Challenges and opportunities of sustainable forest management through community forestry concessions in the Maya Biosphere Reserve, Petén, Guatemala

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Abstract: In Guatemala, the community and industrial forest concessions in the Maya Biosphere Reserve were created as an innovative way to manage natural resource goods and services in a sustainable way while promoting the stabilisation and well-being of local communities. This case study shares experiences from different periods, including the initiation of the process from 1992 to 1994, its expansion through 2001–2002, its evolution through the period 2011–2012, and reflections about future prospects. The concessionary model was created and institutionalised as a means of stopping the advance in the agricultural frontier while promoting economic and social development based on the sustainable management of natural resources. It provided an avenue for reconciling the preservationist and productive views of conservation in a region subject to social conflicts and migratory dynamics. Despite more than 20 years of the successful implementation of this model, achieving sustainability and guaranteeing the conservation of the forest resources remains a challenge. The different needs, objectives, and capacities of the various actors dependent on the forest in the Maya Biosphere Reserve are not always compatible; and the external factors such as corruption and pressure from illegal activities threaten the consolidation of concession governance structures. In addition, the focus on the use and management of forest resources alone (timber, non-timber) has minimised the importance of integrating the different agricultural subsystems (crops, livestock) and off-farm activities into the land-use planning strategies for sustainable development that complement conservation goals and guarantee food security in a poor region.

Keywords: Forest concessions, sustainable forest management, community forest enterprises, social participation, timber and non-timber forest products.

6.1 Introduction

The Selva Maya region is located in the northern part of the biogeographic and cultural bridge of Mesoamerica, linking two large continental masses. The region is of strategic political importance as well, providing opportunities for the integration and development of Mexico, Guatemala, and Belize. It is recognised as the point of origin for a variety of cultivated plants and is home to at least 7% of currently known species. The temperatures (24.4°C–26.1°C), mean annual precipitation (1214 mm–1568 mm) and elevations (97 masl–369 masl) are similar throughout the region. The forest cover is estimated to be 4.5 million ha.

This region is home to the Maya Biosphere Reserve (MBR), the largest protected area in Guatemala, which was created in 1990 by Congressional Legislative Decree 5-90 and is administered by the National Council of Protected Areas (CONAP, Spanish acronym). The objective of the MBR is to conserve biodiversity, maintain the ecological equilibri-

um of the area, conserve its cultural heritage, provide development alternatives that reconcile the need to use and conserve those resources, and promote the active participation of society (CONAP 2005).

The MBR covers more than 21 000 km^2 divided into the following areas: 1) a core zone (national parks and protected biotopes, or wildlife preserves, 36%), 2) a multiple-use zone (40%), and 3) a buffer zone (24%). The guidelines for each of these zones are detailed in the master plan for the MRB (CONAP 2005). The multiple-use zone (MUZ) was designed to allow different productive activities based on sustainable use according to the potential of available resources and it adheres to the reserve's conservation objectives. To meet these objectives, between 1994 and 2002, 14 forestry concessions were granted in the MUZ to 12 organised communities and two industrial enterprises. The formal agreements between the government and the concessionaires are effective for a minimum of 25 years, with an option for renewal. To date, three concessions have been cancelled due to contractual non-compliance and one was suspended but subsequently reinstated. Eleven concessions are active at this time.

Petén, the department with the largest territorial extension of the country (32.9%), is not exempt from the social conditions that affect the rest of Guatemala: poverty, illiteracy, malnutrition, and low life-expectancy. Nevertheless, in 2011, the Human Development Index (HDI) was higher in the municipalities where the community forestry concessions are located – Flores (0.695), San Andrés (0.636), and Melchor de Mencos (0.649) – than at the national level (0.574). The region benefits from important economic activities, including archaeological and nature tourism; the extraction, production, and exportation of timber and oil; and the continual growth of services and infrastructure (FUNDESA 2011).

This case study seeks to systematise the process of creation and development of the community forestry concessions in the MBR of the Petén and the advances made in consolidation of the model for the sustainable management of natural resources on behalf of rural communities (in the case of concessions with resident communities) and urban families (in the case of non-resident concessions). Additionally, the retrospective analysis focuses on the challenges and the complexity of the strategies used to strengthen the concessionary model and the internal and external factors that make conservation and development compatible and challenging. Using a timeline of the events and processes, beginning from the early 1990s, this chapter considers some elements from the ecological, institutional, and socio-economic dimensions and concludes with challenges to be faced in the short term upon contract renewal. This case study focuses on the community forestry concessions rather than the industrial concessions. It is based on the review of documents and direct experience with projects and programs in the region.

6.2 The community-forest-concession process

The Petén has historically been used for the uncontrolled extraction of timber and non-timber forest resources. The raw material from the natural resources was sold to local and export businesses. In the case of timber, most of it was extracted by individuals and external businesses, providing only minimal benefits to the local communities. In the case of xate (*Chamaedorea elegans*; *Chamaedorea oblongata*, and *Chamaedorea erupens*), an ornamental plant exploited for export since the 1960s, the extraction carried out with neither management nor selection has led to depletion of the resource. For example, it was estimated that about 60% of all leaves collected from the forest were thrown away by the businesses that purchased them due to non-compliance with market requirements (quality and size) (Ceballos 1994). As populations increased in the region, particularly after the 1980s, there was more pressure on the resource base. As a result, between 2003 and 2008 CONAP[1] generated several guidelines and studies on xate management; but it was not until 2010 that it established formal regulatory guidelines which has led to more ecologically sustainable harvesting practices, while increasing the time and effort required to harvest marketable leaves.

The conceptualisation, design, and implementation of forestry concessions in the MBR began in 1992. This initiative, which promoted participation of the rural population in the management of natural resources, was considered a necessary condition to ensure forest conservation in and around the MBR. The concessionary mechanism was a means of facilitating integrated development, improving livelihoods, and conserving important ecosystems in this vast region. In the case of the community concessions, some specific motivations included 1) the need

[1] Manzanero and Madrid (2010) refer to several manuals, guidelines and norms used for monitoring and evaluating xate, including "Policy framework for the Management of NTFPs"(2004), "Norms for the management, protection, transportation and marketing of commercial species of *Chamaedorea* in Guatemala" (2008), "Technical tools for the elaboration of xate inventories and management plans in natural forests for extensions greater than 1000 ha" (2003), "Methodology for the elaboration of management plans for xate" (2003); "Guidelines for the elaboration of annual operating plans" (2005), among others.

