



The context of deforestation and forest degradation in Bolivia

Drivers, agents and institutions

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Forest conversion in the department of Santa Cruz, Bolivia.

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Executive summary

About half of Bolivia is covered by forests. Around 40 out of 50 million ha of forest grow in the lowlands. There are significant pressures on these forests, which have increased over time. About 200,000 ha of forest are lost annually, mostly in the lowlands. The three main proximate drivers of deforestation are mechanized agriculture, cattle ranching and small-scale agriculture. Conversion of forest to pasture for grazing caused more than half of the deforestation in 2000–2010. Mechanized agriculture, mostly for soybean production, has been responsible for some 30% of deforestation, while small-scale agriculture has accounted for some 20%. Underlying drivers of deforestation include greater integration of the agricultural economy in international markets, strong international investment, such as from Brazil and increased demand in the domestic market due to the growth of the urban population, in addition to other factors, such as road expansion and institutional weaknesses and uncertainties.

Since the mid-1980s, there has been increased pressure on forests associated with agricultural expansion. Since the 1990s, various policies have been tested to regulate frontier expansion, mostly based on land-ownership regularization, land-use planning and sustainable forest management. Despite the progress, these policies have failed to reduce deforestation driven by the advance of agriculture or the predatory timber extraction with effects on forest degradation. Deforestation has now stabilized, but at a relatively high rate.

In the mid-2000s, major political changes led to questioning of existing public policies over their neo liberal orientation. This criticism included a strong emphasis on alternative views such as the idea of “living in harmony and balance with Mother Earth”, which has become one of the pillars of current Government’s discourse. This resulted in a change in public institutions, reinforcing the role of the State with a more centralist perspective, but accompanied by political disputes with some departmental governments.

This translated into poor adjustment of land and forest policies. Land policies focused on collective titling of indigenous territories, started by previous governments and forest policies introduced minor changes to forest regulations, especially by promoting integrated forest management regulations, control procedures for illegal logging and, more recently, regulating illegal deforestation. However, despite changes in the discourse on the vision of forest management and the importance of a more integrated and inclusive management, still no substantial changes in land and forest policy and legislation were made and a new forest law is still under discussion.

As regards the Bolivian position in international climate change negotiations, the government initially was a staunch supporter of the proposal for reducing emissions from deforestation and forest degradation (REDD). However, this position changed when Evo Morales took office. The new government assumed a position against the marketization of nature and in favor of climate justice. This position was largely identical to the one of the World People’s Summit on Climate Change in 2010, which was defended by the government of Bolivia at the international level. However, Bolivia eventually adopted a more proactive position that has resulted in emphasizing the importance of mechanisms that are not market based. In this context, the government of Bolivia has created the so-called “Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth”. The proposal was formally adopted as public policy in the Law of Mother Earth, approved in 2012 and its regulatory decree of 2013.

In addition, the Plurinational Authority of Mother Earth and the Plurinational Fund of Mother Earth were created. However, these efforts seem to be insufficient to address two major challenges in the Bolivian environmental agenda. The first is to reverse important economic forces that create

increased pressures on forests, particularly as a result of persistent expansion of cattle ranching and medium- and large-scale mechanized agriculture, along with the continued progress of new settlements, which are also encouraged by a parallel discourse of the government to support food production and food sovereignty. The second challenge concerns the weak capacities of public institutions at different levels to effectively implement laws and to also promote coordinated actions with civil society to move towards proposals for more integrated land and forest management fostering the conservation of multiple forest functions. The new policy, as it is referred to in this paper, has assumed these challenges and proposes addressing them by setting up platforms for local to regional territorial negotiations and locally to regionally agreed action plans, supported by monitoring systems not centered in carbon stocks but also for other forest functions.

This document includes a thorough analysis of the drivers of deforestation and proposes a number of specific policy recommendations. We suggest that potential mitigation measures need to take into account the stage of forest transition, distinguishing the areas of the agricultural frontier from areas with still intact forests and, finally, areas dominated by mosaics of agriculture and remaining forests. Our analysis suggests that a priority measure to mitigate forest loss in agricultural frontier areas would be to control the expansion of cattle ranching on forest lands, as well as to improve efficiency to increase production in existing pastures. Options to reduce deforestation associated with mechanized agriculture are more limited because it tends to occur on good soils where it can be highly profitable. As regards small-scale agriculture, potential measures need to take into account the large number of stakeholders, which implies the need to advance in a participatory manner towards improved soil use resulting in increased economic benefits. Regarding the country's remaining vast areas of forest, the suggestion is to support sustainable uses and improve measures of conservation, taking advantage of the fact that many of them are in indigenous territories or lands occupied by agro-extractive communities, protected areas and forest concessions. In already intervened areas, actions should focus on improving agricultural production, in order to diminish the pressure on forest areas. Forest restoration is indicated in specific cases,

but the priority is on mitigating the conversion of existing forests.

Through the Joint Mechanism, the new policies aim to support models of integrated and sustainable forest management that have been developed by local experiences and knowledge of indigenous peoples and other traditional groups. This adds to the idea of reinforcing integrated management actions for indigenous territories and traditional and agro-extractive communities and providing these people with the financial resources needed to support their initiatives and thus stop external pressures on the large extents of forests controlled by these groups. Another proposal is to support larger-scale forest-use in public forests, both for timber and non-timber products and thus prevent slow forest conversion to agricultural land. Gradually, a more integrated perspective has been added to the Bolivian proposal, which considers agricultural-uses in larger landscapes as well as the multifunctional uses of forests and their links with agriculture.

The Bolivian proposal is at the point of moving from a simple proposal to practical policy actions. It is strongly criticized because, although it advocates for a more harmonious relation between society and nature, it lacks specific actions and policy instruments as well as the necessary financial resources that would be needed to support initiatives that secure of forest services and, at the same time, improve livelihoods and food supply. Our analysis highlights that, as long as discourse and policy instruments do not account for the current reality of growing threats on forests, efforts may not achieve the expected ambitious results.

It is important to note that the Bolivian proposal of the Joint Mechanism is getting attention in international discussions on forest management and the role of forests in climate change adaptation and mitigation. This is because the proposal calls for the adoption of more comprehensive, holistic and inclusive approaches for land and forest management. In this sense, an important debate is emerging at international level on how to facilitate the adoption of more integrated and holistic approaches to forest management with wider landscape management processes to meet conservation objectives, provide livelihoods for local people, create options for economic growth and ensure food security.

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1 Introduction

Around half of Bolivia is covered by forests. However, at the same time, a significant amount of forests is lost every year. Deforestation rates are highest in the lowlands, where most of the forests are concentrated. Forest degradation, instead, has been more severe in Andean forests. Deforestation trends have changed over time, with relatively low rates until the mid-1980s and increasing rates till the mid-2000s. Recently, deforestation rates seem to have stabilized on a high level, associated with a number of drivers related to the political economy of land and forest-use.

Until the mid-1980s, Bolivian forests did not face important threats because the country's revenues depended on mining in the west and agriculture was not linked to foreign markets (Kaimowitz 1997). However, since the implementation of the structural adjustment program, greater trade openness has favored the expansion of mechanized agriculture on forest lands with production destined for export, while the collapse of traditional tin mining has encouraged the migration of unemployed miners to settlement areas. The result was increasing market pressure on lowland forests (Pacheco 2006a). In the official development discourse at that time, the main interest was to boost economic growth by exporting non-traditional products, particularly soybeans, by expanding the agricultural frontier and by providing employment for miners dismissed from state-owned enterprises. Concerns about forest conservation were still marginal. However, existing policies led to a disorderly expansion of the agricultural frontier that had negative implications for conservation and resulted in uneven sharing of benefits from land and forest-use (Pacheco 2010).

Since the 1990s, some innovative steps have been taken to reverse the negative effects of the implementation of the structural adjustment

program on the environment and poverty. They include a program for land-management and reforms of forest policy involving the recognition of the land and forest rights of indigenous people and local communities, as well as a political decentralization process that granted greater powers to municipal governments. Although these policies promoted better social participation and political democracy, they had mixed effects on forests. Their focus was on sustainable strategies of land and forest management, but their main shortcoming was that they have fostered the development of medium- and large-scale agriculture instead of small-scale agriculture, often legitimizing public land misappropriation, unable to solve the unequal benefit sharing imposed by asymmetric institutional conditions and markets that tended to marginalize smallholders (Pérez 2003). Although progress has been made in terms of sustainable forest management and efforts were made to improve local people's access to forests, particularly to timber, the limited flexibility of the management model adopted and the lack of incentives for small-scale producers and communities to manage forests has not helped reduce pressure on forests or poor forestry practices (Pacheco et al. 2010).

When Evo Morales took office in 2006, there was a major shift in land and forest policies, at least in the discourse. This change was reflected in a new Political Constitution of the State (CPE) and gradual changes in legislation and public institutions for land and forest management, in the midst of a major political conflict between new power groups, opposition leaders and regional elites, that have strengthened political autonomy processes. In addition, the process of recognition of indigenous rights has been reinforced, followed by the titling process initiated in previous governments and promoted by greater intervention of the central government in key policy processes,

such as climate change. In relation to this, the national government has adopted a position opposite to the carbon market mechanisms adopted by REDD+. Recent efforts have focused on harmonizing the international position with the domestic political agenda. However, despite all the changes in the legal and institutional framework made so far, the situation of land administration and forest management has not changed much in practice and there is still a relatively contradictory policy agenda between forest conservation and agricultural expansion.

This paper analyzes deforestation and forest degradation in Bolivia, including current and historical dynamics, direct and underlying drivers, the political and socioeconomic context, opportunities for forest conservation with sustainable uses, as well as the adoption of national policies on climate change mitigation by reducing deforestation and forest degradation. The Bolivian case not only provides important lessons on how to implement innovative policy actions, but it also shows how the conflicting policy agendas are the result of political disputes and long-standing conflicts on visions and actions to promote, on the one hand, economic and social development and, on the other, forest conservation in the more general framework of climate change mitigation strategies.

Bolivia has moved away from mainstream views under REDD+ schemes, which makes it an interesting case of analysis. Efforts to define a climate change policy have been strongly marked by the government's refusal of market-based approaches. This has led to the development of an alternative proposal, the "Joint Mitigation and Adaptation Mechanism for the Integrated

and Sustainable Management of Forests and Mother Earth". To date the legal and institutional framework for the implementation of this proposal has been developed, but it is difficult to judge its effectiveness since it is at an early stage. In this sense, the government of Bolivia has not committed to specific environmental policy objectives. In fact there are clearer objectives in policies that promote economic development, including investment, agricultural expansion and infrastructure, among others.

The structure of this document follows guidelines prepared by Brockhaus et al. (2011) for CIFOR's series of Global Comparative Studies on REDD. The paper is organized in five sections including this introduction. Section 2 discusses the main drivers and processes of forest conversion and forest degradation and long-term trends, focusing on the past two decades. Section 3 reviews the political, social and economic context, discusses the major legal and institutional changes associated with land administration and forest management and related processes such as decentralization and autonomy processes, which define the conditions of land and forest governance. Section 4 analyzes the Bolivian political position on forests and climate change and its evolution in time, with an emphasis on climate change negotiations in the United Nations Framework Convention on Climate Change (UNFCCC). Section 5 discusses potential measures for effective, efficient and equitable reduction of deforestation and degradation, including an evaluation of forests and climate change policies developed in Bolivia in opposition to those in the REDD+ scheme. The last section summarizes this paper and presents the main conclusions.

2 Forests, land-use changes and drivers of deforestation and forest degradation

2.1 Characteristics of forests

Bolivia is among the countries with the largest areas of tropical forest (FAO 2011). There are around 50 million ha of forest in the country (Cuellar et al. 2012), around 80% of which are located in the lowlands¹ and the remaining 20% are on the eastern slope of the Andes range, on the inter-Andean valleys and to a lesser degree, on the Altiplano (highlands) (Map 1). The greatest land-use changes take place in the lowlands, so we focus on this region, although there is remarkable biodiversity in mountain forests (Araujo et al. 2010).

There is wide forest ecosystem diversity due to the great variety of climate conditions. According to the classification of ecological units (Araujo et al. 2010), a distinction can be made between the main seven types of original forest vegetation (Table 1, Map 1). There are other classifications, some of which are more detailed².

The main characteristics of these forests are summarized in Table 1.

2.2 Relevant agents and land tenure in Bolivia's lowlands

Bolivia's lowlands are occupied by different groups of agents. They have different social and

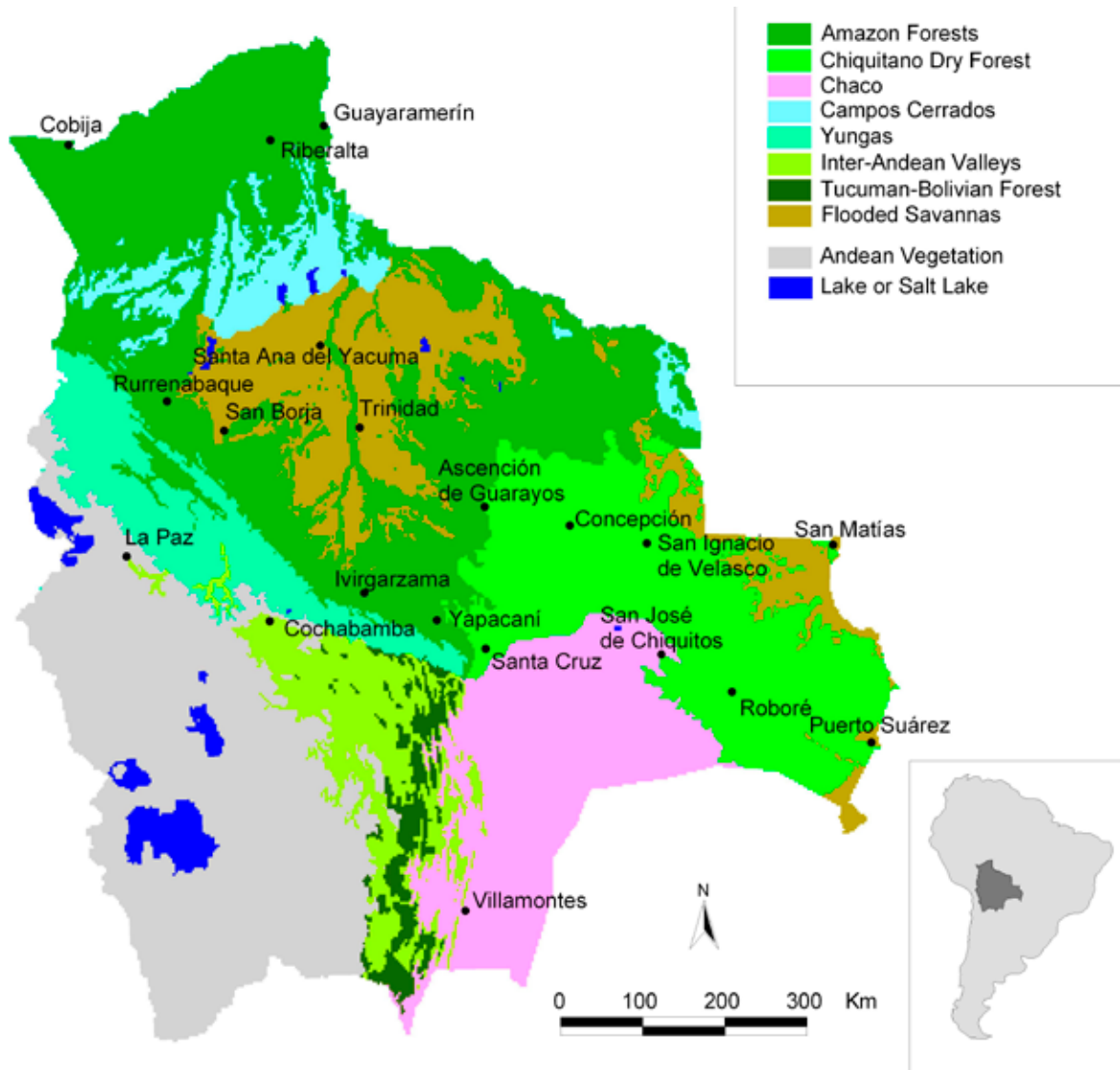
economic characteristics and make different use of the lands and forests they have access to; and they also have different land and forest rights as a result of decades of conflict and negotiation with the State in the context of changing development policies (Pacheco 2007). The process of lowland occupation has been relatively complex, influenced by agents with different interests, as is described below.

A large area of Bolivia's lowlands has traditionally been occupied by different ethnic groups, with an economy focused on natural forest resources and limited impact on forests. Their territories have gradually been invaded by other agents in a constant process of land occupation, often eased by the State. Before the 20th century, there was just limited production of tropical crops such as rice and sugarcane in the areas that can be better accessed from the west (Santa Cruz de la Sierra and Apolo areas, for instance). In Chiquitania and parts of Beni, the Jesuits have established indigenous settlements since the late 18th century, introducing cattle ranching (Tonelli Justiniano 2004). Since then there have been three important land occupation processes, with relevant implications for land and forest-use and the current rural society setting in Bolivia's lowlands.

The first occupation process was associated with the economic boom of rubber (*Hevea brasiliensis*), related to international demand in the mid-1880s. This led to an important movement of investors, capital and workforce for the occupation of forests for rubber tapping in the region which is now known as the northern Amazon in Bolivia (Department of Pando and north of the Departments of La Paz and Beni) (Pacheco 1992, 1998; Bojanic 2001). The exploitation of rubber led to the distribution of the territory into a small number of large *barraquero* establishments (rubber tapping centers). Some of them dissolved after

1 Lowlands are referred to as those areas in the country that are located below 500 m above sea level.

2 Some of the more elaborate classifications include that of Navarro and Maldonado (2002) and Navarro and Ferreira (2007, map of vegetation in Bolivia). A popular classification that is quite similar to that of ecological units is that of ecoregions (Ibisch and Mérida 2003). Other classifications include those developed by Josse et al. (2007, map of Amazon ecosystems) and Montero et al. (2005, map of native Andean forests).



Map 1. Ecological units in the Bolivian forest.

Source: Adapted from Araujo et al. (2010).

the collapse of the international rubber market, around the 1920s, giving rise to the establishment of an uncertain number of traditional communities (Ormachea and Fernández 1989; Stoian 2000).

The second occupation process in the lowlands took place in the mid-1950s when the government designed a plan to “move to the east” to foster import substitution by developing domestic food production, particularly rice and meat, associated with agribusiness expansion, especially cotton and sugar (Arrieta et al. 1990). As a result, since the 1960s there has been an important growth of medium and large-sized farms, aimed at meeting the needs of a growing domestic market and, partly, of exports (Dandler 1984; Pacheco 1998). Settlements in the northern Santa Cruz de la Sierra and Chapare were also stimulated in the 1970s and

1980s, as well as in northern La Paz afterwards, in order to compensate for the limited land availability in the Andean communities, to foster agriculture development and to meet agricultural companies’ labor needs (Blanes et al. 1985). The arrival of Japanese and Mennonite immigrants in Santa Cruz department has also been encouraged since the 1960s.

The largest expansion of medium- and large-scale commercial agriculture started in the 1980s, hand in hand with the third process of lowland occupation, which resulted from policies favoring the opening up of the national economy to foreign markets and the consequent linking of mechanized agriculture with foreign markets. Agricultural expansion in the so-called “expansion zone”, i.e. beyond the Río Grande River east of the City of

Table 1. Main forest types in Bolivia

Ecological unit	Estimated area (million ha) ^a	Forest characteristics	Typical species	Location by department
Amazon forests	28.5	Dense evergreen forest, with trees emerging up to 45 m high	Brazil nut (<i>Bertholletia excelsa</i>), rubber tree (<i>Hevea brasiliensis</i>), mahogany (<i>Swietenia macrophylla</i>), ochoó (<i>Hura crepitans</i>)	Pando, Beni, La Paz, Santa Cruz
Chiquitano dry forest	15.5	Dense semideciduous forest, with canopy heights of up to 30 m.	silk floss tree or toborochi (<i>Ceiba speciosa</i>), tajibo (<i>Tabebuia</i> spp.), curupaú (<i>Anadenathera colubrina</i>)	Santa Cruz
Campos Cerrados	4.1	Thin forest with open canopies of up to 15 m, small and bent trees, with floors covered with grass, fire influence	Chaco (<i>Curatella americana</i>)	Beni, Santa Cruz
Yungas forests	6.3	Highly dense forest, up to 30 m high, mostly evergreen with abundant epiphytes, with dry forests in deep valleys	Orchids and bromelia as epiphytes	La Paz, Cochabamba
Tucumán-Bolivian forest	2.0	They look like yungas, but with different species and more seasonability (more deciduous trees)	Sahuinto (<i>Myrcianthes pseudomato</i>), mountain pine (<i>Podocarpus parlatorei</i>)	Santa Cruz, Chuquisaca, Tarija
Chaco	12.2	Open deciduous forest, up to 20 m high, abundant trees and thorny shrubs	Quebracho (<i>Schinopsis</i> sp), guayacán (<i>Bulnesia sarmientoi</i>)	Santa Cruz, Chuquisaca, Tarija
Inter-Andean valleys	6.0	Deciduous or semi-deciduous forest; appearance similar to Chaco	Molle or pepper tree (<i>Schinus molle</i>), tipa (<i>Tipuana tipu</i>), Roman cassie, or churqui (<i>Acacia caven</i>)	La Paz, Cochabamba, Santa Cruz, Chuquisaca, Potosí, Tarija

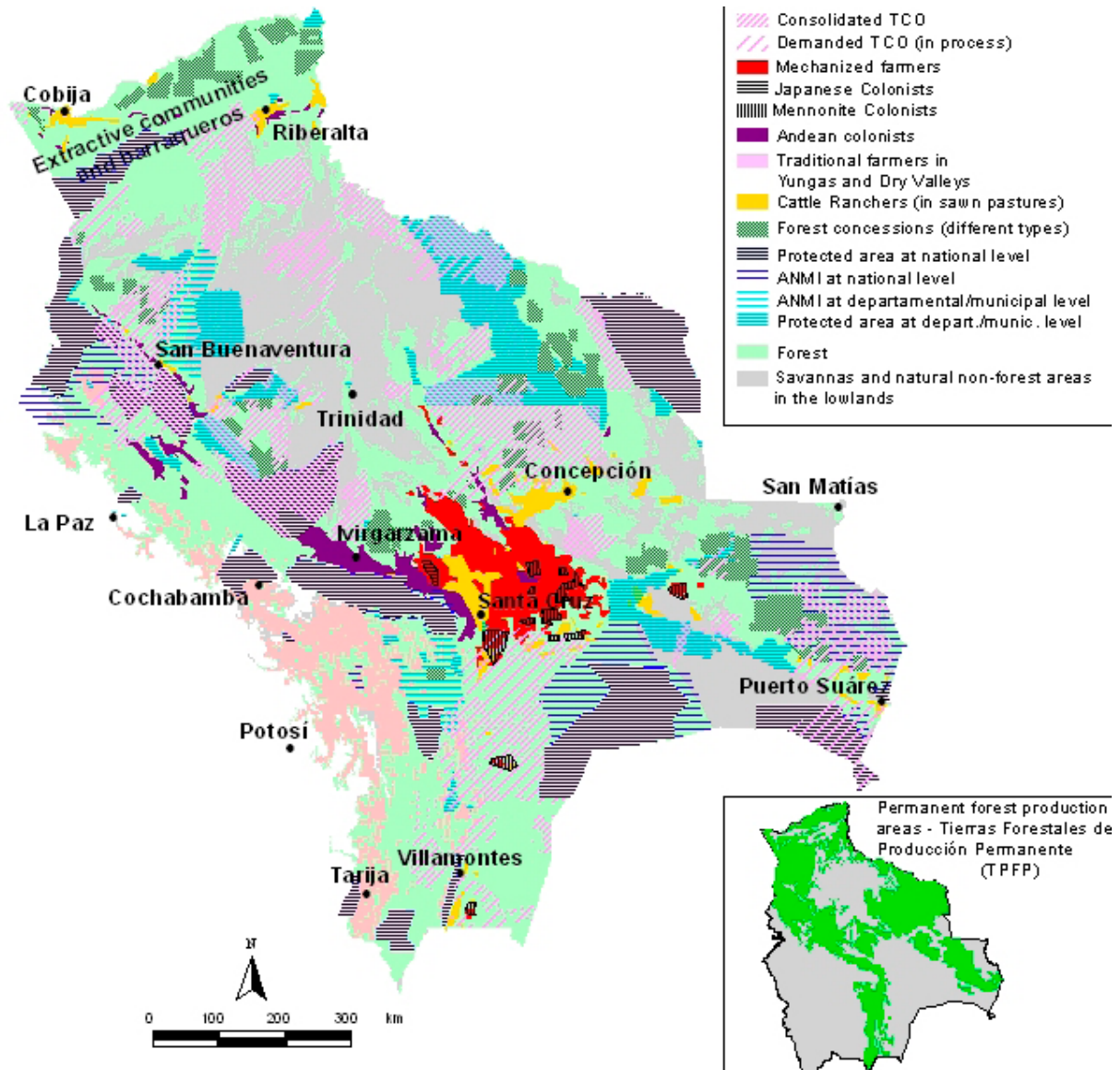
a The total area of each ecological zone is indicated, including areas currently without forests.

Source: Own elaboration based on Araujo et al. (2010) and own criteria.

Santa Cruz, was partially encouraged by Brazilian investors that profited from cheap lands, the market opening in the context of preferential tariff negotiation with Andean countries (Peru, Colombia and Venezuela) and available funding for road building (Baudoin et al. 1995; Pacheco 1998), among others. This has led to a major increase in medium- and large-scale mechanized agriculture, especially for soybean production. Recently, it has been claimed that Brazilian penetration in Bolivia's agricultural frontier may also be driven by stricter environmental policies in the neighboring country, Brazil.

The expansion of the logging frontier preceded the expansion of the agricultural frontier. Pacheco et al. (2010) explain that logging frontiers

originally developed in the 1960s, along with oil extraction in northern Santa Cruz and afterwards as valuable timber was depleted—especially mahogany (*Swietenia macrophylla*)—they followed road expansion to southwestern Department of Beni, where major reserves of hardwood were located, but in areas occupied by indigenous people. The constant timber expansion to northern La Paz enabled agricultural penetration and fueled conflicts between timber companies and indigenous people as well. This became more evident towards the early 1990s, when indigenous people started claiming their territories in a more organized manner and directly urged the national government to reduce the pressure of timber exploitation in new forest areas.



Map 2. Agents and use rights in Bolivian forests.

Source: Own elaboration based on information supplied by INRA and ABT.

Table 2 introduces the agents located in the lowlands, which now have more influence on land and forest-use. There is a wide variety of agents, from indigenous and traditional communities with resource uses focusing more on meeting the basic consumption needs of business groups with large-scale operations, both for agricultural production and timber harvest, as well as settlers with relatively market-oriented economies. The processes of occupying the lowlands and using their resources by the different agents have had a significant impact on land-use pathways.

For each use, the agents require the appropriate forest rights—although there is still a lot of informal use. For agricultural-uses, the property right is needed, which can be collective and individual. Private properties with areas of more than 50 ha are required to have a Plot Management Plan (*Plan de Ordenamiento Predial*, POP) approved by the Forest and Land Inspection and Social Control Authority (*Autoridad de Fiscalización y Control de Bosques y Tierra*, ABT)³, including the definition of use zones (Pacheco

3 ABT was created in 2009 and it replaced the agrarian and forest superintendencies (ABT 2011).

Table 2. Rural society agents with influence on land and forest-use

	Main activities	Rights to land and forest-use	Type of forest-use
Indigenous groups in the lowlands (organized) ¹	Hunting, fishing, extractive uses, subsistence agriculture at a very low scale	Collective access to large territories classified as Indigenous Communal Territory (Tierra Comunitaria de Origen, TCO), exclusive rights to forest resource use	Non-timber harvest, conversion by slash and burn
Traditional lowland communities	Commercial forest product harvest, subsistence agriculture at a low scale	Usually, individual access to land, also access through forms of community property, for instance, in the northern Amazon	Commercial non-timber harvest (for example, Brazil nut) and timber at a small scale
Medium- and large-scale industrial farmers with strong Brazilian influence	Mechanized farming (soybean, sugarcane, rice, sunflower oil, corn)	Individual property rights	Forest conversion for agriculture.
Foreign settlers (Mennonite and Japanese)	Mechanized farming (for instance, soybean, sunflower, corn) and semi-intensive farming	Individual property rights in lands collectively allotted to settlements	Forest conversion to agriculture and cattle ranching
Andean small farmer settlers	Small-scale agriculture (for instance, rice, corn, fruits, coca leaf)	Individual plots in community systems, mostly at the northern Andean foothills	Gradual forest conversion to agriculture
Cattle ranchers	Cattle ranching in natural and planted pasture, usually for cattle rearing under extensive systems	Individual property rights, not all with formal property titles	Usually, forest conversion for pastures
Forest concessionaires	Selective timber harvesting under management systems	Rights to timber harvesting through forest concessions; there is a small area devoted to social concessions	Large-scale forest exploitation for commercial purposes
Barraqueros	Brazil nut harvest	Expected rights of non-timber concessions	Large-scale non-timber harvest
Informal logger mostly using chainsaws	Harvest of timber from more valuable species, usually without any forest management criteria	They do not usually have rights on forests and tend to harvest timber from private properties and public forests as well	Low intensity timber harvest for commercial uses
Traditional agricultural communities in the Yungas and interandean valleys	They perform a relatively intensive agriculture, but they live in landscapes with a long agricultural tradition	Although many have no formal rights on the lands, their land tenure rights are quite secure and are usually transferred	They have few forests; they do not play a very important role in forest conversion or use

Source: Own elaboration based on Pacheco (1998, 2006c).

2005a). Otherwise forest clearing is considered illegal. However, the number of properties under a POP is still very low (ABT 2011). For forest-uses, forestry concessions can be applied for, with a right to selective timber harvest under approved management plans, for a 40-year period and without a property right. While extractive

communities harvest forest resources mainly in collective properties, Brazil nut harvest concessions are also expected to be granted⁴ in the northern

⁴ The so-called *barraqueros* are those who inherited the farms that controlled rubber and Brazil nut extraction in large areas.

