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A sawyer team working in Salvatierra's forest in Guarayos. Santa Cruz, Bolivia.

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Abbreviations and Acronyms

ASL	*Asociación Social del Lugar* (Local Forest user Association)
CDS	*Comitê de Desenvolvimento Sustentável de Porto de Moz* (Sustainable Development Committee)
CAIC	*Cooperativa Integral Agroforestal Campesino* (Smallholders Cooperative of Agro-forestry)
CI	Conservation International
CITES	Convention on International Trade in Endangered Species
COINACAPA	*Cooperativa Integral Agroextractivista Campesinos de Pando* (Agroextractive Cooperative of Smallholders in Pando)
COCODE	*Comite Comunitario de Desarrollo* (Local Development Committee)
COPNAG	*Central de Organizaciones de Pueblos Nativos Guarayos* (Union of Guarayo Native Peoples)
FMP	Forest Management Plan
FORESCOM	*Empresa Comunitaria de Servicios del Bosque* (Community Enterprise for Forest Services)
FSC	Forest Stewardship Council
IBAMA	*Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis* (Brazilian Institute for Environment and Natural Resources)
ICMBio	*Instituto Chico Mendes de Conservação da Biodiversidade* (Chico Mendes Institute for Biodiversity Conservation)
INCRA	*Instituto Nacional de Colonização e Reforma Agrária* (National Institute for Colonization and Agrarian Reform)
INRA	*Instituto Nacional de Reforma Agraria* (National Agrarian Reform Institute)
MBR	Mayan Biosphere Reserve
NGO	Non-governmental organization
NTFP	Non-timber forest product
POA	*Plan Operativo Anual* (Annual Operational Plan)
RAAN	*Región Autónoma del Atlántico Norte* (North Atlantic Autonomous Region)
RESEX	*Reserva Extractivista* (Extractive Reserve)
RIL	Reduced Impact Logging
SNUC	*Sistema Nacional de Unidades de Conservação da Natureza* (National System of Conservation Units)
TCO	*Tierra Comunitaria de Origen* (Community Land of Origin)
TNC	The Nature Conservancy
USAID	US Agency for International Development
WWF	World Wildlife Fund (also known as Worldwide Fund for Nature)

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Abstract

This study adopts an institutional approach to analyze the way in which informal rules, in their interaction with formal rules, shape the use of forest resources by diverse types of smallholders and communities (i.e., indigenous people, agro-extractive and traditional communities) in Latin America. Attention is given to understanding the 'working rules', comprising both formal and informal rules, that individuals use in making their decisions for land and forest resources access and use, which in turn affect benefits generation and distribution from such resources use. The dichotomy between formal and informal institutions take on relative importance, it is their interaction that matters in assessing human behavior. Three areas of behavior that affect forest resource use by smallholders and communities are examined: (1) the interface of formal rules, often contained in written laws, and practiced 'rules of the game' that guide how smallholders and communities control, allocate, legitimize and enforce land and forest tenure rights, (2) local systems for forest resource use and management under the imposition of formal regulations and models, and (3) smallholder interaction with markets influenced by the constraints and opportunities produced by formal regulations. The principal findings suggest that in spite of the fact that many governments have introduced progressive policies intended to benefit rural populations and their forest use, it is questionable the extent to which such policies have actually brought about any real change to benefit communities. Exploring the role of informal institutions, as they interact with formal law, is important to explain these outcomes in practice. This study draws on five case studies that provide evidence supporting this argument. Field research was carried out from 2006 to 2007 in four different countries: Bolivia, Brazil, Guatemala and Nicaragua.

1 Introduction

Over recent decades, important legislative and policy shifts have taken place in Latin America that affect land and forest use and ownership. These changes have focused on formalizing tenure rights over forestlands, including those of communities, and imposing new rules of the game in favor of sustainable forest management. At the same time, community forest enterprises have been actively promoted as the best pathway to enhance the livelihoods of the forest dependent rural poor while simultaneously encouraging forest conservation. One important underlying motivation behind land and forest policy reform was to minimize informal practices for land access and forest use and reduce incentives for illegal behavior. Although the land and forest policy reforms have brought change, many of the anticipated outcomes related to sustainable forest management and increased benefits to smallholders have still not materialized.

This paper draws on institutional analysis to examine the role played by 'working rules' –which include both formal and informal ones – in affecting behavior of social actors for accessing and using forest resources, and in shaping the forms of market engagement that influence on income generation and benefits distribution. Understanding working rules is crucial for assessing policies intended to improve local people's forest livelihoods, the strategies that local forest users adopt to use and benefit from their forest resources, as well as the constraints and opportunities emerging from market engagement.

The formal and informal rules interact in disparate ways each other. In some cases, with regard to land tenure and forest regulation, legal reforms have incorporated informal rules developed by community groups for organizing land access and use. On the one hand, this may mean adopting them or recognizing them, with or without specifically codifying them into law; on the other, it may mean producing a new set of formal rules by blending or combining them with existing formal regulations. In other cases, formal laws work against existing informal rules and impose new ones, crafted externally, likely generating a new set of

informal institutions to get around them. For example, rules designed to formalize and regulate the commercial forest sector may unintentionally exclude community forestry operations and actually promote the development of informal markets and networks. The results often inhibit the growth of community enterprises and reinforce existing market asymmetries that limit the benefits for these groups.

This paper suggests that the current land and forest reforms implemented in several Latin American countries have not fully achieved their expected outcomes because they have inadequately acknowledged the complex local realities in which socially constructed working rules shape behavior related to the access and use of land and forest resources. Informal rules comprise customary practice and other local norms that are not codified in formal laws, often operating at the margin or beyond frameworks defined by the state; they include but are not limited to illegal practices. Formal rules tend to favor the powerful and politically connected forest actors with greater assets and far greater bargaining power in the market. The demand for compliance with these regulations often introduces or reinforces market bias and works against those with limited resources and greater difficulty meeting formal requirements, and may even reinforce informal markets.

This study examined the following questions: (1) How do informal and formal institutions influence land and forest tenure rights of smallholder and communities? (2) How do existing informal systems for forest resource use and management respond to the imposition of formal regulations and management models? and (3) How do formal regulations influence informal market relationships of smallholders and communities? To address these questions, five regions in four Latin America countries are examined, namely: the North Atlantic Autonomous Region (RAAN) in Nicaragua; Bolivia's Guarayos province in Santa Cruz, and the department of Pando in Bolivia; the Porto de Moz municipality in the amazonian state of Pará, Brazil; and the Mayan Biosphere Reserve in Guatemala's northern Petén. These sites have been selected taking into account the existence of formal processes towards land tenure regularization and titling implemented by the states, along with states' efforts to enforcing new rules of the game for achieving sustainable forest management, in local contexts in which an important number of local people depend significantly on forestry-based activities for making a living.