Table II 6.1 Community concessions in the multiple use zone of the Maya Biosphere Reserve.

No	Concession-aires	Year created	Responsible Organisation	Type of organisation	Area (ha)	Members (family bene-ficiaries)	Contract status
With population/communities living within concession area (according to Radachowsky 2013)							
1	San Miguel La Palotada	1994	Asociación de Productores de San Miguel La Palotada (APROSAM)	Non-profit	7039	35	Suspended in 2009
2	Carmelita	1997	Cooperativa Carmelita, R. L.	Non-profit	53797	144	Active
3	La Pasadita	1997	Asociación de Productores Agroforestales La Pasadita (APROLAPA)	Non-profit	18817	137	Suspended in 2009
4	Uaxactún	2000	Sociedad Civil Organización Manejo y Conser-vación (OMYC)	For-profit	83558	279	Active
5	Cruce a La Colorada	2001	Asociación Forestal Integral Cruce a La Colo-rada (AFICC)	Non-profit	20469	69	Active
6	La Colorada	2001	Asociación Inte-gral La Colorada (AFILC)	Non-profit	22067	42	Suspended and evicted in 2009
Without population/communities living within concession areas (according to Radachowsky 2013)							
7	San Andrés	2000	Asociación Forestal Integral San Andrés Petén (AFISAP)	Non-profit	51939	171	Active
8	Río Chanchich	1998	Sociedad Civil Impulsores Suchitecos	For-profit	12217	25	Active
9	Chosquitán	2000	Sociedad Civil Laborantes del Bosque (LABORANTES)	Non-profit	19390	78	Active
10	Las Ventanas	2001	Sociedad Civil Árbol Verde	Non-profit	64793	336	Active
11	La Unión	2002	Sociedad Civil Custodios de la Selva (CUSTOSEL)	For-profit	21176	86	Active
12	Yaloch	2002	Sociedad Civil El Esfuerzo	For-profit	25386	40	Active

to stabilise the agricultural frontier that had been strongly affected by the armed conflict, resulting in disorganised migratory influxes by refugees and displaced peasants from within Guatemala and from Mexico and 2) the need to stop speculation in land, cultural, forest, and natural resources located within the biosphere reserve (Imbach and Galvez 1999).

Since Guatemalan law already included a legal mechanism for concessions, the concept was adapted to apply to a community forestry concession in the

context of a biosphere reserve. This new form of governing natural resource management – linking government and society – is based, in general terms, on the Government Contracting Law (Decree 57-92), the Executive Branch Organic Law (Decree 114-97), and more specifically, Article 19 of the Protected Areas Law Decree 4-89, and its regulations and specific standards (CONAP 2005). When the peace agreements were signed between the government of Guatemala and the Guatemalan National Revolutionary Unit on December 29, 1996, the community concessions were already functioning. Nevertheless, the concept was incorporated into two of the 12 chapters of this historic agreement ("Situation of Agrarian and Rural Development" and "Use of Natural Resources") stipulating that legally organised small- and medium-size groups of peasants could receive concessions to manage natural resources within the multiple-use areas to meet sustainable forest management objectives (Naciones Unidas 1996).

The process of community forestry concessions in the MBR was strongly supported from the beginning by internationally funded initiatives (Swedish, Danish, and Norwegian Cooperation, the United States, and others). These organisations worked with national and local institutions to provide the necessary institutional support, technical tools, standards, economic resources, and awareness that contributed to the viability of the process. As a result, CONAP granted the first legal community forestry concession, covering an area of 7039 ha, in April 1994 to the community of San Miguel La Palotada, located in the municipality of San Andrés, Petén.[2] The initial success of this first experience, in which a population or community resided within the boundaries of its concession, created demand from other communities and industries in successive years, until 532 951 ha had been granted through concessions in the MBR. Of that total area, 75% (440 648 ha) were granted to communities; 64% of the community concessions are registered as non-profit while 36% are registered as for-profit concessions (Table II 6.1). The industrial concessions[3], established in 1999, represent 25% (132 303 ha) of the total land area under concession in the MBR and are registered with the government as for-profit organisations.

The timeline for the concessionary process is shown in Table II 6.2, with the following highlights:

- **The startup phase (1992–1997)**: Initially, the establishment of the MBR was considered by the local populations/users as a threat in that it would limit their access to land, which was important for goods and services (food security, and timber, non-timber, and other natural resources) and as a symbol of wealth and economic power. Also, at the outset, many government officials and international environmental non-governmental organisations (NGOs) opposed local populations' access to the MBR because their actions were perceived as a threat to the preservation of the forests/natural resources. These perspectives caused rivalries among the different social and political stakeholders in the region. Initially, the community concessions were designed to include strategies for sustainable development, such as improving infrastructure (water, electricity, schools, roads), agricultural techniques (increased production, income diversification), and forest management (timber and non-timber forest products). The forestry concession model, first implemented with the recently formed resident communities of San Miguel and La Pasadita, allowed the local population access to the natural resources and the means to sustainably manage them. It also provided necessary institutional arrangements and linkages and the formation of human capital in the technical management of timber and non-timber forest resources (Imbach and Gálvez 1999).
- **The second phase (1998–2010):** During this period, nine of the 14 concessions were approved, and ACOFOP (Association of Forestry Communities of Petén) and FORESCOM (community enterprise providing community forest services) were formed. Substantial advances were made in conservation and protection of forest cover, revitalisation of local and regional economies through the injection of financial resources, generation of employment, and creation of social awareness that has promoted changes in the management and conservation of forests (Radachowsky et al. 2013). It is highly probable that, given the institutional weakness of the government and its inability to stop the type of activities that encroach on national parks, had the concessions not been granted in the MUZ, the forested area in the MBR would have been invaded and deforested by different pressure groups (INAB et al. 2012). In this period, concessions were characterised by their focus on the technical aspects of forest management (timber and non-timber activities).