Amazon. Its approval is pending because priority is given to community property. In spite of the important progress made in recent years⁵, land tenure regularization in Bolivia is still in process.

Map 2 shows forest occupation and rights. For agricultural-uses, only the occupation is indicated (not the property right). We also include protected areas where the use is restricted according to the category. In Integrated Management Natural Areas (*Áreas Naturales de Manejo Integral*, ANMI), low-intensive agricultural-uses are allowed; in practice, however, restrictions are not respected. As shown in the map, rights overlap, for instance, between TCOs⁶ and protected areas. Some of the forest lands (41.2 million ha) have been classified as Permanent Forest Production Lands (*Tierras de Producción Forestal Permanente*, TFPF, Supreme Decree No. 26075, 2001), which cover practically all the areas with pristine high forest. Use within these areas should be forestry oriented, but this is not always the case. The current TFPF map is too inexact to be properly applied at the local level.

There is also use planning at the level of departments and municipalities, based on land-use plans, known as Land-use Plan (*Plan de Uso del Suelo*, PLUS) at the department level (see ABT 2011) and Municipal Land-use Plan (*Plan Municipal de Ordenamiento Territorial*, PMOT) at the municipal level, with better resolution. Although PLUSes were approved by law, they have not been consistently used in land-use planning and were never harmonized with PMOTs. Not all the municipalities have managed to develop a PMOT and not all have been legally adopted. At the national level, there is zoning by the Greater Land-use Capacity (*Capacidad de Uso Mayor de la Tierra*, CUMAT, see ABT 2011), which also distinguishes potential land-uses; however, its application is not clearly defined. ABT uses PLUS and CUMAT as a reference for POP approval (ABT 2011).

5 To date, 56.8 million ha have been regularized, i.e. 85% of the land. www.ftierra.org/ft/index.php?option=com_content&view=article&id=16058:rair&catid=170:tierra&Itemid=243

6 TCOs should be referred to as Indigenous Native Peasant Territories (*Territorios Indígenas Originarios Campesinos*, TIOC) according to the new Constitution, but since the old TCO name is widely known, it is used throughout this paper.

As shown in Table 3, there is a large portion of forests (>50%) in areas where forest-uses prevail or where farm uses are excluded by law.

2.3 Drivers and processes of deforestation

2.3.1 Analysis of the magnitude of deforestation

Deforestation in Bolivia was relatively low until the mid-1980s, when it started to grow steadily until 2000 (Table 4). Deforestation has since remained at a high level with an annual rate nearing 0.5%. The greatest deforestation has taken place in lowland forests⁷.

Killeen et al. (2007) provide detailed estimates regarding deforestation in Bolivia between 1976 and 2004. Two additional sources include recent estimates of deforestation by 2010, i.e. a map developed by the Friends of Nature Foundation (Fundación Amigos de la Naturaleza, FAN) (Cuellar et al. 2012) and another developed by the Museum of Natural History Noel Kempff Mercado (MHNNKM), which includes information on forest regeneration and forest degradation (Table 5). Preliminary data from the latter show even higher deforestation rates.

Another source of deforestation information is the analysis of accumulated deforestation performed by ABT in 2010, on which monitoring of annual forest clearing is planned to be based. Other deforestation estimates are only partial, such as the deforestation map for Chiquitania prepared by the Chiquitano Forest Conservation Foundation (*Conservación del Bosque Seco Chiquitano*, FCBC) or a non-published deforestation map for the Amazon developed by the Bolivian Institute for Forestry Research (*Instituto Boliviano de Investigación Forestal*, IBIF).

Until 1986, deforestation was concentrated around Santa Cruz, as well as in parts of the Yungas de La Paz, Alto Beni and Chapare (Map 3). Between 1986 and 2001 there was a very clear advance in what is known as the “expansion zone” to the east of Río Grande river and the north of Santa

7 Current deforestation rates in montane forests are lower; quantitative assessment is difficult due to the presence of clouds in satellite images.

Table 3. Forests in areas restricting non-agricultural-uses

Category	Occupied area in million ha	Forested area (% forest total)
Titled TCOs	9.5	7.0 (13%)
Claimed TCOs (in regularization process)	9	5.8 (11%)
Extractive community properties	Around 1 million ha	
Forest concessions ^a	3.4	3.4 (7%)
Tapping/harvest concessions ^b	Pending	
Protected areas at a national level	9.6	7.2 (14%)
Protected areas at department/municipal level	5.8	4.0 (8%)
ANMIs at national level	5.9	4.0 (8%)
ANMIs at department/municipal level	1.4	0.8 (2%)

a The area has substantially declined in recent years from a total area of 5.4 million ha in 1996 when concession contracts were originally granted.

b These only constitute the so-called “expectation rights” over the areas traditionally occupied by barraqueros in the past, of which there is no overlapping.

Source: Authors’ elaboration based on information supplied by INRA and ABT.

Table 4. Deforestation rates from selected periods, 1976–2010

Period	Annual average deforestation (in ha)	Annual deforestation rate
1976–1986	51,100 ^a	0.12%
1987–1991	138,800 ^a	0.33%
1992–2000	150,600 ^a	0.37%
2001–2005	194,000 ^b	0.49%
2006–2010	205,000 ^b	0.53%
Accumulated deforestation by 2010	4,600,000 ha ^c	

a Based on Killeen et al. (2007).

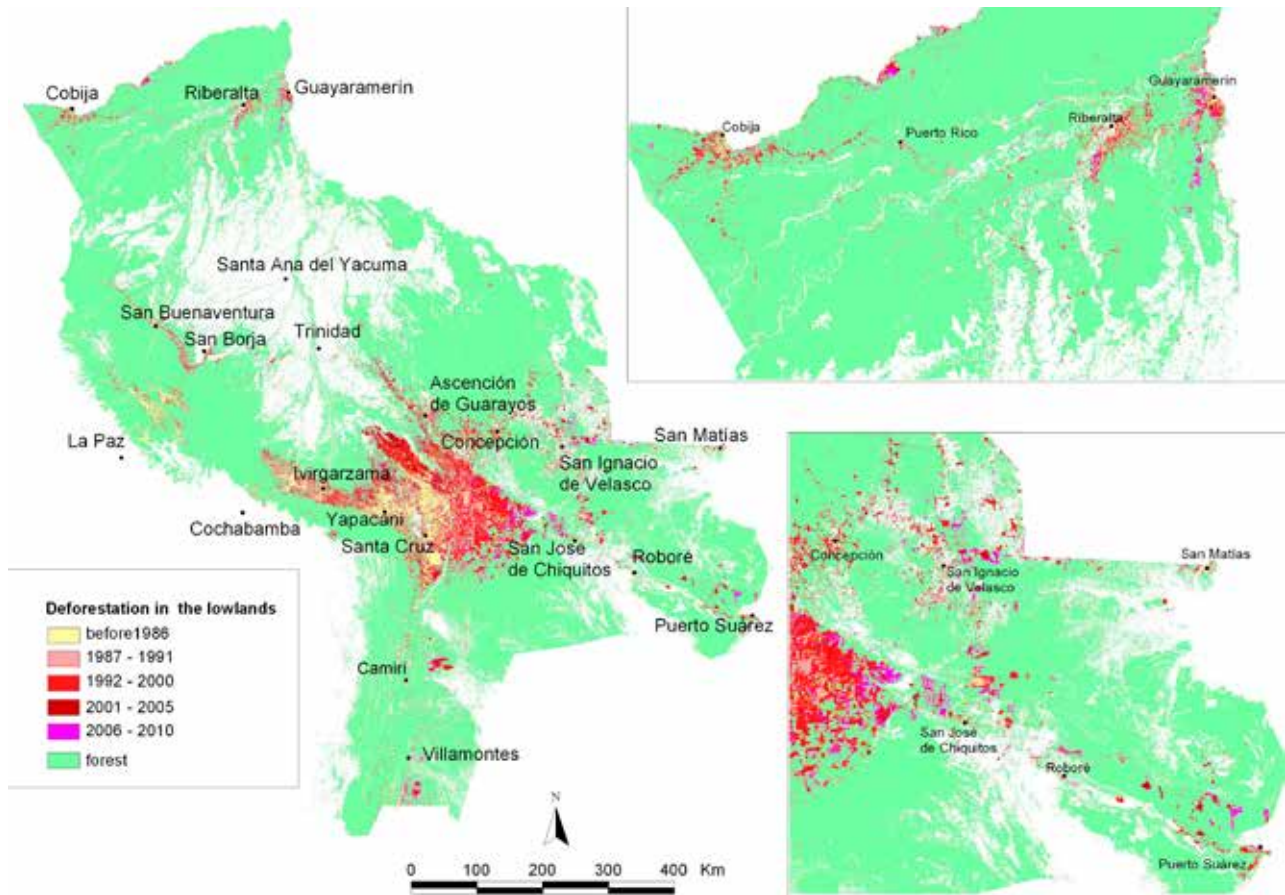
b Data provided by Cuellar et al. (2012). It is worth noting that Killeen et al. (2007) indicate a total of 224,700 ha deforested between 2001 and 2004.

c Approximation based on a combination of Killen et al. (2007) and Cuellar et al. (2012).

Table 5. Deforestation data from 1990–2010

Period	Areas with changes in the period (ha)				Forest area affected by deforestation (%)
	From forest to deforested	Degraded Forest	From deforested to forest in regeneration	From forest in regeneration to deforested	
1990–2000	1,500,334	229,443	119,460	144,539	2.9%
2000–2010	2,112,747	801,272	706,987	437,561	4.7%

Source: Non-published information jointly elaborated by: Museum of Natural History Noel Kempff Mercado (*Museo de Historia Natural Noel Kempff Mercado*, MHNNKM), Conservation International (CI) Bolivia and National Service of Protected Areas (*Servicio Nacional de Áreas Protegidas*, SERNAP) (2013).



Map 3. Advance of deforestation over time.

Source: Own elaboration based on Killeen et al. (2007) and Cuellar et al. (2012).

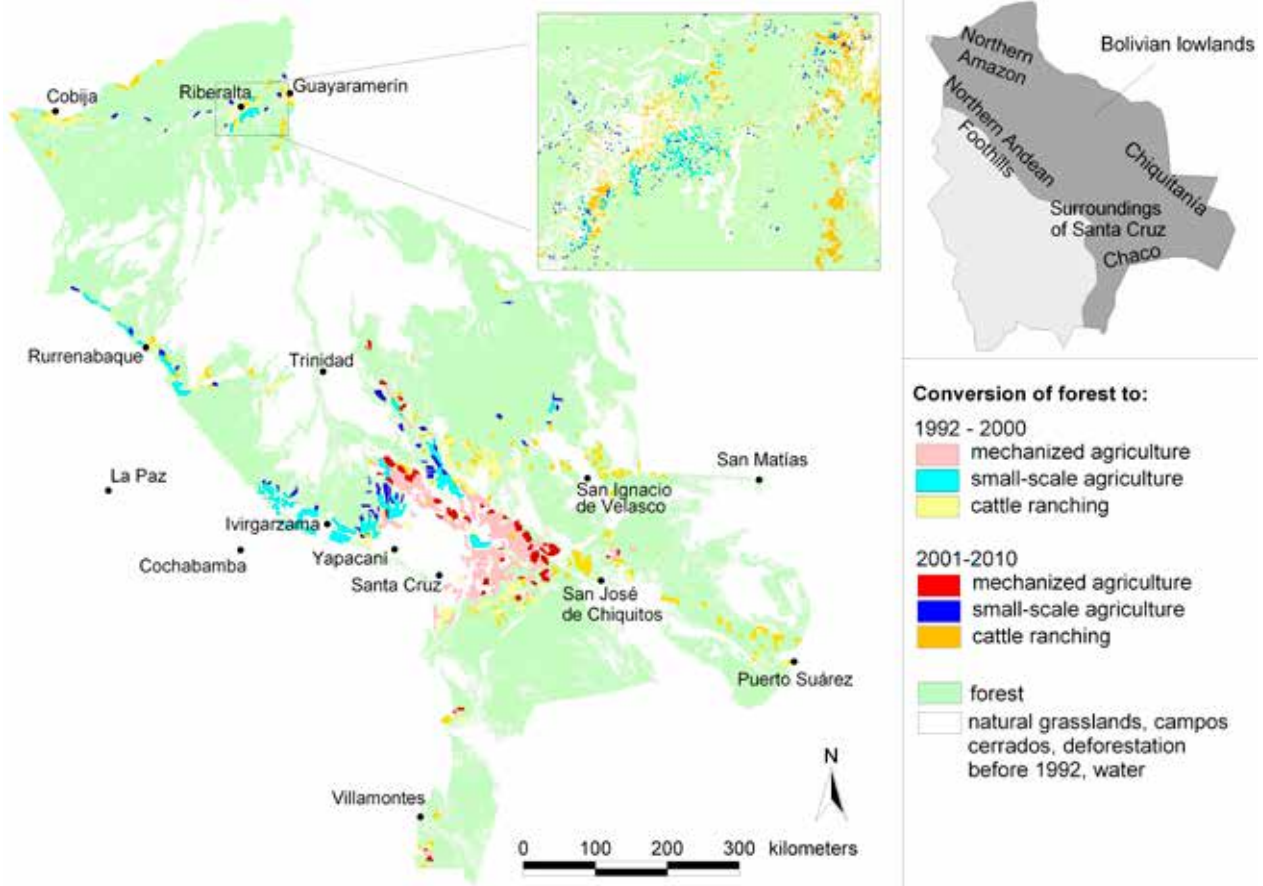
Cruz. Besides, forests are converted in Chapare, the Yucumo–Rurrenabaque road and parts of Chiquitania (near Concepción, San Ignacio de Velasco and San José de Chiquitos) and the northern Amazon (near Cobija, Riberalta and Guayaramerín). In the last decade, deforestation has advanced in different areas with a more disperse spatial pattern. Some areas affected by massive clearing are located in Chiquitania in eastern San Ignacio de Velasco and northern San José de Chiquitos, northern Santa Cruz (in the way to Puerto Suárez), western Chaco, Camiri (in Mennonite colonies), as well as the Brazilian border in northern Puerto Rico in Pando and to southern Guayaramerín.

2.3.2 Direct or proximate drivers of deforestation

There are three main proximate drivers of deforestation in Bolivia, which are here referred to

as main proximate drivers, namely: (1) expansion of mechanized agriculture, (2) growth of small-scale agriculture and (3) expansion of cattle ranching to forest areas (Müller et al. 2012). These drivers are similar in other countries that constitute the Amazon region (Kirby et al. 2006; Hosonuma et al. 2012). A less important role is played by other activities like mining. Direct degradation drivers are associated with timber extraction, as is later discussed under section 2.4. Map 4 shows forest conversion in the lowlands between 1992 and 2010, distinguishing the three main proximate drivers, based on Killeen et al. (2007)⁸ and Müller et al. (2012).

⁸ Deforested areas according to Killeen et al. (2007) were assigned to the three main proximate drivers with the aid of a land-use map in Santa Cruz (Noel Kempff Museum and Prefecture of Santa Cruz 2008) and own evaluation of CBERS satellite images (Chinese-Brazilian satellite). There is a recent land-use map in 2010 (MDRyMA 2011), but the large number of mixed categories make its use difficult.



Map 4. Expansion of main drivers of deforestation in 1992–2010.

Source: Elaborated by the authors based on Müller et al. (2013) and Müller et al. (in press).

Table 6. Contributions of the three proximate drivers of deforestation

Land-use	Deforested area in 2000–2010 (million ha) ^a	Percentage in relation to total	Deforested area in 1992–2004 (% in brackets) ^b
Mechanized agriculture	0.54	29.7%	1.01 (53.7%)
Small-scale agriculture	0.33	18.4%	0.36 (18.9%)
Cattle Ranching	0.94	51.9%	0.52 (27.4%)
Total deforested	1.81	100%	1.89

a Source: Based on Müller et al. (in press).

b Source: Elaborated by the authors based on Müller et al. (2012).

There has been a strong advance in cattle ranching compared to the other uses in recent years. Preliminary data show that 60% of deforestation in 2005–2010 was caused by cattle ranching (Müller et al. in press). The study also suggests that an important part of recent deforestation was caused by new Mennonite colonies, which use intensive systems mixed with agriculture and cattle ranching.

ABT (2011) shows different figures for the contribution of the different direct drivers of deforestation, livestock producers' contribution being 38% and agro-industrial and foreign settlers' being 45%. However, this report does not provide the source of information or the methodology used for the analysis.

Below we analyze the dynamics of each of these drivers (Table 7).

Mechanized agriculture

Mechanized agriculture has expanded replacing forests on relatively fertile lands in eastern and northern Santa Cruz. This type of agriculture encompasses systems of mechanized production of cash crops, mainly soybean, sugarcane, sunflower, rice, corn, wheat and sorghum (CAO 2013). Soybean is the main crop, mostly produced in summer in combination with sunflower or wheat as winter crops. Most of the production is exported (IBCE 2012). Sugarcane is the second most important crop, but it is concentrated in a relatively small area in northern Santa Cruz. Mechanized rice production is concentrated in more humid areas also in northern Santa Cruz, cultivated by Japanese settlers, among others.

A total of 75% of soybean is produced in farms larger than 50 ha (OTAI 2008), many of which are run by agro-industrial companies, partly controlled by a relatively small group of businessmen from Santa Cruz. There is also an important influence of international companies and foreign capitals, mainly Brazilian (Pacheco 2006a; Ribera 2008;

Urioste 2012). Foreign, including Mennonite and Japanese, settlers have a strong participation in mechanized agricultural production (CAO 2013). Mennonites manage mixed agricultural systems, whereas Japanese farmers grow rice and soybean mostly. It is estimated that approximately 100,000 people work in mechanized agriculture and the related production chain (Müller et al. 2013).

Yields of mechanized agriculture are quite high in comparison with traditional agriculture, but significantly lower than in Brazil. Average soybean yields in Brazil are 2.6 t/ha, compared to 2.0 t/ha in Bolivia (CONAB 2010; CAO 2013). To increase yields in Bolivia, increased use of fertilizers would be needed. However, fertilizer use is still limited because agriculture in Santa Cruz is favored by good soils in the current areas of mechanized cultivation and because of their relatively high cost.

Small-scale agriculture

A large number of small-scale farmers also contribute to the loss of forests. This group includes farmers with land areas generally smaller than or equal to 50 ha who grow annual crops (like rice, corn or cassava) and perennial crops (like coca leaf,

Table 7. Characteristics of the main direct drivers of deforestation

	Mechanized agriculture	Small-scale agriculture	Cattle ranching on cultivated pasture
Main location	North and east of the city of Santa Cruz	Northern Andean foothills, northern Santa Cruz	Mainly Chiquitania and northern Amazon, but practically everywhere
Main agents	Foreign and national companies, including Brazilian, Mennonite and Japanese	Mainly settlers originating from western Bolivia	Livestock farmers with big or medium-sized farms, also involvement of Brazilian capital
Main products	Soybean, sugarcane, sunflower, rice, corn	Rice, corn, banana, small amounts of meat and milk	Beef, some milk
Production systems	Large units, highly mechanized with high technical and financial inputs	Traditional systems of manual agriculture, mainly with crop rotation (burning or <i>chaqueo</i>)	Different size systems mainly for fattening, usually with low productivity
Markets	Mainly preferential markets in Andean countries (Colombia and Venezuela), also national markets	Subsistence, local and national markets, very limited exports	Local and national markets, very limited exports

Source: Based on IBCE (2012), Müller et al. (2012) and CAO (2013).

banana, cocoa or coffee) with manual production, both for self-consumption and for local and national markets⁹.

National settlers of Andean origin are the most important group of small-scale farmers in the lowlands. They are found in settlement zones in northern Santa Cruz (Yapacaní, San Julián and Cuatro Cañadas), northern La Paz (Alto Beni, Caranavi, Yucumo and Ixiamas) and Chapare (Pacheco 2006b), slowly expanding to Guarayos in Santa Cruz and the northern Amazon in Pando (Müller et al. 2012). It is estimated that around 400,000 people belong to this group (Müller et al. 2012).

Yields of small-scale agriculture are much lower than in mechanized agriculture (for instance, in the case of rice only 2 t/ha compared to 3–3.5 t/ha in mechanized agriculture, according to CAO (2013)). Improved yields would only be possible through significant changes in the production system, which is hardly feasible.

Cattle ranching

Although there are very important cattle ranching areas on natural grasslands, especially in natural savannas in the Department of Beni, this paper only considers livestock produced on cultivated pasture, which directly leads to forest conversion. Although there are no accurate estimates, based on cattle numbers per municipality (unpublished data for 2006 from the animal health service SENASAG) in the lowlands there is a herd of about 1.5 million cattle on cultivated pasture in previously forested areas. On such cultivated pastures, which are generally located in areas closer to markets, more intensive fattening of livestock breeding is conducted, while in areas of natural savannas, which are farther from main markets, a more extensive livestock system is used.

Chiquitania (especially near San Ignacio de Velasco, Concepción, San José de Chiquitos and Puerto Suárez) has the highest levels of deforestation caused by cattle ranching, followed by the department of Pando, the province of Vaca Díez of Beni, the department border between Beni and La Paz, as well as many other lowland areas. There are cattle farms of all sizes; however, deforestation is partly

due to production in large farms belonging to few farmers. For example, an estimate of cattle numbers by SENASAG in 2006 shows that 50% of the cattle in Pando belong to only 20 families (Müller et al. 2013). A significant part of deforestation resulting from cattle ranching occurs within large, often illegal forest clearings (Superintendencia Forestal 2006).

In the Department of Santa Cruz there is no direct competition between grasslands and soybean crops. Cattle ranching is mostly concentrated in areas where lands have been degraded and, therefore, their suitability for mechanized agriculture has decreased (Müller et al. 2012)¹⁰.

The stocking rate (number of animals/hectare) is generally lower than in Brazil. It is much higher in intensive livestock systems of the integrated zone than in more extensive systems like the Chaco. The stocking rate ranges from 0.5 to 2 head in sown pastures (Müller et al. 2012)¹¹, while in areas of natural grass it is even lower. In Brazil, a stocking rate of 2 head/ha or more is frequent (Walker et al. 2009). Additionally, the low stocking rates and poor management cause more fires in pastures, both in planted and natural grasslands. The potential to improve the stocking rate should be quite high, by increased use of relatively simple technologies, such as grazing rotation to avoid grass degradation due to shrub growth (for example, da Veiga et al. 2004), but these involve investment and require more demanding management.

2.3.3 Opportunity costs of the three proximate drivers of deforestation

The results from the opportunity cost analysis¹², taken from Müller et al. (2013), indicate that mechanized agriculture, with its different crops, is by far the most profitable activity per cultivated hectare. However, an additional evaluation, not

10 Known dynamics of the Brazilian Amazon, where soybean farmers convert grass and make farmers expand the agricultural frontier (Nepstad et al. 2006), do not apply in Bolivia (Müller et al. 2013).

11 It is difficult to find reliable sources. An estimate based on cattle and sown pastures in Pando shows an approximate value of 0.5, while densities reach probably around 2 in the integrated area of Santa Cruz.

12 Opportunity costs of forest conservation represent the profits that could be obtained for uses that replace forests.

9 Bananas and other fruit crops are also exported; coca leaf is partly exported illegally.

included in Table 8, assessed the profitability of mechanized agriculture in a scenario with no diesel subsidy, which suggested a reduction in the net present value (NPV) of almost 50%. It is interesting to note that small-scale agriculture appears to be more profitable than cattle ranching, although there is certainly a wide variety of situations.¹³ Legal forest extraction is in the same range as livestock production.

2.3.4 Spatial analysis of the three main drivers of deforestation

The three main drivers of deforestation show different dynamics of spatial expansion. These have been analyzed with a multinomial logistic regression model for 1992–2004 (see Müller et al. 2012). In this model, the three direct drivers of deforestation formed dependent variables, while the set of independent variables included agriculture suitability factors (rainfall and soil fertility), as well as access to markets and legal restrictions on land-use (protected areas or TCOs). Regression results explain the different effects of spatial factors on the expansion of the three direct drivers. They also allow for the development of suitability maps to project future pressure on forests (Map 5).

The results from the model show that mechanized agriculture tends to expand in areas with good access to international markets and favorable environmental conditions, while legal restrictions on land-use prevent its expansion. Future forest conversion to mechanized agriculture fields will probably occur to the north and south of its current area (i.e. Ascención de Guarayos to the north, San José de Chiquitos to the south), but also new frontiers of mechanized agriculture may open up near Puerto Suárez and San Buenaventura. The expansion to these two areas projected by the model is a likely scenario: around Puerto Suárez, the existence of alluvial soils and good access to export markets through Paraguay River promote the expansion of mechanized agriculture. Some international companies have started experimental soybean plantations; however, no commercial plantations have been established to date. In San Buenaventura, soils have an intermediate quality, but access to the city of La Paz is quite good. There have long been plans to establish an agro-industrial complex oriented to sugarcane production and processing. These plans have been reactivated by the current government, with the creation of a state-owned sugar company and the construction of a sugar mill¹⁴, which will probably cause significant deforestation.

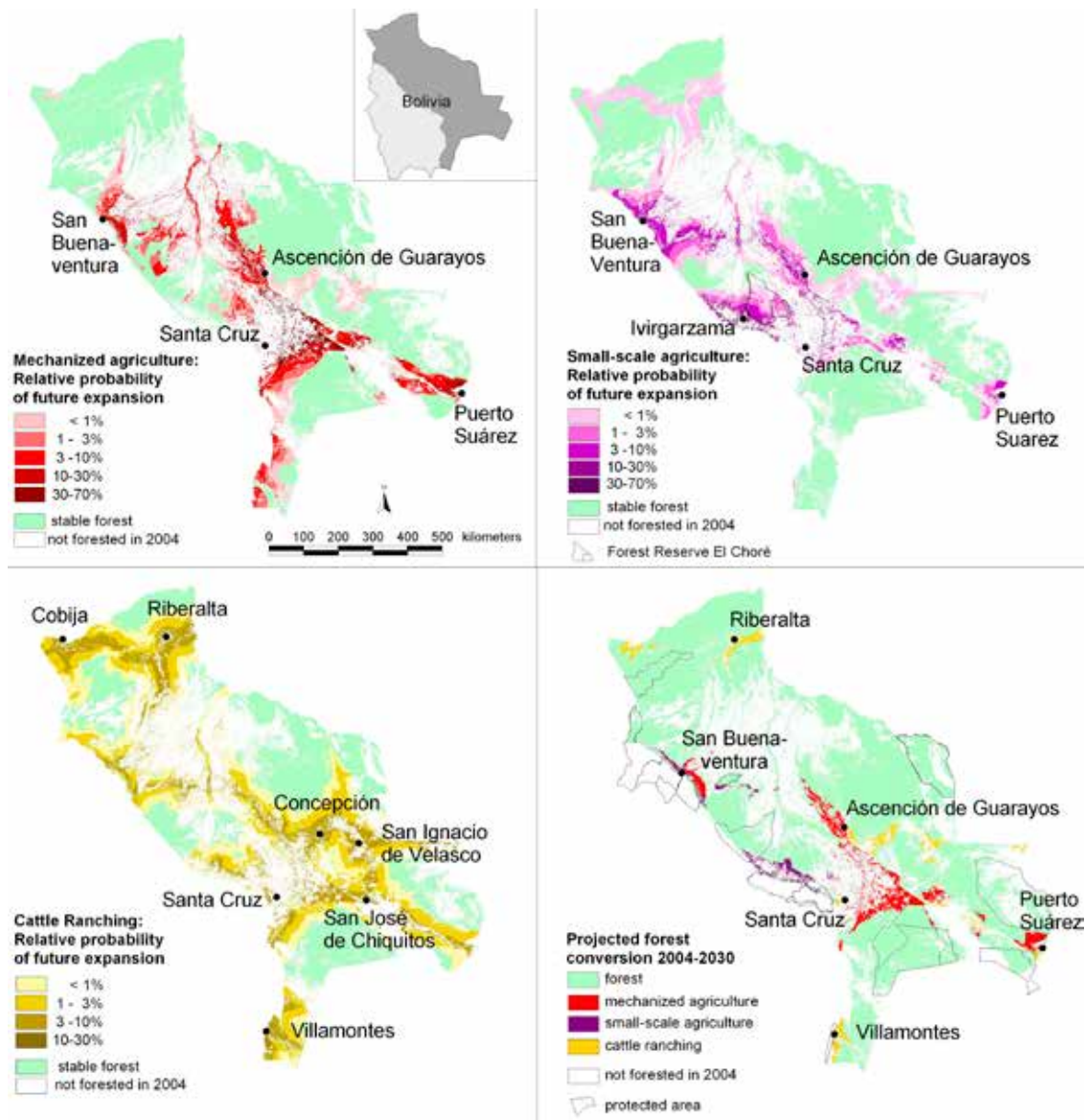
Table 8. Average NPV per hectare for different land-uses in the Department of Santa Cruz (8% discount rate)

Land-use	Details	Average NVP per hectare (30 years)
Mechanized agriculture	Soybean (two harvests per year or in combination with sunflower), rice or sugarcane	1000–2500 USD/ha
Small scale agriculture	rice + corn (manual)	approx. 500 USD/ha
Cattle ranching on sown pasture	In Santa Cruz (around the city of Santa Cruz or Chiquitania)	50–400 USD/ha
Logging	Different regions in Santa Cruz department	100–400 USD/ha

Source: Müller et al. (2013)

13 A recent study by the Conservation Strategy Fund (Malky et al. 2012) in the area of Yucumo-Ixiamas, suggests much higher values for cattle ranching, which is probably because the assumed stocking rate is very high (3 head/ha in comparison with 2 and 0.5 in Müller et al. 2013) and the initial cost of cattle purchase is not included.