This report examines the relationship between formal and informal institutions in three key domains that affect the use of forest resource by smallholders and communities. The first domain relates to statutory law and the formal rules that emanate from it, as they contribute to the practiced 'rules of the game' guiding how smallholders and communities control, allocate, legitimize and enforce land and forest tenure rights. The second concerns local systems for forest resource use and the ways in which the imposition of formal regulations, models and practices shape local forest uses. The third refers to the way in which smallholders interact with markets, how the nature of their engagement is influenced by the constraints and opportunities produced by formal regulations, and how market conditions

affect decision making and benefits. With regard to the formalization of land rights, the principal lesson of this study is that outcomes depend less on the content of the formal rules – which often recognize customary rules and collective ownership – and more on the modes of implementation. Implementation to a large extent leads to the emergence of new sets of informal rules to evade the new formal ones, particularly regarding the allocation of community lands. With regard to sustainable forest management, the study finds that the imposition of homogeneous legal frameworks by the state does not take into account the diversity of local realities and often neglects the existing working rules for forest resources use adopted by smallholders and communities. This has resulted in contradictory outcomes in practice: some communities have profited from the new formal rules but most have not, instead opting for much simpler informal, and sometimes illegal, practices to make a benefit. Thus, extensive informal market networks offer an alternative but are problematic because, by definition, they provide no legal protection (i.e. contracts or courts) but also concentrate greater economic benefits outside the communities.

This report is organized in seven sections including this introduction. The following section provides a conceptual framework for institutional analysis, focusing on the definition of institutions and the working rules that shape people's behavior regarding land and forest resources access and use, and their implications for the generation and appropriation of benefits. The third section introduces the main characteristics of the selected five case studies. The fourth section analyses how working rules (formal and informal) influence on the definition and formalization of land and forest tenure rights. The fifth section examines the implications resulting from the imposition of models for sustainable forest management, coupled with new ways for organizing timber production. The sixth section considers how the interplay between formal and informal institutions shapes the conditions under which smallholders engage with the market place. The final section presents the main conclusions and recommendations.

2 The conceptual foundations: forests and informal institutions

The debate on formal and informal institutions

A vigorous theoretical debate revolves around the role and nature of formal and informal institutions. According to Ostrom (1990), institutions refer to a shared understanding that is used by humans in repetitive situations and organized by norms and rules. In this notion, rules constitute shared prescriptions that are mutually understood and predictably enforced in particular situations by agents responsible for monitoring and imposing sanctions, and norms refer to shared prescriptions that tend to be enforced by participants themselves through internally and externally imposed costs and inducements (Ostrom 1999a). In other words, norms refer to the moral behavior of a society, whereas rules are sets of regulations which, to be effective, require enforceable sanctions (Crawford and Ostrom 1999). Institutions, then, encompass moral norms, rules and regulations, used both across and within organizations, and the organizations themselves (Ostrom *et al.* 2001).

Institutions work at different hierarchical levels. There are three types of rules that directly or indirectly affect people's behavior: operational rules, collective decision-making rules and constitutional rules (Ostrom *et al.* 1997). Each of these rules, in turn, affects different types of decisions. Operational rules are those that directly affect individual behavior and perceptions of resulting actions. According to Thomson and Freudenberger (1997), these might be considered 'surface level' since they are closest to the behaviors affecting the resource base. At an intermediate level are collective decision-making rules, which determine how rules are defined, and influence emerging regulations used at the operational level. Finally, constitutional rules determine who can participate in the political system, what powers and authority they exercise, and how collective decision-making rules are created (Ostrom *et al.* 2001; Ostrom 1999a).

This study will prioritize the analysis of operational rules since they directly affect

the working rules that influence behavior related to land and forest resources use. The working rules (or rules-in-use), following Ostrom (1999a), are those that individuals use in making decisions or "the set of rules which participants would make reference to if asked to explain and justify their actions" (p. 51). Thomson and Freudenberger (1997) suggest that for a rule to be considered as such, it must actually affect the way people behave toward their resource. These authors suggest that working rules have different sources ranging from informal agreements (written or not) on traditional practice by communities to written rules created by governments. In this vein, the roots of working rules can be either formal or informal – grounded in customs or defined by externally imposed formal laws. In practice they are likely to be a combination.

As a concept, the informal has often had a negative connotation. Some scholars have equated informal with chaos or disorganization (Perry *et al.* 2007), and the term is commonly associated with illicit behaviors, such as corruption and clientelism (Helmke and Levitsky 2004). However, a more textured and complex understanding has also emerged. Informal institutions have been analyzed from several points of view; for example, some refer to customary property rights or pre-existing rules for community forest management that have not been codified in law (Otsuka and Place 2002), while others refer to activities developed outside of formal law as 'informal sectors' or 'informal economies' (Guha-Khasnobis *et al.* 2006). It is challenging to assess informal institutions given these multiple concepts and frameworks.

Some scholars separate formal and informal institutions by placing state regulations enforced by an external authority on the formal side, and customary or community rules that are self-enforced or endogenously enforced on the informal side (Eriksson 2004; Cousins 1997). However, the main problem of equating formal institutions with the state is that they can exist both within and outside of formal government, and even within customary systems. Helmke and Levitsky (2004) define informal institutions as socially shared rules, usually unwritten, that are "… created, communicated and enforced outside of officially sanctioned channels" (p. 725). Drawing upon these two definitions, for this report informal rules are understood as those that fall outside the scope of the formal legal frameworks at any scale of decision making, and that are crafted outside of officially sanctioned channels. Informal rules tend not to be codified or written.

In this regard, customary rules are not always synonymous with informal rules, as they are sometimes sanctioned, or recognized, by the state. For example, the state may recognize the outer border of customary property and agree not to intrude into areas governed by customary law (Fitzpatrick 2005), or it may attempt to codify customary practices into formal law. In cases where specific customary institutions have not been formally recognized, they remain in the informal arena. In fact, as informal rules develop and evolve it is virtually impossible to adjust formal frameworks to encompass the wide variety of rules and local variations, or translate them into formal laws. Nor is this desirable, as Sierra (1997) argues with regard to the codification of customary practices: customs have survived precisely through change and adaptation in response to social realities and particularly in relation

to the dominant society. Although the state frequently aspires to measure, codify and simplify land tenure in a workable fashion, attempts to capture the 'cacophony of local property regimes would be a nightmare' (Scott 1998). Hence informal institutions persist and will continue to evolve over time.

Informal institutions are part of a broader institutional architecture that complements and resists formal rules. Thus, 'informal' is not synonymous with unstructured or chaotic, since communities are capable of producing self-organizing structures within or outside the reach of official frameworks (Cousins 1997; Cousins and Hornby 2000). On the contrary, the informal sector can be in occasions very well organized, and it is not exceptional for groups making decisions following informal rules to be more organized than formal ones (Guha-Khasnobis *et al.* 2006).

As suggested by the previous discussion, it may be difficult to differentiate the formal from the informal in the working rules used by individuals, groups and societies to define access to and management of forest products, to influence transactions for positioning forest products in the market place, and to capture the benefits derived from forest use. Thus, the concept of working rules is used in this report to refer to the mix of both formal and informal rules that influences local decision making in practice. The challenge here is to disentangle the effects of the two and analyze the results of their interplay.

The next sections discuss the three arenas of behavior that affect forest resource use by smallholders and communities, which have been mentioned in the introduction. The first refers to the 'rules of the game' that guide how smallholders and communities control, allocate, legitimize and enforce land tenure rights. The second is related to the development of local (mostly informal) systems for forest resource use and management under or in reaction to the imposition of formal regulations and models. The third refers to smallholder interaction with markets (formal and informal) influenced by the constraints and opportunities produced by formal regulations, as well as by market conditions that affect decision making, and acquisition and distribution of benefits.