  During this second phase, three communities had their concessionary rights revoked (San Miguel, La Pasadita, and La Colorada), and one communi-

[2] The preparation phase, including the legal framework, and technical and development assistance was strongly accompanied by the Conservation for Sustainable Development in Central America project (known as the CATIE-Olafo project), financed by the Swedish, Danish, and Norwegian governments.

[3] Two industrial private concessions were established in 1999: Baren Comercial, Ltda manages La Gloria concession with 66 548 ha, and GIBOR, S.A. manages the Paxbán concession with 65 755 ha.

ty was suspended but then subsequently reinstated (El Cruce a La Colorada). These failed concessions all involved recent immigrant populations living within the concession area that did not have a strong forestry culture and they were subject to a high level of internal conflict. They violated their contracts with the government for various reasons: non-compliance with contractual obligations for allowable cuts, and certification regulations. They were also similar in poor financial management and a lack of transparency in their internal decisions, a high level of land invasions/deforestation, the presence of cattle ranching linked to drug trafficking, and a significant amount of registered environmental crimes (Radachowsky et al. 2013).

- **The third phase (2012–2025/27):** This period corresponds to the preparation phase for renegotiating the concessions nearing their contractual end. In addition to strengthening business management skills, attention should be focused on developing and refining the monitoring systems that would permit the concessions to demonstrate benefits that make the concessionary process viable in the long term for their members as well as for Guatemalan society as a whole. In particular, there is a need to design and implement tools that demonstrate the support and impact of forest management on the livelihoods of the beneficiary groups, its contribution to poverty alleviation in the region, and its effect on environmental sustainability. The tools and their results would provide the evidence of concession costs and benefits in the renegotiation process so that usufructuary rights, time periods, and legal structures for the concessions are adjusted and extended appropriately.

6.3 Results from implementing community forest concessions

This section summarises some of the main elements of the situation and challenges facing the implementation of community forest concessions based on the information available according to biophysical, institutional, and socio-economic dimensions.

6.3.1 Biophysical aspects

Using indicator species analysis developed by Dufrene and Legendre in 1997, Segura noted that for the MUZ there are actually three types of forests, which were grouped together based on an indicator-species focus and associated with specific community forest enterprises (Table II 6.3) (Segura 2012). This characterisation showed a diversity of species made up of 42 botanical families, 103 genera, and 147 species, which indicates a forest with great diversity and richness. Despite this diversity, only five of the timber species are harvested for commercial purposes given current market conditions: mahogany (*Swietenia macrophylla*), cedar (*Cedrela odorata*), santa maría (*Calophyllum brasiliense*), manchiche (*Lonchocarpus castilloi*), and pucté (*Bucida buceras*) (Segura 2012).

The predominant non-timber forest product gathered for exportation is xate, and its management has been improving due to two factors 1) CONAP defined institutional norms/management guidelines that include permits for harvest, transport, and export of xate and regular follow-up through field visits, and 2) buyers/exporters have started to pay for the leaves based on quality rather than quantity, causing a change in the extraction process (Radachowsky et al. 2013). While these factors have contributed to minimising the depletion and improving the resilience of the resource base in the forest, more stringent regulatory procedures and the different pricing structure have meant that those who harvest xate spend more time and effort gathering the leaves.

With respect to deforestation and degradation in the Petén region, a comparative study by the National Forest Institute (INAB, Spanish acronym) study on forest cover shows that during the period 2006–2010, the department of Petén lost 176 826 ha of forest, while 52 216 ha were recovered during that same period. This rate of change for this period reflects a slight decline in deforestation rates since 1991. The net loss of 124 611 ha of forest (an annual rate of 2.08% for the period) was concentrated in the western (in and around Laguna del Tigre National Park) and southern parts of Petén, particularly in Sayaxché, due to the expansion of agro-industrial crops and violence (INAB et al. 2012). In the MBR there is evidence that forest cover has consistently been the most stable in areas with formal land-use planning strategies including protected areas and concessions (Bray et al. 2008, INAB et al. 2012). While average annual net deforestation rates in the Petén between 2006 and 2010 were higher than 2% per year, they were 1.5% in protected areas (INAB et al. 2012); in the case of the 14 concessions, the average deforestation rate was only 0.45% annually between 2001 and 2009 (Radachowsky et al. 2013). The average deforestation rate in the weakest four concessions (San Miguel, La Pasadita, La Colorada, El Cruce a La Colorada) was 1.54% per year, versus only 0.0089% annually in the remaining 10 concessions (Radachowsky et al. 2013).

The area affected by fire is lower in the Petén than it is at the national level (INAB et al. 2012) and the rate of fire in the concession areas is significantly lower than in the Petén as a whole. According to the

Table II 6.2 Timeline of Maya Biosphere Reserve, multiple-use zone, and concession processes: Phases, milestones, dates, and processes/results.

Phases	Milestones	Dates	Processes/results
Phase I	CONAP created as part of Protected Areas Law (Decree 4-89)	1989	Significant migratory pressure from within and outside of the Petén
	Maya Biosphere Reserve in Petén created (Decree 5-90)	1990	Delimitation of the protected area nucleus and the multiple-use zone
	First master plan of MBR approved	1991	Social conflicts due to land invasions; conflicts between resident communities and CONAP
	International cooperation initiatives supporting land-use planning processes and the implementation of the master plan for the MBR	1992	Olafo project accompanying process of finding a long-term model to improve local production systems and guarantee protection of natural resources: 1) strengthening community organisation; 2) responding to communities' pressing basic needs − water, education, roads; 3) proposing sustainable management practices for natural resources; 4) improving production systems
	Forestry Advisory Council created	1993	Negotiation and consensus among different actors: government, communities, and international and national NGOs; conflicts between preservationist and sustainable development factions Design and approval of forest management policies, standards, and technical manuals Technical assistance and research
	San Miguel La Palotada concession approved		First community forest harvest with strong presence/orientation from international donors (Sweden, Norway, Denmark, United States)
		1994	CATIE/CONAP project begun with USAID/MAYAREMA funds
	Association for Community Forestry in Petén (ACOFOP) created (initially called CONCOFOP)	1995	Additional migratory pressure due to returning refugees (migration rate about 10%, or 55 people/day, according to FLACSO as cited in Imbach and Gálvez 1999)
	Peace Agreements signed	1996	The peace agreement signed on May 6, 1996, by the Peace Commission of the Guatemalan government and Guatemala National Revolutionary Unit, containing a subchapter on socio-economic aspects and the agrarian situation that recognises the importance of granting legally organised small- and medium- scale peasants natural resource management of 100 000 ha for sustainable forest management within multiple-use areas in Guatemala
	Carmelita and La Pasadita Concessions approved	1997	Forestry inventories, payment of fees, and compliance guarantees for new concessions

Table II 6.2 Continued.