14 <http://easba.produccion.gob.bo/>



Map 5. Projected agricultural expansion to lowland forests in Bolivia

Source: (Müller et al. 2012)

Small-scale agricultural expansion is projected to humid areas with relatively fertile soils and good access to local markets. Restrictions on land-use only have limited impact on this category, which means that protected areas or forest concessions are scarcely respected, according to the results of the model by Müller et al. (2012). In the future, small-scale agriculture will probably continue to expand in the northern Andean foothills. In turn, forest conversion to pastures for cattle ranching is relatively independent of environmental factors; the determining factor is good access to local markets. Restrictions on land-use do not affect cattle ranching much either. According to the results of the model, future expansion of cattle

ranching can affect accessible forests in practically all the lowlands.

2.3.5 Other direct drivers of deforestation drivers

As mentioned above, in addition the three main proximate drivers described, there are other direct drivers of deforestation with a less important role. These other drivers are described below. They include mining, oil and gas extraction and hydroelectric dam construction. Road expansion, due to its influence on the other direct drivers, is discussed as an underlying driver in the following section. A discussion about

forest fires is included in section 2.4 because its main impact is on forest degradation.

Mining and oil/gas extraction

There is no reliable information to show the impact of mining or oil/gas extraction activities on Bolivia's forest cover. Although mining has been established over all the west of the country, there is some mining development in the lowlands, especially in Santa Cruz (Tejada 2012). Impacts on forests are direct, with deforestation and forest cover conversion into open production areas; or indirect, when adjacent forests are deforested or degraded and become suppliers of raw material for underground mine structures or mining camp construction. An example is the deforestation and forest degradation caused by gold exploitation in the tropical region of the province of Larecaja in the Department of La Paz (areas of Guanay, Tipuani and Mapiri), where a large number of miners who carry out small-scale operations and who are organized in cooperatives are exploiting gold in underground mines and open pits, normally using methods that are destructive for the environment. Informality causes difficulties in the control of these activities.

There are two mining mega-projects with strong potential impacts in south-eastern Santa Cruz: Empresa Siderúrgica del Mutún and Don Mario mine, both with the potential to have considerable impacts on deforestation, due to the likely demand of vegetal charcoal, among others. Likewise, steel companies in the Brazilian territory could increase the demand for vegetal charcoal from Bolivia. Alluvial gold extraction in several Amazonian rivers has a limited impact on forests, but it leads to contamination caused by mercury use (Tejada 2012). In turn, oil /gas extraction also causes deforestation because of the clearing of oil/gas fields and the prospecting activities. But the largest impact is probably indirect, through the opening of access roads.

Hydroelectric dams

Bolivia has a great potential to generate hydroelectric energy with export possibilities. While in the Andean part they take advantage of strong slopes to generate energy with relatively low amounts of water, environmental impacts are usually strong in the Amazon, where large-scale hydroelectric projects require huge dams that lead

to the flooding of large forest areas, with severe impacts on local people, biodiversity and climate as well. Climate is affected due to the generation of methane from submerged biomass rotting (Coaquira 2010). A program with huge probable impacts is the construction of a series of dams in the Madera River basin under the Initiative for the Integration of the Regional Infrastructure of South America (*Iniciativa para la Integración de la Infraestructura Regional Suramericana, IIRSA*). Two dams in the Brazilian part of the Madera River, San Antonio and Jirau, are in an advanced state of construction and will probably cause flooding of forests in the Bolivian part. Bolivian has planned the Cachuela Esperanza mega-project, with a flooding area estimated at 57,000 to 69,000 ha of forest (Coaquira 2010; Lanza and Arias 2011). Another projected dam with potentially significant impacts is the dam in Bala, on the Beni River (Coaquira 2010).

2.3.6 Underlying drivers of deforestation

Underlying drivers are the driving forces behind proximate drivers. There have been many efforts to classify underlying drivers of deforestation, but this constitutes a complicated exercise due to a large number of interactions between political, social and economic factors. Geist and Lambin (2002) have developed probably the most complete effort in this sense. These authors see the demographic, economic, political/institutional and cultural factors as the main categories of the underlying drivers explaining deforestation. Table 9 introduces the main underlying drivers of deforestation in Bolivia following this classification. Implications of current policies for deforestation and degradation are analyzed thoroughly in sections 3 and 4. There is currently an ambitious environmental policy in Bolivia, but there is also an agricultural development agenda with significant effects on forests.

Different underlying drivers have tended to interact differently throughout history (Pacheco 2006a; Pacheco et al. 2010). The most relevant drivers in the present and probably in the future are described below: demography, international demand for agricultural products and investment opportunities, as well as construction of infrastructure.

Table 9. Underlying drivers of deforestation in Bolivia

Underlying drivers	Effects on direct drivers	Current importance and future trends
Demographic		
Migration from the west to the lowlands, previously also foreign settlements.	Forest conversion in areas of planned and spontaneous settlement, by small-scale agricultural expansion and mechanized agriculture in areas of foreign settlement	Continued spontaneous migration to the northern Amazon, among others; foundation of new Mennonite colonies
Population growth in settlement areas	Expansion of small-scale agriculture and Mennonite colonies due to demand for land from settlers' children	Formation of new colonies from existing colonies.
Urban population growth associated with increased demand for food	Expansion of agriculture and cattle ranching in the lowlands. Greater impact due to demand for beef, which requires relatively large areas	Increasing impacts due to greater demand
Economic		
International demand for agricultural products	It encourages mechanized agriculture, which is more competitive in foreign markets; strong soybean expansion since 1995	Continued expansion due to increasing international demand
International capital seeking investment opportunities	Growth of agribusiness and cattle ranching, financed by Brazilian and Argentine capital, among others	Continued growth, depending on the global economy
Integration and development of the domestic market.	Better infrastructure, investments in processing and marketing logistics	Expansion of domestic demand due to better infrastructure
Political/institutional		
Policies to promote agriculture	Among others, tax incentives and diesel subsidies encouraged mechanized agriculture. Strong boost in the World Bank Tierras Bajas project on the lowlands in the 1990s	Incentive policies continue to encourage agricultural expansion, especially for grains and sugarcane
Policies to improve access to lands and allocation of rights	Agricultural expansion fostered by abundant easily accessible lands, subsequent legalization of illegal occupation, perverse incentives to show the socioeconomic function (Función Económica Social, FES, see chapter 2)	The Government provides access for small farmers; Law 337 has allowed large producers to legalize illegal forest clearing since 1996
Development of road infrastructure	Indirect impact, facilitating access to markets	Continued road integration in IIRSA
Weak institutions that control deforestation.	Deforestation continues despite legal restrictions	ABT as a new institution which could improve control
Technological change		
Agricultural mechanization	Mixed effects; mechanization of production encouraged the expansion of commercial agriculture. Low technological level in cattle ranching and small agriculture causes low spatial efficiency	Mechanization in areas of small agriculture, possibility to adapt poor soils for planting soybean
Cultural factors		
Cultural perceptions of forests	Negative impacts because of agriculture-centered visions and poor knowledge of the tropical ecosystem. Andean settlers' agriculture poorly adapted to the tropical ecosystem, soil degradation due to very intensive Mennonite agriculture, social motivation for "rancher" social status	Agents with more agriculture-centered visions and poorer knowledge of forests tend to gain influence on policy decisions

Source: Own elaboration, based on Geist and Lambin (2002).

Population growth and migration

Although planned colonization does not play an important role anymore, there are demographic processes with significant effects on pressure on forests. People from western Bolivia without or with little land continue migrating, seeking to establish themselves in the lowlands. At the same time, there is a natural population growth in the settlement areas, which results in an increasing demand for lands, as is seen for example in the surroundings of El Choré Forest reserve (Müller 2009). There is no land abundance in traditional settlement areas anymore, which increases conflicts over lands. The current population in settlement areas of Andean colonists is estimated at around 400,000 people (Müller et al. 2013) and the rate of annual population growth in these areas is relatively high (about 5%, approximate estimate based on www.ine.gob.bo), also because of the influence of migrations. Likewise, new colonies are being formed from existing colonies, both in the case of Andean settlers and Mennonites. New Andean colonies often start using mechanized cultivation now, with capital support from existing colonies (for example, from Chapare investors, personal communication from Rafael Rojas). The Bolivian Government is also supporting Andean settlers' expansion, for example with the funding of agricultural projects in the Municipality of Concepción through the Pro Tierras national fund¹⁵.

The formation of new Mennonite colonies has recently been highlighted as one of the primary drivers of deforestation. Based on anecdotal information and analysis of high-resolution satellite images, these new colonies are also founded as a means of expansion of existing Mennonite colonies in Bolivia, on lands that are purchased on the market and then cleared—frequently without an authorization for land clearing.

Finally, domestic demand for agricultural products is expected to grow in cities¹⁶. Demand for beef has a greater impact because production requires relatively large land areas, which increases the pressure on forests.

15 See, for example, www.protierras.gob.bo/prensa/npconce.pdf.

16 Annual urban population growth was 3.6% from 1992 to 2001, www.ine.gob.bo/indice/visualizador.aspx?ah=PC20112.htm.

International demand for agricultural products

The increase in international demand for agricultural products from Bolivia has significantly contributed to the increase in the expansion of the agricultural frontier, especially soybean. For the domestic economy, exports of agricultural products are increasingly important in the balance of payments. In 2011, around USD 685 million of soybean products were exported, representing around 10% of total exports (IBCE 2012). From an international perspective, there are several trends indicating continued growth of the demand for agricultural products, especially soybean (DeFries et al. 2010; Kissinger et al. 2012): The price of soybean showed a clear upward trend in recent years. After a temporary downturn caused by the financial crisis in 2008, there was a new record in mid-2012¹⁷. Taking into account that international demand for food will continue to grow, the influence of foreign markets in deforestation is likely to continue to be an important factor. Furthermore, in addition to soybean, there may be future export of beef from the lowlands in Bolivia, fostered by efforts to control foot-and-mouth disease, which may have a significant effect on the expansion of deforestation caused by conversion to pasture (Müller et al. 2013). In Chiquitania, for example, it is reported that investments have already been made in expectation of possible exports of meat, such as a slaughterhouse in San Ignacio de Velasco¹⁸.

International capital seeking investment opportunities

Globally, there is a strong and increasing accumulation of capital in private hands, combined with a sharp decline in revenue for state bonds, both trends as a consequence of the global financial crisis. An increasing part of this private capital is invested in agriculture in developing countries (FAO 2010). Accumulation of private capital in Brazil, due to the economic boom in this country, is especially relevant for Bolivia—this also applies to Argentine capital. Much of private capital in Brazil is generated by agribusinesses. At the same time, the development of Bolivia's agricultural sector lies behind Brazil's and lands are much cheaper. In addition, deforestation control has increased considerably in recent years

17 <http://www.indexmundi.com/es/precios-de-mercado/?m=ercancia=soja&meses=360>.

18 <http://www.eldeber.com.bo/vernotaeconomia.php?id=120519203648>.

in Brazil. Consequently, there are huge flows of international investment capital, especially from Brazil, being directed to agribusinesses in Bolivia, thus promoting mechanized agriculture and cattle ranching. In the areas of San Ignacio de Velasco or southern Guayaramerín, for example, it is reported that a large part of cattle ranching is done with Brazilian capital and there is a strong informal cross-border livestock trade with Brazil.

Road infrastructure construction and improvement

The importance of construction and improvement of road infrastructure was identified as an important driver of deforestation in the spatial model of Müller et al. 2012 (section 2.3.4) and it is likely to continue in the future. In general terms, the road network is still underdeveloped in Bolivia, especially in lowlands, where there is less than 2,000 km of paved roads¹⁹. However, there have recently been important investments in roads which have facilitated access from forest areas to capital cities of the departments and foreign markets. For example, the paving of the Santa Cruz–Trinidad road has gone hand in hand with strong forest conversion (Map 3) due to agricultural activities at different scales—especially mechanized production of rice and soybean. Another case is livestock expansion to southern Guayaramerín (Map 3), apparently as a result of the new road built to the south, connecting with the city of Trinidad.

Planning of the basic road network in Bolivia integrated with IIRSA²⁰ will surely further increase pressures on forests. The main planned investments within this initiative are the Central Inter-Oceanic Axis, including the stretches which connect Santa Cruz with Puerto Suárez, San Matías and Cochabamba, as well as the integration of Peru, Brazil and Bolivia, called the “north corridor” in Bolivia, with the stretches of La Paz–Yucumo–Riberalta–Cobija. These programs include different projects to improve existing roads, such as the Santa Cruz–Cochabamba highway. Other planned roads inside and outside IIRSA with potential

significant impacts on forests²¹ are the connection of Cobija–Extrema–Puerto Maldonado, with a route to Brazil and Peru, the Apolo–Ixiamas road, which would be crossing the Madidi National Park or the Ixiamas–Chivé road, or possibly Ixiamas–Puerto Maldonado (Peru), creating a more direct connection between the Departments of La Paz and Pando, threatening another large area of practically virgin forests.

The infrastructure project that has generated more conflicts is the road that would connect Villa Tunari with San Ignacio de Moxos, crossing the Isiboro Sécure National Park and Indigenous Territory (*Territorio Indígena y Parque Nacional Isiboro Sécure*, TIPNIS), a project still under discussion due to indigenous peoples’ resistance, even under a consultation process implemented by the government. In addition to the construction of large core roads, there are also important impacts of the opening of roads locally, for example, by forest roads (Chomitz and Gray 1996).

2.4 Drivers and processes of forest degradation

There is little reliable information about forest degradation in Bolivia’s lowlands. This is mainly because of technical difficulties for its evaluation by remote sensing (Chazdon 2003; Souza and Robert 2005; Rodriguez and Armijo 2011), as well as the lack of common definition of the forest degradation phenomenon. The degradation of an ecosystem is defined as the total or partial change that creates a type of ecosystem different from that expected in the area (Thompson 2011). Regarding forest degradation, Lund (2009) identified more than 50 definitions of forest degradation. In turn, the Intergovernmental Panel on Climate Change (IPCC) (2003) defines forest degradation as a human-induced long-term loss of a certain percentage of forest carbon stocks and forest values, without qualifying as deforestation. In this sense, degradation is here understood as a permanent forest biomass loss in areas which remain forest land²².

19 See map on www.abc.gob.bo/IMG/pdf/rvf_junio2010.pdf

20 Initiative for the Integration of the Regional Infrastructure of South America (www.iirsa.org), a program coordinated with neighboring countries where axes that cross the country from border to border are prioritized and where financing is provided.

21 See map on www.abc.gob.bo/IMG/pdf/rvf_junio2010.pdf

22 In the context of REDD+, the definition of IPCC (2003) is probably the most relevant one.

There are also some technical problems to assessing degradation (Chazdon 2003). Remote sensing can detect degradation, but it is difficult to conduct quantitative assessments, due to important changes occurring below the forest canopy (Souza and Robert 2005; Rodriguez and Armijo 2011). In this sense, Bolivia is still at an early stage where local pilot sites are being analyzed²³.

Map 6 shows a generalized attempt to compare current forest biomass stocks with the original state before human disturbance (Müller 2011)²⁴. This method makes it possible to estimate the forest areas that have lost most of their forest cover. As a result of this analysis, inter-Andean dry valleys, parts of Chaco and Campos Cerrados in Chiquitania are mainly highlighted²⁵.

According to preliminary data based on the analysis of the Museum of Natural History Noel Kempff Mercado (MHNNKM 2013), an area of 800,000 ha is classified as degraded. However, no appropriate methods or definitions are known. Apparently, degradation refers to low-density forests (the largest relative proportion of forests being degraded is in tropical areas of Cochabamba, where secondary forests formed by small-scale agriculture predominate).

Forest degradation in Bolivia is associated with four direct drivers identified by Hosonuma et al. (2012) in a global comparative assessment in different developing countries. These drivers are: (1) forest fires, (2) selective logging (legal and illegal), (3) grazing/browsing in natural forests and (4) fuelwood extraction.

23 For example, there was a fairly successful attempt to measure and map forest degradation in northeastern Beni under FAN's REDD Amazon project, based on calibrated Landsat satellite images calibrated with high-resolution images (CBERS HRC, Spot 5, personal communication from A. Rodriguez, FAN).

24 It is based on a map of ecological zones (Araujo et al. 2010), which shows likely natural expansion of different forest types. For each zone, an original forest cover was defined, evaluating it with a classification based on MODIS (Hansen et al. 2003) in a seemingly undisturbed area. Then the percentage of the remaining original cover was calculated for each pixel. The map was made at a very coarse scale and it assesses forest cover and not biomass content.

25 In Chiquitano Cerrado, as well as in the area of Apolo (east of San Buenaventura), it is not certain whether open forests are natural or anthropic.

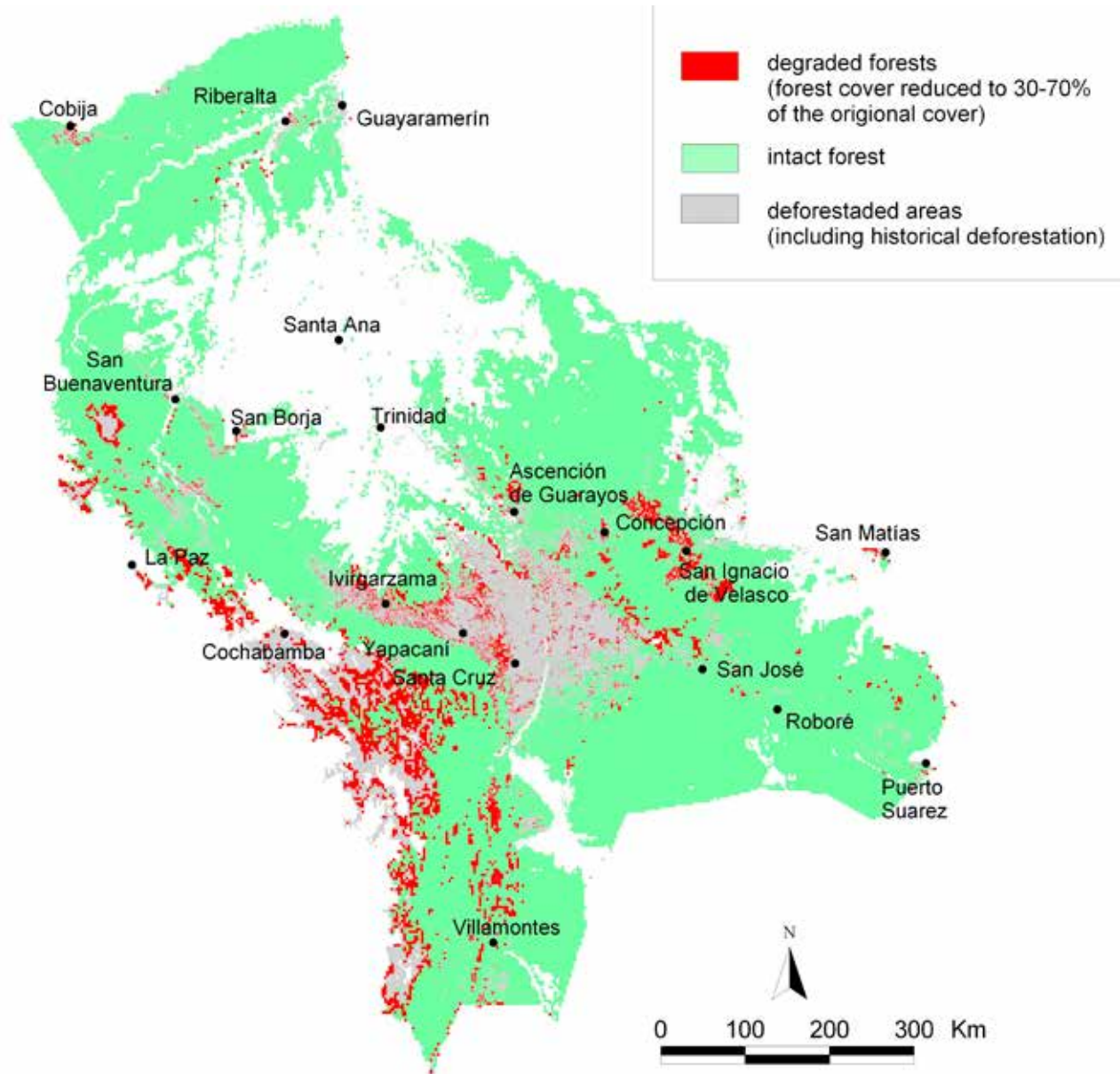
Forest fires

In Bolivia, forest fires are generally due to the use of fire as an agricultural tool to prepare lands for cultivation. Underlying drivers are probably related to high costs of alternative practices as well as the weak control of planned burning. In addition to destroying parts of the forest and transforming the original cover, fires can change the original composition of species, including the establishment of invasive species²⁶ which end up prevailing over native species because, with the consequent loss of ecosystem goods and of the possibility of recovering or reusing these lands (Chazdon 2003; Cochrane 2003; Veldman et al. 2009). Other effects of burning are soil fertility loss, as dead organic matter is burned and the inhibition of natural ecosystem regeneration. The most detrimental effect is the death of trees and the increase of combustible material, which generates successive cycles of increasingly frequent and intense fires.

The Directorate of Natural Resources (DIRENA) of the government of Santa Cruz, by monitoring through an Early Warning System for Forest Fires, carried out an assessment of the area burned in 2006–2011 in relation to the land-use type according to PLUS (Figure 1), showing that forest-use lands are the most affected areas.

Recently, a national study carried out by Rodriguez (2012) presented a quantification of areas affected by fires through remote sensing based on MODIS. Between 2000 and 2010, a total of 22,012,910 ha of burned areas was detected, 20% of which was caused by forest fires. The highest value was found in 2010, when forest fires affected 1,072,435 ha. The study indicates that areas detected as burned are often new areas, which were not burned previously. It also mentions that estimates exceed the figures used by ABT at a national level for 2010 (ABT 2011). Santa Cruz is by far the department with the highest incidence of forest fires, followed by Beni.

26 Examples include "chusi" (*Pteridium aquilinum*), a very aggressive invasive fern in moist forests, sujo grasses (*Imperata* spp.) or guinea grass (*Panicum maximum*); both species lead to the establishment of permanent forest clearing. Chamba (*Leucaena leucocephala*), a tree originally used for agro-forestry systems, appears in drier forests; it is included on the Red List of Invasive Species (Lowe et al. 2000).



Map 6. Approximate location of degraded forests in Bolivia.

Source: Own elaboration based on Müller 2011, Hansen et al. 2003 and Araujo et al. 2010.

Logging

Timber extraction tends to cause forest degradation by directly removing and damaging biomass. The underlying driver is national and international demand for timber. Since legal logging should respect forest regenerative capacity, it is possible to assume that it does not significantly affect forests, while greater impacts could be expected because of informal or illegal harvest. According to ABT (2012), in 2011 it was possible to control 66% of the sawn timber that reached the market, which means that 34% comes from illegal logging, that does not comply with sustainability rules.

The impact of logging on forests' regenerative capacity is uncertain. The greatest effect is probably found in species composition, affecting the reproduction of timber species such as mahogany or Spanish cedar, which may lead to local extinction of these species (Superintendencia Forestal 2003). An indirect effect of forest extraction is that the risk of forest fires increases due to fuel accumulation in ground vegetation (Mostacedo et al. 1999; Cochrane 2003).

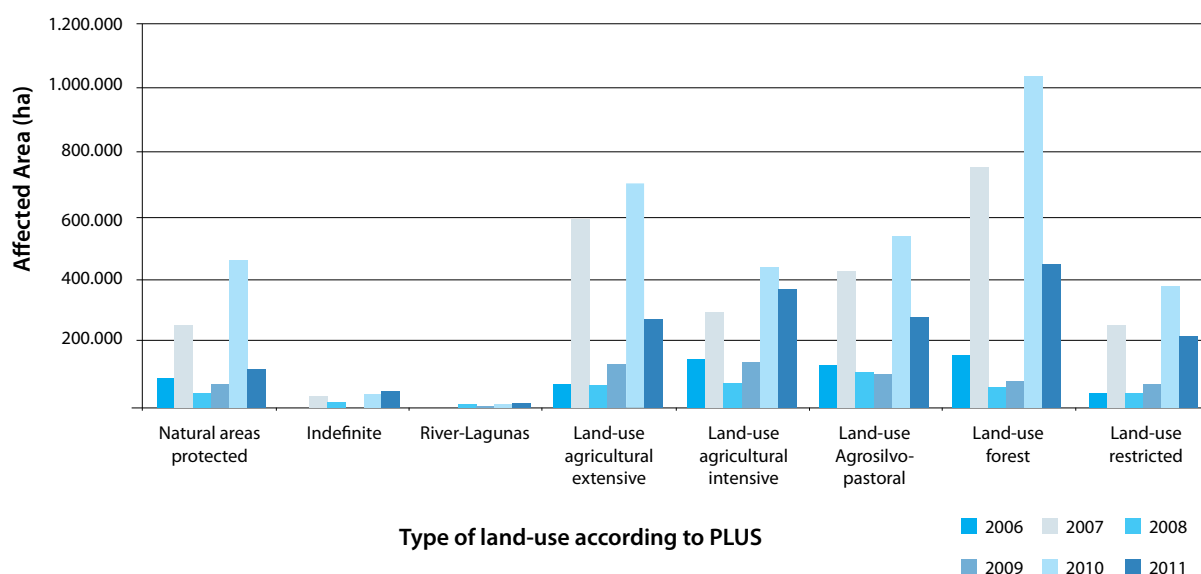


Figure 1. Area affected by forest fires in the Department of Santa Cruz by land-use type (2006–2011).

Source: Gobernación de Santa Cruz (2012).

Browsing

The practice of browsing refers to very extensive livestock (cattle, goat and sheep) production in forests, which is mostly done on dry forests in the valleys and Chaco (Museo Noel Kempff and Prefectura de Santa Cruz 2008). A typical effect is inhibition of natural regeneration as well as of ground vegetation in general, returning to open forests with few old tree individuals susceptible to erosion (Navarro and Maldonado 2002). Although in economic terms this extensive livestock farming is not very efficient, it is common in rural areas as a form of “money box”, i.e. to save capital (van’t Hoft 2004).

Fuelwood extraction

Fuelwood use is associated with relatively higher costs and limited access to alternative fuels, such as LPG gas, in many rural areas in Bolivia (Lazcano and Espinoza 2001). Its impact is greater in dry forests, where regeneration is slower. Dead biomass extraction may affect the soil organic matter content, while the use of living trees can change the structure towards more open forests (Lazcano and Espinoza 2001). There is also some partly illegal production of vegetal charcoal (ABT 2011).

2.5 Contribution of deforestation to carbon emissions

Villegas and Mostacedo (2011) present a summary of carbon content estimates in different forest

types in Bolivia. The main sources mentioned are Dauber et al. (2001) and Andersen (2009), the latter referring to the global map elaborated by Ruesch and Gibbs (2008) as well as an unpublished study prepared by Villegas et al. The latter, based on a network of over 1,000 plots of 1 ha and estimating carbon stocks for the greatest number of forest types, is the most complete. Another available source is the carbon content referring for the Amazon by Saatchi et al. (2007). After reviewing values provided by different sources, we can conclude that there is no consistent assessment of carbon quantities stored in Bolivian forests yet. Therefore, we opted for a rough estimate based on rounded values from the unpublished study by Villegas, which are apparently the best in terms of quality and accuracy.

It also seems that there is confusion about units applicable to measure carbon in Bolivia. There is often confusion between aboveground biomass, carbon content per forest hectare and CO₂ emissions from deforestation of 1 ha of forest²⁷. Thus, in Table 10, these three different values are provided.

²⁷ Villegas and Mostacedo (2011) indicate tC/ha as the unit; however, it is evident that they refer to aboveground biomass. Carbon content accounts for 50% of aboveground biomass, while CO₂ emissions in the case of forest destruction are obtained by multiplying carbon content by 3.67 (or multiplying biomass content by 1.83).

The resulting average value of CO₂ emissions is much higher than the values indicated in the Second Communication of Bolivia to the UN Framework Convention on Climate Change (UNFCCC) (about 50,000 tons for 2002 and 2004; PNCC 2009). This may be due to a confusion of units²⁸, although the biomass estimates by forest type used for the second

communication are not clear either²⁹. We conclude that the contribution of land-use change to carbon emissions is even higher than that indicated in the Second Communication, probably over 80%. An estimate of emissions from degradation is not provided here, due to the lack of data and the complexity of the issue.

Table 10. Approximate emissions from deforestation

	Aboveground biomass per hectare (t)	Carbon per hectare (t)	CO ₂ per hectare (t)	Loss 1976–1992 (thousand tons of biomass)	Loss 1992–2001 (thousand tons of biomass)	Loss 2001–2010 (thousand tons of biomass)
Northern Amazon	300	150	550	20,355	12,810	42,308
Rest of the Amazon	200	100	367	91,250	71,925	155,125
Chiquitania	200	100	367	107,535	150,680	172,840
Chaco	80	40	146	15,822	35,408	41,840
Yungas	200	100	367	8,815	5,545	11,590
Tucumán-Bolivian forest	200	100	367	745	660	535
Total				244,522	277,028	424,238
Annual averages (thousand tons)						
Aboveground biomass loss				15,283	30,781	42,424
Carbon loss				7,641	15,390	21,212
Emissions of CO ₂				28,044	56,483	77,848

Note: One thousand tons equal one gigagram (Gg), a measure commonly used in the context of GHG emissions.

Source: Own elaboration based on Killeen et al. (2007), Araujo et al. (2010), Villegas and Mostacedo (2011) and Cuellar et al. (2012).

28 At the same time, deforestation rates of around 300,000 ha are mentioned. With these values, the estimates indicated as CO₂ emission would be plausible as a results of biomass loss.

29 The Second Communication of Bolivia to the UNFCCC reports a contribution of land-use change of only 48% and 50% of GHG emissions (CO₂ equivalent) in Bolivia for 2002 and 2004 (PNCC 2009). This also includes an important removal of carbon from the atmosphere under the category of “land-use change”, equivalent to a third of the emissions in this category. However, this figure is doubtful considering that there is no large-scale reforestation in Bolivia.