The 'rules of the game' for defining land tenure rights

Property is recognized as a 'bundle of rights'. For common property, tenure rights are usually expressed along a continuum ranging from limited to more complete rights, such as rights for access to withdrawal or use, management, exclusion and alienation (Agrawal and Ostrom 2001). These concepts are not explained further here since their use is now common in the institutions and property rights literature (see also Ostrom and Schlager 1996; Schlager and Ostrom 1992). Barry and Meinzen-Dick (2008) simplify the continuum of property rights by dividing it into two types: use rights (i.e., access and withdrawal) and decision-making rights (i.e., management, exclusion and alienation).

Property rights to land and forest resources respond to relatively complex case-specific governance structures and rules that allocate rights, and more importantly legitimize those rights in practice. Because property is composed of a 'bundle', different institutional systems coexist to define and enforce these rights. The distinction between formal and informal institutions regarding

property rights is relatively straightforward (Otsuka and Place 2002). While formal rights are defined by formal procedures of recognition, registration and titling, either individually or collectively, informal rights are mainly linked to local practices of rights allocation, which are often neglected in the laws (Cousins and Hornby 2000).

The authority that underlies the bundle of rights that define property can have multiple origins, including state law, customary law, religious law and informal local rules that provide a basis for claiming rights (Meinzen-Dick and Pradhan 2002). This condition has also been called a polycentric legal system (Lund 1998) and suggests that property relations do not evolve in a linear fashion from the informal to the formal in a sort of legal centralism but rather that both can coexist in a given historical and spatial context (Manji 2006). Scott (1998) suggests that property rights are modified over time according to changes in the mandates and interests of the state, and on the strength of local communities to enact their local rules over formal regulations.

Formal mechanisms, such as land titling, can be important for guaranteeing property rights. Here, property refers to an enforceable claim (McPherson 1978), but while a property title is supposed to guarantee security this is not always the case in practice. Bromley (2005) argues that land titles can increase insecurity for the poorest sectors and that titles are meaningless without the full backing of the state that issued them. Broegaard (2005) suggests that perceived tenure security is more important than the possession of a title in determining farmers' investment behavior. Legitimacy is an important source of security because it makes property claims enforceable (Sikor and Lund nd). In many cases, formal legal systems only work for those who can maneuver or manipulate them, and thus take advantage of such formal laws (Nygren 2004).

The legal recognition of customary land rights is not a simple process. Fitzpatrick (2006) argues that the nature and degree of state legal intervention in a customary land system should be determined by addressing the nature and causes of any tenure insecurity in specific contexts. A key problem is that the process of formalization can cause a breakdown of property rights systems into open- or contested-access areas due to the superimposition of and conflict between state-based, or formal, property systems and norm-based, or customary, regimes. Tensions can increase if the state recognizes one side in a dispute over local representational authority. The superposition of models can also result in 'forum shopping', whereby different claimants appeal to their framework of choice to justify property rights claims (Ftizpatrick 2006, Larson and Soto 2008). Sometimes this results in a breakdown in the local system of authority, but without state capacity to 'fill' the void.

The rules governing forest resource management

The current trend in forest areas is for states to devolve greater control or decision-making rights over natural resources to local people and communities, including management and exclusion (Ribot 2001a; Sunderlin *et al.* 2008), Nonetheless, the rights transferred to smallholders and

communities tend to be heavily regulated by formal norms, especially in relation to forest resources. The main assumption underpinning such regulations is that forests constitute a public good whose maintenance must be protected against private actors who might over exploit the resource (Agrawal 2005). At the core of this assumption is the simplified view of the 'tragedy of the commons', which argues that resources held in common would lead to their irreversible depletion (Hardin 1968). This view still has influence in spite of ample evidence demonstrating that this outcome is only likely in open access situations. For example, in the absence of rules for forest use, different stakeholders would attempt to reap the benefits by over harvesting the most valuable timber-tree species, putting at risk their future regeneration. However, it has been demonstrated that the commons are often –or can be– governed by effective local institutions and that the development and enforcement of rules can make a significant difference in the management of forest resources (Gibson *et al.* 2000; Ostrom 1999b; Dietz *et al.* 2003). A positive correlation has been found among strong local institutions, collective activities, and good forest management (Varughese 1999; Andersson *et al.* 2006).

The question thus becomes, 'to what extent can imposed external rules obtain the expected outcomes?' or, in contrast, 'are forest user groups able to develop their own rules, through collective-choice, to prevent individual members from over-exploiting timber or non-timber resources, or prevent outsiders from doing the same?' The above discussion suggests that the latter – the development of local rules – can be accomplished in at least two ways. First, some argue that because self-interested individuals will not act to achieve group interests, coercion by external authorities, based on a stated set of rules, is necessary to help individuals achieve collective action (Olson 1965). Second, evidence demonstrates that social groups are capable of devising and enforcing rules among members to protect their forests, if they have a common interest that encourages collaboration and collective action (Gibson *et al.* 2000; Nagendra and Gokhale 2008). These points suggest at least three options for the state: (1) to establish a regulatory framework that forces local collective action, (2) to accept and reinforce local rules and norms where these already exist, or (3) to seek to impose external regulations. Each of these implies a different type of interaction between formal and informal existing rules.

Nonetheless, many of the norms devised by communities for forest resource use, and the governing mechanisms for enforcing such norms, are often ignored by forestry regulations and enforcement bodies (Pokorny and Johnson 2008). Too often formal forest regulations, rather than building on existing informal community forest management institutions, tend to imposed new rules, practices and models over the internally devised and sanctioned rules used by indigenous, agro-extractive, and smallholder communities. This can create internal confusion or competition between the 'new' and 'old' organizational structures, lead to a breakdown in control, or to the kind of forum shopping noted above. The impact can eventually fuel open-access behavior that puts forests at risk and reduces forest benefits for local people in the long term.

The devolution of forest rights to communities has sometimes come hand in hand not only with the opportunity to undertake logging activities but also with the pressure to do so under introduced models for commercial forest management. In these cases, groups may have to overcome a variety of obstacles to adapt existing rules and governance systems. A fundamental problem is that customary or other existing local rules are often focused on subsistence uses, particularly in indigenous, traditional, and peasant communities. These same rules do not automatically translate to contexts in which market economies prevail and pressures to harvest forest resources increase rapidly, without allowing time for local adaptation. This may also apply to situations when extraction of a high value product like timber is permitted where communities previously traded only in limited markets for low value, non-timber forest products (NTFPs).

Rules for subsistence, and sometimes for low value NTFPs as well, tend to be tightly embedded within the social structures and cultural belief systems of communities. Decision making regarding the allocation of access and use rights is based on local knowledge that is acquired over time, hence age and gender are important. When a new activity like commercial logging is introduced, these social groups face enormous challenges, particularly when the activity, or the organization promoting it, requires organized hierarchical structures, often based on technical 'know-how' for decision making and control that have not existed previously. While some communities are able to adapt to changing situations emerging from new productive activities, types of organization and engagement in open markets, others fail to do so. Often, the imposition of an industrial model and the rapid time frame for local appropriation are at the heart of the failure, revealing the lack of recognition of the 'starting point' of these groups.