Phases	Milestones	Dates	Processes/results
Phase II	First harvest and commercialization of timber (La Pasadita)	1998	Implementation of measures by La Pasadita community organization to control concession boundaries due to illegal timber extraction and cattle ranchers' staking claims within the boundaries CONAP made the decision to modify the regulations for granting concessions: streamlining processes for delineation, evaluation of available goods, tender and award processes for the concessions. This change in regulation paved the way for the approval of only a few concessions to the current scale.
	Industrial forest concessions approved	1999	Operations begun at La Gloria and Paxbán concessions
	Chosquitán and Uaxactún Concessions approved	2000	
	Master management plan of the MBR approved		Policy framework for integrated management of natural resources in Petén protected areas defined for the period 2000–2005
	Certification process initiated: compliance with international Forest Stewardship Council (FSC) standards through Smartwood		As part of the contract, all forestry concessions to work towards certification (three- year grace period)
	Las Ventanas, Cruce a la Colorada, La Colorada Concessions approved	2001	
	Land invasions/illegal sale of government land in concessions	2001–2010	Throughout this period, waves of illegal appropriation of land in protected area by large cattle ranchers
	Points of control established/strengthened by the government		CONAP, DIPRONA (Dirección de Protección de la Naturaleza), and the army with formal control points in San Miguel, Uaxactún, and La Colorada to prevent the entrance of cattle or illegal transit of timber/non-timber products from the reserve
	La Unión, and Yaloch Concessions approved	2002	
	FORESCOM (Empresa Forestal Comunitaria de Servicios del Bosque, S.A.) created to provide technical and business services	2003	Primary and secondary processing/commercialisation and exportation of products (collective/individual concession levels); Group FSC Certification provided through Smartwood
	San Miguel, La Pasadita contracts suspended; La Colorada contract suspended and community evicted	2009	More than 1000 ha of forest area illegally cleared in La Colorada
	Cruce a la Colorada put on notice	2010	In response to the threat of suspension, Cruce a La Colorada meeting conditions, continues to function
		2012	Beginning of discussions related to upcoming concession contract renewals
Phase III	First cycle of concessions finalised	2019–2027	Creation and strengthening of negotiation tools for concession agreements between communities and the Guatemalan government

Table II 6.3 Forest types that make up natural subsystem in the multiple-use zone of the Maya Biosphere Reserve.

Forest type	Characteristics	Community forestry foncessions*
Forest 1: *Aspidosperma megalocarpon*, *Pouteria*, *and Brosimum alicastrum*	43 indicator species, including *Callophyllum brasiliense* and dominance of Zapotaceae and Moraceae families	Yaloch Las Ventanas La Unión Chosquitán Río Chanchich Uaxactún
Forest 2: Forest made up of *Manilkara zapota*, *Metopium brownei*, and *Vitex gaumeri*	31 indicator species; mahogany one of the indicator species in this forest	La Gloria San Andrés (AFISAP) Paxbán
Forest 3: *Alseis yucatanensis*, *Ampelocera hottlei*, and *Spondias mombin*	70 indicator species: *Cedrela odorata* an indicator of this type of forest; *Brosimum alicastrum* (Importance Value Index =10.3%) dominant	La Colorada San Miguel Cruce a la Colorada.

* La Pasadita could not be categorised into one particular type of forest but rather showed evidence of being a transition between forest types 1 and 3 for the 54 plots analysed. In addition, La Carmelita was not categorised due to limitations in the type and quality of the information available (Segura 2012).

Petén Commission for Forest Fires in 2006, 95% of forest fires in Petén are caused by agricultural burns or are intentionally set. The other 5% represent fires provoked by hunting, campfires, and other causes (CATIE/BID 2010). In addition, challenges to the ecological integrity of the MBR include potential threats from other economic activities such as oil and mineral exploration and exploitation and the construction of roads and infrastructure developed in the Selva Maya region. Despite these threats, the evidence indicates that the diversified forest management by and for local communities will continue to be as effective as protected areas in preventing deforestation and degradation, or even more effective (Bray et al. 2008, Nelson and Chomitz 2011).

6.3.2 Institutional aspects

CONAP was established to play a crucial role in the management of natural resources and biodiversity in the country and, in particular, in the Guatemalan System of Protected Areas (SIGAP acronym in Spanish) through the definition and implementation of policies and standards that restrict and regulate the actions of different stakeholders linked with forestry concessions.

CONAP has many strengths that allow it to comply with its mandate, including providing opportunities for financing, cooperative agreements, alliances with civil society, technical committees, coordination/working groups, and training programs. The policy framework, standards, and guidelines[4] required to ensure sustainable forest management in the MBR have been in place and applied since the community concession process began in 1994.

For example, the terms of the agreements/contracts signed by the concessionaires and the government (CONAP) provide the guidelines and create a relatively stable environment for effective short- and medium-term planning. Each forestry concession is governed by the standards of sustainable forest management made up of a general management plan, five-year plans, annual operating plans, business plans, community development plans, and investments plans, and is sustained by a broad legal framework that covers different levels of management for

[4] National policy and strategies for the development of the Guatemalan System of Protected Areas System, Guatemalan Forest Policy, political framework for concessions for the integrated management of natural resources in protected areas of the Petén, political framework for non-timber forest products; Policy for Co-administration of Protected Areas; National Strategy for Biodiversity (ENB, Spanish acronym), the Forestry Administration Manual for Protected Areas, norms for granting concessions for harvesting and managing of renewable natural resources in the MBR, Strategic Institutional Plan for CONAP 1999–2010, master plans for protected areas.

the country's natural resources.[5] In addition, the regulatory framework requires that concessions establish and maintain permanent sample plots (PSPs), which permit the generation of information useful for management decisions about economic profitability and ecological sustainability and allow the government (CONAP in this case) to monitor the forest dynamics locally and at the regional level.[6]

Despite this strong policy and regulatory framework, CONAP remains administratively weak[7] and faces political, legal, economic, and social threats, as described by the current administration in its 2013 Operation Plan (CONAP 2012).[8] Its credibility with respect to management of the Guatemalan System of Protected Areas and for the mitigation of social pressure on natural forests is frequently questioned because of its lack of response to anthropogenic and natural threats. As a result, there are concession areas in the MBR that are vulnerable to drug trafficking, deforestation, and speculation to do with renewal and non-renewable natural resources.