3 Political, social and economic conditions

3.1 Context of the main legal and political changes

3.1.1 Neoliberal policies in the 1990s

In the mid-1980s, the government of Bolivia embarked on deep structural reforms aimed at reversing a drastic economic crisis caused by the collapse of tin mining—which was the main source of revenue for the State—and aimed at establishing new conditions for economic growth. To this end, measures of economic stabilization and structural adjustment were adopted (Morales and Sachs 1987). While the former implied short-term measures to address inflation and manage public deficit; the latter—of neoliberal orientation—were intended to establish a new model of economic growth and social redistribution based on free market principles. The main measures promoted deregulation of domestic markets, trade liberalization, privatization of public companies, public subsidy reduction and State role reduction (Morales 1991, 1994). Structural adjustment promoted economic recovery, mainly because of the important boost to non-traditional exports, including agriculture based on soybean production and recovery of timber exports, which led to increased pressures on forests (Kaimowitz et al. 1999; Pacheco 2006a).

Until the end of the 1980s, the development of agriculture in the lowlands had been planned at the State level with the objective of achieving self-sufficiency in food production; exports were not very significant then (Pacheco 2006a). In the context of structural adjustment, many incentives were created for the start of agro-industrial production, mostly soybean, including national currency devaluation, removal of barriers to foreign investment and land market liberalization, allowing access to lands for companies and large landowners. The limitation due to reduced

domestic demand was replaced by an orientation of agricultural production in the lowlands towards foreign markets, especially preferential markets in the Andean countries (Pacheco 2006a).

Cattle production grew steadily, catering for the demand of the growing population in urban centers such as the City of Santa Cruz (Pacheco 2006a). Domestic demand, generally met with production from natural pastures, was gradually supplemented by increasing production in abandoned agricultural areas and then also in forest areas directly converted to pasture, in some cases with government incentives (CEDLA 2011).

Although adjustment policies improved macroeconomic indicators, they did not manage to solve problems of redistribution of growth benefits and poverty remained, mainly among rural people that depended on a sluggish agriculture, negatively affected by trade liberalization and reduction of support to agriculture (Pérez 2003). Environmental and social problems fostered the implementation of “second-generation” policies in the early 1990s to face environmental problems and improve the allocation of public resources. These policies were accompanied by international cooperation programs, such as the Eastern Lowlands (*Tierras Bajas del Este*) project, financed by the World Bank and the German International Cooperation (KfW), including technical assistance for agricultural production, as well as support for land-use management. This World Bank project also included a credit component, road opening and support to indigenous organizations (Baudoin et al. 1995).

Second-generation policies attempted to solve structural problems which affected land and forest conservation and management, as well as mechanisms for allocation and management of public resources. These policies followed the policy

agenda suggested for sustainable development at the Conference on Environment and Development held in Rio de Janeiro, Brazil, in 1992, which were then regionally discussed at the Summit of the Americas on Sustainable Development in Santa Cruz, Bolivia, 1996. An important decision in this context was the creation of the Ministry of Sustainable Development, which then became the Ministry of Environment and the Secretariat of Popular Participation, which became the Ministry of Popular Participation. These public agencies together with other public departments and society agents played a key role to encourage processes for discussion and passing of forestry laws in the mid-1990s (Law No. 1700, 1996), Land Management Law (Law No. 1715, 1996)³⁰ and Popular Participation Law (Law No. 1551, 1994). This legislation had a decisive influence on the process of redefining institutional aspects in the management of land, forests and public finance in the context of sustainable development objectives with neo liberal orientation (Pacheco 2007c).

Additionally, the government signed several important agreements resulting from international processes, which guided some of the policies adopted in the mid-1990s (see Table 11). The

most important ones were the International Labour Organization (ILO) agreement on indigenous peoples' rights and the conventions on tropical timber trade and endangered fauna and flora, as well as the Kyoto protocol.

New institutional aspects emerged with the implementation of the National System of Protected Areas (*Sistema Nacional de Áreas Protegidas*, SNAP), through the gradual creation of protected areas, mainly in areas with high biodiversity, many of which are still forested. The National Service of Protected Areas (*Servicio Nacional de Áreas Protegidas*, SERNAP)³¹ was responsible for their administration and it gradually started to develop management plans for these areas but with clear operational and financial difficulties. Besides, it was necessary to establish management rules for forest production lands by updating the previous forest legislation passed in 1976 with the approval of the new Forestry Law in 1996. This law created the Forest Superintendence (*Superintendencia Forestal*, SF), responsible for the approval of forest management plans, as well as for supervision and control of forest operations and the Agrarian Superintendence (*Superintendencia Agraria*, SA), in charge of the supervision of

Table 11. Major international agreements ratified by the Bolivian State

AGREEMENT	RATIFICATION DATE
International Tropical Timber Organization Agreement (ITTO agreement)	Law No. 867 dated 27 May 1986
Agreement 169 of the International Labor Organization, ratified on Indigenous Peoples' Rights	Law No. 1257 dated 11 July 1991
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Law No. 1255 dated 5 July 1991
Convention on Biological Diversity	Law No. 1580 dated 15 June 1994
United Nations Framework Convention on Climate Change	Law No. 1576 dated 25 July 1994
The Kyoto Protocol, adopted by the Parties at COP 3 in 1997	Law of the Republic No. 1988 dated 22 July 1999
United Nations Convention to Combat Desertification and Drought	Law No. 1688 dated 27 March 1996
United Nations Declaration on the Rights of Indigenous Peoples	Law No. 3760 enacted on 7 November 2007.

³⁰ This refers to the Law of National Service for Agrarian Reform, known as the INRA Law.

³¹ SERNAP was created by a Supreme Decree in 1998 as a decentralized institution of the Ministry of Sustainable Development and Planning.

land-use plans at the farm level³². The National Institute for Agrarian Reform (*Instituto Nacional de Reforma Agraria*, INRA), created with the above-mentioned land law (Table 12), was in charge of land-management duties, mainly agricultural land titling. These institutional elements were based on a decentralized public management system implemented with popular participation, which assigned greater responsibilities to municipalities.

3.1.2 The Government of Evo Morales

The legal framework and institutional structure remained intact until the beginning of the government of Evo Morales, leader of the Movement for Socialism (*Movimiento al Socialismo*, MAS), in 2006. This administration based its policy agenda on severe criticism of the neo liberal development principles applied by previous governments and on a new paradigm based on “Living Well”³³ (Gobierno de Bolivia 2006). One of the main initiatives of the current administration was the approval of the new Political Constitution of the State (*Constitución Política del Estado*, CPE) in 2009, after a period of considerable political upheaval due

to the lack of agreements on the process in the Constituent Assembly.

The Government of Evo Morales aimed to modify the production matrix and internal accumulation of wealth through the promotion of a more plural economy, with greater State intervention in production and development planning and recovery of some strategic sectors for the State. This public management proposal was incorporated in the new Political Constitution of the State (CPE). It stresses, among other aspects: the ownership of natural resources by the Bolivian people and their management by the State; the recognition of social, economic, civil and political rights of citizens; the strengthening of the State autonomy process; as well as the recognition of economic, social, legal and political plurality of the Bolivian State in the context of the construction of a plurinational State (CPE, *Estado Plurinacional de Bolivia* 2009). The practical implications of these different aspects are still difficult to determine because they should be gradually incorporated in the sectoral regulation frameworks.

The economic approach, called the “national production model” is based on the following five

Table 12. Legal framework governing land and forest governance in Bolivia in the neo liberal period

Forestry Law No. 1700 dated 12 July, 1996	Regulates the use of forest resources in the country and establishes mechanisms which guarantee the adoption of sustainable forest management
Decree 24453 regulates Law No. 1700 dated 21 December 1996	Establishes an institutional framework with responsibilities and functions and the allocation of percentage resources for forest-use and clearing in the interest of public forest system institutions
Law of National Service for Agrarian Reform No. 1715 dated 18 October 1996	Establishes the institutional framework for land administration, defining modalities and procedures for land property titling and regularization and conditions to preserve ownership

32 A key aspect of superintendencies was their self-regulatory nature, since the National Congress designated the superintendent to reduce partisan bias.

33 According to the Law of Mother Earth (Art. 5), the concept of “Living well” means “[...] the civilizing and cultural horizon alternative to capitalism and modernity which is born in the visions of nations and indigenous, native, rural peoples [...] to allow the harmonious living together among all beings, components and resources of Mother Earth. It means living in complementarity, harmony and balance with Mother Earth and societies, in equity and solidarity, eliminating inequalities and mechanisms of domination. It is Living Well among us, Living Well with what surrounds us and Living Well with ourselves”.

pillars: (1) expansion of the role of the State with a more active role not only in regulation but also in development planning, mainly in strategic sectors that guarantee internal accumulation of wealth, (2) production development, adding value to natural resources and fostering environmental sustainability, (3) active participation of public, private, community and cooperative economies in the production system, (4) production to meet the needs of the domestic market and exports, with emphasis on the former, and (5) redistribution of wealth and surpluses and reduction of inequalities (Gobierno de Bolivia 2006). At the international level, the government of Morales initiated a process towards universal recognition of Mother Earth's rights, which also influenced the development of national regulations on Mother Earth, within a more general proposal aimed at preventing nature marketization.

The State has started to have a much more active role in the agricultural sector. There is a strong discourse that gives priority to production for the national market. There are also centralized programs and projects, such as the implementation of an agro-industrial complex in the area of San Buenaventura³⁴. In addition, companies with state administration have been established in the agricultural sector such as Food Production Support Company (*Empresa de Apoyo a la Producción de Alimentos*, EMAPA) or a company to support the Brazil nut extraction with Bolivian Brazil Nut Company (*Empresa Boliviana de Almendra*, EBA). There are still no detailed impact assessments of the operations of these companies.

Accompanying the agenda of defense of Mother Earth, the government passed the Law of Rights of Mother Earth (Law No. 071, 2010) and the Framework Law of Mother Earth and Integral Development for Living Well (Law No. 300, 2012), hereinafter referred to as Law of Mother Earth. This law defines land rights as a collective subject of public interest and establishes the collective and individual rights of indigenous nations and peoples, rural peoples, intercultural and Afro-Bolivian communities within a comprehensive development proposal for natural resource use. This should be associated with an institutional scheme, with state intervention and social participation, to promote climate change

mitigation and adaptation. Along the same line, the Morales administration has made international proposals for the recognition of peoples' collective action in the conservation and sustainable use of biodiversity and of non-market approaches in the framework of respect for Mother Earth.

In opposition to the Law of Mother Earth, the Law of Support to Food Production and Forest Restitution was passed (Law No. 337). Taking into account that it was almost impossible for the State to punish infringers for illegal clearing under conditions defined in the forest legislation and with the view of providing food security, this law allows farmers to legalize illegal clearing between 1996 and 2011, through the affiliation to a food production program and with the commitment to restore 10% of affected forest cover, in addition to recovering legal ecological easements. For farms larger than 50 ha a fine of approximately USD 60 is set per illegally deforested hectare. Furthermore, in collective properties in permanent forest production lands a conversion of 20% of the area is permitted. In fact, this implies a kind of amnesty because fines for illegal deforestation have so far been guided by estimated quantities of illegally exploited timber, resulting in much higher amounts (around USD 200 per hectare). This law was proposed in close cooperation with the agro-industrial sector and was welcomed by the latter. Now farmers joining the program face the challenge of reforesting within stipulated periods and ABT has to control compliance with the measure through close monitoring.

The current regulatory framework, resulting from the changes made during the Morales Government, has modified the institutional architecture of the public system that is associated to natural resource governance. Table 13 presents the main regulations established in this administration that support the new public institutional aspects in agriculture and forestry.

This legal framework emphasizes, in general terms, the resolution of problems associated with formalization of rights to access land by indigenous peoples and communities, as well as the need to support food production. The essence of forest regulations has not changed although some adjustments have been made, as discussed below. The Law of Mother Earth, in turn, is an effort to promote development visions with an approach of Living Well, but ensuring sustainability of

34 <http://easba.produccion.gob.bo/>

Table 13. Legal framework guiding land and forest governance in Bolivia from 2006 to date

Law No. 3545 on Community Redirection of the Agrarian Reform	Modifies Law 1715 (INRA Law), accelerates collective land titling and establishes that all available public lands should be provided preferentially in favor of indigenous peoples and communities or peasants that have no or insufficient lands
Law No. 3760 ratifying the Rights of Indigenous Peoples	Raises the United Nations Declaration on the Rights of Indigenous Peoples to the rank of law
Law No. 071 of Rights of Mother Earth	Recognizes Mother Earth's rights, as well as the obligations and duties of the Plurinational State and society to ensure respect for these rights
Law No. 144 of Productive Agricultural Community Revolution	Aims at establishing rules for the process of the Productive Agricultural Community Revolution for food sovereignty, establishing the institutional and political bases and technical, technological and financial mechanisms of production, processing and marketing of agricultural and forest products
Framework Law No. 300 of Mother Earth and Integral Development for Living Well	Promotes articulation of rights, establishes sectoral bases, technical instruments and guarantees for the rights of Mother Earth. It bans the marketization of livelihoods and the processes that support them. It also establishes the Plurinational Authority of Mother Earth, mitigation and adaptation mechanisms and a financial mechanism for the implementation of the climate and environmental agenda in Bolivia
Law No. 337 on Support to Food Production and Forest Restoration	Enacted in order to regularize illegal clearing through immunity from fines for clearing performed until end-2011 to contribute to food security. It is generally perceived as an instrument to facilitate the expansion of the agricultural frontier, although it includes commitments to reforest and restore ecological reserves

Mother Earth's regeneration capacities. In practice, however, there are contradictions between public policy objectives to support food production and extractive industry development and the compliance with the rights of Mother Earth.

3.2 Regulatory framework for land and forest management

3.2.1 Rights on lands and forests in neo liberal governments

The reforms of the land and forest policy in the mid-1990s introduced new rules in the distribution of agricultural and forest rights. The INRA Law widely incorporated indigenous peoples' territorial demands and respected medium- and large-scale farmers' corporate interests (Hernández and Pacheco 2000). In turn, the Forestry Law defined the rights of forest-use on public forest production lands and in individual properties (Pacheco 2007).

The main purpose of the land law was to clarify property rights through a process of farm

regularization which could lead to the titling and structuring of the rural registry. It also merged agricultural and forest rights and considered conservation criteria in the justification of the socioeconomic function (*Función Económica Social*, FES). In the new land agenda, regularization of land tenure became the centerpiece of the recognition of territorial indigenous rights in Indigenous Communal Territories (TCOs), the identification of public lands for allocation to landless farmers and the legalization of rights on agricultural properties for agricultural small, medium and large landowners. It was also considered that all restructured properties over which there were not granted or claimed rights could be considered public forests. The tax on rural property was used as a criterion to justify land tenure and tax collection was associated with a self-appraisal process (Urioste and Pacheco 2001). This partly involved formalizing tenure of illegally occupied public lands.

As regards forest lands, legislation allowed the conversion of old forest-use contracts into a new system of concessions for a period of 40 years,

renewable every 5 years. Besides, up to 20% of public forests available within municipalities were declared municipal reserve forest areas (*Áreas Forestales de Reserva Municipal*, AFRM) for local forest-users to access areas under concession contracts, prior organization in Local User Associations (ASL). Formal rights were also recognized for forest-use to all owners of land with forests, both individual and collective, including communities and TCOs. The ultimate purpose of forest reforms was to clarify rights over forests in order to guarantee private investment in forest management that could lead to the modernization of timber operations and the reduction of illegal logging (Contreras and Vargas 2001).

Demarcation of public forests and areas already identified as protected areas or forest concessions, largely depended on the completion of the regularization of agricultural properties with the criterion that all remaining forests without established ownership should be considered public forests. In practice, however, it was very difficult to identify them because most lands were claimed under some kind of right, mainly by medium- and large-scale farmers. Considering this, the Law of Community Redirection of the Agrarian Reform established that all areas identified as public forests, instead of AFRM and those given to ASL, as defined by the Forestry Law, should be allocated to indigenous and native or rural communities, with or without lands.

3.2.2 Instruments for sustainable forest management

The forest law of 1996 introduced regulations to guarantee sustainable forest-use in the understanding that this was feasible with the adoption of forest management practices promoting natural regeneration of intervened species. It included changes in the tax collection system from a volume to an area-based system and also the establishment of patents for clearing (15 times higher than patents for forest-use), in addition to clearing authorizations. Forest regulations made instruments of sustainable management, forest management plans (PMF) and operational annual plans (POAF) mandatory, where usable timber inventories are determined and cutting plans and silvicultural treatments are defined. The main practices adopted were 20-year

cutting cycles and respect for minimum cutting diameters by species.

Different forest rules were approved depending on the type of forest right distinguishing forest concessions, private properties under 200 ha and forest community operations in TCOs. However, the last two have been inspired by the model developed for forest concessions and, to a large extent, they copied the technical parameters used for large-scale commercial use in concessions. As a result, all small-scale community operations should adopt use practices similar to those established for large-scale commercial forest operations (Pokorny and Johnson 2008). Likewise, forest regulations have often created barriers to the entry of local indigenous, farming and agro-extractive people in forest commercial exploitation, tending to become bureaucratic procedures rather than technical demands and they were not gradually revised (Hansen and Iversen 2005). Nevertheless, the forest decentralization process fostered the incorporation of a large number of community initiatives for timber forest management with mixed results (Pacheco 2007).

As regards land policies, it was established that the acquisition of property rights over land should take into account compliance with the FES. Although it included conservation and forest management criteria, in practice, the FES continued to be dominated by agricultural-use criteria as a justification for recognition of rights, which led to unfair competition between agricultural and forest land-uses (Pacheco 2006a). Agricultural and forest policies, although developed in the same year, had contradicting purposes, which in practice came into conflict according to Pacheco (2010), who discusses their implications on forests. For example, the regularization process stimulated expansion of farms on public lands—mostly forests—encouraging illegal occupation. Since the FES was determined, in practice considering agricultural and livestock use criteria, the easiest, fastest and cheapest way to justify land-ownership and thus compliance with FES, was by clearing. Consequently, farm regularization has tended to accelerate deforestation (Matsuzaki et al. 2005; Pacheco 2006b). One way to legalize clearing was through the development of Plot Management Plans (POPs). However, the Agrarian Superintendence (SA) approved these plans even in areas classified as Permanent Forest Production

Lands (TPFP), infringing regulations that banned clearing in those areas (Ministerio de Desarrollo Sostenible 2005). In fact, the TFPF map, drawn in 2001 at a scale of about 1:5 million, represents the only national approach that distinguishes forest and non-forest-uses. There are also Land-use Plans at the department level. These are generally consistent with TFPFs and are also in force for the approval of clearing applications.

3.2.3 Changes to forest regulations in the MAS Government

Since 2006, with the government of Evo Morales, the state administration has experimented with changes introduced by new political objectives. These changes altered existing provisions of the agricultural and forest regulations only in part. There have been major advances in adjusting land rules and, although many government agencies developed several proposals to modify the Forestry Law, consensus on a version has not been achieved yet due to lack of political agreement.

The main changes to the inherited regulations were adjustments to the land-management system, through a law called “Law of Community Redirection of the Agrarian Reform” (Law No. 3545, 2006). Although the law somehow changed the administrative process of regularization of land-ownership and the titling process, it kept almost the same agricultural institutional characteristics. This policy agenda had important implications for agricultural titling, mainly accelerating collective titling for indigenous territories and, to a lesser extent, for forest titling that was oriented towards a comprehensive and sustainable management approach for forests, still under construction.

Regarding the forest agenda, Law No. 3545 waived rights for access to public forests to ASLs and established that all public lands that were identified through the regularization system—even public forests—should be given in order to establish new settlements. Likewise, one of the most important aspects of the new CPE is the cancellation of forest concessions, having changed to special temporary authorizations that grant rights to forest ex-concessions on forest areas. It is still expected that the definitive treatment of rights in forest concessions is established in a future forest law.

The National Policy for Comprehensive Forest Management was designed in 2008 (MDRAyMA

2008). This policy established the basis for the reorientation of public forest policy, which had so far focused on promoting sustainable forest management, particularly for timber. One of the purposes of this strategy was to encourage the transition towards a management model supported by a more diversified forest system, incorporating forest management approaches by local users and appreciating the role of forests in climate change. Although this strategy had a slow start, it provided the basis for the development of the new proposal of policies for the forest sector, including the re-adaptation of the institutional system—with the creation of ABT—and the gradual adjustment of forest regulations. ABT has so far approved some resolutions to adapt forest control mechanisms and promote the development and approval of integrated forest management plans beyond timber. In this sense, there is a regulatory proposal to encourage the development of integrated land and forest management plans including all forest resources (Table 14).

Probably the most important decision in relation to agricultural and forest institutions was the removal of the Superintendences for Forestry and Agriculture, SF and SA. These bodies were replaced by the Forest and Land Inspection and Social Control Authority (ABT), which ceased to be an autonomous entity and was transferred to the jurisdiction of the Ministry of Rural Development. Although there was an attempt to change forest regulations, there was not enough political consensus on these efforts and forest regulations have remained relatively unchanged. Only after 2010 were there some adjustments in the administrative forest processes in order to improve forest control, penalize illegal practices and modernize registration systems and Forest Certificates of Origin, through which the control of timber cutting and marketing is conducted (ABT 2012). Another important change was the loss of support to the forest decentralization process at the municipal level as the department governments gained more prominence and resources and, consequently, the ability to redirect that agenda.

More importantly, the MAS government policies regarding land and forest management have been relatively contradictory due to disputes between different groups in the ruling party. Initially, a perspective of “agricultural revolution” was built up, particularly from the Secretariat of Lands (*Secretaría de Tierras*) of the Ministry of Rural,

Table 14. Current legal framework for forest management in Bolivia

Supreme Decree No. 29643 on Community Forest Organizations dated 16 July 2008	Recognizes, regulates and promotes Community Forest Organizations (<i>Organizaciones Forestales Comunitarias, OFC</i>). It establishes a set of financial and economic incentives to promote integrated forest management by OFCs and the implementation of Integrated Forest Management Plans with a technical orientation of the State. It establishes that the usable forest volume may serve as guarantee for bank credit
ABT Guidelines (2008)	Administrative resolutions aimed at regulating fundamental aspects such as the registration of OFCs (Guideline SF-IDS No 002/2008), the development of Forest Comprehensive Management Plans (Guideline SF-IDS No 003/2008) and the execution and registration of contracts (Guideline SF-IDS No 001/2008)
Supreme Decree No. 0726 of Special Temporary Authorizations (2010)	Provides for automatic conversion of the natural resource concessions granted until then into Special Temporary Authorizations in order to adapt them to the current CPE legal system, which establishes that all natural resource concessions—including forest concessions—should be adapted to the new legal system
Supreme Decree No. 0443 of the National Program of Forestation and Reforestation dated 10 March 2010	Establishes the creation of the National Program of Forestation and Reforestation to advance in the increase of forest cover in the country

Agricultural and Environmental Development (*Ministerio de Desarrollo Rural, Agricultura y Medio Ambiente, MDRAyMA*), intended for land distribution and agricultural mechanization, mainly to strengthen the growth of community-based and small-scale agriculture. Shortly after, the ministry developed a proposal of “rural, agricultural and forest revolution” which set forth a series of actions to improve the food production system and other goods and services based on agriculture, forest management and conservation of natural resources (soils, water, forests and biodiversity), in the context of a more diversified rural economy (MDRAyMA 2007). Although this strategy led to the implementation of various programs in support of rural-based production as well as community production, its results are still uncertain. Although Law No. 144 of Productive Revolution guides interventions in agricultural matters towards community organizations, in practice it rather implies the promotion of agro-industrial activities, not directly, but through legal provisions that facilitate development by making regulations more flexible, mainly those related to clearing.

The National Strategy of Forest and Climate Change was developed in 2010 (PNCC 2010). Its importance lies in the fact that for the first time there is an explicit reference in government proposals to the major role of forests, not only in climate change mitigation due to their contribution to carbon emissions, but also in the

adaptation of local people because they contribute to their ability to resist external changes. It is after 2010 that forests have been included in national proposals on climate change, which have become more relevant since COP 17 held in Durban in 2011. A detailed review of proposals on forests and climate change is provided in section 4.

Initiatives to promote integrated forest management run against the grain of agricultural policy, the latter being predominant in the public policy agenda for food security objectives (Pacheco 2007). Over time, a perspective that has acquired greater strength in the government is the view of supporting the agro-industry sector through the expansion of the agricultural frontier, partly to make the food sovereignty strategy possible. In this context, Law No. 337 on Support to Food Production and Forest Restoration has been enacted. Although the official policy has tried to promote a more plural economic development, in theory with more rural production promotion, in practice financial incentives and initiatives to support the commercialization of agricultural products have tended to target the most capitalized groups in agriculture (Ormachea 2012).

A more explicit vision of support to the development of sustainable production systems has been incorporated in Law No. 300 of Mother Earth. In general, this regulation suggests that the adoption of actions was intended to support Mother Earth’s regeneration capacities and the

livelihoods of indigenous, native or rural peoples that are based on the use of natural resources, as well as to support other rural production agents, including mechanized agriculture, which depend on the use of natural resources. This in the framework of the Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth. In addition, as discussed below, this proposal suggests an alternative way of addressing the relation between forests and climate change, which has been negotiated in international agreements related to the dominant global REDD+ proposal.

3.2.4 Current legal situation of forest clearing

In spite of extensive changes in the relevant legislation, there are still few implications for the approval of forest clearing by ABT and the 1996 legislation is still in force. The main criterion for approval of forest clearing is compatibility with current land-use zoning, mostly with TFPs at national level and PLUSes at departmental level. Most existing land-use plans in different municipalities lack legal validity at the national level. There is no zoning that can replace these classifications yet. Integrated Forest and Land Management Plans (*Planes de Gestión Integral de Bosques y Tierras*, PGIBT), which have just started to be implemented, have a local approach. A relevant change, already approved, derived from Law No. 337 is the possibility of authorizing the conversion of 20% of the forest area in collective properties for agroforestry uses, even in TFPs.

3.2.5 Implications for deforestation and forest degradation

The current regulatory framework clearly defines the forms of acquisition and preservation of property rights, both for individual and collective owners, including those of the traditional communities and indigenous peoples. Besides, it sets the conditions for commercial forest-use by means of management plans, patents to be paid for exploitation and penalties for non-compliance with regulations. In theory, compliance with these regulations should help reduce land speculation, ensuring long-term investments on them, including forest management and preservation and adoption of good practices for

land and forest-use. Nevertheless, in practice, several factors, particularly difficulties associated with implementation, have led to distortions in land regularization and management processes and hindered compliance with regulations for sustainable use of forest resources. As a result, pressures on land remain, although there is a regulatory and institutional framework available for land and forest management.

The main distortion in the regularization process that has contributed to deforestation is the fact that it has fostered a speculative process of public land appropriation, with the expectation of properties being legalized afterwards by means of regularization. Furthermore, as a result of bias in FES evaluation, conversion of forests to agriculture, particularly livestock production, has become the most economical and effective justification to demonstrate the FES. This, together with the lack of a mechanism to identify public lands prior to the acceptance of rights of third parties, has switched an important part of forests to private hands. Further, instruments to regulate land-use in private properties are quite weak and changing, which makes us suppose that deforestation will continue in the future driven by market forces, unless there are public policy actions and private responsibility actions, sustained by clear mechanisms to establish property rights and better regulate the expansion of agricultural frontier.

In turn, regulations for forest exploitation should guarantee sustainable use. Nevertheless, regulations have been inspired by industrial forest operation models, so not all users can apply these systems. Therefore, it has been extremely difficult to comply with forest regulations, which has contributed to an increase in informal operations. Likewise, changes in forest public institutions have created uncertainty in timber investments, fostering short-term approaches to forest exploitation. In this sense, because agricultural processes have privileged titling in favor of properties, whether individual or collective, over concessions, there has been a decline in the area under large-scale commercial exploitation, which has increased the contribution of private landowners to the timber supply, with the difficulties associated with the performance of sustainable forest management in private properties (Pacheco et al. 2010). The government is promoting the implementation of integrated forest management plans, but nothing makes us

think that owners privilege any operation beyond those for commercial use.

In line with the new perspectives over options to improve the preservation of forest environmental functions and develop agriculture to ensure food security, there is a growing tendency to more explicitly consider territorial approaches to landscapes that complement agricultural and forest perspectives of provision and preservation of environmental functions with that of food production³⁵. In practice, concrete and applicable representations of such concepts are still lacking in Bolivia.

3.3 Decentralization, autonomies and benefit sharing

3.3.1 Implementing forest decentralization

Bolivia was a highly centralized country until the Popular Participation Law was passed in 1994. Authorities of the nine prefectures were appointed by the President and were not entitled to make decisions independently from the central government. At a lower administrative level, the municipal governments only existed in the nine department capitals and in some intermediate cities, covering only urban areas. After approval of this legislation, around 300 province sections—an administrative unit that almost had no significance at all until then—were converted into municipalities, broadening the jurisdiction of municipal governments to all the urban and rural area (Rojas 1996). In addition, municipal governments started to obtain financial resources from the central treasure. The so-called *Participación Popular* transferred 25% of overall national revenues to municipalities through the so-called “coparticipation resources”, which were allotted based on the population figures in each municipality (Kohl 2002).

An additional measure, part of a decentralization scheme, was that neighborhood organizations in the cities, as well as indigenous, native or peasant communities in the rural areas had to request recognition as grassroots territorial organizations (*Organizaciones Territoriales de Base*, OTB), aimed at obtaining the legal status that would

enable them to fully participate in the processes of municipal land planning. The *Participación Popular* also created the so-called “surveillance committees”, composed of representatives from OTBs, invested with the authority to oversee the actions of the mayors and municipal councils, as well as veto their rulings. After distributing new funds, municipal governments were vested with the capacity to use these resources, based on participative planning processes, in health, education, road and irrigation infrastructure (Rojas 1996). In this sense, the *Participación Popular* strengthened municipal governments and contributed to make them more democratic.