There is substantial evidence that the expansion of markets has resulted in significant changes in social relations. Mallon (1983) showed how the growth of markets - especially labor markets - may result in an increased focus on individual interests (see also Vatn 2007), leading to conflicts and the breakdown of the collective. Indigenous and agro-extractive communities are learning how to communally manage timber extraction with hierarchical organizations and entrepreneurial models introduced from outside, often premised on the goal of profit maximization as the primary objective of the economic activity (Pacheco 2007). As these new organizations are introduced, community groups face major challenges in designing and implementing mechanisms to marshal labor, to make decisions collectively, to administer transparently, to distribute benefits and responsibilities equitably, to enforce rules, and apply sanctions, not to mention developing the skills and experience to implement silviculture operations and to negotiate in the market place.[1]

Formal and informal aspects of forest markets

For the purpose of this study, informal timber markets constitute all interactions for exchanging goods and services among different actors in the market place that

1 Mexico has been a notable exception to the rule, where community enterprises and silvicultural practices have been allowed to grow more 'organically' (Bray *et al.* 2005)

take place outside formal state regulations, including fiscal, commercial, labor, and forestry norms. In this definition, illegal acts refer only to those informal activities that contravene existing state regulations for the use, transformation or exchange of goods. For example, in the forestry sector, regulations typically define forest resources that can be harvested, processes for acquiring transportation permits, payment levels and criteria for taxes and fees, requirements for the registration of enterprises, and standards for compliance with labor norms, among other issues. However, in spite of the regulatory breadth of most legal frameworks, there are several realms of forest resource management that fall outside the formal norms, and hence remain informal, such as operational level transactions between stakeholders, certain types of unregistered intermediaries and service providers, and a variety of terms of trade that are devised to make the market work.

There are two main views why formal regulations may not reach production and markets systems that they intend to reach. The first argues that sectors that are unable to comply with heavy regulatory constraints may be excluded from state benefits. This suggests that burdensome entry regulations prohibit some economic actors from entering the formal sector, leading them to remain informal as a defensive measure. The second suggests that organizations decide to stay out of the reach of the state as voluntary exit decisions resulting from private cost-benefit calculations (Perry *et al.* 2007). This view argues that some economic actors choose to remain informal based on a valuation of the trade-offs associated with becoming formalized and the state's capability and will to enforce restrictions. These two views may be more complementary than exclusive. To the extent that regulations impose conditions that are difficult to comply with, they also open the door for illegal operations. Interestingly, economic actors often adopt a combination of legal and illegal actions.

States tend to regulate, and in some cases over-regulate, forest resources with high market value, such as timber, but may pay little attention to lower value resources, such as many NTFPs. The primary reason for this is that regulation usually has a number of goals, including obtaining profits or tax income and promoting efficient resource use to avoid overharvesting (Dryzek 1997), hence the emphasis on high value resources. In general, compliance with best practices is monitored by controlling the circulation of timber to differentiate that which originates from approved management plans from that which does not. Contravening forest regulations leads to illegal acts.

There is a growing literature on illegal logging that is mainly focused on explaining the challenges faced by law enforcement regarding forest planning and harvesting, monitoring of outcomes, and the application of sanctions (Contreras 2005). Although it is increasingly acknowledged that a significant portion of illegal practices occur due to legal shortcomings and implementation failures (Contreras 2005; Tacconi *et al.* 2003), many suggestions for overcoming 'forest crime' still stress law enforcement as the main instrument for halting illegal practices (see also Larson and

Ribot 2007). Such views tend to criminalize informal practices, without distinguishing between the nature and role of the informal institutions along the value chain that are often organized and exploited by formal or legal entities. This happens either due to the inability to detect the differences between informal and illegal forest resource use (Colchester *et al.* 2006), or because of complicit interests.

Insufficient attention has focused on the functioning of informal forest markets, which is particularly striking given state efforts to implement forest regulations, and the market distortions and asymmetries that such regulations introduce or reinforce. Analysis has emphasized illegal logging, under the assumption that better forest law enforcement will be conducive to improved sustainable forest management. However, in practice, most forest regulations tend to be biased against communities and other local forest users. As Kaimowitz (2003; 2002) suggested, formal forestry regulations tend to create additional costs for smallholders and communities interested in developing formal forestry operations. Because they cannot afford to comply, they instead operate informally at the risk of having their activities criminalized by the state (see also Colchester et al. 2006). In this regard, forestry regulations increase the entry barriers for people who lack access to capital and cannot pay the high transactions costs required by bureaucratic processes for the approval of forestry operations (see also Larson and Ribot 2007).

Another barrier for communities is that forestry regulations sometimes implicitly presuppose technologies or require levels of operations that are beyond the means of smallholders, forcing reliance on forestry service providers, local loggers, or timber companies. For smallholders and communities to legally enter the forest product market, they must formalize their forestry operations. Only those that create and register their forestry enterprises (under existing legal models), formulate a forest management plan, pay fees and taxes, are in a position to obtain the approval of their plans, and harvest their products following the prescribed standards can legally participate. However, norms, such as the restriction of forest pre-processing of logs with chainsaws, require that processing take place in approved mills, and since most communities lack the capital or capacity to manage operations that yard, transport, and process wood, they are forced to collaborate with existing service providers or depend on outsiders for technical and financial support. Forest users unable to perform such tasks are excluded, and enlarge the ranks of the informal economy (Pokorny and Johnson 2008; Pacheco *et al.* 2008). Nonetheless, as the demand for timber supply increases, they become the source (informal and illegal) of raw material for the formal industrial sector.

Timber markets in Latin America tend to be distorted and imperfect. The problems are mainly related to the asymmetric distribution of power and information that facilitates or even promotes 'elite capture'. It is argued that elite capture emerges when the availability of high value resources is coupled with powerful actors operating under weak institutional control mechanisms, which creates opportunities for them to obtain substantial shares of the benefits generated

from local forests (Iversenb *et al.* 2006). The stakeholders that 'capture' these benefits (i.e., intermediaries and local loggers) tend to operate in nebulous, semi-invisible alliances that are actually highly structured and organized shadow networks (High *et al.* 2005). These networks operate in the 'nooks and crannies' of market imperfections, causing the distribution of profits to be highly inequitable and failing to satisfy the aspirations of many actors, such as the rural poor.

3 Introducing the case studies: a diversity of situations

This report focuses on five study sites within four Latin American countries, namely: Bolivia and Brazil in South America, and Nicaragua and Guatemala in Central America. In recent decades all four countries have transferred significant forest area to communities under a variety of mechanisms and legal models, benefiting a diverse group of forest users including indigenous people, agro-extractive communities and smallholder settlements. In Bolivia, research focused on two regions: the Guarayos Province in the Santa Cruz department, which is largely covered by an indigenous territory for the Guarayos people; and the northern Pando department where agro-extractive communities predominate. In Brazil, research centered on the Amazonian municipality of Porto de Moz in the state of Pará, on the borders of a large Extractive Reserve (RESEX) that has been declared in response to demands by agro-extractive communities (Figure 1). In Nicaragua, the study focused on indigenous territories in the process of demarcation and titling in the North Atlantic Autonomous Region (RAAN). The Guatemala research focused on the northern *Petén,* where a substantial portion of the buffer zone of the Mayan Biosphere Reserve has been granted to communities as forest concessions. This section provides a brief introduction to the cases (Figure 2).

The variation among the selected cases is representative of the diverse range of traditional stakeholders found among local forest users in the region's forest frontiers, including indigenous, agro-extractive and peasant communities granted rights as communal territories, reserves and concessions. Although these groups depend on forest resources in different ways, they all rely on both timber and non-timber forest resources for subsistence and commercial uses. Commercial logging is making

Figure 1. Map of the study sites in Bolivia and Brazil

an increasingly important contribution to household incomes in all the regions studied. Recognizing the context in which local forest users develop their livelihoods is fundamental for understanding the role of informal institutions for forest resources management, the impact of the formalization of community property rights, and the introduction of legal frameworks to promote sustainable forest management and formal market integration. Table 1 summarizes the relevant ecological and socio-cultural characteristics of the selected regions.