One means of confronting these challenges is through the strengthening of what Carrera and Prins (2002) refer to as the "new rural institutionalism." This refers to horizontal relationships of cooperation created among the concessionary organisations, including the Community Development Councils (COCODES, Spanish acronym), the Municipal Councils for Development (COMUDES, Spanish acronym), and other stakeholders from the Guatemalan and regional forestry sector, such as CONAP, the National Forestry Institute (INAB), local and international NGOs, as well as buyers of forest products and providers of services. The primary organisation that brings together and represents the interests of the community concessions is the Association of Forestry Communities of Petén (ACOFOP), created in 1997. This organisation plays the role of liaison between the concessions and external cooperation agencies and the certification groups, for timber as well as non-timber forest products (NTFPs). In addition, ACOFOP works with government organisations for the definition of forest management strategies and integrated community development. It works as an agent to promote technical assistance and commercialisation of the community forestry concessions (Taylor 2012). These organisations make up a diverse network that allows concessionaires and other stakeholders to share information and opportunities and create awareness about the technical, administrative, and market standards/regulations, and mechanisms to troubleshoot threats due to internal and external factors.

The level of social empowerment is still very weak with respect to how the instrument of concessions contributes to long term conservation of Guatemala's collective national heritage. However, it is important to increase interest on behalf of the Peten citizens (and Guatemalans in general) on the quality of management practices of the natural resources, given that while the renewable resources are concessioned to a specific group over a period of time, the resource base belongs to the society as a whole.

Given the significant external threats to concessions, such as drug trafficking and corruption in the region, there should also be vertical integration linking to the central government, the Guatemala army, and the Department for the Protection of Nature

[5] Political constitution of the Republic of Guatemala, Protected Areas Law, and its reforms (Decrees 4-89, 18-89, and 110-96 of the Congress of the Republic); Regulations of the Protected Areas Laws, Government Agreement 759-90; Law for the Protection and Improvement of the Environment (Decree 68-86 of the Congress of the Republic); Law for the Creation of the Maya Biosphere Reserve (Decree 5-90 of the Congress of the Republic; General Hunting Law (Decree 36-2004); Government Purchasing and Contact Law (Decree 57-92 of the Congress of the Republic), its regulations and related laws; Forestry Law (Decree 101-96 of the Congress of the Republic) and its regulation; Law for the Harvesting and Commercialization of rubber and for the Protection of the Chicozapote Tree (Decree 99-96 of the Congress of the Republic); Law for the Protection of National Cultural Heritage (Decree 26-97).

[6] A more detailed review on the current state of the network of PSPs established in broadleaf natural forests indicated that there are a total of 227 PSPs in Guatemala, of which 88% were located within the MUZ/MBR. Nevertheless, most of the research experiments and their corresponding databases are controlled by the concessionaires, with only cursory supervision by the respective government institutions (INAB and CONAP). Review of the data reveals that the information from the PSPs is disorganised, that there are inaccuracies in the implementation of protocols, and errors in the identification of species; these factors limit the analysis of the experiments in the long term. As a result, the information needed for the effective orientation of sustainable forest management in the concessions is either unreliable or unavailable, both for the concessionaire and for CONAP (Marmillod 2012).

[7] Budgetary limitations have caused a reduction in multi-annual planning, high rotation of technical personnel, lack of equipment, communication services and transportation, poor infrastructure, a centralised administration, and a lack of decentralised processes, among others.

[8] Political vulnerability, gaps, and legal overlaps for effective management of natural resources, ungovernability of protected areas due to factors such as drug trafficking, illegal cattle ranching, risks in maintaining the sustainability of SIGAP in the face of accelerated population growth, pressures of extreme poverty around the protected areas, social conflict associated with agricultural invasions, political pressure to develop megaprojects, and change in land use, among others.

(DIPRONA/National Police), which would permit the administrators of justice to prosecute crimes against the environment. Strengthening linkages among the central governmental agencies would provide the institutional infrastructure necessary to more effectively implement the existing rule of law in and around the MUZ/MBR.

It is also important to note the role of agriculture within these forest concessions. For those community concessions with communities residing within their boundaries (San Miguel, La Pasadita, La Colorada, Cruce a La Colorada, Carmelita, and Uaxactún), there are areas dedicated mainly to agriculture for family consumption and cattle ranching activities. Nevertheless, historically, the attention the government has given to agriculture/livestock within concession areas has been marginal. Given its goal of improving food security, agricultural health, hydrobiology, and the sustainable use of renewable natural resources, the Ministry of Agriculture, Livestock and Food (Spanish acronym MAGA), should play a fundamental role in integrated attention to these management units. In particular, MAGA should be involved with communities through the agricultural component of the concessionary process, as outlined in the National Integrated Rural Development Policy (PNDRI 2009), by providing technical assistance and access to credit to ensure effective administrative, management, and diversified sustainable use of renewable resources.

6.3.3 Socio-economic aspects

While there is a lack of systematic, detailed, and trustworthy information on the impacts of the concessions on income and quality of life of the families associated with the concessions, as well as the indirect impacts of the concessions in the region, there are some case studies showing socio-economic impacts. Radachowsky noted that the resident community concessions with recent immigrants who depended on subsistence agriculture to survive (income sources dependent on cattle ranching, agriculture, and timber) had the lowest estimated mean economic level, while the resident community concessions with a history of using forest products (primary income sources included xate and timber) and the non-resident community concessions had medium estimated mean economic levels (primary income source was timber). In general, it has been shown that members have benefited from the creation of employment (including during seasons where there are few other economic opportunities available), increased their incomes as a result of the concessions (through dividends and wages), and have diversified their sources of income (from timber and NTFPs, services, agriculture) (Ammour and Reyes 2000, Stoian and Rojas 2006, Radachowsky et al. 2013).

