-style-type: none"> ▪ Improving mechanisms to facilitate access to capital ▪ Exports promotion ▪ Training in managerial skills and specialized services ▪ Supporting community forestry and expansion of forestry industry
<i>Private sector actions</i>	<ul style="list-style-type: none"> ▪ Stimulate a reengineering process of forestry industry ▪ Supporting consolidation of certification and standards of quality 		<ul style="list-style-type: none"> ▪ Developing strategies for forest products marketing 	<ul style="list-style-type: none"> ▪ Exports promotion ▪ Consolidation of certified products supply ▪ Diversification of species
<i>Other strategic actions</i>		<ul style="list-style-type: none"> ▪ SFM as central piece of watershed management ▪ Reforestation for soil recuperation ▪ Securing biodiversity conservation and SFM in protected areas ▪ Enforcement of zoning 		

Source: Based on Castello and Roca (2002), Consejo Departamental de competitividad de Santa Cruz (2004), STCP Engenharia de Projetos Ltda. (2001), Viceministerio de Recursos Naturales y Medio Ambiente (2003).

134. It is surprising to find four different strategy papers for the forestry sector formulated in Bolivia during the last five years, which is the result of the lack of a policy framework in support of the new Forest Law. Table 9 summarizes the main forestry strategies available in the country. These are namely: (1) Strategic Plan for the Bolivian Forestry Sector Development carried out in 2000 by the Bolivian Forestry Chamber, (2) Policy and Strategic Plan for Forestry Development in Bolivia formulated in 2002 by the Ministry of Sustainable Development, (3) Integral Program for the Bolivian Amazon's Development under the responsibility of the Viceministry of Natural Resources, 2003, and (4) Strategy for Integral Sustainable Development in the Bolivian Forestry Sector, elaborated in 2004 by the Departmental Council of Competitiveness of Santa Cruz.

135. None of the strategies elaborated by the government was officially assumed, but this has its main explanation in the high political instability which underwent the country in the recent past. Anyhow, it seems that does not make too much sense to produce too many strategies in such a short period of time, but the lack of a formal forest policy, the insufficient discussion about where the priorities are, and the political instability in governments and collaborative efforts in the forestry sector, are all factors that have stimulated such proliferation of strategies. These strategies cover the whole country -like the first, second and fourth- or the Bolivian Amazon -like the third- although in practice they focus only in the Bolivia's lowlands area.

136. Furthermore, there have been elaborated some departmental forestry strategies such as those for the departments of La Paz and Santa Cruz¹², and elements for strategic development of the forestry sector have been included in the departmental development plans of Santa Cruz and Pando. Nonetheless, these are not included in this review. As mentioned earlier, most of the strategies mentioned have not been crafted in a participatory way, and often they consist of a document -coming from some consultancy work- which has been put in consult to stakeholders, and local and regional public and private organizations. Therefore, almost any of these strategies is assumed formally as an instrument for action but the Bolivian Forestry Chamber (CFB) strategy. The latter is an exception since it did not come from the government but from the national timber producers' association. It is noteworthy that several lines for action and goals contained in the CFB strategy have been successively appropriated by the other strategies.

137. The mentioned strategies put heavy emphasis on the need of achieving greater development of the forestry sector by promoting forestry-based economic activities, and improving their competitiveness in the international markets by enabling conditions for investment in the sector. The latter, in turn, could lead to increasing national income and employment. To large extent, the development view adopted for the forestry sector, is the same which has been adopted for other economic sectors, which is favoring sectoral investment in primary production and processing, in order to increase productivity, and adding value to final products, in order to improve the performance of forest product exports. Thus, little emphasis receives, as usual, non-timber forest products, and forest products whose supply is demanded by domestic markets, and markets for environmental services.

¹² These documents were elaborated with support of the extinct Project FAO-PAFBOL.