The forest reform started with Forestry Law No. 1700 and strengthened the process of administrative decentralization by delegating specific forest management duties to municipal governments, together with the resources to execute them. Municipalities could now contribute to the demarcation of AFRMs and support local user groups or ASL in forest management in these areas. The law also transferred several tasks of inspection and control of forest resource use, particularly actions supporting those carried out by SF in controlling forest concessions, inspection of use authorizations and clearing permits and measures to prevent forest regulation violation. Prefectures, in turn, should establish programs to strengthen the capacities of municipal governments. Both municipal governments and prefectures were provided funds to implement these duties through Municipal Forest Units (*Unidades Forestales Municipales*, UFM) (Pacheco 2004).

Forest decentralization had many weaknesses in its implementation and its results have been mixed. An assessment by Pacheco (2006c) suggests that a homogeneous policy was quite inappropriate for all municipalities since not all of them were able to create UFM's due to the lack of financial resources and the lack of interest, as local power groups had opposite interests. In practice, only the municipalities with the largest forest resources, which had sufficient areas for the creation of AFRMs and had enough resources from forest patents, were ready to start implementing a local forest agenda, whose goals and results varied greatly depending on the groups' influence on local politics. These perceptions have been confirmed by other studies on the issue (see Andersson 2002).

35 See www.agricultureday.org and <http://www.forestsclimatechange.org/events/forest-day.html>

3.3.2 Political tensions associated with the regional process

Demands for consolidation of the regional political process have increased in Bolivia since the late 1990s. These demands initially started in the social organizations congregated in the Pact of Unity (Pacto de Unidad)—including organizations representing peasant, settlers and indigenous farmers—which proposed them as a demand that was essential to the process of reformulation of the Political Constitution of the State between 2006 and 2009. However, the consolidation of the regional process was a proposal driven from several directions. The demand to enhance autonomy was crucial in the arguments of the forces opposing President Evo Morales that controlled the department prefectures in the departments of the so-called “half moon” (Santa Cruz, Beni, Pando, Chuquisaca and Tarija).

Autonomy became a flag of the opposition to the central level of the State, specifically Evo Morales’ government, by the departments with prefectures that did not share the central government’s political line. For that reason, the government adopted the political decision to reject department autonomy processes. Some of these prefectures started the process of drafting and approval of their autonomous statutes incorporating the powers over lands and forests as exclusive of department governments in clear opposition to the legal and institutional regulations in force until then; consequently, these statutes were never recognized as having any legal value. The 2009 CPE acknowledged four regional scenarios in Bolivia: department, regional, municipal and indigenous native peasant. Likewise, the competencies of each regional level were defined, also consolidated by Law No. 031, Framework Law of Autonomies and Decentralization “Andrés Ibáñez”.

Regarding management of renewable natural resources, the CPE acknowledges the land policy and land titling. While the biodiversity and environmental policy is the sole responsibility of the central State level, the forest resource and forest scheme and the land scheme are “exclusive” of the central State level. Likewise, the tension between the indigenous view of the absolute right over renewable and non-renewable natural resources and ownership by the Bolivian people is settled through the decision that indigenous peoples can

manage renewable natural resources in accordance with their own rules and procedures within the legal framework.

3.3.3 Prospects for land and forest management

Bolivia has made progress in the process of agricultural land regularization. However, there are still some problems regarding compliance with land-management processes and expansion of the agricultural frontier. One of the main issues is the permanent invasion of private farms over forests. The government’s inability to control expansion of the agricultural frontier has led to approval of Law No. 337 as discussed below.

Likewise, national forest regulations are not in line with local production practices due to the presence of growing pressure of the expanding agricultural frontier in farms of smallholders and indigenous territories. National regulations to authorize areas of cultivation in these communities and clearing plans no longer adjust to the current situation. There is growing difficulty in regulating the cultivation areas for small-scale farmers and communities in settlement areas. In turn, conflicts regarding access to land and forests in critical areas like northern Santa Cruz and northern Bolivian Amazon have not abated. Although illegal timber harvesting continues, ABT has made great efforts to adjust the regulations for control and monitoring of timber production, particularly to improve control in storing centers or *rodeos*.

Further, autonomy and decentralization processes are still consolidating and there is no clear definition of the roles and responsibilities of the different regional levels, especially in relation to critical issues like natural resource management, particularly in land and forest management and planning. Although in practice there has been a tendency to recentralize the decisions regarding natural resources, including land administration and forest management, department governments, as a result of their heavier political force, tend to compete for some of those roles. But the central government has systematically weakened opposing department governments. Besides, neither central nor department governments have made great efforts to strengthen the capacities of municipalities to contribute to local forest management.

This set of problems has made the government of the Plurinational State of Bolivia establish a comprehensive alternative for the solution of different challenges in the context of the creation of the Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth as set forth by Law of Mother Earth and officially introduced at international negotiations on climate change³⁶. This proposal aims to link the agricultural and forest agendas by means of a system for promotion, regulation, control and monitoring instruments towards the construction of sustainable production systems that are accompanied by an organized expansion of the agricultural frontier and processes of forest preservation, giving rise to a net reduction in deforestation and forest degradation processes. This is an early initiative, so it is difficult to anticipate its impacts on public forest management, land preservation and use and its effects on actions to address climate change, as an alternative to the mechanisms negotiated as part of REDD+.

3.3.4 Implications for deforestation and forest degradation

There is not much certainty about the implications of decentralization for deforestation and forest degradation or regarding their influence over the proposals to build an institutional mechanism to reduce pressures on forests and thus reduce emissions from deforestation and forest degradation. In turn, decentralization has often promoted forest resource preservation when it has strengthened the political influence of local groups whose activities are based on more sustainable forest-uses. But it also led to increased forest pressure when it reinforced the political position of elites or other local groups whose economic strategies are based on forest conversion, for agriculture or livestock, or on timber harvesting.

However, the fact that municipal governments started to receive forest powers and resources to execute them enabled local user groups that depended on timber harvesting, indigenous or agro-extractive communities to claim better formal access to forest resources or to receive technical assistance to develop forest management

plans. Even though in some cases these resources have contributed to support local capacities, they have not been sustained over time, or their use has not been transparent, which has made local municipality management less effective (Pacheco 2006c). The greater interest of municipal governments in forest management has also enabled cooperation organizations or projects to perform actions supporting local initiatives, thus improving the possibilities of collaboration in local forest management. For instance, there are cases of forest management projects in the northern Amazon and municipalities in Chiquitania.

The regional process has led to the re-emergence of department governments at the expense of municipal governments. Some department governments have made initiatives aimed at planning land-use, supporting forest management or care for protected areas. Nevertheless, they depend on governments' good will and the efforts have not been quite systematic. The political controversies generated by tensions between the central government and department governments, especially in the lowlands, has not helped to create an institutional environment of actions agreed between these different government levels. This suggests that any institutional initiative aimed at reducing pressures on forests, by means of command and control measures or offsets for conservation, will face difficulties due to these tensions, apart from duplicating efforts. Likewise, the main interests of department governments have been associated with revenue-generating activities, such as mining and oil/gas extraction and not so much with forests, which do not generate significant revenue for the governments.

3.4 Land and forest tenure and distribution

3.4.1 Process of land regularization and distribution

The INRA Law approved the administrative processes for regularization of land-ownership as a previous step to farm titling in order to solve the countless land conflicts derived from overlapping rights. Regularization took many forms including: (1) land regularization for TCOs (*Saneamiento de*

36 Section 4 presents a detailed discussion on this mechanism and its negotiation.

Tierras Comunitarias de Origen, SAN-TCO)³⁷, and (2) “SAN-SIM” or simple regularization that could be performed by the State in private properties or at request of the holders. Regularization for TCO established, as a previous step, a process of identification of the basic spatial needs of the different ethnic groups that submitted their territorial claims in order to check whether those demands matched their needs of social, cultural and economic production and reproduction. Regularization for private properties considered a stage of legal verification of the files for agricultural administrative steps—aimed at tracing the legal origin of the property—together with another stage of verification of FES on the ground. Compliance with these processes enabled the issuance of land titles, which were granted collectively to TCOs or traditional communities and individually to the rest of the farms.

This law established a 10-year period for completion of the regularization process, that is, from 1996 to 2006. However, this deadline was not realistic. By 2006, only 9.2 million ha (8.7%) out of a total of 106.7 million ha subject to regularization had been titled, 5.7 ha (5.3%) of which were TCOs (INRA 2012). Although regularization of TCOs was prioritized, an important part of the process was still underway, due to the conflicts with third party owners with rights established in those territories. Until 2006, a total of 9.3 million ha were titled, 6.5 million of which were in the lowlands. Regularization made slow progress due to the fact that it was a bureaucratic and costly process; international consulting firms that qualified for this were commissioned. However, the costs of these services was relatively high. Most of the regularization, which tended to favor TCOs, was financed with international cooperation funds. The average cost of this process has been estimated at approximately USD 2.75 per hectare (INRA 2012). In order to reduce costs for small farm regularization, INRA resorted to collective titling (Cronkleton et al. 2009).

Since the beginning of the current administration in 2006, regularization has moved forward. By

2012, around 64 million ha had been titled and 298,000 titles had been granted to 953,000 beneficiaries. Titling covered 41 million ha according to the following distribution: 22.5 million ha for TCOs (with 12.8 million ha in the lowlands), 14.1 million ha for peasants and settlers, and 4.3 million ha for large and medium owners. Additionally, 23 million ha out of the total number of titled ha remain as public lands (including protected areas, forest concessions and public lands) (INRA 2012). According to these data, only a small part has been titled to large- and medium-sized farms, which does not mean that all titling amounts to the total land area occupied by these producers. Until 1996, according to this source, 39 million ha were under control of large- and medium-sized properties; however, it is worth highlighting that the lands of peasant and indigenous people were prioritized in the titling process.

Although important progress has been made in titling of TCOs and of lands occupied by family agriculture and settlements, in practice, effects on land tenure security have been mixed. Generally speaking, the lands occupied by indigenous people that have been recognized as TCOs are better protected than in the past and are legally safeguarded. Nevertheless, in some cases, these lands are still subject to pressure by third parties, mainly timber producers and peasant settlers and indigenous people have few possibilities to effectively benefit from the resources that have been assigned (Pacheco et al. 2011). Settlers often exert pressure on indigenous people’s lands and protected areas, which is related to the institutional closure of the agricultural frontier for settlement as large- and medium-sized farms were prioritized in the process of agricultural expansion (Thiele 1995).

As a result, some conflicts have recently emerged in relation to indigenous lands, depending on the type of external pressure exerted over indigenous lands and the capacity of the different ethnic groups to respond to these pressures. For example, significant pressures on timber and land sales and purchases have taken place in the indigenous territory of Guarayos, near the expanding frontier of commercial agriculture and settlements (Cronkleton et al. 2009). Likewise, conflicts related to oil/gas extraction in northern La Paz have been documented—explorations financed by the state oil company ignored the process of indigenous communities’ consent. Besides, there is criticism

37 With the Political Constitution of the Plurinational State of Bolivia approved in 2009, the name Indigenous Communal Territory (TCO) was changed to Indigenous Native Peasant Territory (Territorio Indígena Originario Campesino, TIOC).

that these investments have not been accompanied by the appropriate environmental and social impact studies (Peredo et al. 2009). Another recent case is related to the government's attempts to build a road through the Indigenous Territory and the Isiboro Secure National Park (TIPNIS). The analysis of the tensions related to the indigenous territories is beyond the scope of this paper.

3.4.2 Administration of public forest lands

In the late 1980s, the administration of public forest lands was relatively chaotic. Approximately 20 million ha had been assigned to logging companies for forest exploitation under short- and long-term permits. A significant area overlapped with areas established for protection, others were occupied by indigenous territories and settlements (Hunnisett 1996). Since the late 1980s, an important effort was made to create protected areas under SENARP tutition. Gradually, these areas have incorporated around 18 million ha, 14 million of which are located in the lowlands (Ribera and Liberman 2006). Indigenous claims over territories, as described above, also implied that an important part of public lands were assigned to different ethnic groups. This led to a reduction in the conflicts resulting from overlapping rights claims.

The Forestry Law contributed to reduce overlapping by turning existing forest permits into long-term concessions for a 40-year period and automatically renewable every 5 years. The logging companies that held forest permits could preferentially request the areas that they wished to convert to the concession system. Likewise, changes in payment of logging rights per volume to a system of forest patents per hectare made companies reduce their exploitation areas to 5.4 million ha, which possibly had better quality forests where fewer conflicts existed. In addition, since municipalities to establish an AFRM in a portion of the public forests, little less than 1 million ha were classified under this category (Pacheco 2005). As a result of the cancellation of the natural resources concessions system by the CPE, forest concessions were declared special provisional authorizations, which has not represented any deep change in the concessions system. Due to the pressures facing concessions and the return of some of them to the State, the total area has declined to 3.7 million ha (ABT 2011).

An exception to what was previously mentioned is the *barraca* (patron-controlled extraction area), which has persisted in the northern Amazon. In the past, *barracas* used to be a specific form of public forest tenure intended for rubber tapping and are now managed for Brazil nut. During the regularization process, *barraqueros* tried to legalize their tenure over approximately 3 million ha, but the attempt failed due to the strong resistance of the communities that also depended on Brazil nut collection. This led to an agreed regularization process in the northern Amazon region that concluded with the titling of around 2 million ha to communities, under collective titles and the reduction of *barracas* to around 1.5 million ha, which were kept with "expected rights" in favor of the *barraqueros* that held these areas (Cronkleton et al. 2009). A proposal to convert the *barracas* into concessions of exploitation of non-timber was presented; however, with cancellation of the concessions, the legal situation of these areas is uncertain.

However, the main problem derived from the implementation of the land and forest law has been the lack of clear mechanisms to identify the remaining public lands, apart from those assigned to forest concessions and *barracas*, classified as protected areas or areas recognized to indigenous people. As discussed above, a significant portion of public lands were illegally occupied by private owners, whose property rights were later legalized through different means. The INRA Law assumed that public lands would be all those pieces of land with no individual or collective rights identified after the completion of the regularization process. However, what was not considered was the fact that land regularization would promote a speculative process of public land occupation, hoping to achieve legalization in the regularization process itself. This has given rise to the fact that the amount of public land without assigned rights is now relatively small.

3.4.3 Implications for deforestation and forest degradation

The current situation of land tenure suggests that the relevant agents have a key role in any mitigation measure for reduction of carbon emissions associated with deforestation and forest degradation. In this sense, two important aspects

are worth highlighting. The first one is that, as a result of the recognition of rights over lands and forests, many of these agents are currently in lands with formal rights recognized to indigenous and traditional communities, as well as in lands controlled by individual owners, mostly medium and large sized. The second aspect is that forest public lands, especially those in forest concessions, have tended to decline over time, while some of the protected areas are subject to external pressure. This has major implications for the institutional options to reduce pressures on forests and improve conservation.

Many of the forests with the greatest indices of forest conservation—except for conservation areas—are currently under the control of indigenous people and communities, that is to say, under collective access rights, although their use is often in the hands of families, groups of individuals or individuals. The decisions of these different groups on the use of their resources will have key effects on forest conservation in the country. However, as time goes by, road infrastructure is improved and markets are integrated, pressures on forests in community lands are likely to increase and these communities will probably decide to

seek new options for local economic growth, possibly also based on unsustainable use of natural resources. This means that strategies to reduce the pressures of deforestation and forest degradation need to seriously consider all different options of land and forest-use and management in TCOs, traditional, agro-extractive communities and other local groups.

A smaller (still significant) number of forests is now individually owned, especially by medium and large owners. Although these are the producers that have so far had a greater effect on forest conversion, their influence in deforestation will tend to decline as forest reserves are depleted. The main dilemma in politics is whether to preserve these forest reserves in private properties or to foster conservation in community lands, or both. In addition, the main efforts for public forest conservation should focus on the remaining areas under forest concessions, as well as in lands classified as conservation areas. Political approaches to reduce deforestation and forest degradation to date have often adopted relatively fragmented views without considering the set of institutional options and mechanisms adjusted to the needs and interests of the different agents.

4 Environmental policy: Proposals and political processes

Bolivia has been one of the few countries to take a critical position on REDD³⁸. Although the Bolivian Government together with a coalition of other countries known as *Rainforest Coalition* was one of the main drivers of an offset scheme for reduction of greenhouse gas emissions (GHG) through avoided deforestation, later it took a critical position toward market mechanisms, which were privileged by the United Nations Working Group in charge of REDD discussions³⁹. This rejection of carbon markets was one of the reasons why Bolivian representatives did not support the negotiation process at COP 16 in Cancún.

Subsequently, the Bolivian government elaborated an alternative proposal to REDD+, considering experiences in the decentralization and forest autonomy processes, sustainable forest management and recognition of the rights of indigenous peoples and other traditional groups, as discussed in section 2 of this document. The proposal is based on multiple environmental forest roles⁴⁰ and is an attempt to harmonize the policies and actions in the local environment with those of the national and international spheres. This is no easy task because of the contradictions existing in domestic policies regarding natural resource management and agricultural development and also due to the fact that in the foreign environment commitments on carbon reduction are still lacking (Orellana and Pacheco 2012).

38 REDD means “Reducing Emissions from Deforestation and Forest Degradation”. It refers to the proposal discussed in the framework of UNFCCC that has linked rainforest deforestation to climate change.

39 It is the so-called “Ad Hoc Working Group on Long-term Cooperative Action, AWG-LCA”.

40 The Plurinational Bolivian State proposed considering the inclusion of the multiple environmental functions in monitoring, reporting and verification in the discussion of the Subsidiary Body for Scientific and Technological Advice (SBST 37) in Doha.

This chapter discusses the Bolivian position and its treatment in international and national spheres. First, it introduces the international context of REDD+ negotiations. It also discusses the evolution of the Bolivian position on climate change in the period of neoliberal governments and describes the Bolivian position on forests and climate change. Next, it analyzes the contradictions in the Bolivian position on REDD+ and presents a more detailed analysis of the Bolivian proposal called “Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth”. Finally, it discusses the Bolivian position in other negotiation fora related to forests and provides a summary of agents’ positions.

4.1 International context of REDD+ negotiations

Already in 2001 (Marrakesh Agreements), “avoided deforestation”—which gave rise to REDD—was excluded from the Clean Development Mechanism (CDM). In 2005, it returned to the international agenda as an initiative of the *Coalition for Rainforest Nations*⁴¹, a group of 10 countries led by Papua New Guinea and Costa Rica, which demanded the possibility of developed countries compensating countries with tropical forests for reducing deforestation.

The initial term “avoided deforestation” became REDD to include forest degradation and subsequently REDD+ to consider improved forest management as a measure to avoid CO₂ emissions. In the context of international negotiations on climate change there is no official recognition of the REDD+ acronym. However, it is used as an

41 See <http://news.mongabay.com/2005/1127-rainforests.html>.

abbreviation of the Ad Hoc Working Group on Long Term Cooperative Action (AWG-LCA) in item 1(b)iii of the group's agenda, "Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries". The Bolivian Government has been quite active in its attempts to remove the REDD+ acronym from all international negotiations arguing that this is not a common term among United Nations countries⁴².

There is no single strong position regarding the reach of this working group (AWG-LCA) in relation to deforestation, forest degradation and sustainable forest management. The common objective of the different positions is to have a financial procedure available through which developed countries can compensate developing countries for their efforts to reduce emissions from deforestation and forest degradation. Despite the dominance of the views that suggest the importance of having financial mechanisms based on the development of a global carbon market to enable the transfer of resources conditional on concrete results, there is also room for other approaches, since there are still some countries that do not support the market approach or different positions regarding how these mechanisms should work.

Some countries, including Papua New Guinea, the United States, Australia, Canada, Japan and the European Union promote the consolidation of a financial mechanism to ease the transfer of private funds as part of a global market mechanism. For some countries, this approach is oriented towards recognition of offsets for reduction by the United Nations; however, not all market approaches are similar. Brazil, for instance, promotes market processes, but it does not support compensation of

emissions in the framework of these negotiations. The least developed countries, mainly African countries, recognize mitigation efforts in market approaches, but at the same time they insist that the co-benefits of carbon should be acknowledged. Bolivia, in turn, has promoted an approach that is not market based, clearly recognizing the links between climate change mitigation and adaptation.

Discussions over a carbon market to finance REDD+ need to address two issues. The first is the limited feasibility of global carbon markets, mainly due to the lack of clear commitments to reduce emissions by developed countries that hinder expansion of this market, as well as to the crisis of existing carbon markets⁴³. The second is the delay in creating the new market mechanism, which would provide the institutional framework for market transactions in REDD+. At COP 18 in Doha, the establishment of a global market mechanism is halted and the debate continues.

Apart from the need to reach agreements on many details of a REDD+ mechanism, it is also necessary to reach an international agreement following the Kyoto protocol, which would constitute the basis for a mechanism under the United Nations. So far, there are different international financing programs that support pilot projects and tropical countries readiness preparation for a potential REDD+ mechanism. The most important mechanisms are the readiness program managed by the World Bank through the FCPF (Forest Carbon Partnership Facility) and the UNREDD program, coordinated by the United Nations. Besides, there is a very large voluntary informal market (Ecosystem Marketplace 2013), where millions of tons of CO₂ are sold, formally reduced by REDD+ projects, mostly to companies seeking to improve their environmental image. However, sold credits come from different private standards, so there is no official uniform control to ensure appropriate real deforestation reductions. In fact, most credits are for hypothetical emission reductions expected in the future.

42 For instance, this is the case in relation to the documents "The future we want" Rio+20 (June, 2012) and of the decisions of COP 11 of the Convention on Biological Diversity held in Hyderabad, India (October, 2012), where the Plurinational State of Bolivia requested the removal of the REDD acronym. Likewise, in February 2013, the Bolivian Government submitted a decision draft at the meeting of the First Universal Session of the Governing Council/Global Ministerial Environment Forum of the UNEP, requesting the change in the name of the UNREDD program since it would not be a name agreed by all the United Nations countries.

43 The price of CDM certificates ("CERs") decreased below 1 EUR in 2012 (www.pointcarbon.com).

4.2 The Bolivian position on climate change in neoliberal governments

The National Climate Change Program (*Programa Nacional de Cambios Climáticos*, PNCC) was created in 1995, aimed at meeting the obligations undertaken at the UN Framework Convention on Climate Change ratified in 1994. The main roles were to develop the national GHG inventories and to manage studies on GHG mitigation and climate change adaptation, as well as the education and dissemination programs. Likewise, it was in charge of developing national communications to UNFCCC, which generally describe the country's progress in implementing UNFCCC objectives and explain the Bolivian position with respect to international negotiations on climate change. The Inter-Institutional Council on Climate Change (*Consejo Interinstitucional del Cambio Climático*), founded in 1999, was in charge of discussing policies on climate change and approving PNCC actions, but it was short-lived and no really important decisions taken by this council are known.

As part of the development of a national strategy for the CDM, the Clean Development Office (*Oficina de Desarrollo Limpio*, ODL) was created in July 2002 as executing agency of PNCC, which would assume the role of "Designated National Authority" by the Bolivian Government before the UNFCCC. In March 2003, the development of the GHG National Inventory for different years between 1990 and 2000 was completed⁴⁴, confirming that while GHG emissions are relatively limited in the country, a large number of emissions (>75%) come from deforestation.

The Kyoto protocol came into force in 2005. Through Supreme Decree No. 28218, Bolivia facilitated participation in the CDM, enabling the issuance of carbon certificates by means of projects to reduce emissions (but excluding avoided deforestation projects). As a consequence, ODL promoted the implementation of CDM projects in Bolivia. Four projects were finally registered under the UNFCCC and one project

was granted carbon credits⁴⁵. Approximately one dozen projects started the registration process but were unable to complete it before Bolivia ceased to support this mechanism. In addition, the ODL made several efforts to promote the avoided deforestation agenda as part of the Coalition for Rainforest Nations⁴⁶.

4.3 The new Bolivian position on climate change

In 2006, the Evo Morales' government designed and started implementing a new international policy on climate change in the UNFCCC framework. In the government's National Development Plan (*Plan Nacional de Desarrollo*, PND) climate change adaptation was incorporated as a priority in the actions for sustainable development, including guidelines for the reduction of greenhouse gas emissions and carbon sequestration, and highlighting the role of the forests in climate change mitigation (Gobierno de Bolivia 2006). The government's new political and ideological position was in line with the rejection of carbon markets and marketization of nature, arguing that capitalism is one of the structural causes of climate change. But at the same time, until 2009, the country followed the conventional REDD path pursuant to the agenda given by international bodies, mainly the World Bank and UNREDD (Table 15).

Since COP 14 held in Poznan, Poland, in 2008, the Bolivian Government's position has been critical of market mechanisms associated with the REDD proposal, arguing that marketization of nature goes against nature's rights and especially against the peoples that depend on it, in addition to providing an easy way for industrialized countries to be released from their obligations in matters of GHG emissions. On 28 November 2008, President Evo Morales addressed a letter to the UNFCCC where he clearly expresses the Bolivian opposition to the main current of international policies of climate change discussed in the UNFCCC framework, thus laying the

44 www.mmaya.gob.bo/webpncc/RED%20DE%20INVESTIGACION/PRESENT.%20INVEST.NACIONAL/5Inventarios%20Bolivia%201990%20-%202000%20.pdf.

45 See <http://cdm.unfccc.int/Projects/projsearch.html> A hydroelectric dam in Taquesi River has so far generated 1.4 million certificates of CO₂ (called CER).

46 See <http://news.mongabay.com/2005/1127-rainforests.html>.

Table 15. Summary of the main actions undertaken by Bolivia

Name of the event	Date	Main decision/Proposed policy
Proposals on forests and climate change	2006	Bolivia is a member of the Coalition for Rainforest Nations demanding a compensation mechanism for reduced deforestation
Participation in the preparatory program of the World Bank's FCPF	2007/2008	Elaboration of R-PIN, a preparatory program for execution of a REDD mechanism
First letter from President Evo Morales	2008	Letter from President Evo Morales to the UNFCCC at COP 14 in Poznan rejecting market mechanisms
World People's Conference on Climate Change and the Rights of Mother Earth, Cochabamba, Bolivia	2010	Condemns market mechanisms, like the REDD mechanism in general, arguing that they violate peoples' sovereignty, among others
Second letter from President Evo Morales	2010	Letter from Evo Morales to the indigenous peoples: "Nature, forests and ourselves, the indigenous peoples, are not for sale".
Approval of participation in UNREDD	2010	A USD 4.7 million budget is approved for a REDD readiness preparation program
Preparation of Strategy on Sustainable Forest Life	2011	Bases for the development of an alternative proposal to REDD+
Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth	2012	An alternative mechanism to REDD was proposed, based on land-management plans and support to initiatives assigned to sustainable management of forest resources
Bolivia achieved approval of the use of UNREDD funds for alternative policies to REDD	2012	Agreement to use UNREDD funds, originally approved for a carbon market-based system, for the Joint Mechanism with a non-market based approach of forest environmental functions
Law supporting food production and forest restoration	2013	Proposed legalization illegal forest clearing between 1996 and 2011 and demanded the restoration of 10% of the deforested areas and ecological easements

bases for the basic concepts of the Bolivian policy over REDD.

Although for some time there was a relatively contradictory position between the discourse on climate change and the policy on climate change due to the persistent view of policies conceived within the ODL of PNCC, in 2009 this office was transferred to the competent environmental agency running the Ministry of Environment and Water.

At COP 15, held in Copenhagen, Denmark, in 2009, the Bolivian Government argued that GHG mitigation goals should be more ambitious, setting a limit to the increase in global average temperature between 1°C and 1.5°C and not 2°C. Likewise, it was announced that Bolivia would not access the carbon market or the REDD+ mechanism. On the contrary, it demanded the creation of an economic compensation fund to help mitigate the effects of climate change in the

most affected and poorest countries, with a 6% contribution to developed countries' GDP. This climate justice fund should not be subject to conditions by developed countries.

It is important to note that one of the key elements that defined the Bolivian position on climate change was the organization of the World People's Conference on Climate Change and the Rights of Mother Earth, held in April 2010 in Tiquipaya-Cochabamba, Bolivia (see Acuerdo de los Pueblos 2010). At this event, social organizations and representatives from different world organizations reaffirmed their position against the marketization of nature and particularly the launch of the mechanism known as REDD+. Bolivia adopted the mandates from Tiquipaya as public policy for presentation in the climate change negotiations. The final declaration of the conference also includes items from the 2008 President's letter, like the demand for resource transfer to developing

Box 1. Extracts from the letter from President Evo Morales, Poznan-Poland, November 2008

..".Climate change" has placed all humankind before a great choice: to continue in the ways of capitalism and death, or to start down the path of harmony with nature and respect for life.

...As long as we do not change the capitalist system for a system based on complementarity, solidarity and harmony between people and nature, the measures that we adopt will be palliatives that will be limited and precarious in character. For us, what has failed is the model of "living better", of unlimited development, industrialization without frontiers, of modernity that deprecates history, of increasing accumulation of goods at the expense of others and nature. For that reason we promote the idea of Living Well, in harmony with other human beings and with our Mother Earth.

...The reduction of emissions from deforestation and forest degradation must be based on a mechanism of direct compensation from developed to developing countries, through a sovereign implementation that ensures broad participation of local communities and a mechanism for monitoring, reporting and verifying that is transparent and public.

countries as compensation for the ecological debt. These funds are demanded directly for ancestral indigenous, native, peasant peoples, nations and organic structures. Other highlights include the importance of forest social control by these groups and their integrated life plans and Living Well. Besides, market mechanisms, including REDD, are rejected⁴⁷.

In 2010, the Bolivian delegation introduced the key forest issues of Tiquipaya at the negotiations on climate change of COP 16 in Cancún, Mexico. Among the main points argued is the fact that REDD should incorporate the following aspects:

- To guarantee the rights of indigenous peoples and local communities in the framework of the international instruments and regulations.
- To focus not only on mitigation, but also on adaptation when referring to forests
- Not to develop market mechanisms in forest-related actions
- Not to create mechanisms through which developed countries can avoid the obligation to reduce emissions in their own territory
- Not to consider proposals that allow for industrial forest-use or activities involving conversion of natural forests to plantations or

other commercial uses or infrastructure and projects that damage the environment or violate the rights of indigenous peoples and local communities.