Indigenous territories in the RAAN, Nicaragua

Nicaragua's Autonomous Regions were created by the Autonomy Statute (Law 28) in 1987, as part of the peace negotiations taking place with dissident groups, including an important part of the country's indigenous population, which supported the counterrevolutionary forces in the 1980s' war. These two regions, the North and South Atlantic Autonomous Regions, known as the RAAN and RAAS, constitute about 45% of the national territory and 12% of the population; though only

Table 1. Main features of the five case studies in four selected countries

Characteristics	North Atlantic region in Nicaragua	Guarayos in Bolivia	Porto de Moz in Brazil	Northern Amazon in Bolivia	Northern Petén in Guatemala
Location and extent (in ha) of study site	Located in the northeastern portion of the country, comprising 3,2 million ha, of which at least 2 million ha are being titled as indigenous territories	Located in northern Santa Cruz consisting of 3 million ha of which about 1.3 million correspond to an indigenous territory	Located in the eastern Amazon, the region consists of about 1.9 million ha, 1.2 million ha of that total is within an extractive reserves	Located in the Bolivian north over 6 million ha, out of which about 2 million ha correspond to agro-extractive communities	Located in Petén, the Mayan Biosphere Reserve comprises 2 million ha. The Multiple Use Zone is 848,000 ha.
Main vegetation cover	About 72% was covered with forest in 2001. Most of these are broad-lead forest, with a small portion of pine forests	About 90% of the area is covered with deciduous forests, with some valuable timber species	About 15% is seasonal flooded forest (*varzea*), and the rest is upland (*terra firme*) tropical forest	Over 90% of the region's landcover consists humid tropical forest, rich in timber species and non-timber forest products	Home to one of the richest and most diverse ecosystems in the world, mostly covered by broadleaf forest
Total and rural population	Approximately 314 thousand people, 72% are rural	Approximately 37 thousand people, out of which about 15 thousand are indigenous	About 23 thousand people, out of which 13 thousand is rural people	Approximately 50 thousand people, with about 30 thousand people in rural areas	Approximately 80 thousand in the Mayan Biosphere Reserve
Predominant ethnic groups in the population	The population in the RAAN is predominantly *ladino* but also holds the vast majority of the country's indigenous and ethnic populations, principally the *Miskito*	The population is ethnically mixed but the largest ethnic group is composed of *Guarayos* indigenous people	populations with An ethnic mixed population known as *caboclo* due to their livelihoods tied to rivers and the Amazon estuary	Forest dependent rural population is ethnically mixed consisting of several lowland indigenous and peasant groups as well as migrants from Bolivia's highlands.	About one fifth of total population is indigenous (the most important is the q'qeqchi group)
Model for titling land in favor of communities	Indigenous territories in different processes of demarcation and titling	Indigenous territory labeled Community Land of Origin (TCO)	An extractive reserve that is part of the national systems of conservation units (SNUC)	Agro-extractive communities based on an estimate of 500 ha per family	Concessions range from 7 to 83 thousand hectares for a total of about 450 thousand ha
Predominant forest use of communities	Mainly for subsistence, but also some commercial logging	Mainly for subsistence uses, although logging is rapidly expanding	Extensive use of non-timber forest products (NTFP), but logging has expanded over time	Mainly harvesting of Brazil nuts (*Bertholettia Excelsa*) for commercial uses, and other NTFPs	Main forest use is commercial logging although there is some *xate* harvesting
Main livelihood characteristics of local people	Livelihoods are based primarily on subsistence agriculture, fishing, hunting and some commercial forestry	Livelihoods are based on subsistence agriculture, off-farm employment, and to a lesser extent commercial forestry	Highly diversified livelihoods, but population mainly rely on small-scale agriculture and some fishing	High dependence on Brazil nuts harvesting, combined with subsistence agriculture and off-farm employment	Based on subsistence agricultural, extraction of NTFP and timber, and off-farm employment.
Communities selected for field research	*Tasba Raya* territory and *Layasiksa*	*Cururú* and *Santa María de Yotaú*	*Sagrado Coração* de *Jesus* and *São Raimundo*	*San Jorge* and *Turi Carretera*	*Carmelita* and *Arbol Verde*

Source: Elaborated by authors based on Albornoz *et al*. (2008), Mendoza *et al*. (2008), Monterroso (2008), Nunes *et al*. (2008), Vieira *et al*. (2008) , Wilson (2008).