Furthermore, the strategies state goals, which far from being realistic, it is not clear the way in which they were crafted

138. As was mentioned earlier, the strategies have more points of agreements that discrepancies. They focus on the specific actions for the government, the private sector, and other are inter-institutional in kind. The main points of agreements in terms of the responsibilities demanded from the government are: (1) guarantee secure tenure for forest concessions and landholdings; (2) incentives through reduced taxes; (3) import tariffs for capital good imports and credits; (4) investments in research and technological transference; (5) road construction and maintenance; and (6) incentives and credits for reforestation and forest plantations. The private sector should: (1) diversify exploited species; (2) consolidate certified products supply along with forest products marketing, mainly in external markets, and (3) restructure forestry industry. The inter-institutional actions should be oriented to, namely: (1) developing guidelines for improving quality certification; (2) setting up centers for entrepreneurial development including training in business strategies; managerial skills and others specialized services; (3) supporting forestry industry and locally based processing under a logic of forestry clusters development; (4) facilitating capital to finance forestry operations; and (5) developing a platform for marketing of forest products, mainly linked to international markets. Main point of discrepancy seems to be in the MDS strategy, which sees a larger room for the state in conservation actions.

B. Strategic Actions: Helping Forest to Help People

139. This work's section 4 pointed out that the forestry sector's main problems are linked to the unfair competition between agriculture and forest land-uses, persistence of forest crime, and the lack of competitiveness of forestry, along with some other structural factors that depress the value of forest resources such as the limited markets for non-timber forest products, and the fact that there are still very incipient mechanism for the payment of environmental services. In tune, a strategy for action seeking to revert some of such problems, aiming at expanding the contribution of forests and forestry to economic development and poverty alleviation, has to deal with such complexity. Several are the strategic actions that might be undertaken to make a difference, but these have to involve strong efforts of the state agencies mainly dedicated to securing land rights for forest-based uses, and curbing illegal logging and clear cutting, and the private sector has to work hard to build a more modern forestry industry, which should integrate better the supply of timber coming from private properties, and small-scale forestry initiatives. Furthermore, additional efforts have to be made on expanding the coverage of certification.

140. To make a difference in Bolivian forest and forestry, in a context of financial resources restrictions, the World Bank has to invest resources in key actions to guarantee a serious improvement in (1) forest governance, (2) the enhancement of forest users' livelihoods from forest-based activities, and (3) landscape management in areas with intense human intervention. These are not easy goals to achieve but constitute important issues to tackle down for helping forest to help forest users, and then they can decisively contribute to increase the role of forests in development and poverty alleviation in the line with The World Bank global priorities. Some key strategic issues for action where to concentrate the attention are enumerated below:

1. Contribute to Understand the Role of Forests in Poverty Alleviation and Development

141. There are still some gaps to fill in the knowledge about the trade-offs between forest contribution to poverty alleviation and development, and its implications on forest resources conservation. More comprehensive assessments are needed to understand what are the policy mechanisms that may incentive pathways out of poverty based on forest resources, and local development, while at the same time promoting forest conservation. These interactions also tend to vary depending on the ecological conditions, and specific socio-economic contexts.

- *Making visible the contribution of forests to poverty alleviation:* basic research is needed to explore the formal and informal contribution of forestry to poverty alleviation in order to inform the debate about the pathways out of poverty based on forest resources while protecting them from depletion and forest conversion. It will contribute also to determine the policy instruments needed to improve the contribution of forest resources to enhance local people livelihoods, and complementary actions that will need to be undertaken.
- *Understanding the interactions between forestry development and conservation:* Unless coupled with an effective conservation strategy, development efforts can accelerate deforestation even as they expand livelihood options and reduce poverty. In this sense, additional knowledge is needed to enhance the productivity, sustainability and diversity of landscape mosaics that meets the needs of the rural poor, and economic growth, whilst maintaining the flow of environmental goods and services, and conserving forest biodiversity. Analysis and recommendations about steps to take are crucial to inform the policy debate.
- *Developing forest policy with stakeholders participation:* the current forestry strategies do not necessarily represent the diverse stakeholders' interests and needs. Then, it is needed to undertake a comprehensive review of current strategies, and to formulate a long term strategy for forest and forestry involving stakeholders participation. Furthermore, a forum of forest policy dialog has to be institutionalized as the best mechanisms to promote debate, and finding common agreements about solution not only for short term demands but also for the sector's structural problems. In this same line, it would be relevant to build similar public spaces in departments, and municipal governments with abundant forest resources.