Along these lines, with regard to REDD+ policies, the Bolivian government's negotiating delegation has proposed the creation of a mechanism to stop deforestation and degradation outside the logics of the carbon market. The Bolivian proposal was removed from the final negotiating text of the W-GLCA Working Group, which led to the implementation of a REDD+ proposal deeply based on the design of an international global carbon market mechanism, although with different versions of the countries in the negotiation process.

A significant step in the REDD+ negotiation was given at COP 16 in Cancún, Mexico, with the approval of the main methodological aspects for its implementation. Its design is intended to consolidate a funds transfer system for deforestation reduction, taking into account a set of safeguards, such as environmental integrity and respect for the rights of indigenous peoples. Bolivia expressed its rejection of this proposal, but it was finally isolated in its position⁴⁸. It also demanded more ambitious commitments in GHG reduction and finally rejected all the final decisions as the only country present. From the Bolivian perspective, since the COP in Cancún,

⁴⁷ "...market mechanisms such as REDD (Reducing Emissions from Deforestation and Forest Degradation) and its versions + and + +, which are violating the sovereignty of peoples and their right to prior free and informed consent as well as the sovereignty of national States, the customs of Peoples and the Rights of Nature" (Official Declaration of the World Peoples' Conference on Climate Change, April 2010).

⁴⁸ See *The Economist* "The UN climate conference achieved some results, albeit modest ones", 16 December 2010. <http://www.economist.com/node/17730564>.

Box 2. Extract of the letter from President Evo Morales, October 2010

"In the current process of negotiations on climate change, all parties recognize that it is essential to avoid deforestation and forest degradation. However, to achieve this, some propose the marketization of forests based on the false notion that only what has a price and an owner can be taken care of and conserved.

...It is essential that all countries around the world work together to avoid deforestation and forest degradation. Developed countries have an obligation and it is part of their climate and environmental debt toward developing countries, to contribute financially to the preservation of forests, but NOT through their marketization. There are many ways of supporting and financing developing countries, indigenous peoples and local communities that do contribute to the preservation of forests".

climate change policies have been oriented towards promoting the development of its own alternative proposal to REDD+, based on a combined concept of mitigation and adaptation in the framework of a non market-based approach. Instead of keeping the fundamental opposition as at COP 16, work focuses on including alternative concepts in the UNFCCC.

In order to develop an alternative proposal, a strategy was started with the following objectives: (1) to incorporate the concept of different existing approaches (beyond the market approach) and the formal recognition in the WG-LCA Working Group of an approach not based on market mechanisms as part of its discussions on "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries" and, in more formal terms, to question the adoption of the REDD+ acronym as an official term encompassing all the approaches, in the understanding that REDD+ is biased towards the market alone approach, and (2) to incorporate the need to build a joint mitigation and adaptation mechanism for the integrated and sustainable management of forests in the framework of the so-called Working Group on "Various approaches, including opportunities for using markets".

During COP 17 negotiations in Durban, South Africa, the Bolivian delegation officially presented the alternative proposal to REDD+ called "Sustainable Forest Life". This proposal considers the following items: (1) non-marketization of forest environmental functions, (2) full recognition of the rights of indigenous peoples, and (3) the need to articulate mitigation and adaptation in the relation between forests and climate change

in the framework of integrated and sustainable management, promoting the creation of sustainable and resilient, climate-friendly economies while ensuring the reproduction of the local people's livelihoods, moving forward towards poverty eradication (Estado Plurinacional de Bolivia 2011).

In the new Bolivian position, which is clearly different from the previous one, Bolivia does not oppose to the use of market mechanisms for the countries that wish to do so as a sovereign decision, but it demands the establishment of a balance in the text of negotiations promoting the development of a non-market-based approach.

In decision 2/CP.17 of the UNFCCC in Durban, it was acknowledged that financing for developing countries (new, additional and predictable), in the framework of the Working Group to reduce deforestation and forest degradation, can come from a variety of sources: public, private, bilateral, multilateral including alternative sources (see Box 4). Likewise, it was decided that a market and non-market approach (alternative to the markets) can be developed, the basis of the latter being the proposal of "Sustainable Forest Life" presented by the Plurinational State of Bolivia, as detailed in Box 4.

At COP 18 held in Doha, Qatar, the Bolivian delegation developed a strategy to defend the Joint Mechanism from a double perspective: as an approach and as a mechanism. First, in the Working Group on "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation" including opportunities for using markets, the recognition and development of the joint mitigation and adaptation approach has

Box 3. Summary of the Proposal “Sustainable Forest Life”, December 2011

The Plurinational State of Bolivia proposes the creation of a mechanism called “Sustainable Forest Life” to help local and global efforts aimed at improving the role of forests and local people in their contribution to climate change mitigation and adaptation, based on existing proposals for sustainable forest management. This mechanism is based on the following grounds: (1) the principle of “non-marketization of forests”; (2) the conceptual approach of integrated and sustainable management of forests with joint results, in both mitigation and adaptation to climate change; (3) objectives for enhancing the processes of collective action and community values of forest owners to foster integrated and sustainable management, taking into account the respect for their rights as well as compliance with state duties; and (4) the development of new global values sustained in complementarity, confidence and recognition of national and local efforts in relation to integrated and sustainable management of forests, with effects on emissions reduction. This proposal is based on the views on integrated and sustainable management of forests promoted by Evo Morales’ government, but with a more explicit coordination of climate change actions.

Source: Proposal sent by the government of the Plurinational State of Bolivia to the UNFCCC. December, 2011.

Box 4. Decision on alternatives to the carbon market at COP 17 in Durban, South Africa

Paragraph 67 of decision 2/CP.17 states that approaches that are not market-based, such as *joint mitigation and adaptation approaches for integrated and sustainable management of forests as a non-market alternative* that supports and strengthens governance, the application of safeguards mentioned in paragraph 2 (c–e) of Appendix I of decision 1/CP.16 and multiple forest functions, could be developed.

Source: Decision 2/CP.17

been promoted as one of several approaches to progress towards the reduction of emissions from deforestation and forest degradation. Likewise, it has been insisted that the REDD+ acronym must not be used in the official decision since it has connotations that are not recognized by the Plurinational State of Bolivia. At the same time, the Working Group on “Various approaches, including opportunities for using markets” has proposed a working program to develop non-market-based mechanisms, having created a specific forum to discuss the Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth.

4.4 Initial contradictions in the Bolivian proposal

Although not much has been written in that respect, the Bolivian position on REDD+ has often been considered contradictory. On the one hand,

the Bolivian delegation made severe criticisms of REDD+ in international spheres and, on the other hand, an agreement with the United Nations was signed to implement the United Nations REDD program in Bolivia. As discussed above, Bolivia was among the first countries to promote the REDD mechanism and to closely follow up on the agenda of international institutions in the first years since its creation. Afterwards, there was a break with these positions and the international position changed dramatically while the domestic agenda did not go hand in hand with it. This situation has gradually changed over time.

The primary source of support for the implementation of REDD activities in Bolivia was managed by the ODL of PNCC through the World Bank Forest Carbon Partnership Facility. Bolivia was one of the first countries to participate in this program⁴⁹. To this end, in 2007, under leadership

⁴⁹ See <http://www.forestcarbonpartnership.org/fcp/node/61>.

Box 5. Decisions related to the Bolivian proposal at COP 18 in Doha

Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries

39. Requests the Subsidiary Body for Scientific and Technological Advice, at its thirty-eighth session, to consider how non-market-based approaches, such as joint mitigation and adaptation approaches for the integral and sustainable management of forests, as referred to in decision 2/CP.17, paragraph 67, could be developed to support the implementation of the activities referred to in decision 1/CP.16, paragraph 70 and to report on this matter to the Conference of the Parties at its nineteenth session.

Various approaches, including opportunities for using markets, to enhance the cost-effectiveness of and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries.

47. Requests the Subsidiary Body for Scientific and Technological Advice to conduct a work programme to elaborate non-market-based approaches, with a view to recommending a draft decision to the Conference of the Parties for adoption at its nineteenth session.

Source: Taken from the draft decision -/CP.18, UNFCCC, Doha.

of the ODL, the Technical and the Political Committees were created, aimed at elaborating the idea note for REDD readiness (Readiness Plan Idea Note, R-PIN). The R-PIN, with an approximate budget of USD 6 million was pre-approved by FCPF in 2008. However, its official approval was never reached due to subsequent changes in the Bolivian position regarding the start up of the REDD+ mechanism, which hindered negotiations for transfer of these resources.

At the same time, Bolivia was among the first countries to receive support from the UNREDD program⁵⁰. In 2010, a USD 4.7 million budget was approved for a group of preparatory activities for REDD⁵¹, aimed at strengthening the governmental institutions to implement REDD+ activities, monitor and assess carbon reservoirs in forests, improve the civil society capacity to implement REDD+ activities and generate REDD+ pilot experiences at the local level. It is worth mentioning that the request

of the Bolivian Government to support the implementation of REDD to the UNREDD program resulted from the initial drive of the PNCC to implement compensation programs for reduced deforestation. Nevertheless, this position then opposed the official position of the Ministry of Foreign Relations, which articulates the official position before the UNFCCC.

The absence of a single position in the national and international agendas by the Bolivian Government fostered the presence of a diversity of experiences in the framework of the REDD+ initiatives in Bolivia, giving rise to contradictions between different areas of the executive body. While the Ministry of Foreign Relations promoted a process of severe criticism of REDD+ as a whole, since it was based on a market approach, the Vice Ministry of Environment, on which PNCC depended, moved towards a more pragmatic position that understood that REDD+ could have a market approach and a non-market approach. Consequently, within that logic, promotion of a National REDD+ Program was not contrary to the international position of the Bolivian government in the UNFCCC. Besides, the United Nations agency in Bolivia developed an active campaign to make the government accept the implementation of the National UNREDD Program and start

50 The UNREDD program is an initiative of three United Nations agencies (FAO, UNDP and UNEP) launched in September 2008 to help developing countries prepare and apply national REDD + strategies.

51 See www.un-redd.org/Newsletter7_PB4_Countries_Reactions/tabid/3924/language/en-US/Default.aspx.

the program that was being negotiated to support REDD+ actions in Bolivia.

As a step towards understanding these contradictory views, the Vice Ministry of Environment of the Ministry of the Environment and Water promoted the elaboration of the National Strategy of Forest and Climate Change (2010), discussed above, under coordination of PNCC. This strategy reflects the most pragmatic criteria in this vice ministry's position on the mitigation actions related to deforestation and forest degradation reduction but in a context of criticism of the substantial bases of the REDD+ mechanism. Additionally, it introduces recognition of the climate debt payment, as well as the importance of the integrated and sustainable management of forests with an emphasis on the community forest governance and an explicit rejection of carbon markets (Ministerio de Medio Ambiente y Aguas 2010).

It is worth noting that in the context of the uncertainties between the Ministry of Environment and Water and the Ministry of Foreign Relations different initiatives originated in Bolivia to implement subnational initiatives like REDD+ pilot experiences, particularly promoted by NGOs. Among these initiatives, the following can be highlighted:

- Climate Action Plan at Noel Kempff Mercado Park. Launched in the 1990s, it is considered one of the first REDD pilot initiatives at international level (Robertson and Wunder 2005). Informal carbon credit sales to US companies were achieved by extending the national park, suspending forest concessions and paying compensation to timber companies. The project was considered a pioneering reference for REDD although it also shows the potential weaknesses of REDD projects (Müller 2011): it was not possible to fully ensure that forest operations were not transferred to other areas (problems with carbon leakage); moreover sustainable logging can also be considered a form of forest conservation instead of a threat.
- The initiative promoted by the German Government with PNCC in 2009 defines criteria for the selection of municipalities for the establishment of compensation pilot projects (San Ignacio de Moxos in Beni, San Ignacio de Velasco in Santa Cruz, the Municipality of Ixiamas in La Paz and Bella Flor in Pando).

- Strategic Conservation and Sustainable Management of the Forest Resource (COMSERBO). This is a program promoted by Pando's Government and San Ignacio de Velasco Municipality in Chiquitania with the support of international NGOs such as The Nature Conservancy (TNC) and CI, which implement mechanisms of payment for forest conservation⁵².
- The indigenous REDD Program or REDD Amazonía⁵³, with the support of the *Fundación Amigos de la Naturaleza Bolivia* and funding by the Moore Foundation, under an agreement with indigenous organizations, among them, the Central Indigenous of the Bolivian Amazon Region (*Central Indígena de la Región Amazónica Boliviana*, CIRABO) and the Confederation of Indigenous Peoples in Bolivia (*Confederación de Pueblos Indígenas de Bolivia*, CIDOB)⁵⁴.
- Other specific experiences of compensation for environmental services, which are related but are not explicitly pilot REDD+ experiences, like the one supported by *Fundación Natura Bolivia* in Los Negros (region of Valles de Santa Cruz, Asquith et al. 2008), where people that use downstream water provide compensation in kind with bee boxes and wiring to the people living on headwater areas for forest conservation.

In October 2010, the Bolivian Government signed the National Program UNREDD with a footnote that established that the REDD+ program would be started with a non-market approach, although the initial objectives of the program were maintained, which were the institutional preparation for the implementation of REDD+ actions in the country. This gave rise to much confusion and was the reason of the different voices that identified contradictions in the Bolivian position. Nevertheless, since the Bolivian position

52 <http://espanol.tnc.org/dondetrabajamos/bolivia/descubre/comserbo.html>.

53 http://www.katoombagroup.org/events/Prog_Indi_REDD_Amazonia.pdf.

54 At the III National Commission held in June 2011, CIDOB decided to support REDD+ and agreed that CIDOB and its regional offices should be authorized to sign agreements with the World Bank and other international organizations to finance several REDD and other programs associated with environmental services.

in relation to REDD+ was clarified at COP 16 as an open criticism of the market approach that was being adopted by REDD+ in the international sphere, the implementation of this agreement was halted in Bolivia at its inception. Likewise, the Bolivian Government stopped participating in the FCPF REDD readiness program. Something that is both curious and difficult to explain, however, are the reasons that led to the signing of the agreement with UNREDD in a context of criticism against the REDD scheme.

These contradictions were somehow lessened with the official presentation of the Bolivian proposal “Sustainable Forest Life”, which would give rise to the proposal of the Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests, as explained below. In this context, the implementation of the National Program UNREDD stopped completely. Through a note sent on March 2012, the Minister of Environment and Water requested the UNREDD Policy Board to re-direct the funds of UNREDD Bolivia Program to support the design and implementation of the National Mitigation and Adaptation Mechanism for the integrated and Sustainable Management of Forests adopted by the government. The Policy Board decided to send a High Level Mission to assess the proposal in June 2012. This mission concluded that the Joint Mechanism proposed should be formally adopted by the Bolivian Government.

In October 2012, the Bolivian government participated in the UNREDD Policy Board, requesting the program’s resources to be transferred to finance mitigation activities in the framework of the Joint Mechanism design and implementation, taking into account that it was a non-market-based approach. The decision by the Policy Board was as follows: “The Board requested Bolivia to prioritize the activities within the approved National Programme document to contribute to Bolivia’s Joint Mitigation and Adaptation Mechanism for the Integral and Sustainable Management of Forests” (UNREDD 2012). Thus, the UNREDD National Program was acknowledged as a source of funding of the Joint Mechanism. In this direction, the Bolivian Government has insisted on the fact that funding by UNREDD for the Joint Mechanism does not imply Bolivia’s acceptance of the REDD+ mechanism. It was recently agreed that UNREDD funds would be used to establish a system for land-use-change monitoring.

4.5 The Law of Mother Earth and the Joint Mechanism

Framework Law No. 300 of Mother Earth and Integral Development for Living Well⁵⁵, passed in 2012, is intended to harmonize the Bolivian international position with the national agenda. One of the central aspects of the laws is the development of a new production approach based on the creation and strengthening of “sustainable production systems”. The aim is to promote the protection of environmental functions of livelihoods, the achievement of food sovereignty without increasing pressures on forests and the restoration of livelihoods damaged by industrial agricultural activities. Mother Earth rights are also granted as a subject of public interest.

Among others, the Law of Mother Earth absolutely prohibits the conversion of forest land-use into other uses in live zones suitable for forestry (Title 3, 25.4). It also orders to reclassify land-use to prevent the expansion of the agricultural frontier (Title 3, 1.16). However, another part refers to minimizing the advance of the agricultural frontier but not to avoiding expansion (Title 3, 24.2). It is arguable how many of these intentions will come true, in view of the adoption of other laws which contradict these statements. Law 337 on Support to Food Production and Forest Restoration, passed in early 2013, has an implicit objective to promote the expansion of the agricultural frontier.

In order to apply the approach advocated in the Law of Mother Earth, the creation of a new strategic institution is planned under the name of Plurinational Authority of Mother Earth (*Autoridad Plurinacional de la Madre Tierra*, APMT) (Article 53, Law of Mother Earth) to promote interactions between land-management processes, forest management and agricultural production systems. APMT was created through Supreme Decree No. 1696 in August 2013. At the same time, this agency operates different mitigation and adaptation mechanisms, including the Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth (Article 54, Law of Mother Earth). In the approach of this law, climate change mitigation and adaptation efforts, within a

55 Available at: www.la-razon.com/sociedad/MARCO-TIERRA-DESARROLLO-INTEGRAL-VIVIR_0_1706229409.html.

Box 6. Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth

The Framework Law of Mother Earth creates the Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth, which is operated by the Plurinational Authority of Mother Earth.

The main characteristics of this mechanism are as follows:

1. The mechanism aims to promote the integrated management and sustainable use of forests and livelihoods of Mother Earth, conservation, protection and restoration of livelihoods, biodiversity and environmental functions, facilitating better land-uses through the development of sustainable production systems, including agriculture and forestry, to address the drivers of and reduce deforestation and forest degradation, in a context of climate change mitigation and adaptation.
2. It is based on the non-marketization of the environmental functions of Mother Earth, on integrated and sustainable management, on the multiple functions of forests and livelihoods of Mother Earth and on the respect of the rights of indigenous native rural peoples and intercultural and Afro-Bolivian communities.
3. It focuses on strengthening sustainable livelihoods of local peoples and peasant native indigenous nations and peoples and intercultural, intracultural and Afro-Bolivian communities, in forest areas or living areas suitable for forestry, in the context of climate change mitigation and adaptation.

Source: Article 54, paragraph I. Framework Law No. 300 of Mother Earth and Integral Development for Living Well.

perspective of integrity and sustainability, seem to be the catalysts to apply this new vision. Pacheco (2013) presents an explanation of the conceptual basis of this mechanism.

According to the proposal made by the Ministry of Foreign Relations of the government of Bolivia (2012), the Joint Mechanism would constitute a network of articulation and coordination of public, community and private entities. According to the provisions in the Law of Mother Earth, it should enable the development of a great variety of processes, including:

- Political: Establish strategic coordination between the central level of the State with autonomous territorial entities and other social, associative and private organizations to meet the expected results in the integrated and sustainable management of forests and Mother Earth.
- Technical and methodological: Development of operational and methodological criteria for integrated and sustainable management of forests and Mother Earth.
- Functional–operational: Promote operational processes of coordination between state agencies for the implementation of public, community-based and private policies according to

institutional roles and responsibilities defined in the current legal framework to better achieve the results expected in the integrated and sustainable management of forests and Mother Earth.

- Financial: The Joint Mitigation and Adaptation Mechanism transfers financial resources to public, community and private entities, which become the implementation agencies of the mechanism. These financial resources are subject to compliance with joint mitigation and adaptation indicators.

For the operation of the Joint Mechanism, a process for the inscription of integrated and sustainable management initiatives has been established. This process involves the registration, evaluation, monitoring and certification of initiatives of integrated and sustainable management of forests and Mother Earth through the Joint Mechanism with an approach of climate change mitigation and adaptation (Ministerio de Relaciones Exteriores 2012). According to the same source, the Joint Mechanism should operate in the framework of a process coordinating different public agencies of the state central level and autonomous territorial entities, based on joint climate change mitigation and adaptation

results identified locally with a territorial approach (Box 7).

The first step in the implementation of the Joint Mechanism is the definition of the so-called Integrated Forest and Land Management Plans (PGIBTs). Initially, they will be developed for indigenous and peasant native communities. Through PGIBTs, communities will plan land-use from a local perspective, which offers the opportunity to reach realistic results with the ownership of the actors who will implement them. However, it is not clear yet how these local initiatives will be made compatible with national planning. Law No. 337 allows the conversion of

20% of collectively held forest lands⁵⁶ into agro-forestry systems.

PGIBTs are also intended for administrative units at higher levels such as municipalities. In the medium-term there is a plan to replace forest concessions with PGIBTs.

For the implementation of the Joint Mechanism, ABT will play a key role as surveillance institution. The role of the National Agriculture and Forestry Innovation Institute (*Instituto Nacional de Innovación Agropecuaria y Forestal*, INIAF) will also be crucial as it will be responsible for the task of coordinating the technical support to be provided

Box 7. Single operational and methodological process of the Joint Mechanism

- Strengthening of governance of forests and livelihoods through the consolidation of an institutional context favorable for the integrated and sustainable management of forests and Mother Earth, including: i) strengthening of legal security in relation to agricultural and forest property rights; ii) autonomous processes for the management of forests and ecosystems and iii) development of local technical, organizational and institutional capacities with an emphasis on the community.
- Implementation of participatory processes of planning and territorial management in municipalities, indigenous native rural autonomies, indigenous native rural territories or community organizations, as appropriate, with an approach of climate change mitigation and adaptation, including: i) development of processes for diagnosis, participatory mapping, identification of living areas and analysis of scenarios and impacts of climate change; ii) territorial planning according to their potentials, limitations, opportunities and risks, identifying living systems and sustainable production systems to every ecosystem; iii) strategies of integrated development and strategic institutional actions incorporating integrated monitoring and regulatory systems.
- Multi-agent agreement on common goals: in municipalities, indigenous native rural autonomies, indigenous native rural territories or community organizations, as appropriate, in relation to joint indicators climate change mitigation and adaptation, including the set of public, community, private and agricultural property agents.
- Integrated application of instruments of regulation, promotion, supervision and control in the framework of transfers of funding subject to compliance with joint indicators of climate change mitigation and adaptation, including: i) regulatory instruments: support to integrated and sustainable management of forests with regionalized criteria; ii) promotion instruments: financial and non-financial support for the integrated and sustainable management of forests; iii) surveillance instruments: monitoring of compliance with indicators of integrated and sustainable management of forests and iv) control instruments: penalties for unplanned use of integrated and sustainable management of forests.
- Monitoring of joint indicators of mitigation and adaptation, in the framework of a plurinational system of holistic and integrated monitoring of forests and Mother Earth, as appropriate.

Source: Taken from the Proposal of Supreme Regulatory Decree of the Plurinational Authority of Mother Earth (Gobierno de Bolivia 2013).

⁵⁶ Belonging to indigenous native rural peoples, Afro-Bolivian and intercultural communities.

to local agents. One of the responsibilities of APMT will be to ensure institutional coordination, clearly a difficult task.

4.6 Different agents' perspectives on REDD+

Bolivia was one of the first countries to promote a REDD mechanism when REDD emerged in the international agenda, in conjunction with international cooperation agencies, particularly the World Bank and the United Nations. This position emerged from the PNCC, which held views prior to the MAS government, aligned with the international perspective. However, it then came into conflict with the critical position arising from the Presidency of the Republic and the technical team of the Ministry of Foreign Relations. This critical position was imposed and adopted in the outcomes of the World Peoples' Conference, which established an open criticism of the market mechanisms adopted by REDD+.

In Bolivia, the REDD approach was openly promoted by some national conservation NGOs, such as the *Fundación Amigos de la Naturaleza* (Friends of Nature Foundation, FAN) and other international conservation NGOs, such as TNC and CI. There was also strong encouragement for programs promoted by international organizations, mainly through German cooperation, the World Bank's FCPF and then UNREDD, the main promoters of REDD. Gradually, other civil society agents were included in these negotiations, such as CIDOB, representing lowland indigenous groups, who would then be part of the Amazon REDD pilot project of FAN.

Other agents were not present in the first phase of REDD+ discussions in Bolivia, including authorities of the Vice Ministry of Environment, Biodiversity and Climate Change (2007–2010), who then promoted a non-market REDD line. However, the criticism of REDD+ as a market mechanism became stronger from the Presidency of the Republic of Bolivia, promoting the creation of an alternative mechanism to REDD+ in a non-market-based approach.

There have been discrepancies between social organizations on REDD+. While at a certain time CIDOB held critical positions, at a different time

this organization held a favorable position for the promotion and establishment of REDD actions in Bolivia, as confirmed by the resolutions of the III National Commission held in June 2011: "CIDOB and regional bodies are authorized to sign agreements with the World Bank and other international bodies to finance different REDD programs and others associated with environmental services" (CIDOB 2011). On the other hand, the indigenous and native rural organizations in CSUTCB, CSCIB-BS and CNMCIQB-BS rejected REDD in a public statement in 2011: "Developed countries must reduce their emissions in their territory and not through the REDD mechanism and the carbon market. The financing source for REDD cannot come from the carbon market. REDD policies do not define benefits such as real conservation. We reject marketization of forests. Forests are not only carbon sinks. They keep biodiversity. Reforestation by companies for commercial purposes should not be included in the REDD mechanism" (Pacto de Unidad 2011).

However, once the government of Bolivia agreed on a position on the alternative mechanism to REDD+, CIDOB said that despite the differences on economic issues, this organization had the openness and willingness to work on joint proposals with the central government (CIDOB 2012). The Government of Bolivia has invited several conservation and development NGOs to form a technical team to support the Joint Mechanism. Although the Joint Mechanism is a law, its approval has had little support from some public, private and community sectors. In addition, clear positions on this proposal have not arisen yet, in a context significantly marked by views for or against the REDD+ mechanism. The implementation of the Joint Mechanism is still pending because, although the areas on which it will rely have been agreed, as discussed in Box 7 (see DS. 1696, Art. 13, II), it is still not very explicit regarding the procedures through which these different processes will be implemented. It is important to note that the greatest virtue of the Joint Mechanism may be the creation of a forum within the government of Bolivia to more positively discuss land and forest management issues within a broader perspective of climate change mitigation and adaptation and the provision of a discussion forum for social organizations and NGOs in an institutional cooperation framework at different scales.

5 Concepts and policies for effective, efficient and equitable mitigation of deforestation and forest degradation

This section analyzes the potential solutions to reduce deforestation and forest degradation in Bolivia and also discusses the efficiency of relevant current public policies. The first part explores some potential measures to mitigate deforestation and forest degradation from a technical perspective, without analyzing the current political context yet. The second part reviews current Bolivian policies in relation to forests and climate change. The section concludes with an analysis of the so-called “3Es” of these policies, that is, effectiveness (achieving significant emission reductions), efficiency (reducing emissions at a minimum cost) and equity (distributing benefits and costs equally). This section is also meant as a contribution for policy makers towards the fulfillment of the 3Es in deforestation and degradation reduction and better forest conservation.

5.1 Potential measures to reduce deforestation and forest degradation

In order to address the direct and underlying drivers of deforestation and forest degradation in

Bolivia, it is important to adopt a framework of policies that can respond to different situations throughout the “forest transition”; that is to say, to the different phases of conversion of forests to other uses (Angelsen and Rudel 2013). For instance, for areas with strong deforestation pressures, like those present in northern Santa Cruz, in Chiquitania or in the areas neighboring Guayaramerín, different actions are needed in comparison with areas where there are more stable forests, like in many parts of the northern Amazon or within protected areas, where there are better opportunities for conservation. A third case is that of mosaics of agricultural areas and remaining forests, like in settlement zones in Chapare or around the city of Santa Cruz, where actions more oriented towards restoration are needed.

Table 16 introduces a summary of these potential mitigation actions through the different phases of forest transition from areas with more forests to more agricultural areas.

To reduce high deforestation rates in the short and medium term it will be necessary to apply measures in the areas of the agricultural frontier.

Table 16. Potential policies to address deforestation and forest degradation

Areas with forests under little threat	Areas of expansion of the agricultural frontier	Agricultural and forest mosaics
<ul style="list-style-type: none"> • Promote sustainable forest management • Clarify tenure rights and forest-use rights • Fight corruption related to forest revenues • Strengthen forest management institutions 	<ul style="list-style-type: none"> • Control agricultural expansion • Develop land-use plans • Reduce agricultural incomes in frontier areas • Improve road planning • Provide financial support for forest protection areas • Non-agricultural jobs 	<ul style="list-style-type: none"> • Stabilize remaining forests • Stimulate restoration and reforestation activities • Provide incentives for forest conservation and compensation for environmental services • Intensify agricultural activities • Reduce support for extensive activities

Source: Authors' elaboration based on Angelsen and Rudel (2013).

Measures for control and regulation of agricultural expansion, among others, are highlighted for these areas. The fact that over 80% of deforestation in Bolivia does not comply with legal requirements (ABT 2012) shows the potential and also the need for greater control. To guarantee long-term forest stability, the measures mentioned for areas with forests under little threat are important, e.g. the promotion of sustainable forest-uses and the strengthening of the relevant traditional users. Restoration activities, as well as incentives in the form of compensations for forest environmental services, seem to be more adequate for agricultural-forest mosaic areas; that is to say, for areas where the deterioration of forest environmental functions is already visible at the local level. Even though the distribution of incentives to reduce deforestation often appears as the most important solution in REDD+ discussions, it is complex in terms of land administration, governance and tenure (see Boerner et al. 2010). For this reason, it would be less effective in areas where there is not a good application of the legal deforestation framework and where it would be difficult to monitor actions associated with conservation and ensure sustainability in the long run.

5.1.1 Potential to address the three proximate drivers of deforestation

Taking into account the most recent dynamics, cattle ranching appears as the first threat to Bolivian forests and, at the same time, it exerts pressure on almost all forest areas. The costs of reduction are theoretically very low due to the limited performance, which provides the opportunity to increase production without expanding the areas occupied by cattle ranching. Beef production currently aims at local and/or national markets. This limits the potential for expansion; nevertheless, expectations of future beef export as well as informal border trade increase the potential for expansion. An important part of the conversion of forests to pastures is caused by a reduced number of large illegal forest clearings caused by few cattle ranchers (Müller et al. 2013). This implies a good potential to apply legal measures. The fight against livestock production within forest areas thus represents a very high potential for deforestation reduction.