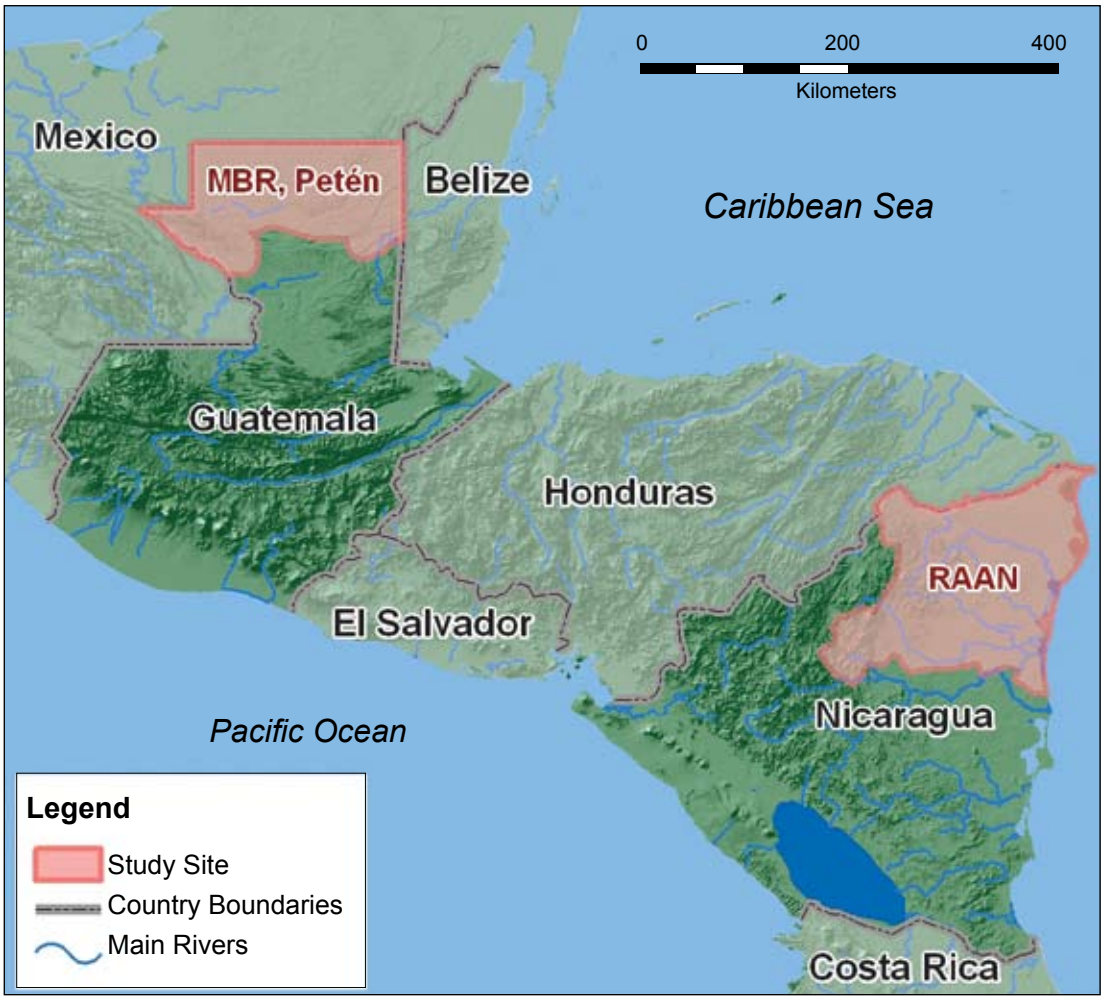

Figure 2. Map of the study sites in Guatemala and Nicaragua

8.6% of the population self-identifies as indigenous, the vast majority of these groups are located in these two regions (INEC 2005). Though these regions had few non-indigenous residents historically, this has changed as colonists have moved into this forested frontier region from Pacific and Central Nicaragua. According to data from 2000, 70% (4 million ha) of the country's forests are located in the RAAN and RAAS (MAGFOR/INAFOR/MARENA 2001). Though there are no official statistics, it appears that today at least 2 million hectares of forest are located on areas claimed as indigenous territories.

The study focused on indigenous territories that are being demarcated and titled in the RAAN. These communities won the right to recognition of their historic territories in the 1987 constitution, but until 2003 no law had created the procedures for demarcation and titling. Only now the process of rights recognition is being fully implemented. At the time of this study, only five titles had been authorized, on lands that had been previously demarcated by an NGO, and only one of those had been registered. The process was delayed by problems such as central government foot dragging, the misuse of funds by the titling commission

and conflicts among communities, among others, but has been moving forward since 2007 under a more favorable political climate. The territory model, however, creates new tensions, because only a few communities have previously held land and resources as a group or created governance structures at this larger scale. This has led to conflict, for example, between some communities and regional government authorities regarding the design and size of the territories.

The invasion of indigenous lands by non-indigenous colonists and conflicts among neighboring indigenous communities also continue to generate conflicts at the local or territorial scale (Roper 2003). Conflicts between communities appear to be related, in particular, to natural resource rights, and often forests specifically (Mendoza *et al.* 2008). Before the recognition of indigenous land rights, the state granted concessions to logging companies in many community forests. After these were suspended, communities have sold timber in a variety of ways, in both formal and informal markets. This has usually involved the sale of standing trees, though some community members have also sold timber and sawn wood in local markets. In 2006, however, all modes of small-scale extraction were formally suspended in favor of developing forest management plans for all logging; at the same time, the logging of certain high-value species such as mahogany and *cedro real* was also prohibited. In September 2007, however, hurricane Felix knocked down about 1 million ha of forest in the RAAN, and new small-scale salvage plans were being implemented in 2008. Community forestry operations are very new and operate in only a few places, including one of the study sites, Layasiksa, but both national and regional forest administrations are promoting a community forestry strategy and developing new draft legislation in that regard.

The indigenous territory of Guarayos in lowland Bolivia

Guarayos, a province in Bolivia's Santa Cruz department is a rapidly changing forest frontier that is also home of the Guarayo indigenous people. The construction and later paving of a highway opened the region to outsiders, including timber industries, ranching and large-scale agro interests and smallholder colonists, putting strong pressure on the land that has been occupied and is formally claimed by the Guarayos people. Tenure reform and the promotion of sustainable forest management that were intended to stabilize the region and protect indigenous lands did not sufficiently consider existing indigenous rules for land access and forest use. As result, the region faced growing tensions as indigenous people felt the pressure from land claims and resource extraction by outsiders.

In 1996, the Guarayos indigenous organization (COPNAG) presented a claim for a type of property called a TCO (literally Community Land of Origin), which the government approved, determining that about 1.4 million hectares should be allocated for the TCO. Land regularization and titling progressed slowly, however, and a portion of the forests originally

claimed by the Guarayos were lost when the government instead recognized demands by timber industries for forest concessions (Vallejos 1998). From 2000 to 2004, six indigenous communities established forest management plans as a strategy to consolidate their hold on forest areas that were unoccupied and thus viewed as available to outsiders; a seventh plan is currently being evaluated by the state forest agency.[2] Nevertheless, the formalization of property rights remains incomplete[3], and those lands that have been titled are far from indigenous settlements. The areas most populated, where the highest concentration of indigenous communities are located, are still waiting for regularization.

The main problem faced by the land regularization process in Guarayos is the pressure from outsiders attempting to establish landholdings, sometimes fueling corruption involving third parties, the state land agency and indigenous leaders. At the same time, the tenure situation for most indigenous people has not changed or has changed only marginally, as few people live in the areas that have been granted a title. In addition, the Guarayos people currently lack a unified institutional structure capable of effectively administering and managing their expansive territory, given the dispersed indigenous settlements, distance to the titled areas and the nature of this ethnically mixed and dynamic region.

[2] In total, 211,178 hectares of forest have been placed under Guarayo community forest management plans with the assistance of NGOs, which have been assisting communities to develop and implement forest management plans, probably more than in any other region in the Bolivian lowlands.

[3] According to information provided by the state land agency (INRA), by the end of 2003, 970,202 hectares of the area demanded had been titled, and by late 2006 an additional 17,958 hectares were titled.

The agro-extractive communities in Pando, Bolivia

In the northern Bolivian department of Pando, agro-extractive communities have recently gained communal property rights over large expanses of tropical forest based on customary claims to territory traditionally used for Brazil nut gathering. Modifications to Bolivia's tenure reform process have resulted in the titling of nearly two million hectares of forest in favor of communities. The case is particularly noteworthy because the changes attempted to mold the process to the customary forest livelihoods of the region's rural population. While land recognition led to substantial improvement in property rights security, it was not without problems. Ultimately a successful outcome will require adaptation by community residents to organize and align informal institutions to the new formal property titles.

The Pando department has been one of Bolivia's more remote forest frontiers. It has been changing in recent times with the construction of a road connecting the region to the rest of the country. Historically, NTFPs have been the basis of the region's economy. Initially, in the late 19th century, occupation of the region was driven by the rubber boom but later shifted to other NTFPs. Brazil nuts (*Bertholletia excelsa*) have been one of the principal NTFPs extracted from Bolivia's northern forests since the mid-20th century and more recently have become the foundation of the regional economy (Stoian 2000). In fact, since 2003 Brazil nuts have been one of Bolivia's more important forest exports. During the first five years of this century, Bolivia accounted for over 50% of world Brazil nut exports –

or over 70% if only the processed shelled nuts are considered (FAOSTAT 2007). Although Brazil nuts are found in most of Bolivia's northern Amazon, most of the production comes from the department of Pando.

Competition to control forest resources in the region has pitted rural communities against previous forest estate owners, known as *barraqueros*.[4] These actors formerly dominated the region, holding huge expanses of forests rich in stands of natural rubber and other forest products that were harvested by a rural work force held in debt peonage through a system of *habilito*[5], described below. The *barraqueros* lost considerable power with the collapse of rubber prices at the start of the 20th century and recently have been further weakened as a result of land tenure reforms, mainly the recognition of land rights to communities. However, they have actively defended their traditional forest holdings, pushing hard against the claims of communities.[6] Rural communities began to form shortly after the collapse of the rubber boom and, depending on their proximity to urban centers, difficulty of access and relations with former landlords, have different levels of forest dependence and organization (Stoian and Henkemans 2000). Before recent reforms, both types of stakeholders claimed holdings based on traditional access rights but without legal title.