2. Improve Forest Governance by Strengthening Democratic Decentralization

142. There is a need for enhancing forest resources governance in a decentralized frame of forest management. Decentralization do not guarantee that all forest users are going to benefit from forest resources, and that the rural poor will secure their access to, and will be able to manage their forest resources in their own benefit. In this light, it is needed to strengthening forestry decentralization granting more voice to municipal governments to make significant decisions about forest resources, and through articulating more actively to forest users' institutions at the local level in forest resources governance. Furthermore, these actions should build larger transparency in decision-making about forest resources, increase the voice of the marginalized social groups, and stimulate better institutional check-and-balances.

- *Strengthening forestry democratic decentralization:* This is a key issue to pursue aimed at setting in place a better balance of powers between the central, regional, and lower levels of government such as municipal governments. Municipal governments, and specifically Municipal Forestry Unites (UFM) have to be strengthened for them to implement more effectively the functions they have been granted, on one hand, in forest vigilance and control, and on the other hand, in providing services to small-scale timber producers. Technical and administrative capacities have to be developed in the UFM to comply with other functions granted to them which are key to forest management such as territorial planning.
- *Devolving larger responsibilities to local institutions:* To date, communities and other local organizations have to adapt their own rules for natural resources and forest management to regardless of the norms issued by the SF. It is important to help communities to formalize their own rules of forest resources access, management of the resources, and sanction norms to them who break the rules. Forest users' own-devised rules for forest management have to be formally recognized by the SF since they may increase the self-governance capabilities of these groups. Further, there is the need to develop formal linkages between them and UFM.
- *Larger stakeholders involvement in forestry decision-making:* There are some mechanisms in the current legislation to promote involvement of civil society like in controlling forest crime. Yet larger involvement has to be promoted not only in vigilance activities but in building alliances among stakeholders to stimulate the growth of local forestry economies. Municipal governments, through their municipal forest units (UFMs), should promote more social participation, and increasing the voice of marginalized people in decision-making about forest management including such needs in their annual operational plans. This should offer an instrument for municipal governments to leverage resources with external donors.

3. Collaborate to Local Users to Improve their Capacities for Forest Management

143. The initiatives of communities managing forest resources with commercial goals are multiplying, but in many cases local forest users do not have the conditions to take full advantage of forest management due to technical, managerial, and financial constraints, as well as their low bargaining power in the markets. In many cases, forest management makes part of a broader set of activities that community members carried out to secure their livelihoods. Hence, actions are needed to promote multiple forest management by integrating timber and non-timber forest products, but additional efforts are needed to promote markets of non-timber forest products, and to improve the conditions under which local forest users participate in the markets.

- *Promoting multiple forest management:* Additional research is needed about the ecology of specific species (i.e., production, regeneration, management), which has to be included in the design of guidelines and implementation of multiple forest management plans combining timber and non timber forest products management. The likelihood of small-scale forest users to enhance their livelihoods would be greater if management plans integrate a diversity of products. Furthermore, these forest management plans have to be

inserted into broader management plans encompassing the whole landholding or the indigenous territory.

- *Market promotion of non timber forest products:* Forest dwellers cannot rely on a single activity for making their living, conversely they require diversified sources of cash income. Non timber forest products can have a critical role on people's livelihoods. Hence, more efforts are needed to explore some specific market niches where low-income producers could develop some competitive advantages on reaching and benefiting from these markets.
- *Removing biases against participation in markets:* In most situations small-scale producers or farmers have fewer limitations on market entry when there are flexible quality and volume requirements, product standards that do not biases against small-scale producers, and no preferences for larger producers. Leveling the playing field in forest markets demands from increasing assistance with market information and business opportunities to forest communities and other small-scale farmers which have their main source of income in forest resources. Furthermore, special attention requires facilitate access of financial resources for certification of small-scale forestry operations to overcome current biases against them.