The harvesting and sale of NTFPs continue to provide options for the generation of immediate monetary and non-monetary income for resident and non-resident families and complement the traditional production systems (agriculture, cattle ranching, extractive activities, off-farm activities mainly services). Other complementary activities include hunting wildlife for family consumption and for sport, the production of honey (*Aphis melifera*), the collection of palms for roof construction (guano, *Sabal* sp. Arecaceae), harvesting fibres for use in handicrafts, baskets, and furniture (in particular, *bayal*, *Desmoncus* sp., a climbing palm), gathering seeds or nuts (ramón, *Brosimum* sp., Moraceae), collection of at least three kinds of xate (*Chamaedorea* sp.), and the use of other materials for handicrafts. Other products are also sold, such as the loose pita fibre (*Aechmea magdalenae*), rubber (chicle, *Manilkara* sp.), and allspice (*Pimienta dioica*), but they are less important given the relative scarcity of the raw material and changes in the market conditions.

6.4 Community forest enterprises

It is stipulated by law that when the concessions are granted, the communities must create a legal entity responsible for management of the forestry concession. Community Forest Enterprises (CFEs) are made up of members who harvest timber and NTFPs through concessionary agreements; nevertheless, not all community members are part of the CFEs[9] (Larson et al. 2008). The CFEs are constituted under three organisational forms: cooperatives (governed by Decree 82-78 of the Congress of the Republic), civil associations, and civil societies. The civil societies are subject to the Civil Code (Decree 106 of the Congress of the Republic) and other tributary and labour laws; their objectives can be for profit or not for profit,[10] and the legal, administrative, accounting,

[9] Unable to determine the number of families/individuals participating in the respective CFEs versus the total population of the communities (data not available systematically over time).

[10] Non-profit entities are organisations that by law are exonerated from taxes but not free from complying with administrative or fiscal factors, which they must comply with in order to maintain their exemption in the corresponding registers; for example, associations, foundations, NGOs, churches, and cooperatives, among others. In general, they reinvest any profits from economic activities in meeting community needs or within the organisation. This is based on Article 15, number 3, of the Guatemalan Civil Code.

and financial standards are determined by the legal designation and the goals for which the enterprises were created.

The concessionary process was designed to emphasise and strengthen sustainable business and social administration over the medium term. As a result, the majority of concession associations have dedicated part of their budgets to community social investments, including roads, health centres, schools, community halls, and potable water (USAID/BIOFOR Project 2006). With respect to the business component, the CFE has the incentive to make long-term investments in the construction of infrastructure for primary processing, the purchase of field and basic industrial equipment, and training human resources. To meet the technical and marketing challenges the CFEs faced, they created a second-level organisation called the Community Enterprise for Forest Services, S.A. (FORESCOM); originally made up of 11 CFEs, FORESCOM was set up in 2003 to provide technical and business services to the concession community (Stoian and Rojas 2006).

Despite the significant advances made towards the sustainable management of the MBR forest resources over the past two decades, a recent report reviewing the administrative and accounting management practices of the community forest concessions in the MBR, Petén (Sterkel Mas et al. 2011), shows a series of weaknesses that affect administrative operations carried out by these businesses. For example, these include a poor ability to prioritise and plan for investments, inadequate organisational structure for business purposes, instability of trained personnel in key positions, and the absence or weakness of controls over the use of the available resources.

In part, such problems are due to the absence of basic administrative structures, the lack of long-term entrepreneurial vision among leaders and members, the low educational level of directors and support personnel, the lack of organisation, and procedural manuals that provide details about the functions of the participants in the directive bodies. Some examples of financial and accounting weaknesses include the limited use of accounting software programs and, up until 2011, the generally low compliance with the country's tributary laws (Table II 6.4), subjecting the concessionaires to fines on behalf of the superintendence of administration (SAT, Spanish acronym).

In addition, the rotation of the members of the boards of directors in management and administrative positions has affected leadership and organisational capacity. There are examples where changes in the participants in the board of directors were due to personal/group interests and they provided privileged access to resources. These factors have had negative impacts on the production, administration, and commercialisation processes and affect the transparency, confidence, and organisational development required to consolidate the business aspects of the concessions.

In addition to the internal weaknesses related to the administrative management of the CFEs mentioned in Table II 6.4, there are other factors that influence the success or failure of these nascent organisations. Ostrom (1990) and Taylor (2012) noted that communities are more likely to organise successfully when the members agree to some basic tenets: the benefits of cooperation are greater than the costs, adequate community participation is possible, there is systematic supervision, sanctions are implemented, efficient procedures for conflict resolution exist, and there is external recognition of the rights of the communities for the governance of their resources.

The three concessions that have failed to date were in the hands of resident communities living within the concession area (as defined by Radachowsky et al. 2013[11] – see Table II 6.2). They did not meet the above-mentioned criteria that Ostrom identified as necessary for success. The communities of San Miguel, La Pasadita, and La Colorada were made up of immigrants from different parts of the country (settled between 1985 and1990) who lived in extreme poverty, had very low educational levels, lacked organisational capacities at the community level, and had no previous experience living in/from the forest (Ammour and Reyes 1999). Their interest in participating in the concession process was to maintain access to the land for subsistence agriculture and cattle ranching rather than a specific interest in forest management. The low quality of the soils[12] and the lack of access to water made it difficult to promote technological crop improvements. In addition, the location of their forestry concessions was easily accessible to the routes between San Andrés and Carmelita, allowing outsiders to enter and illegally remove valuable timber. In addition, there were formidable external factors such as drug trafficking/cattle ranching, and weak backstopping from government organisations. As a result of the illegal sale of land, migration and drug trafficking, the social conflicts, deforestation for the establishment of cattle ranches, forest fires, wildlife trafficking, and administrative corruption, three of the concessions from

[11] Three types of actors have been involved in the concessionary process, as defined by Radachowsky et al. 2013): 1) Community forestry concessions with their population residing within the limits of the concessions, 2) Community forestry concessions without resident communities, and 3) private industrial concessions (Table II 6.2).