Porto de Moz in the Brazilian Amazon

The Brazilian municipality of Porto de Moz, in the Amazonian state of Pará, has a long history of land struggles. Most of the local communities, established during the rubber boom of the early 20th century, developed diversified livelihoods that include agriculture, fishing and forest extraction. In the 1980s, small- and medium-scale loggers and sawmill owners entered the region and established operations, stimulating the advent of commercial logging. In the 1990s, large-scale timber companies initiated logging operations in Porto de Moz, often encroaching on community lands and providing minimal benefits for local people (Nunes *et al.* 2008; Salgado 1995; Moreira and Hébette 2003). The arrival of the timber companies led to intense conflicts with forest communities, putting in motion a strong movement to expel the companies from their lands. These efforts culminated in 2004 with a presidential decree that created the extractive reserve (RESEX) 'Verde para Sempre' covering over 1.3 million hectares. Although the reserve secured property rights of residents and allowed the communities to exclude timber companies from their lands, it also imposed new constraints on forest use, fueling informal practices and markets and affecting the livelihoods of families established within and near the reserve.

The RESEX changed the patterns of informal logging in the surrounding areas, reconfigured timber markets and shifted local power structures. This compounded the problems of residents that remained outside the reserve, because it not only triggered informal logging within the reserve but also increased pressure from

[4] *Barracas* were formerly 'rubber estates'; nowadays a unit of forest exploitation located in public forests which were under the control of a *patrón*, or *barraquero* who holds the possession of the *barraca*.

[5] *Habilito* constitutes an informal system for advancing credit in the form of cash payments or goods in return for the future supply of forest products, established since the beginning of the rubber boom.

6 According to Ruiz (2005), in 2000 there were 221 *barracas*, whose owners claimed over 3 million hectares of forest, although 71% of this area was controlled by just 44 *barracas*.

loggers on communities outside, which have no formal property rights (Nunes *et al.* 2008). While the communities located outside the reserve do not have the same land or resource use constraints, they are not exonerated from compliance with existing forest regulations. This means that they are not allowed to develop forest management plans until their property rights have been formalized. This has further motivated their fight for recognition from the government. Nevertheless, legalizing land claims is not easy because it entails the navigation of cumbersome legal procedures to transfer and title state lands for communities (Carvalheiro 2007).

The northern Petén region in Guatemala

The study sites in Guatemala focused on the community forest concessions of the Petén. These concessions represent a type of rights allocation to communities through the imposition of a forest management model that initially focused only on logging. Though this model has been adopted successfully, it was implemented by disregarding rules that had been previously developed by local settlers for forest resource access and management, particularly regarding NTFPs. The community concessions were allocated to relatively diverse groups comprising communities settled inside the forest, and others located in settlements or towns in the vicinity.

In this remote tropical forest lowland, the common practice from 1920 to 1960 was the state allocation of large individual landholdings, mostly for cattle ranching, timber harvesting or gathering *chicle* gum (*Manilkara* spp.) (Clark 1998; Schwartz 1990). The latter also provoked an influx of poor peasants from other regions. The process resulted in distinct patterns of settlement, with some based on gum extraction, where family camps were located deep inside the forest, and others linked to logging activities; still others resulted from colonization programs that focused on clearing forests for agriculture and ranching. With the decline in gum prices in the 1980s, the activity waned but not the population, which continues to grow. Starting in the late 70s, *de facto* land seizures called 'agarradas' triggered a new legalization process that attracted landless peasants into the southern region of the Petén. In the north, the establishment of the Mayan Biosphere Reserve (1991-1996) represented a change in the logic of forest use to conservation as a goal, and included the establishment of a new, but weak, government conservation agency and unclear regulations for allocation of usufruct rights. In this period, the Petén underwent significant population growth as well.

As part of the global effort to recognize the importance of forest biodiversity, the Guatemalan government established the Mayan Biosphere Reserve (MBR) to preserve these fragile and threatened ecosystems. Yet government effort towards conservation met with unexpected local resistance since long-term resident communities lost their historic settlement and land use rights granted under the previous regime. The newly formed conservation authorities and foreign conservation NGOs were seen as invaders who were undermining the very basis of their subsistence. In a relatively short period of time, widespread polarization set in between communities and those associated

with the MBR while a distant central government remained anxious to maintain peace. Thus, in 1994 the government put into place a formal community concession system in the Multiple Use Zone of the MBR. What emerged was a much more complex system of community concessions based on the recognition of d*e facto* settlement rights for some, while conferring to others access, use and management rights to forest resources.

The entire tenure reform that led to the establishment of community forest concessions was focused on the exploitation of timber resources, despite the fact that only a small proportion of local community members had previous experience in logging activities. The community concession model allowed for the transfer of use and decision-making rights from individuals to legally recognized collective entities and required compliance with a series of regulations, with rights allocated through a 25-year renewable contract. Large scale projects led by the international conservation organizations supported state efforts to establish the MBR[7] and, as the community concessions emerged and expanded their area and importance, significant levels of funding were directed toward creating the infrastructure, building capacity and providing the enabling policy environment for communities to develop timber enterprises. This has been one of the most serious attempts in the region to formalize sustainable forest management under community land tenure systems, though with limited rights.

[7] Specifically, Conservation International (CI), The Nature Conservancy (TNC), and World Wildlife Fund (WWF), with a strong backing of USAID.

4 The 'rules of the game' for formalizing property rights

Land rights recognition under disparate tenure models

The wide variety of local populations living in forested landscapes, such as indigenous people, agro-extractive communities, and smallholders, have developed a diverse range of rules, practices and organizational strategies for guiding processes such as territorial occupation, land use and management of forest resources. These strategies have evolved in response to factors such as population pressures, production needs and the availability of technology, and are based on shared perceptions, values and interests. However, in formerly isolated regions, with little previous intervention of the state, customary institutions are now being challenged as community members face pressures from land speculators, loggers and ranchers, as result of expanding road networks, increased land values, and growing market demands for timber.

Indigenous people and other traditional forest communities whose tenure rights are not formalized run the risk of losing their lands through land encroachment and difficulties in excluding third parties who are interested in occupying community lands to satisfy short-term goals (Schmink and Wood 1992). As a result, the diverse array of social groups and forest users have begun to demand that governments secure their property rights claims, usually based on ethnicity, rights-based approaches relying on ancestral claims, and/or traditional occupation, a processes that has been labeled 'community-led land reform' (Sikor and Müller nd). In addition to such claims, governments often face demands from other smallholders, some of whom are landless, who are seeking access to lands in these frontier areas. These groups may make their living through the extraction of forest resources, although more often they

are involved in agriculture production for subsistence and market production that entails forest conversion.

In recent years, governments have begun actively to engage with social movements by accepting their diverse claims, recognizing and allocating land tenure rights in forested areas (Taylor *et al.* 2008). Different land tenure models (i.e., indigenous territories, extractive reserves, agro-extractive settlements, and community concessions), each encompassing different bundles of rights, have been created as a way to formalize property rights in favor of local people (Pacheco *et al.* 2008). As pointed out previously, these approaches for land regularization do not always effectively resolve the targeted problems, and in some cases have actually exacerbated tenure insecurity.