The expansion of mechanized agriculture is also a major threat to forests, but at the same time,

this land-use is concentrated in some areas with good land suitability where high opportunity costs limit the potential to reduce expansion. An important part of production is intended for international markets, where the demand is not limited in comparison to the Bolivian production. The fact that the structures for the provision of inputs and financing are often centralized helps apply measures for land-use control and planning. The potential to reduce deforestation caused by mechanized agriculture is thus moderate.

Low-scale agriculture causes less deforestation than the other main proximate drivers, but its contribution is still important. It expands to many different areas in the country. Profitability is quite low and the markets are mostly local and national. Centralized mitigation measures can be hindered by the large number of stakeholders and due to the limited dissemination of technology. We consider that the potential for deforestation reduction here is low to moderate. It would be important to achieve better respect for restricted areas and also apply social control mechanisms.

In the framework of the previous reflections, based on Müller et al. (2013), we distinguish four possible non-exclusive general strategies that could be adopted to reduce the expansion of agricultural-uses on forests, which are associated with the three direct drivers:

- Restrict the expansion of agriculture/cattle ranching directly
- Increase the spatial efficiency and productivity
- Replace agriculture with alternative activities with lower impact on forests
- Redirect expansion towards recovered degraded lands or non-forest areas

Table 17 discusses these different measures for the three main proximate drivers of deforestation in Bolivia: mechanized agriculture, small-scale agriculture and cattle ranching. In addition, for each of these drivers, priority areas are identified where specific measures may be implemented.

Opportunities to reduce deforestation caused by mechanized agriculture

Restricting the expansion of mechanized agriculture can be difficult due to its high profitability and contribution to the national economy. However, since profitability depends on favorable environmental conditions that

Table 17. Measures to mitigate deforestation and forest degradation in Bolivia

	Mechanized agriculture	Small-scale agriculture	Cattle ranching (priority)
Mitigation of the direct drivers of deforestation			
Potential solutions	<ul style="list-style-type: none"> • Restriction to selected suitable areas • Better control, streamlining and application of laws • Increased legal deforestation costs • Reduction of subsidies to diesel oil • Critical evaluation of projects in new agro-industrial areas • Recovery of degraded areas near Santa Cruz 	<ul style="list-style-type: none"> • Enforcement of existing land-use restrictions • Zoning at the level of the community or individual farm • Incentives to adopt more efficient and sustainable production practices • Promotion of employment outside agriculture 	<ul style="list-style-type: none"> • Improved law enforcement and control • Improved spatial efficiency (like higher stocking rates)
Priority areas	Northern Santa Cruz, San Buenaventura, Puerto Suárez	El Choré Forest Reserve and surrounding areas, northern La Paz, northern Amazon	Chiquitania, northern Amazon
Mitigation of forest degradation			
Potential solutions	<ul style="list-style-type: none"> • Priority: Mitigate forest fires by regulating fire use in agriculture, fostering of agricultural practices with reduced burning • Stricter forest control, forest certification • Intensification of cattle ranching in browsing areas • Support of use of alternative fuels for cooking and improved stoves 		
Priority areas	• Mostly areas with dry forests		
Consolidation of sustainable uses in areas of stable forests			
Potential solutions	<ul style="list-style-type: none"> • Consolidate and extend use and/or property rights of agents with sustainable uses in TCOs, forest concessions or extractive territories • Ensure the sustainability of these uses and adopting sustainable practices 		
Priority areas	Areas of TCOs and forest concessions, mostly northern Amazon		

Source: Own elaboration partly based on Müller et al. (2013).

only take place in certain areas, it would seem adequate to regulate expansion through land-use zoning, thus allowing expansion of mechanized agriculture only in certain areas, which would also lead to increasing its efficiency. An indirect restriction could also be achieved by eliminating diesel subsidies, which would make it less attractive to convert forests to agricultural-use in less suitable areas. Nevertheless, this measure also has a great impact on the population in general, as could be clearly seen in December 2010 when a measure to eliminate fuel subsidies ended with a strong popular protest and uprising against the government, for which reason it was immediately lifted. But in the medium-term, the reduction of diesel subsidies is still an important measure to fight deforestation. In addition, taxes could be increased. Curiously enough,

Law No. 337 supports tax reduction to enable pending payments.

For improved efficiency of mechanized agriculture, productivity could also be boosted by increasing fertilizer use. Current use is low in Bolivia. Such measures, which have a direct impact on production costs, could be linked to land-use zoning, giving advantage to production in selected areas, for instance, by levying higher taxes in areas with lower suitability. Nevertheless, it has always been difficult to put into practice the levying of taxes on farms, as there is currently a system of payments based on self-appraisal. As a basis for zoning, the Land-use Plans elaborated at the level of departments could be used, although they clearly need to be revised. Besides, Municipal Land-use Plans could help as input, even though

they are scarce⁵⁷. It is important to update them for better zoning. However, they need to be socially agreed. The Brazil experience shows that imposing restrictions on agricultural loans in municipalities with outstanding deforestation, together with restrictions on market access for products derived from illegal clearing, contributes to reducing deforestation.

Land regularization has progressed very little in areas of mechanized agriculture due to the fact that the Bolivian Government gives priority to TCOs regularization and small property areas. Nevertheless, INRA continues to have as one of its priorities the conclusion of the regularization process for all types of farms in all the country. However, it is not clear whether they will have enough financial resources to complete the process. Accelerated regularization in the agro-industrial area could mitigate crop expansion in lands informally controlled by large Brazilian and Argentine producers and use of taxes differentiated by the use of land should be made, positively favoring forest-uses (Urioste 2012). Nevertheless, the replacement of mechanized agriculture with alternative uses is not a very feasible option since other uses cannot compete in terms of profitability. Production practices may be promoted which are more integrated between crops, cattle and forests, or more sustainable production measures, such as increased use of windbreaks.

Moreover, there is a potential in the recovery of degraded lands in the areas neighboring Santa Cruz, where there is good market access. For instance, there are degraded areas under cattle ranching in places like abandoned Mennonite settlements in the municipality of Santa Rosa del Sara, north of Santa Cruz. Recovery of areas like these for agriculture could be promoted in different ways, e.g. through preferential fertilizer prices or through public procurement of products from such areas. Priority areas to mitigate the expansion of mechanized agriculture are located in northern Santa Cruz and southern Beni, where expansion is highest at present. Priority should also be given to

avoiding the opening of new agricultural frontiers, which seems more likely in the areas of Puerto Suárez and San Buenaventura.

Opportunities to mitigate deforestation caused by small-scale agriculture

It is more difficult to expand small-scale agriculture due to the large number of farmers that depend on it to make their living. Yet, it is important to achieve a better application of existing restrictions, for example, in the case of El Choré Forest Reserve (Müller 2009). A restriction at the level of settlers' individual plots—typically 50 ha—could be achieved with concepts like those introduced in Yapacaní, where areas of annual crop production, perennial crop production and conservation areas are defined. Control would be at the community level and at the level of social organizations.

The difficulty in improving the spatial efficiency of small-scale agriculture, which would often require changes in the production system, has already been mentioned. The same is true for replacing it with alternative land-use. Both tasks have been started by many cooperation programs and NGOs, but it has been difficult to achieve significant changes in production systems. This also applies to activities such as ecotourism and timber harvesting. They can contribute to family income, but will not easily change local production strategies. Still, there is significant potential for the adoption of perennial and permanent crops like banana, citrus, cocoa or cupuacu. Profits per hectare can be greater than with annual crops like rice, but there are major challenges associated with the logistics of marketing these products, mainly in terms of transport and storage. An interesting alternative would be the introduction of rice under irrigation, which could double yields and allow continued production at the same plot (see Eyzaguirre 2005).

Regarding the recovery of degraded areas, it is important to avoid forest clearing and degradation for very short production cycles with slash and burn agriculture, for example with permanent production systems. An important option that must not be ruled out for small-scale production is the promotion of economic activities outside farms, mostly for second- or third-generation settlers. This includes processing of agricultural and forest products at the local level, but also the importance of access to education that helps them enter the urban labor market.

⁵⁷ However, existing zoning needs to be harmonized. For instance, the updated PLUS of Santa Cruz (www.santacruz.gob.bo/archivos/pn23072010131607.pdf) identifies most of agro-industrial expansion in the north of the department as unsuitable for intensive agriculture. There is some risk of flooding in this area, but apparently it is possible and highly profitable to plant soybean there.

One of the priority areas for measures related to small-scale agriculture is the El Choré Forest Reserve with its surrounding areas, which represent the last block of non-fragmented forest in northern Santa Cruz. Additional priority areas are settlement areas in northern La Paz and, to a lesser extent, in Chapare, where dependence on coca is a limiting factor. Further, small-scale agriculture is likely to expand significantly in the northern Amazon.

Opportunities to mitigate deforestation caused by cattle ranching

The avoidance of illegal clearings for cattle ranching should be a priority measure. The potential of this measure has become evident in recent years in Pando, where major ranchers have had to face trials for illegal clearings since 1996, in application of the forest law in force since then, obligating them to pay accumulated penalties for timber illegally extracted from such clearing⁵⁸. Nevertheless, Law No. 337 has curiously provided the possibility of avoiding payment of these penalties instead of reinforcing compliance with those regulations. From a practical perspective, the reduction of penalties for illegal clearings until 2011, together with commitments to restore forests, may regularize a situation that is difficult for producers. In the past, there were also perverse deforestation incentives—especially for cattle farms—due to the need to demonstrate the FES.

An aspect that has already been mentioned is the possibility of improving efficiency in livestock production. Potential measures include better pasture management by means of rotational grazing, silage for cattle feeding in dry seasons and better forage, including legumes, to achieve better stocking rates. Currently, the priority for most ranchers does not seem to be on measures to improve spatial efficiency, but rather on genetic improvement, with only minor effects in space use. Promotion of production improvement should be combined with greater control to prevent accelerated expansion due to higher profitability. In the event of the opening of foreign markets for Bolivian beef, this activity could expand and further increase its contribution to deforestation. In some cases, the promotion of forest management could be an alternative to extensive cattle ranching, but often timber extraction is the

first step towards forest conversion to pastures. An interesting solution would be to promote integrated systems (crops, cattle and forests).

Priority areas for mitigation of deforestation due to the expansion of livestock are the northern Amazon and Chiquitania. Better control by controlling large illegal clearing seems feasible given that the number of producers is quite small, which facilitates violator identification. An assessment of a 2006 livestock census by SENASAG shows that 50% of the livestock in Pando belongs to only 20 families. Nevertheless, since livestock in sown pastures causes forest conversion almost in all the lowlands, it is important to apply measures of national scope.

5.1.2 Mitigation of other direct and underlying drivers

Other direct drivers of deforestation include mining, oil drilling and hydroelectric projects. Compared with agricultural-uses, these projects are much more centralized and have greater control by the central government, although in some areas low-scale informal mining is important and encompasses a large number of people, which makes it more difficult to control. In order to mitigate impacts on forests, serious environmental impact assessments are needed when deciding on these projects. In addition, the right to consultation and previous, free and informed consent should continue to be exercised responsibly. This also applies to the construction of infrastructure, mainly roads, which is an underlying driver of deforestation.

It is more difficult to suggest concrete specific measures for the different underlying drivers of deforestation since these drivers are often related to a much broader context, which also includes the international level. Therefore, mitigation measures are often beyond the scope of national policies and markets. In this framework, however, actions may be implemented to better control international investment on lands intended for agro-industrial production, which usually lead to pressures on forests. Regularization of land tenure has made little progress in agricultural frontier areas and, in spite of the official discourse, there seem to be few government attempts to apply a stricter control to mitigate “foreignization” of the land (Urioste

58 Personal communication of the local ABT team in Pando, March 2010.

2012), although such control has been approved in Law No. 300.

5.1.3 Mitigation of forest degradation

The potential for mitigation of the drivers of degradation is only discussed qualitatively here, focusing on existing activities as there are no quantitative evaluations of forest degradation. Fire control and policies to promote sustainable forest management have been identified as the measures with the greatest potential.

There are different forest fire mitigation initiatives. The greatest acceptance of burning as a traditional tool for farm management has led to the introduction of burn plans, a tool to regulate fire use and make large producers obtain a permit (Villegas and Martínez 2009). There are several programs to control burning, e.g. an ambitious initiative led by the government of Santa Cruz called “Comprehensive Fire Management in Santa Cruz” (*“Manejo Integral del Fuego en Santa Cruz”*) with 10-year duration (2013–2023)⁵⁹. The different programs seek to reduce the impact of fires by strengthening local capacities to prevent and respond to forest fires and disseminating practices that are alternatives to fire use. In relation to fire control, there is also an important potential in the recovery of local experiences in fire management⁶⁰.

Timber harvesting is another important driver of degradation. Improved control of legality in forest exploitation would have an important potential for mitigation. Forest control has been strengthened recently and seems to be leading to a reduction in illegal harvesting, but this is

something very difficult to determine in practice⁶¹. There is an important margin to improve the forest monitoring and control system in Bolivia. Digital Certificates of Origin (CFO) have been established (ABT 2012). However, it is still necessary to combine the computerized system with surveillance actions not only in harvesting areas and checkpoints but also in storehouses and processing centers (ABT 2012). Forest certification can contribute to reduce forest degradation. Nevertheless, certification has apparently reached its limit in the country, not only due to the costs but also to the most recent difficulties to guarantee the rights of concessions⁶².

Compensations for forest concessionaries to stop timber extraction harvesting may not have a large potential for mitigation. Even though an extension of the Noel Kempff Mercado National Park was achieved with the Climate Action Plan described in section 4, it is important to see the potential of forest management for forest conservation by giving an economic value to forests. As regards browsing, there are initiatives to fence forest areas to prevent the entry of cattle. Especially in areas where forests protect headwaters, there is a strong motivation of local people to protect these forests⁶³. Finally, to reduce timber consumption, it is important to broaden access to liquid petroleum gas (LPG) as fuel for domestic cooking uses; however, there are also some initiatives for distribution of improved stoves that reduce timber consumption since they are more efficient compared with traditional techniques⁶⁴.

59 This program seeks to reach almost 200,000 people in 2650 communities and 22,000 cattle ranchers registered by SENASAG (unpublished data from the Directorate of Natural Resources of the Departmental Autonomous Government of Santa Cruz, 2012).

60 A study of the Bolivian Amazon identifies several burning practices adapted to the specific socio-environmental context (Pokorny et al. 2010), e.g. for the protection of Brazil nuts (*B. excelsa*) through strips (Hoch et al. 2009).

61 According to ABT (2012), in 2011 66% of sawn timber that reached the market was controlled, which means that 34% comes from illegal logging and does not comply with sustainability regulations. An increase in control is mentioned, which led to a strong rise in confiscated sawn timber in year 2010 (equivalent to 2054 lorries, compared to 1269 lorries on average in previous years), but a reduction in confiscated timber in 2011 (1443 lorries), in spite of a still intensified control.

62 Bolivia has been a pioneering country to certify forest exploitation in natural tropical forests. In 2010, there were 12 certified forest operations (883,559 ha), 11 of which belong to natural forests (883,394 ha) and to forest plantations (165 ha). While 90% of the certified area under forest management is made in forest concessions, ASLs (stewardship system), TCOs and private properties share similar values with approximately 3% of the overall area each (CFV 2011).

63 www.naturabolivia.org/Informacion/naturalia12011.pdf.

64 www.endev-bolivia.org/index.php?option=com_content&view=category&layout=blog&id=9&Itemid=14.

5.1.4 Strengthening of forest conservation actions

Apart from reducing threats to forests, it is important to consider the potential of strengthening the capacities of the agents who exert more forest-friendly land-uses. Such agents often depend on forest-uses for their livelihood or income; groups of agents with a potential for sustainable forest-uses are listed in Table 18. The effectiveness of providing support for these agents and uses strongly depends on the clarity and certainty of their land and forest rights, as well as on the rules for land and forest-use. Therefore, we also include references to policies related to property rights and land-use rights, mainly forest rights, as well as regulations on land-use, like zoning.

Section 2 analyzes the situation of land and forest distribution. Forest conservation by means of sustainable uses by these agents depends on two factors, namely: (1) these users' rights over their lands and, particularly, the rights over forests, should be clear and protected by the State state to defend those rights against pressures by third parties, (2) promotion structures are needed for these forests to be used sustainably and contribute to the livelihoods of the different groups depending on them; otherwise, they will eventually be converted to other land-uses.

Land regularization in TCO areas is almost complete and progress has also been made in titling of extractive communities and small properties. Still, conflicts remain, notably between groups of settlers and indigenous people in the lowlands. The most well-known case is the conflict over the road planned through the TIPNIS⁶⁵ protected area. There are other examples such as the Tacana TCO, where there are conflicts between indigenous peoples in the lowlands and settlers⁶⁶ or the Monteverde TCO, where there are also conflicts with neighboring large farm owners⁶⁷. Another source of tension over lands is the conflict between indigenous people and forest concessions, since several concessions are located

within TCOs, which has led these groups to claim for rights over the concessions. Also several forest concessions have suffered cuts, which have even affected certified areas, such as the La Chonta concession, returned to the Guarayos TCO. In this sense, land administration agencies, as well as the agricultural court, should play a more active role in rights protection, mainly of those held by the most vulnerable people.

In order to promote these sustainable uses, initiatives focus on improving market access for extraction products, such as cocoa exploitation by farming families in the Baures region⁶⁸, although the options are relatively limited. Certification schemes have the potential to ensure the sustainability of adopted practices while improving market access, following the example of forest certification. An important experience to sustain the livelihoods of local people has been the structuring of the Brazil nut complex in the northern Amazon, thus enabling not only the development of a national industry linked to foreign markets, but also including a significant number of urban communities and people that depend greatly on the Brazil nut economy.

The creation of protected areas is another commonly discussed measure to fight deforestation. But in Bolivia there seems to be little potential for the creation of new protected areas. A total of 17% of the territory is already under protection and several conflicts show that at first the existing protected areas should be respected, as can be seen for instance in the conflict on the planned road through the TIPNIS. A significant number of protected areas are in quite isolated areas with low agricultural potential, where there is less pressure (see Map 5). Thus, their impact primarily consists in "passive" conservation. It cannot be ensured that these areas will be able to stop agricultural frontier expansion.

As it discussed above, land-use planning could be a strategy to control mechanized agriculture expansion, but at the same time it could help consolidate areas of exclusive forest-use. There are now land-use plans at different administrative levels, but with some inconsistencies between

65 http://www.ftierra.org/ft/index.php?option=com_content&view=article&id=2736:tipnis&catid=101:graficos&Itemid=149.

66 <http://lapatriaenlinea.com/?nota=1789>.

67 www.territorioindigenaygobernanza.com/bov_16.html.

68 www.lostiempos.com/oh/actualidad/actualidad/20101205/el-cacao-silvestre-mueve-la-economia-de-baures_101931_198430.html.

Table 18. Agents and uses that contribute to forest conservation

Agents	Activities with a potential for forest conservation
Indigenous groups in the lowlands	Traditional use of natural resources in TCOs and other indigenous areas (hunting, fishing, forest product harvesting, subsistence agriculture)
Extractive communities (traditional but not always indigenous communities)	Sustainable extraction of forest resources (mainly Brazil nuts, a well as rubber, palms, jatata, incense, cocoa and others)
Barraqueros	Sustainable extraction of Brazil nuts in concessions
Companies and other users with forest concessions (ASL, chainsaw users and others)	Sustainable forest extraction, possibly with forest certification
Small-scale farmers with traditional production in agroforestry activities	Coffee and cocoa production under shade in permanent systems that preserve land fertility as well as significant amounts of biomass

them. There is no plan expressing a national view on the expected land-use planning. It is therefore important to advance towards the development of a national vision of land-use. The classification of “Permanent Forest Production Lands” (TPFPs) could serve as a basis for such zoning, but this needs to be adjusted to a more detailed scale to also consider the existing contradictions and inconsistencies that have led, for instance, to the approval of POPs within the lands identified as TPFPs (ABT 2012). It is worth highlighting that land planning has almost been eliminated from government policies and there are no institutions in charge of these functions, although this should be recovered by actions promoted by the Joint Mechanism.

The fact that a vast amount of forest is located in TCOs, collective properties, extractive communities, timber and non-timber forest concessions, as well as in protected areas, suggests that consolidation and protection of these use and/or property rights can constitute quite an effective measure to conserve forests in areas with still stable forests and, in the medium term, prevent conversion to other uses. This has probably become one of the priorities in the policies of the Bolivian Government, more than the control of deforestation in agricultural frontiers. Nevertheless, as it is suggested below, adopting a comprehensive perspective that considers the different phases of “forest transition” is probably the most appropriate concept to address deforestation and forest degradation.

5.2 Discussion of alternative policies to REDD in Bolivia

In this section, we present a preliminary evaluation of the policies recently proposed by the Bolivian Government as an alternative to REDD+ (referred to as “new policies” in this section). The discussion includes different aspects of these new policies, but it focuses on the Law of Mother Earth and the Joint Mechanism. The Law defines overall guidelines of the policy, while the Joint Mechanism is a more practical instrument oriented towards the definition of concrete actions. The discussion of these new policies is divided into subject areas, namely: the conceptual framework of the new policies; agent participation; monitoring, reporting and verification (MRV); mitigation of the main proximate drivers of deforestation, mitigation of degradation, consolidation of uses with a potential for forest conservation, land-use planning in general, prioritization of intervention areas, and financing. A discussion on Law No. 337 is also included here due to its relevance.

5.2.1 Conceptual framework of the new policies alternative to REDD+

The classic REDD+ concept is based on trading the carbon stored in forests and achieving conservation by compensating for not deforesting nor degrading forests. Including the “+” has broadened the scope from a more restricted deforestation and degradation approach to an approach involving

forest management, conservation and restoration, but which does not change the main concept. This conventional approach has been questioned because it does not help move towards an alternative life style since simple compensation will probably not lead to a change towards an alternative sustainable system (McGrath et al. 2010; Karsenty et al. 2012). Furthermore, it has been questioned for representing the lowest-cost option for the most developed industrial economies to compensate for carbon reductions.

In contrast, the policies of the Bolivian Government come from a view of living in harmony with forests that is based on their integrated and sustainable management (Pacheco 2013). The vision of the Joint Mechanism is to create regional platforms for the different local agents that develop specific proposals for each local and territorial situation. This makes it difficult to know, in advance, their potential implications for agricultural and forest development and forest conservation. Moreover, given that Bolivia has not adopted a concept of “zero deforestation”, it is necessary to define clearer goals for agricultural frontier expansion as well as policies to achieve these goals. Currently different figures for a planned expansion of the agricultural frontier are mentioned in public discussions⁶⁹, but there is no official figure or document available on this topic. Although a new definition of systems of life has been proposed as a basis that could substitute the existing zoning in force (TPFPs and PLUSes), it is not known yet how this concept will be implemented in practice as a form of improving land and forest management by supporting more sustainable production systems in the long run.

It is also worth noting the lack of a detailed analysis of current deforestation and degradation processes as a basis for the new Bolivian policies; probably because their conceptual basis is more political than technical. From the perspective of promoting life in harmony with forests, this proposal is mostly inspired by community-based management of land and forest resources. It has, however, slowly started to incorporate other land systems and other agents. Nonetheless, the underlying question is how to advance the desired agreements towards more sustainable production

systems supported by legal frameworks, as well as incentive instruments that lead to the expected results. This shows how important it is to more specifically consider certain policy instruments to improve institutional arrangements or production and management practices, like those suggested in the previous section.

The Joint Mechanism has set an operational and methodological intervention process for land and forest management that is quite ambitious in its goals of strengthening governance in forests and livelihoods, given the current lack of coordination of legal instruments. At the same time, this process advances towards participatory land-management processes, agreed development goals between agents, application of incentive and control instruments for land-management and monitoring mitigation, and adaptation indices. These complex proposed goals, however, will require an operational strategy based on land approaches and actions based on the different phases of “forest transition” (as suggested in section 5.1) and the views of the different local and regional actors. In this sense, more specific policy tools need to be adopted without disregarding the integrated nature of the approaches and proposals for reconciling agricultural and forest development with conservation.

5.2.2 Institutional coordination in new policies

There is strong discussion in the international REDD+ context regarding participation of local forest dwellers to ensure that they benefit from the potential profits from forests and that their rights are not violated⁷⁰. Bolivian rejection of market mechanisms is also driven by the risk of potential abuse of forest dwellers. The participation of local actors is a key aspect of new policies⁷¹, which are mostly based on the views of the indigenous

⁶⁹ http://www.la-razon.com/economia/Agro-proyectora-frontera-agricola-millones_0_1759624072.html.

⁷⁰ See, for instance, www.redd-monitor.org/2009/07/24/more-on-pngs-carbon-cowboys/.

⁷¹ Joint Mechanism, page 10: “Complementarity of rights, obligations and duties for forest management, highlighting the rights of the indigenous native peasant peoples and the rights of Mother Earth”.

people and small-scale farmers⁷². However, since there is no explicit recognition of the most urgent pressures on forests (mechanized agriculture and cattle ranching), the agents behind these pressures are not taken into account properly. This, however, has been gradually changing by recognizing that one of the important challenges of the Joint Mechanism is to reduce the pressure exerted by mechanized agriculture on forests while maintaining ecological reserves. It would therefore be important to more explicitly develop a proposal on the potential controls, on the one hand and incentives, on the other, in order to change these agents' behavior. The operational process of the Joint Mechanism includes several aspects to implement the recommendations suggested in the above section. Still, a description of more explicit actions in relation to the different types of agents, and land and forest-uses is needed.

Regarding the institutions that would implement the new policies, there is another pending challenge related to their creation and strengthening. The Law of Mother Earth has created the APMT (Plurinational Authority of Mother Earth), which the Joint Mechanism (art. 54) depends on, as well as the Plurinational Fund of Mother Earth (art. 57). In this new approach it has been established that new institutions shall not replace the competences of other public institutions of the executive power and autonomous land agencies that are currently working. Rather, their objective would be to coordinate the institutions that have competences on land and forest management, apart from those in charge of planning, which are now working in an uncoordinated manner, giving the Joint Mechanism performs a political, technical and financial role. For example, there is ABT (*Autoridad de Fiscalización y Control de Bosques y Tierras*), the forest monitoring and control agency, INIAF (*Instituto Nacional de Innovación Agropecuaria y Forestal*), SERNAP (*Servicio Nacional de Áreas Protegidas*) and others. The Joint Mechanism also highlights the importance of the decentralized government bodies and organizations of rural agents of the civil society, among the most important agencies.

Even though four processes for streamlining and coordination have been established (see section 4.5) this is undoubtedly another important challenge for the Joint Mechanism in a country such as Bolivia, where there has always been weak, politicized cooperation with little technical coordination between the institutions in charge of implementing the agricultural and forest agenda, particularly taking into account that these agendas promote contradictory objectives in practice.

One of the many examples is the lack of coordination between INRA and ABT. While INRA is responsible for land titling, including the control of the FES of land properties, ABT is the body that authorizes clearing. Recently, these institutions have started to cooperate better, which is a necessary condition for reverting lands to the State as a measure to penalize illegal clearing.

5.2.3 Monitoring, reporting and verification of results (MRV)

International REDD policies give great importance to MRV (Romijn et al. 2012). It is essential to determine and monitor emissions according to the main concept of compensating for non-emission of carbon stored in forests. Monitoring is an important aspect in the Bolivian proposal, but it does mainly not refer to carbon emissions but rather to indices of social and economic performance than to environmental indicators alone. It may therefore be challenging to implement.

The Joint Mechanism refers to a performance assessment in relation to the Autonomous Territorial Entities to promote greater involvement to achieve joint results of climate change mitigation and adaptation based on three categories (red: poor performance; yellow: regular performance; and green: good performance). The definition of concrete variables for monitoring is a process under discussion; quantitative goals for reduction of deforestation and degradation and measurement indices have not been made explicit yet. One of the priority actions as part of the support to the UNREDD program to the Joint Mechanism is the creation of an integrated monitoring system, with participation of the Food and Agriculture Organization of the United Nations (FAO), in which the central monitoring pieces will be related to land-use change, as well as

72 Law of Mother Earth: "Mother Earth is a subject, a living being that is considered sacred, fruitful, fertile and the source of life from the worldviews of the nations and indigenous native peasant peoples, intercultural and Afro-Bolivian communities".

monitoring of other forest functions. Since this is not a carbon-based approach, monitoring efforts may be even more demanding.

At the national level, deforestation monitoring capacities are relatively good, although uncoordinated. There are different public and private institutions with good capacities and human resources, but better coordination between them is still lacking. In addition, there is a need to create technical and operational capacities in state agencies for monitoring actions that are crucial to start any type of deforestation control. In this sense, there is still confusion over data sources and methodologies used. Nevertheless, there has been significant progress in the development of a unit of deforestation monitoring in ABT. Further, the country is part of a program to set up a regional deforestation monitoring system, with the support of Brazil's National Institute for Space Research (INPE), promoted by the Amazon Cooperation Treaty Organization (ACTO). Currently, the Forest School of Cochabamba (*Escuela Forestal*, ESFOR) is the national focal point of this regional initiative. However, there is risk of duplicating the efforts of ABT, which has just completed a map of clearing between 1996 and 2011. To date, however, the only recent published data come from the deforestation map prepared by FAN (Cuellar et al. 2012).

The report of the results of the activities under the Joint Mechanism should be made at different scales: national and local. The distribution of local-level monitoring information and responsibilities is an important task for ABT to comply with its terms of reference of surveillance and the Joint Mechanism can constitute a good basis for this. The report of the monitoring results to international bodies is mentioned as a voluntary option. Section 2.5 of this paper discussed the problems of quantification of emissions from land-use change observed in the second national communication. Regarding verification, this issue is still difficult to assess since currently quantitative reduction targets for deforestation, degradation or carbon emissions have not been defined yet.

5.2.4 Mitigation of deforestation

Our analysis indicates that cattle ranching and, to a lesser extent, mechanized agriculture should be prioritized to reduce deforestation.