4. Facilitate Forest Rehabilitation in Degraded and Highly Intervened Landscapes

144. There are places that underwent severe degradation, particularly in Andean forest, putting in risk the provision of forest environmental services such as water production, and biodiversity conservation. Furthermore, intense use for agricultural production is leading to an extensive removal of original forest cover, with subsequent processes of soil degradation. These areas, in which human action lead to changes in forest cover, with low productivity of alternative land uses, are plausible to be intervened for either forest rehabilitation. The likelihood for forest cover to be restored is basically an issue of incentives. This line for action suggest to put in place some incentives, compensations or support actions in order to promote rehabilitation of forests and degraded areas for them to become more valuable assets particularly for low-income people.

- *Promoting landscape restoration in degraded areas:* Landscape restoration is aimed at promoting a mosaic of land-uses through diverse practices to restore the environmental functions of forests, such as production of wood and water. Land-use mosaics may also integrate natural forest reserves, forest plantations, and agroforestry systems. Forest restoration has to be a collaborative effort that strongly involves to the stakeholder that drawn a benefit from forests, such as local communities, colonists, small-scale timber extractors, forest concessionaires, and indigenous people. They should prioritize the forest good and services that matter more and the best ways to restore them. In this regard, it is also important to identify the ongoing efforts to find a way to support and amplify them, offering technologies appropriated for the different situations, and adapted to local interests.
- *Experimental payments for environmental services:* It is likely that initiatives to compensate for environmental services are going to expand over time, along with evolving markets for environmental services. Taking into account the importance that

income from forest services may constitute an alternative way to enhance forest users' livelihoods, there is a need to strengthening the establishment of payment for environmental services through promoting more actively environmental services markets, although they will surely take some time to consolidate. In the short run, experimental mechanisms of compensation should be put in place assessing their implications for forest conservation and landowners' incomes.

C. Guidelines for Implementation

145. The issues for a forestry strategy in Bolivia mentioned above are challenging, but achieving them can make a difference in the future of the forestry sector. This strategy, however, stresses some issues that should be taken into account to facilitate their implementation. Three are the main factors that should be considered for putting into practice the mentioned lines for action: (1) the efforts have to be collaborative with the current forestry projects implemented in Bolivia, mainly those targeting community forestry, and focus on some geographical areas where the likelihood to achieve better impact is greater, (2) they should rely on private and public partnership to amplify the effect of collaboration, and ensure broader participation of stakeholders, and public agencies, and (3) multi-scale interventions should be prioritized in order to create synergies among different levels of government (central, departmental, and municipal).

Territorially Based Collaborative Efforts

146. Implementation of this strategy should be condensed in some specific places in order to ensure greater impact. This could be done as part of broader planning process focusing in the areas in which there is larger history of communities involvement in forest resources extraction, in areas where local people depends more heavily of forest resources for their livelihoods, and also in those areas in which there is also high levels of poverty. Hence, actions implementation should include explicitly a spatial dimension, in order to build collaboration efforts to lead towards a more coherent networking and clustering of actions. Furthermore, policy dialog, building partnerships alliances among stakeholders, and landscape management should be territorially based actions adapted to place-specific nature-society conditions.

Building Institutional Alliances

147. A large number of the actions mentioned would require from partnerships between different institutions working with colonist, communities, and small-scale timber extractors, either public or private in order to effectively pursued objectives of forest resources governance, alleviating poverty and promoting forestry-based economic development. Many actions are scattered in space, and privilege different dimensions of forestry development. Not only better policies are necessary but also partnership agreements are crucial to provide resources to communities, and small-scale loggers seeking to improve their conditions to undertake forest management, incursion in markets, overcome legal barriers, and enhance their incomes from forest-based activities while at the same time engaging actively in conserving their forest resources base. These partnerships no only have to involve to governments in all their levels –from national to municipal—but also commit to other

stakeholders engaged with sustainable forest management. Multiplying such alliances will become a key factor for success.