[12] Soils classified as laterites, from 20 cm to 40 cm maximum, equivalent, according to the USDA, FAO, and French classifications of soil types: Rendolls, Rendzinas, and Rendosols (Collinet 1997).

Table II 6.4 Administrative, financial, accounting and fiscal aspects of active community forest enterprises. Source: Sterkel Mas et al 2011.

Aspects evaluated	Community Forest Enterprises (CFEs)								
	AFISAP / San Andrés	AFICC / Cruce a La Colorada	Laborantes / Chosquitán	Árbol Verde / Las Ventanas	Cooperativa Carmelita	OMYC / Uaxactún	Suchitecos / Río Chanchich	Esfuerzo / Yaloch	Custosel / La Unión
Accounting									
Accounting records									
Organizational taxes									
Guatemalan Institute of Social Security									
Debt									
Employee taxes						N/A		N/A	
Transparency of administrative management									
Evaluation									

Criteria for evaluation:

- Excellent: complies with more than the standards stipulate
- Good: complies with the standards
- Average: the variation of compliance with the standards is minimal
- Deficient: non-compliance with the standards is problematic
- Unknown: unable to verify the information or information not provided
- N/A — Not applicable: the norm does not apply to the concessionary unit

Box II 6.1 Example of wood-product sales for the Integrated Forestry Association of San Andrés, Petén (AFISAP) in 2011

The Integrated Forestry Association of San Andrés, Petén (Spanish acronym AFISAP) is an example of a forest concession in the MUZ/MBR with a relatively stable wood-product value chain (Gómez 2012). The association benefits from a steady provision of primary material as laid out in its 25-year management plan, assuming that it has complied with its contractual requirements. In addition, it has installed its own machines for primary processing. As a result, the association controls the first link in the supply chain (primary production, transportation of forest products from the forest to the industry, and primary processing). AFISAP does not control the step of commercializing the wood to wholesalers.

Factors considered critical to success have been overcome: AFISAP counts on technically trained human resources, has access to financing, has developed and maintained road infrastructure, has purchased and maintained harvesting equipment, has maintained access to stable timber markets/prices, and has learned to control forest extraction costs. As a result, the quality of the timber and non-timber products delivered has been standardised according to market demand, extraction costs are near optimal, and registers for income and costs are maintained.

The forest products commercialised are a function principally of clients' requirements. The buyer defines the dimensions, quality, and delivery dates. In 2012, the sale prices of mahogany wood (*Swietenia macrophylla*) ranged from USD 4.90 for FAS special cuts to USD 3.90 FAS[2]; for wood from five species sold in the local and national markets, prices were from USD 0.76 to USD 2.00. The estimated gross income for the 2011 harvest was USD 830 309 (Tables A and B) at an approximate cost of USD 0.51/board foot, which yields a cost-benefit ratio of 4.44 for the harvest in the reference year.

Table A. Wood volume exported internationally and estimated income (USD),[2] 2011, Integrated Forestry Association of San Andrés, Petén (AFISAP).

Species	Volume (board feet)	Sale Price (USD)	Gross Income (USD)
Mahogany (*Swietenia macrophylla*)	96 495	4.36	420 718
Cedar (*Cedrela odorata*)	60 934	2.85	173 662
Santa maría (*Calophyllum brasiliense*)	33 000	1.27	42 038
Manchiche (*Lonchocarpus castilloi*)	10 000	1.41	14 071
TOTAL	200 429		650 489

Table B. Wood sales in national and local markets and estimated income (USD),[2] 2011, Integrated Forestry Association of San Andrés, Petén (AFISAP).

Species	Volume (board feet)	Sale Price (USD)	Gross Income (USD)
Mahogany (*Swietenia macrophylla*)	95 132	0.96	90 890
Cedar (*Cedrela odorata*)	24 965	2.00	49 930
Santa maría (*Calophyllum brasiliense*)	36 815	0.76	28 139
Manchiche (*Lonchocarpus castilloi*)	6529	1.02	6654
Pucté *(Bucida buceras)*	3004	1.40	4206
TOTAL	166 445	–	179 819

[1] FAS refers to the grading of timber quality "First and Seconds" by the National Hardwood Lumber Association.
[2] Exchange rate: GTQ 7.85 x USD 1.

this group have had their contracts revoked, and one was temporarily suspended. The exceptions to this characterisation are Carmelita and Uaxactún, which are more established settlements dating back to the 1930s. Their historic and current economic activity includes nature tourism, the harvesting of NTFPs such as xate, rubber, allspice, and now the primary processing and exportation of timber products.

Since the concessions without resident communities have not faced the same challenges that affected the first group of concessions, they have been able to consolidate their CFEs over the past decade: 1) eight of the community concessions have advanced in the supply chain from selling their unprocessed timber at the forest gate to primary processing of forest products, thereby earning a higher price and 2) they are seeking to incorporate species beyond the traditional ones[13] into their management and marketing strategies in order to expand the volume of wood available on a per-hectare basis. AFISAP is an example of this non-resident type of community concession that has been able to consolidate its timber and non-timber forest management. The text box II 6.1 outlines how they were able to generate more than USD 830 000 in income in 2011 from timber sales internationally as well in the national and local markets.

Nevertheless, this group has also had to overcome challenges. Although the forest cover is the principal capital that Petén and the concessions have, the majority of tree species available do not correspond to market demand. The high diversity of forest species in natural forests such as those in the Petén means that while many different tree species are available for harvest, a relatively small volume of timber for each of them is available per hectare. As a result, historically and currently, the majority of timber sales from the concessions come from mahogany (75%), followed by cedar (10%–15%), and finally, by small volumes of manchiche, santa maría, and other species (personal communication with Forster, administrative manager from AFISAP in 2013). Broadening the range of marketable species and adding value to the available forest products through primary and secondary processing continue to challenge these concessions.