The new policies emphasize the need to give a qualitative leap in land-use optimization, by changing extensive, low-productivity production systems (Estado Plurinacional de Bolivia 2013). However, it is quite clear that in the new development discourse this has not been reflected in concrete policies yet. The Joint Mechanism does not mention the instruments with which this transformation will be made, although it promotes discussion and supports processes to recover ideas of future perspectives of resource use from civil society agents.

The challenges to progress towards more sustainable agriculture are also stated in the Law of Mother Earth (Title 3, 24.6): “to promote and foster agribusiness and cattle ranching as long as they incorporate technologies and practices that ensure the regeneration capacity of the ecosystems and livelihoods [...] to guarantee food sovereignty and safety [...]”. It then seems that only under sustainable production conditions agribusiness would be promoted. But it is not clear how to meet these conditions and what the consequences would be where they are not met. It is a fact that current agroindustry is oriented towards exports and not just towards ensuring food safety and that its present development does not respect the regeneration capacity of ecosystems. There is a conceptual gap between the formulation of business production conditions that would be desirable and the current state of affairs of this sector's development. It is necessary to coordinate policies to progress in that direction⁷³.

There are still major legal contradictions between conservation objectives and current agricultural policies. The Law of Mother Earth prohibits (Title 3, 25.4) “in an absolute manner, the conversion of forest land-use to other uses in life zones with forest suitability, except when it is related to projects of national interest and public use”. Nevertheless, one of the main objectives of Law No. 337, approved some time later, is the legalization of illegal clearing before 2012. The law has been openly promoted to facilitate the

73 The current Agricultural Development Sector Plan “Rural and Agrarian Revolution”, introduced by the Ministry of Rural Development and Land (Ministerio de Desarrollo Rural y Tierras) for 2010–2020 clearly mentions the strategy to change the model for agricultural product exports. However, no strategy for the existing agro-industrial sector is mentioned.

expansion of the agricultural frontier. This type of contradiction in the legislation creates doubts regarding the effectiveness of the new policies.

The first part of this section indicated that better control by the State of the compliance with forest legislation could be a key strategy to reduce deforestation and degradation. In this sense, the most remarkable action by the current administration has probably been the creation of ABT, aimed at coordinating control of forest lands and agricultural lands in only one unit. When controlling logging—both for forest extraction and clearing of agricultural fields—ABT is probably the most important institution regarding direct mitigation of pressures on forests, although its work is still not as effective as desirable and its presence at the local level is still limited⁷⁴. In recent years, ABT has increased control of illegal timber, which has probably contributed to reduce illegal logging. There is some evidence that ABT control has started to have real effects on deforestation in specific cases. Nevertheless, the new Law No. 337 jeopardizes these achievements, wrongly allowing the legalization of illegal clearing in the past, although it also introduces the possibility of regularization and restoration of ecological reserves and the effectiveness of the sanctions to illegal clearing made since 2012 is uncertain. Besides, implementation of this law will probably exceed ABT's capacities to supervise illegal clearing. If applied consistently, this law could also serve as a new basis to revert lands to the state as a measure to penalize illegal clearing, but this cannot be anticipated.

As a priority measure to mitigate livestock expansion, this study identified the promotion of a better use of space for cattle production. Law No. 337 mentions the figure of 0.4 animals per hectare as the lowest limit for FES recognition in cattle farms outside Chaco. Even though this figure is quite far from a desirable stocking rate for good spatial efficiency, it can be considered a first step since this is the first time the stocking rate required for FES recognition has been quantified.

⁷⁴ In 2011, the local ABT team in Pando, responsible for controlling not only legal and illegal deforestation but also timber extraction, consisted of only 11 people for an area of 6 million ha. (ABT 2012). Besides, greater efficiency is still required in the judicial system for the prosecution of lawbreakers.

5.2.5 Mitigation of forest degradation

The Law of Mother Earth and the Joint Mechanism do not explicitly refer to forest degradation. When it is mentioned, it is associated with deforestation (“deforestation and forest degradation”). Nevertheless, the set of strategies and measures proposed to support sustainable forest-uses may have a positive effect on forest degradation reduction. In spite of this, more concrete measures should be proposed, such as those suggested below, mainly related to fire control and better incentives to promote sustainable forest management.

5.2.6 Consolidation of sustainable uses in areas of stable forests

Instead of compensating local forest-users for stopping interventions in their forests, the Joint Mechanism proposes incentives for sustainable management activities within the forest, differentiating themselves from other programs that are being executed in other countries like Mexico and Ecuador⁷⁵. This approach is being progressively considered an advantageous alternative to direct compensation (McGrath et al. 2010). This would prevent additionality problems (Angelsen and Rudel 2013), carbon leakage and wrong incentives (Karsenty et al. 2012).

At the global level, there is a large number of pilot REDD projects that are being questioned since they repeat or continue traditional activities of natural resource conservation and management with new financing, but with no clear effects in practice for not tackling the main drivers of deforestation or degradation (Karsenty et al. 2012). The same criticism also applies to the Joint Mechanism. While the proposed actions may not have an impact in the short term, policies on land tenure and use rights may be effective in the medium and long term, due to a reduction in lands available for conversion to agricultural-uses. Consolidation and extension of rights over land for users with a potential for sustainable forest-use, as well as the tendency to give priority to local communities in regularization (Urioste 2012), can reduce the potential for expansion of other agricultural-uses that tend to have a greater impact.

⁷⁵ For instance <http://sociobosque.ambiente.gob.ec/>.

Ideally, a “social shield” for forest protection could be created. However, it cannot be guaranteed that indigenous and peasant users do not opt for mechanized agricultural production or other intensive uses in the future, since the adoption of Integrated Forest and Land Management Plans (PGIBT) to define sustainable uses is a voluntary action according to the Joint Mechanism as it is. There is also a risk that Law No. 337 may create an incentive for community owners to informally lend the 20% of forest lands allowed to be converted to other intensive users—an already existing practice in Bolivia. The promotion of sustainable forest-uses is likely to have limited effects on deforestation in the short run, while there are no clear instruments to address disorganized expansion of the agricultural frontier. On the other hand, it also has potential to ensure local welfare and promote local capacities for collective action.

5.2.7 Land-use planning

One of the main challenges of the new policies is to progress towards the planning of land-uses and life zones, which is, at the same time, one of the priority support actions in the Joint Mechanism. Land-management based on local agents’ views is a key element in the Joint Mechanism, which has the potential to lead to proposals that are more adapted to the local conditions and are therefore more likely to be applied in practice. It is not clear yet how this new vision of land planning is going to be related to existing land-use plans (PLUSes and PMOTs), which did not succeed in becoming concrete instruments for land-management. It can easily be inferred that life zones do not refer only to land-uses but also take into account other environmental ecosystem functions. It is important to set the parameters to be considered in the definition of life zones, as well as their operation in practice.

In this new scheme, the development of PGIBTs is important. It is defined as a voluntary activity that would enable farm certification and access to the incentives to be implemented by the Joint Mechanism. The PGIBT instrument is centered around indigenous and peasant communities. It is not known yet when PGIBTs will be applied at levels of the municipality or specifically in agricultural frontier areas and whether they will gradually include cattle farms or agro-industrial

facilities, thus becoming a certification scheme for use in farms. A classification of live zones representing a national vision of land-use could provide the basis for better control of agricultural frontier expansion. So far, TPFs and PLUSes are still in force for clearing approval, although they are quite old, generic classifications.

5.2.8 Priority setting in geographic areas of intervention

The Joint Mechanism document proposes to start activities in the northern Amazon. However, prioritization does not seem to be based on a systematic analysis; neither does it explicitly mention the criteria of this selection. However, the possibility is now being analyzed for the first areas to be prioritized in Joint Mechanism actions to include not only the Amazon but also Chiquitania and probably Chaco⁷⁶. This priority setting seems justified but is still not very specific.

5.2.9 Funding

Bolivia’s rejection of carbon markets is driven by ethical positions and support to the construction of a new civilizing horizon based on the concept of Living Well and the respect for Mother Earth. This overall rejection of the marketization of nature also seems justified for practical reasons, as reflected in the current state of carbon markets. The price of carbon credits under CDM projects fell from 13 EUR in 2010 to less than 1 EUR in 2013 (www.pointcarbon.com). This state of affairs suggests that carbon markets will probably not constitute the most appropriate mechanism to provide financing for sustainable deforestation reduction. Even if prices were higher, they would not be stable or predictable. In this sense, it seems justifiable to explore alternative funding sources. The Joint Mechanism aims at generating “new, predictable, additional and time-sustained public financial resources” (page 20). The Green Climate Fund is mentioned as an important funding source (page 15). There is still no plan for an alternative, secure form of funding. One of the most important challenges for the Joint Mechanism is to have the government of Bolivia commit its own resources

⁷⁶ Personal communication from the team in charge of the design of the mechanism.

to the implementation of this mechanism in order to attract external funding. Supreme Decree No. 1696, which creates the Plurinational Fund of Mother Earth (*Fondo Plurinacional de la Madre Tierra*, FPMT), only allocates USD 2 million (Art. 19, II) for its operation, so this fund faces the challenge of generating additional funds for the mobilization of resources aimed at financing its actions.

Initially, international cooperation resources will be important for the launch of the Joint Mechanism. Currently, a Danish cooperation program to support the Amazon region is being developed; a process to implement a GEF project in northern La Paz (linked to the Amazon) is underway; the preparation of GEF projects to cover part the Amazon and Chaco is underway too. Finally, other international cooperation funds are expected to fund activities in the Chiquitania region.

During the discussion of this document with national experts in Bolivia there was strong consensus on the need to increase financial resources for ABT, since it plays a key role in deforestation control. Currently ABT depends mostly on international cooperation funds, which creates an instable situation.

5.3 Evaluation of the Bolivian proposal regarding the 3Es

5.3.1 Effectiveness

In order to fight forest destruction effectively in the short term, it is necessary to mitigate the expansion of the uses that cause most deforestation; that is, cattle ranching and agroindustry. This approach is not very visible in new policies. As is discussed below, certain effectiveness of increased control by ABT can be expected. But its financial situation needs to be improved. The coordination of actions that link the agrarian and forest agenda and their operational instruments can have positive effects as well. However, a clear and systematic approach per prioritized region is still needed to mitigate pressures on forests; this gap can make new policies less effective. Although the Joint Mechanism promotes the elaboration of regional strategies, it is not clear how detailed the actions in these strategies will be. The methodological framework of the Joint Mechanism has key objectives

regarding support to forest governance processes, including farm regularization, land planning and management, as well as the need for greater supervision and control. This set of actions could limit the amount of land that would be available for forest conversion in the future. The worrying fact is that there are other policies going in the opposite direction, particularly Law No. 337.

5.3.2 Efficiency

Carbon markets have emerged as instruments that have little efficiency to reduce greenhouse gas emissions. The Bolivian proposal rejects markets and so it could obtain more efficient funding, but it is uncertain whether the Plurinational Fund of Mother Earth (FPMT) will have the capacity to raise additional funds. What is clear is the persistence, in international negotiations, of methodological approaches related to markets due to developed countries' limited availability to allocate public resources to these initiatives. In the Bolivian proposal, it is unclear whether quantitative indices will be applied to assess the success of future measures. Although the concept of a better use of space with more efficient production is part of the proposal, the development of measures and instruments that favor the transition towards more productive and sustainable agriculture is still underway. A factor that currently reduces the efficiency of forest conservation policies is the lack of coordination between different administrative levels and institutions of the State and the presence of contradictory agendas. It is not clear whether the implementation of new policies will be efficient in terms of administration through the Plurinational Authority of Mother Earth. It remains to be seen whether efficient and more coordinated distribution of public responsibilities can be achieved.

5.3.3 Equity

In Bolivia's policy of deforestation mitigation as it is, the equity of potential measures and co-benefits seems to be a priority in comparison with effectiveness and efficiency. The processes of municipal indigenous autonomy and decentralization of the levels of the State may have positive effects in ensuring participation of local

Table 19. Evaluation of new policies for forests and climate change in Bolivia regarding the 3Es

	Effectiveness	Efficiency	Equity
Conceptual framework	(+) New policies are based on an integrated and sustainable vision of forests and theories of collective action, not only on emissions reduction (-) Not based on an analysis of drivers	(+/-) Planning processes land-use zones and development of sustainable production systems are contemplated, but they are not based on a clear considerations of opportunity costs	(+) Participation of local agents is a central element
Institutional coordination of policies	(+) Methodology of operation and intervention for all the country: deforestation and forest degradation (-) The cattle and soybean agents that cause most deforestation are not explicitly considered (but they could be included through the elaboration of territorial approaches)	(+) New institutions with an appropriate hierarchy to develop deforestation and degradation actions (-) The creation of the institutions under the Framework Law of Mother Earth is still lacking	(+) A lot of importance is given to indigenous people and smallholders
Monitoring, reporting and verification of results (MRV)	(+) There is an important capacity to monitor deforestation (-) The methodology to verify the quantitative results is not clear; Law No. 337 creates requirements that exceed existing capacities	(+/-) Monitoring at different scales and with local participation and state-of-the-art technology systems, but criteria and indices still need to be developed	(+) Emphasis is placed on the importance of the local level, e.g. for reporting
Mitigation of deforestation	(+) ABT is apparently intensifying control (-) There are no clear plans; there are contradictions, such as the recent possibility of legalizing illegal clearings in the past (Law No. 337)	(-) There are few concepts how to increase agricultural production without expanding the agricultural frontier	(+/-) Difficult to assess, since there are no clear policies
Mitigation of forest degradation	(+) Measures for sustainable forest-use are given priority (-) Not explicitly assessed	(+/-) There are no clear mechanisms to fight forest fires but they could be part of the sectoral territorial strategies	(+) Participation of local agents
Consolidation of sustainable uses in areas of stable forests	(+) The strategy gives priority to forest areas and livelihoods of Mother Earth	(+) Coordination of sector initiatives, instruments and positive and negative incentives and recovery of local experiences by joining initiatives	(+) Priority is given to local agents with potential for sustainable use
Land-use planning	(+) A new concept of livelihoods based on local views is introduced (-) The future vision of land-use is unclear; there are serious intentions to expand the agricultural frontier	(-) It is unclear whether and how the proposed land-management is based on existing instruments like PMOTs	(+) Based on local agents' views
Priority setting in geographic areas of intervention	(+) The Joint Mechanism is expected to give priority to the most threatened areas by hierarchy: the northern Amazon, Chiquitania and Chaco to support sustainable uses	(-) Prioritization is not based on an analysis of quantitative baseline data	(+) Priority is given to activities to support indigenous people and smallholders
Funding	(-) There is still no stable funding; in particular, ABT would require more funds for good control	(+) The instability of carbon markets is avoided. (-) It is unclear how funding is related to quantitative success evaluations	(+) Priority is given to activities to support indigenous people and smallholders

agents and decision making in terms of forest management and land-use. Compared with many other countries, major successful efforts have been made in Bolivia to recognize the collective rights of indigenous communities and peoples over lands with forests, giving them greater control over forest resources and an opportunity to obtain better benefits from their lands and forests. However, these rights still need consolidating and a significant number of rural people do not have clear legal rights over forest resources (due to absent or overlapping titles).

Global discussions on REDD show strong concerns over the risk that private agents may

occupy the lands of peasants and indigenous people to sell carbon credits⁷⁷. Even though this risk is highly relevant at the global level, it seems less severe in Bolivia, because no large private projects are allowed where private agents can control lands. This suggests that new policies can advance towards a more equitable implementation approach. Rather, there seems to be some risk that the approach in terms of equity and local indigenous and peasant agents may distract attention from the main drivers of deforestation and prevent the necessary steps from being taken to address these drivers effectively.

⁷⁷ See for instance: <http://www.actforclimatejustice.org/2011/02/rejecting-redd/>.

6 Conclusions

This paper aims to discuss the dynamics of deforestation and forest degradation, the origin of which is in long-term structural trends in the history of lowland occupation and to analyze them in relation to recent political history, including the context of climate change policies developed by the Bolivian Government. The case of Bolivia arouses great interest because of the government's position in the international debate, contrary to market approaches for promoting carbon sequestration in forests to mitigate climate change, known as REDD+ (Reducing Emissions from Deforestation and Forest Degradation) in international negotiation processes. The Bolivian position on climate change is not without contradictions and has evolved in the context of internal political tensions. This is evident in Bolivia's alternative proposal to REDD, internationally known as Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth, which is gradually being translated into domestic politics. This paper introduces elements to better understand the tensions between the discourse, policies and situation of deforestation and forest degradation, focusing on Bolivia's lowlands.

The state of forests and deforestation

Bolivia is rich in forests, in terms not only of the area of around 50 million ha, but also of the significant diversity of forest formations and land-use types. Many of these are public forests that have been classified as protected areas and a smaller part is being used by companies for timber exploitation. Another important part is under the control of indigenous groups, usually in collective ownership systems. Currently, more forests are in individual properties ranging from small plots of land in settlement areas to large crop or livestock farms. The situation of forest and land tenure is still not very clear since the land-ownership

regularization process has not yet been completed across the country.

The main interest of this paper is in the lowlands, where Bolivia's largest forest area is concentrated. Forests in the highlands have been under great pressure and are now often degraded or deforested. In the lowlands, there has been strong pressure on forests for five decades, which has increased over time despite all the efforts to promote a more orderly expansion of the agricultural frontier and more sustainable forest management practices. However, it is important to note that despite the exponential growth of deforestation in the 1980s, it has been relatively stable in the last 10 years, albeit with some fluctuations, keeping an average of 200,000 ha per year. This suggests that the forest area that is lost every year is still very significant—Bolivia is among the countries with the highest absolute forest loss worldwide. The lack of consistent annual information on forest loss is a limiting factor in this discussion.

Drivers of deforestation and forest degradation

There are three main proximate drivers of deforestation in the lowlands of Bolivia: the expansion of cattle ranching, medium- and large-scale mechanized agriculture and small-scale agriculture. Although mechanized agriculture has traditionally been the main cause of deforestation, especially associated with soybean expansion in the Department of Santa Cruz, it has now been replaced by cattle ranching for the last decade, mostly due to livestock expansion in the region of Chiquitania, also in Santa Cruz. Based on average figures for 2000–2010, cattle ranching is responsible for 50% of total deforestation in the lowlands, followed by mechanized agriculture with 30% and by the expansion of small-scale agriculture in settlement areas mainly in Chapare,

northern La Paz and northern Santa Cruz with the remaining 20%. Mining, which tends to be a direct driver of deforestation in other contexts, does not play a significant role in Bolivia; however, it is on the rise.

Forest degradation is mostly associated with forest fires, logging, firewood extraction and browsing. As mentioned before, degradation processes have been quite severe in Andean dry forests compared to the lowlands. Unfortunately, there is no quantification of forest degradation in Bolivia, so no sound statements can be made about this.

There are numerous underlying drivers of deforestation and forest degradation and their effects on forests are complex. There are political, institutional, economic and demographic factors, among others. These drivers interact in different ways in the process of economic development, with different implications for forests. Since the 1950s, different governments have stimulated agricultural production in the lowlands to improve domestic food supply, partly due to the reduction of production in the highlands. This encouragement has resulted in the expansion of roads and has fostered medium- and large-sized land occupation, including foreigners' arrival and settlement expansion, mostly migrants from Andean origin, but also including the establishment of Japanese and Mennonite colonies in the past. This has led to the expansion of the agricultural frontier with variations in time, influenced by broader economic development and conservation policies. The most influential policies have been, on the one hand, policies of economic development, focusing on the promotion of mechanized agriculture and land occupation by settlers and on the other hand, conservation policies, especially with the establishment of forests as protected areas and policies on forestry. Exploring policy changes in detail is beyond the scope of this paper; they have been studied by others.

It is important to note that deforestation has remained relatively low until the mid-1980s, when the expansion of soybean and the entry of Bolivian agriculture into export markets were encouraged. In the mid-1990s, partly to mitigate negative effects of the economic policies on forests, some key actions were taken to improve land-management and promote sustainable forest management, in combination with a process of political decentralization and recognition of

the land and forest rights of indigenous peoples and local communities. These measures had multiple complex effects on forests, but failed to reduce pressures.

Today, there is still an important influence of international demand for oilseed products and also much influence of foreign capital on the expansion of mechanized agriculture and livestock and population growth is increasing the demand for agricultural products, especially beef and also for agricultural lands in settlement areas. In addition, investment continues in construction and road infrastructure improvement to integrate markets and connect people to services; this exerts indirect pressure on forests. This adds to institutional changes resulting from recent political transformations and reforms in land and forest administration, which has created uncertainty since State agencies tend to operate without coordinating their activities. In addition, political disputes between the central government and departmental governments, especially those of the opposition, have encouraged institutional fragmentation. The discourse of the central government encompasses views that have not been reconciled with the role of forests for development, conservation and climate change mitigation and adaptation.

The potential of forests in mitigating climate change

There are important options for reducing deforestation and forest degradation and promoting forest conservation in the perspective of reducing the contribution of forests to climate change in Bolivia. Control of cattle ranching expansion on forests, especially low-productivity ranching, is a priority action. Although expansion of mechanized agriculture contributes significantly to deforestation, this type of farming is concentrated in areas highly suitable for agricultural development and therefore, high opportunity costs would limit the chances of stopping expansion. Although small-scale agriculture contributes less to deforestation, productivity could be improved in areas with agricultural potential and forest conservation may be encouraged.

As regards cattle ranching, recent expansion suggests that it is a bigger threat to forests than mechanized agriculture. It is possible to prevent

massive illegal forest clearing for cattle ranching through stricter law enforcement. Further, low productivity could be increased with practices for management of pastures and herds that have been tested in other contexts, especially in Brazil. Examples include better use of rotational grazing, which helps increase stocking densities without expanding the area of pasture available, genetic improvement of livestock and the integration of agriculture and cattle ranching. Mitigating the expansion of cattle ranching could offer huge potential for reducing deforestation, but it should be accompanied by additional measures to protect stable forests and restore degraded and deforested areas with ecological functions. Only by combining these actions, improvements in livestock production in the short term can occur without triggering the clearing of more forests in the long run.

As for the expansion of mechanized agriculture, even though it occurs in areas more suitable for agriculture, there is still significant room to improve efficiency and productivity. We suggest the promotion of more intensive farming in areas where this type of agriculture has already been consolidated. However, just as in the previous case, this should be done in combination with measures prohibiting agricultural expansion to new lands, in order to reduce the expansion of the agricultural frontier at the expense of forests. Restrictive measures may include land-use zoning and measures to discourage production in less efficient areas, for example, by increasing the legal costs of clearing in the most vulnerable forests (through patents and taxes). This requires a public institutional system with the ability to monitor compliance with land-use regulations and, above all, to enforce sanctions on violators.

Small-scale agriculture tends to contribute less to deforestation at the national level. Despite low yields, it is difficult to increase production efficiency due to the absence of a system of technical assistance and rural extension in the country and due to the large number of small farmers who need these services. Nevertheless, it is important to apply more rigorous restrictions in some areas where this type of agriculture is expanding on vulnerable forests, such as El Chore forest reserve and other conservation areas and indigenous lands. In addition, priority may be given to the strengthening of small-scale production and to the work of organizations

supporting production and marketing in selected areas with a greater potential to keep stable forest areas.

It is worth highlighting that the approach to encouraging production improvements while promoting forest conservation is not new in Bolivia and several of the suggested solutions have been tested in the past. However, there are important political and economic forces that operate in the opposite direction, resulting in permanent expansion of the agricultural frontier and slow forest reduction in the country.

It is difficult to prioritize measures to address mitigation associated with forest degradation due to the lack of empirical evidence about its magnitude. However, the fight against forest fires may be a priority in terms of effectiveness and efficiency in all the areas affected by forest degradation.

Finally, different policy tools should be used in different situations of agricultural frontier advance or forest transition. This means developing more intensive, cost-effective and sustainable production in already established agricultural areas, in combination with greater control of agricultural expansion. In areas with more primary forests that are less impacted, forest-based activities should be promoted to improve income from forest and conservation. In these last areas, it is also advisable to take actions to prevent forest conversion in the future, such as strengthening and expanding sustainable use rights for indigenous groups, collective properties allowing for extractive uses and ratifying rights for forest and non-timber concessions, as well as conserving forests in protected areas more effectively. It is very important to stabilize these forests today and to not wait until pressure increases and it becomes more difficult and expensive to implement mitigation measures. In this context, compensation for preserving forest environmental services may be more advisable in areas where deterioration of forest environmental functions is already evident at the local level.

Bolivia's alternative proposal to REDD+

The Bolivian Government was one of the main drivers of the REDD proposal in its early stage through its participation in the FCPF and

UNREDD programs. This changed in 2006 when Evo Morales took office and Bolivia started to conceive and implement a new international climate change policy in the context of the UNFCCC, which was critical to REDD. The position of the government of Bolivia builds on a discourse advocating the rights of Mother Earth as well as climate justice, in opposition to carbon markets and the marketization of nature, arguing that capitalism is one of the structural drivers that has driven climate change and that the least developed countries have done little to contribute to global climate change; paradoxically, however, they would be the most vulnerable to its consequences. The Bolivian Government adopted the agreements made at the Peoples' Summit in Cochabamba, 2010, in opposition to REDD, as official policy. This led Bolivian representatives to object to the negotiation process at COP 16 in Cancún, 2010. This position changed in part and at COP 18, Doha, 2012, Bolivian representatives achieved recognition of the possibility of designing non-market mechanisms under the UNFCCC.

The Bolivian Ministry of Foreign Relations proposed gradual alignment of the Bolivian agenda on forests and climate change at the national and international level, reflected in the so-called "Joint Mitigation and Adaptation Mechanism for the Integrated and Sustainable Management of Forests and Mother Earth", supported by the adoption of Law No. 300, the Framework Law for Mother Earth and Integrated Development to Live Well in October 2012 and the creation of the Plurinational Authority of Mother Earth (APMT) under Supreme Decree 1696 in August 2013. Although this agenda has often been criticized for being discourse more than reality and for not implying concrete actions to halt deforestation and forest degradation and support forest conservation, it has been built gradually to become a more concrete process under the leadership of APMT.

In 2012, the government of Bolivia reached an agreement with UNREDD to use the funds approved by this program for the implementation of the Joint Mechanism, including the support of international cooperation agencies. Since this mechanism is still being designed and APMT has only recently been created, it is quite difficult to judge its effectiveness in achieving its goals. There are several internal and external conditions that need to be addressed to implement this type of initiative. Internally, the natural resource

management policy in the context of climate policy is not supported by other sectoral policies, including transport and agriculture.

Assessment of the Bolivian proposal alternative to REDD

Compared with conventional REDD concepts at the international level, the Bolivian proposal can avoid many of the risks associated with the potential implementation of REDD. In the Bolivian proposal, funding is not based on carbon markets, which reduces the risk associated with the volatility of these markets. It also reduces the risk of abuse of local people's rights, since the Bolivian proposal promotes, at least in writing, a high level of participation and respects the sovereignty of indigenous peoples and other traditional forest-based groups. Furthermore, it is based on a vision of a sustainable life with forests, which goes far beyond simple compensation of opportunity costs and is an important condition for sustainable development in the long term. The proposal of the Joint Mechanism to support sustainable natural resources management through a fund can help move towards more integrated landscape management through more holistic approaches, which are increasingly necessary and are being given greater attention in the current development and conservation agenda.

However, our analysis of potential priority measures for forest conservation suggests that there are still several challenges that need to be addressed in implementing the Bolivian proposal in practice, through the adoption and harmonization of specific public policy instruments. In theory, the proposal includes coordination between the agriculture and forestry agendas in the country and emphasizes the importance of promoting sustainable agricultural-use leading to forest conservation. In practice, however, there is a need to identify the critical roadmap to achieving these goals. The Joint Mechanism suggests building the roadmap only from participatory platforms in the territories. Every time the Joint Mechanism will allocate funds from the central, departmental and municipal governments, specific territorial plans, programs and/or projects will need to be developed in a participatory territorial planning process. This is a greater challenge given the frequent institutional and political disputes.

If successful, more specific operational proposals adapted to different regional and local conditions may achieve the proposed objectives. It remains to be seen, however, whether these strategies will include different responses for different situations of pressure and forest conservation and how effective they will be in the long term. In addition, it would be helpful for the Bolivian agenda to explicitly include targets to objectively assess the effectiveness of different initiatives. As suggested above, one of the main challenges in the Bolivian context is to align other sectoral policies, such as

road network policies and policies to promote agricultural frontier expansion, that come into contradiction with the proposal for forests and climate change. This is, however, a more complex task because the contradiction between agricultural and conservation policy is long standing in Bolivia's contemporary history—and not only in Bolivia—, which suggests the importance of adopting new approaches to land and forest management to find ways of promoting food security without affecting forest functions both for climate change adaptation and mitigation.

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Bolivia's forest resources are of global importance, its main forest areas are located in subtropical and tropical regions. There is severe deforestation going on in the lowlands at a rate of approximately 200,000 ha per year, whilst forest degradation mostly concerns montane forests. Cattle ranching is the most important direct driver of deforestation, followed by mechanized agriculture at medium- and large-scale level, mainly for the production of soy bean, and finally small-scale agriculture. Underlying causes of deforestation include, among others, the opening of the agricultural economy to international markets and the weakness of institutions in charge of controlling land use. From 2006 on, under the government of Evo Morales, Bolivia adopted an official position against the marketization of nature and in defense of the rights of mother earth. In consequence to its rejection of REDD, Bolivia developed an alternative proposal called "Joint Mechanism of Mitigation and Adaptation for Integrated and Sustainable Management of Forests and Mother Earth". This proposal was also promoted in international negotiations on climate change. It focuses on local experiences for a sustainable and integrated management of natural resources and fosters land use planning at different levels of governance. Our analysis suggests that there is still a lack of concrete approaches to mitigate the direct threats to forests; moreover, the control of illegal deforestation is still insufficient. We also note that in parallel to policies of nature conservation, there is a contradicting political agenda being implemented promoting the expansion of the agricultural frontier. Only the future will show if the vision of "Living Well in Harmony with Mother Earth" will really lead to effective measures to combat the loss and the degradation of the immense richness of Bolivian forest.



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