Planning Multi-Scale Interventions

148. Most of the stated lines for action demand of multi-scale intervention. In this line, it is a crucial issue to harmonize actions to be undertaken at different levels of government and at different scales (i.e., central, departmental, and municipal). Multi-scale interventions are demanded while carrying out actions for a better governance of forest resources (i.e., participatory policy dialog, and territorial planning), and for improving the economic performance of the forestry sector (i.e., networking of undergoing initiatives, services provision for forest users), and landscape management and forest rehabilitation. In this vein, collaboration and proper distribution of functions and responsibilities may constitute a key piece for making a difference. This may also promote a common view about the most pressing needs.

VI. THE ROLE OF INTERNATIONAL AGENCIES

149. There is a lot of room for international agencies to help on this strategy implementation. Main issues that might demand collaboration of international agencies, and bilateral and multilateral banks are related to: (1) making available resources to finance part of the required capital to support a more inclusive forest development through helping community forestry initiatives, putting in place specific programs for forest restoration and vulnerable areas protection, and strengthening the forest system, mainly municipal governments acting in the forestry sector, (2) providing scientific and technical cooperation in order to stimulate the creation of a critical mass in the country, with capabilities to carry out research, training, and transference of technologies, but also policy and market analysis to inform institutional actions, and (3) supporting ongoing innovative efforts undertaken by either private organizations, public agencies or stakeholders aimed at enlarging the contribution of forests to economic growth and local people's livelihoods but at the same time conserving the forest resources-base.

150. It is critical, therefore, the role of international agencies in supporting such a strategy but based on a strategy commonly agreed among stakeholder and the different levels of government. The forestry sector does not attract too much interest of international agencies, but long term contribution for the United States Agency of International Development (USAID), and the Swedish International Development Cooperation Agency (SIDA). These international agencies have their own strategies for supporting the forestry sector, as well as conservation efforts. In this line, it is important that such strategies be harmonized, and even help to the formulation of a national strategy for supporting forests, forest users, and the forestry sector in Bolivia.

151. This document is one more step in such a way. Its main contributions consist in assessing which are the main achievements of forest policy, identifying the main problems that the forestry sector face with, and analyzing the main rooting causes of such problems. This analysis provides the foundations upon which it is suggested a strategy for action, encompassing several critical issues that need to be tackled down from economic, social, and ecological. Yet, this strategy will achieve their proposed goals only whether some pressing

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issues are overcome such as the competition from agriculture over forest land-uses, a persistence of illegal timber extraction and clear cutting, and the lack of competitiveness of the timber industry. It is necessary to implement the suggested actions in parallel since isolated actions will achieve only little impact.

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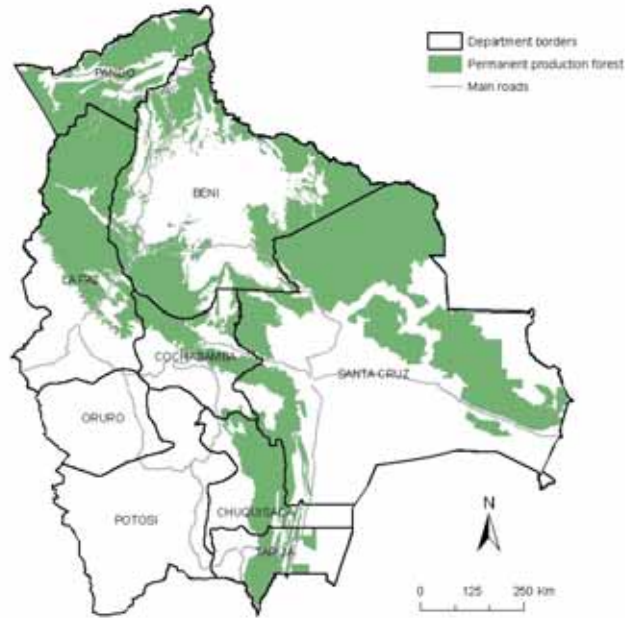
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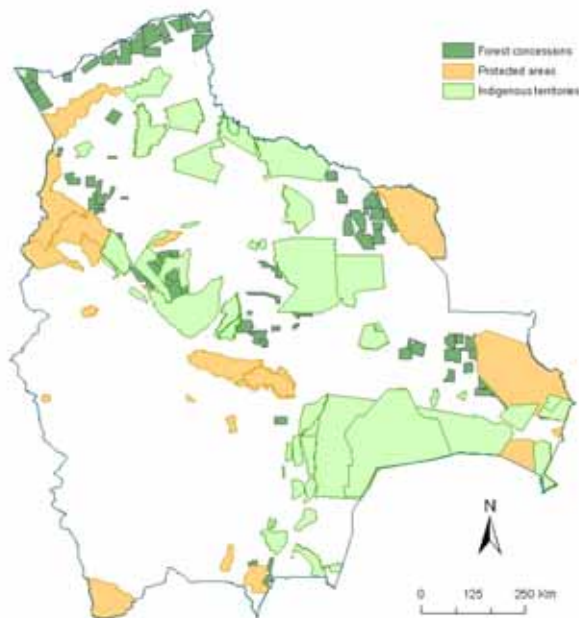
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APPENDIX