The concession organisations have a formal/legal harvesting and commercialisation structure that lends certainty to the buying/selling agreements for timber forest products. This means that they are granted harvesting licenses, transport guides, can count on the presence of a forest manager, can provide proof of payment of taxes based on the stumpage value or the extracted volume, and have certificates for those species subject to the complementary controls of the Convention on International Trade of Endangered Species (CITES), as well as formal FSC certification for forest management and chain of custody. As far as marketing their timber products, the concessions need to strengthen their internal organisation and administration with respect to improving alliances that optimise primary processing and commercialisation, including market intelligence, so that they can increase sales to appropriate national and international markets, including niche and fair trade markets in the United States and Europe. In the case of non-timber forest products such as xate (*Chamaedorea* spp), the concessions of Uaxactún, AFISAP, and Carmelita have established strategic alliances among themselves that allow them to commercialise directly to importers in the United States, Canada, and Holland.

The concessions still face challenges in consolidating administration of their financial resources. In particular, there is a need to incorporate more analytical means of prioritising investments and to separate the social-community management from the business management of productive activities. Some argue that the cancellation of the concessions of San Miguel La Palotada, La Pasadita, and La Colorada concessions can be attributed to the mixing of these processes. Other elements that affect the long-term sustainability of the concessions are debt levels and the low capacity for business administration; these factors have led concessions such as El Cruce a la Colorada and Uaxactún to face critical situations.

For both types of community concessions (those with and those without resident populations), it will continue to be important to strengthen their capacities with the goal of obtaining beneficial results in the social, economic, environmental, and institutional realms. Since the technical aspects of forest management are progressing well, efforts should be focused on community organisation and entrepreneurial capacity along the lines of management (leadership, direction, and coordination), business administration (including accounting and administration), primary and secondary processing links along the productive chain, and the commercialisation of products. In addition, it is imperative that the government assume its role in controlling illegal activities, such as land occupations and the illegal harvesting of timber and non-timber products.

[13] Traditional timber species are mahogany (*Swietenia macrophylla*), cedar (*Cedrela odorata*), santa maría (*Calophyllum brasiliense*), manchiche (*Lonchocarpus castilloi*), and pucté (*Bucida buceras*).

6.5 Conclusions

The analysis of the design and implementation process of the community concessions in the Petén, Guatemala 1) provides evidence of progress toward the integrated management of the MBR and its contribution towards effective management of protected areas and the integrated development of the local population and their surroundings, and 2) generates some lessons learned, factors for success, and challenges for the consolidation of the community concessions. The following conclusions summarise some of these elements:

- The adaptation and approval of the legislation for community concessions to a biosphere reserve necessarily involved reconciling the protectionist perspective (at the national level as well as at the level of international environmental NGOs) with the productive vision by linking economic and social development with the sustainable management of natural resources.
- The factors that facilitated the institutionalisation and implementation of the community forest concessions were the government's need – and its political will – to stabilise the conflictive social dynamic of migrations (from Mexico and, in particular, from southern Guatemala) in order to stop the expansion of the agricultural frontier.
- The establishment of community concessions with resident populations was initially based on a land-use-planning concept that took into consideration the diversification of production of agricultural activities, animal husbandry, and forestry. Unfortunately, not all community concessions with resident populations were implemented based on the above-mentioned criteria. The diverse institutions working with the concessions focused primarily on the productive use and conservation of forest resources, completely ignoring the importance of agricultural areas for food security and other off-farm activities. The lack of an integrated vision for the different subsystems (crops, timber, and NTFPs) limited the possibilities of creating complementarity among the different components, including production for family consumption as well as for generating income. Therefore, when designing communities' concessions with residents living within the concession areas, it is imperative to incorporate land-use-planning strategies for agricultural areas according to soil potential as part of the integrated development strategy for agriculture as well as forestry, with particular focus on technical, marketing, and credit assistance.
- Given the differences in perspective on the role of the forest for concession models with populations residing inside the concession area and those without resident populations, it would be worthwhile to determine if more than one type of concession contract should be developed to reflect the different realities and needs for technical and administrative assistance – rather than just one format. The continued administrative deficiencies, the lack of transparency in the use of financial resources generated, and the lack of debt-level controls, which are the responsibility of the community leaders and political decision-makers, should be addressed when renewing concession contracts.
- The concessions represent an acceptable governing structure for the management of natural resources in the MBR, given that at least nine of the original 12 community organizations continue to manage their concessions and have begun to generate tangible benefits, including:
  - Social: community infrastructure, business management, formation of human capital, establishment of dialogue, and conflict resolution mechanisms
  - Economic: generation of employment, income that stimulates the local economy and purchase of capital goods and other assets for primary processing
  - Environmental: control of forest fires, control of illegal harvesting, control of predation on archaeological sites, and applications of other measures for recuperating forest cover

  The environmental sustainability of the concessions remains a concern given that most timber sales continue to be generated by mahogany (75%) and cedar (10%–15%), followed by santa maría and manchiche, given that they do not represent the species with the greatest available volume. It continues to be difficult to commercialise non-traditional species.
- Sustainable forest management in the tropics requires that there be improvements in managing information through a closer dialogue between scientists and those who possess local knowledge (Lawrence 2007). It is important to resume long-term forestry research through the use of permanent sample plots (PSPs) as an integral part of the monitoring and evaluation system of community forest concessions. The monitoring systems would provide analytical information to guide management decisions, allow for adjustments, permit the recuperation of areas disturbed by forestry operations and other incidents, and allow for comparisons between concessions and other areas in Guatemala (when research protocols are reviewed, standardised, and institutionalised). Scientific studies of dendrology based on the PSPs could be used to promote awareness of species under forest management, particularly those having economic importance, examining

them from the phytogeography perspective as well as anatomical, physiological, and ecological points of view.

- Given that the first concession contracts are coming to an end by 2019, the third phase (2012–2019/27) should focus on the information and tools needed for the negotiation process between the different actors and the government of Guatemala. Specific attention should be paid to the systematic quantification and qualification of amounts and types of socio-economic benefits generated by the concessions to their members and the region. The current complexity of the institutional context should be considered, given the strategic importance of the natural, economic, and cultural resources in the MBR.
- The current performance of the concessions is due to the interaction of several factors, including: the existence of explicit public policies, instruments for incentives and controls, and the existence of the technical framework for concession administration. The social empowerment of those communities directly involved as well as civil society needs to be strengthened. Our knowledge of the process has allowed us to identify important weaknesses in each of the previously mentioned dimensions, the most critical being government leadership and social empowerment.

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