Source: Based on information provided by SF

Figure 1. Permanent Production Forest in Bolivia

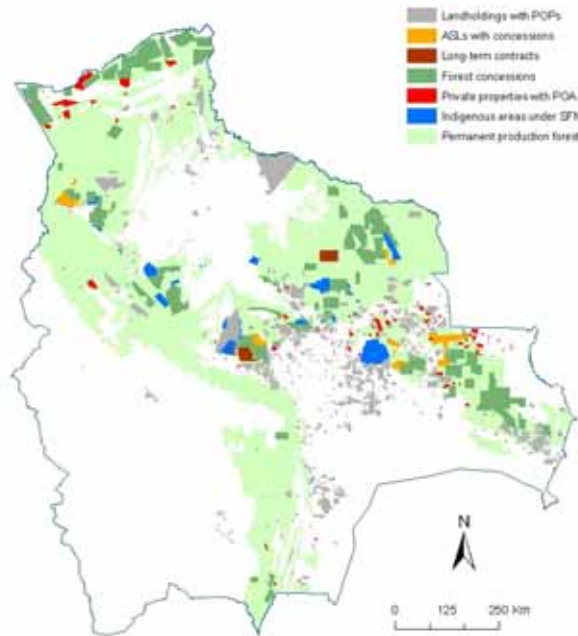


Source: Based on information provided by SF and SERNAP

Figure 2. Forest Concessions, Indigenous and Protected Areas

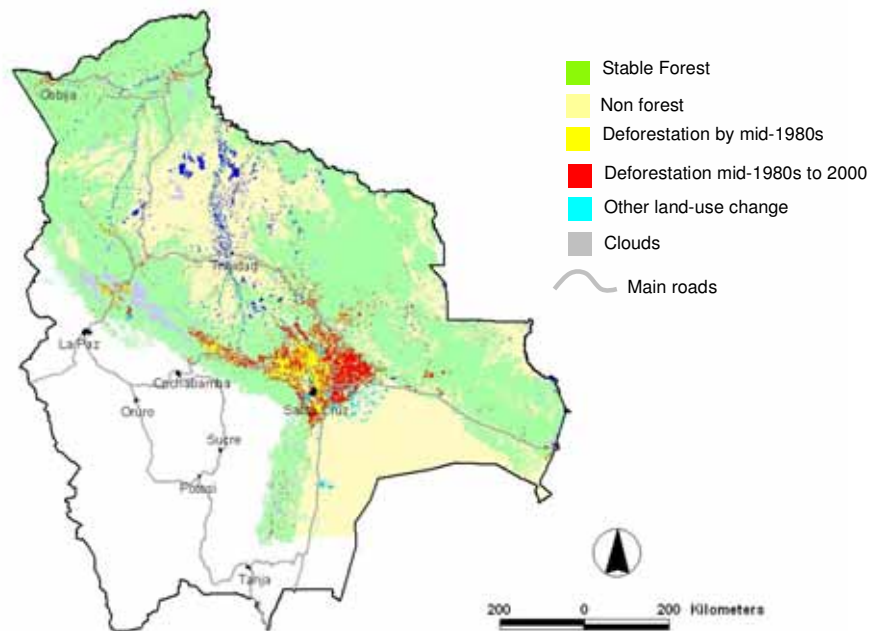
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APPENDIX



Source: Based on information provided by SF, and SA

Figure 3. Forestry Rights Granted in Lowland Bolivia



Source: Based on information from UMD, and BOLFOR I. Taken from Pacheco (forthcoming)

Figure 4. Location of Deforestation in Lowland Bolivia

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APPENDIX

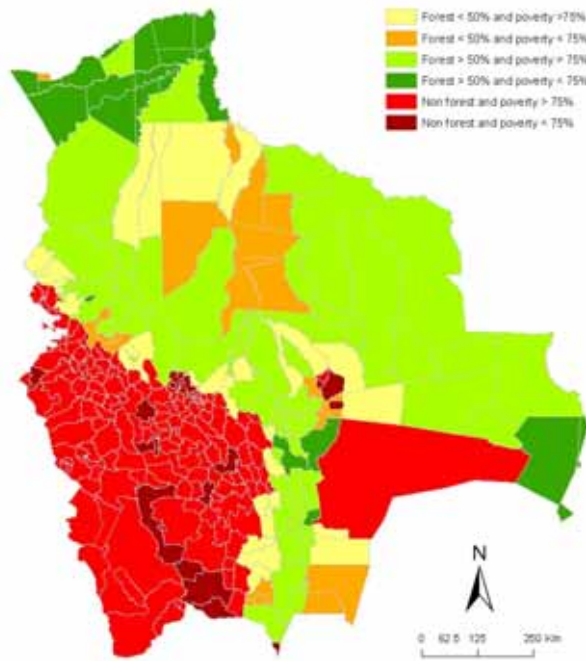


Figure 5. Proportion of Forest Cover and Poverty Line in %

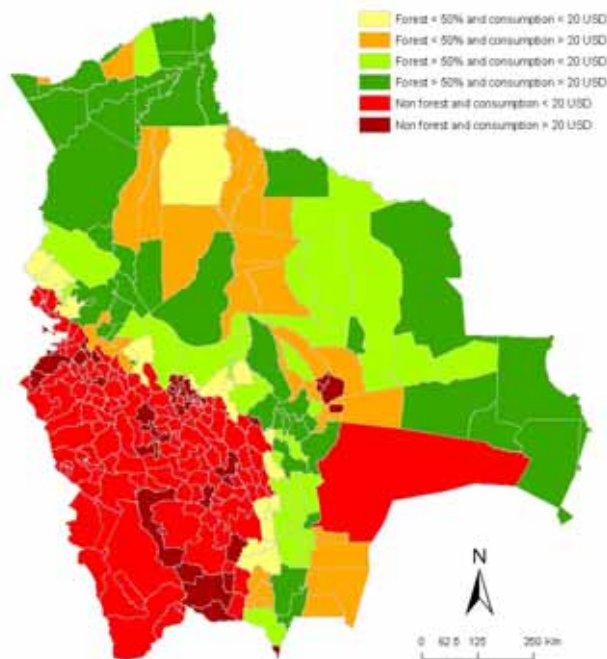


Figure 6. Proportion of Forest Cover and Monthly Consumption (US\$)

The Andean countries of South America have vast areas of natural forests, most of which comprises biologically rich and ecologically fragile tropical moist forests. Proven models for the sustainable management of this resource are scarce, and while farm forestry has been successfully developed in some areas, the development of commercial plantations has taken place only in Colombia. The sustainable and equitable development of forestry in the region faces special challenges. Topography, poor infrastructure in forest areas, weak and centralized forestry institutions, low levels of compliance, unclear forest tenure, and a lack of clear and stable natural resource management policies where the role of forestry is clearly defined are factors which combine to constrain potential. However, addressing these issues is a complex undertaking, and if success is to be obtained a measured approach will be required. Initially, support will be needed to put in place an institutional and policy environment supportive of sustainable and equitable growth, with progress in these areas being used to intensify efforts to maximize the contribution which forestry can make to poverty alleviation, sustainable development and environmental conservation.