In effect, the formalization of land tenure rights consists of clarifying those rights by adopting formal rules that may (or may not) contradict the rules that communities already employ to occupy land and manage resources (Fitzpatrick 2005). In some cases, formal rules may effectively complement informal ones in providing secure tenure and diminishing rent-seeking behaviors. With indigenous and traditional people, community rules are likely to be customary rules (mainly non-formalized rules-in-use), implying that they have been repeated over time and carried down through tradition and a customary authority structure. In situations where formal rules ignore or contradict customary rules for land acquisition and possession by imposing formal regulations biased against traditional practices, the existing practices of communities are rendered illegal, which in turn reinforces asymmetric power relations by privileging certain elite interests outside of communities. The latter tends to aggravate illegal land appropriation, and generate problems by enhancing the power of authorities that do not respond to traditional social systems. Conversely, the recognition of a traditional authority can reinforce and empower it; when such authorities are not democratic or accountable, this may also lead to the reinforcement of elite interests, corruption, and the exclusion of some segments of the population (see Ribot 2001b; Larson 2008a; Ribot *et al.* 2008).

At times states also adopt rules-of-law that take a hands-off approach to the customary rights of resident groups. The preexisting rights are recognized without major intervention in internal affairs. In other cases, states do the opposite and attempt to intervene more heavily by imposing restrictions on the use of certain resources and establishing rules for internal land allocation and mechanisms for the election of authorities. In the land tenure models that governments have adopted and which are discussed here, there is an implicit assumption that indigenous groups have better developed local institutions for land allocation, use and exclusion than other traditional communities, which are assumed to have weaker systems of rules. However, this is not necessarily the case for some agro-extractive communities that have developed institutions for forest management.

The following section assesses the five cases in greater detail to assess how formal and informal rules related to property rights interact in practice, and their resulting outcomes. The cases offer a range of

Table 2. Formal and informal rules for defining property rights according to different land tenure modalities

Type of rights	Indigenous territory in the RAAN (Nicaragua)	Indigenous territory in Guarayos (Bolivia)	Extractive reserve in Porto de Moz (Brazil)	Agro-extractive communities in northern Amazon (Bolivia)	Community concessions in northern Petén (Guatemala)
Formal rules					
Origin of the claim	Based on ethnicity and ancestral rights	Based on ethnicity and ancestral rights	Right-based claims	Right-based claims	Right-based claims
External boundary demarcation	State demarcated, based on indigenous claim	State demarcated, based on indigenous claim	State demarcated the reserve	State demarcated, based on an estimate of 500 ha per family	State defined both location and area
Internal access demarcation	Individually and collectively defined by customary rights	Individually and collectively defined by customary rights	State ratified existing distribution and delimited community land	Internal demarcation defined by existing practice	No internal demarcation
Land title	Collective for the whole indigenous territory	Collective title held by COPNAG in name of Guarayos people	Collective for the whole reserve	Collective for the community	No land title
Third party rights	Existing third parties rights respected with conditions	Respected with modification if certification process verifies socal economic function of the land	Existing tenure rights inside the reserve respected	Rights recognized on a family basis but only up to 50 hectares but not as part of community.	No recognized third party rights
Alienation of tenure rights	Indigenous lands are inalienable, non-transferable and non-mortgageable	Members of the TCO are prohibited to sell land to third parties	Usufruct rights conceded to local settlers who cannot sell land to outsiders	Prohibition applied to selling or transferring individual plots	No ownership but concessionary rights that are alienable and cannot be transferred
Authority and governance systems	Communal authorities formally recognized and registered by the state	Authorities appointed by TCO members elected to COPNAG	A council has to be created to govern the extractive reserve	Territorial base organization elected by the community	Beneficiaries have to constitute a government body
Informal rules					
Access to individual lands	Defined by household investment in the agricultural plot	Household plots organized in agricultural zones at the village level	Individual plots based on factual possession treated as private property	Customary property rights based on tree tenure (originally rubber trails now for Brazil nut stands)	Increasingly being claimed due to land markets and insecurity
Access to collective lands	Members free to withdraw resources for subsistence, for commerce or agriculture with permission	Access to collective forest in the villages' zones of influence for subsistence and commercial with permission from village	Open access tends to dominate in collective areas. Subsistence and commercial use are informal due to lack of working formal authorization process	Non-occupied lands treated as reserves for future occupation, but access right vary depending on resource	Defined by pre-existing rights to non-timber forest products
Third party rights	Recognized if accepted by the collective	Recognized if land rights are purchased			
Alienation of tenure rights	Outside land sales still occur; community authorities trying to stop this, even on private individual plots within the territory	Accepted informal transactions, rental of forest lands to outsiders or agriculture and land sales among TCO members and outsiders	Permitted transference of land improvements to local settlers and outsiders	Control of land sales vary depending on the community, usually involved sale of 'improvements' to gain access rights.	Land sales occurring but not in study communities
Authority and governance systems	Authorities elected by indigenous group at community and territory level, not always recognized by state	Authorities appointed by members in zones and village level councils	Local leaders at the community level	Agrarian syndicates elected by the community	Community authorities exist parallel to concession authority

Source: Elaborated by authors based on Albornoz *et al*. (2008), Mendoza *et al*. (2008), Monterroso and Barry (2008), Nunes *et al*. (2008), Vieira *et al.* (2008), Wilson (2008).

situations in terms of land tenure models used to formalize land rights, the level of development of informal rules and institutions for land possession, and conditions regarding pressure from third parties. The Nicaraguan RAAN case examines the emergence of indigenous territorial models influenced by a system of regional autonomous government. In the Bolivian Guarayos case we describe a large indigenous TCO property superimposed on an ethnically mixed, dynamic frontier; and in the Pando case the focus will be on agro-extractive communities that have received communal title to forests traditionally used by residents. In the Brazilian Porto de Moz, case we compare the impacts on agro-extractive settlements within the RESEX to those remaining on the margin. Finally, in the Guatemalan Petén, we will analyze the manner in which diverse communities were accommodated within a community timber concession model. Table 2 details the main formal and informal rules shaping land rights found in the different study areas.

RAAN: formal rules resting on previously informal institutions

In Nicaragua, in 2003, the Communal Lands Law[8] (Law 445) was enacted. Like the Constitution, the Communal Lands Law formally recognizes the rights of indigenous and ethnic communities to their historic territories, but it also establishes the institutional framework for demarcation and titling and for the formal recognition of indigenous authorities. This law guarantees indigenous communities "full recognition of rights over communal property, [and] use, administration and management of traditional lands and their natural resources" (Art. 2). It establishes mechanisms for negotiation among neighboring communities and makes it clear that colonist invasions of lands claimed by indigenous communities are illegal, establishing the basic guidelines as to how third parties (usually non-indigenous colonists) in indigenous territories should be dealt with. Under these guidelines, colonists with legitimate titles issued prior to 1987, and who are in possession of their land, may remain, but if they wish to leave they must sell the improvements to the community. Those without legitimate titles should be compensated and the lands returned to the community. Those who have no title but wish to stay should leave or pay rent. Indigenous lands are inalienable, nontransferable and non-mortgageable.

The most significant immediate change for indigenous communities was in the role of the state, which, prior to the International Court decision[9] that led to the Communal Lands Law, granted itself the right to alienate indigenous lands considered 'national lands'. In the 1990s, this was expressed primarily through land giveaways to combatants who demobilized after the 1980s war. The state also gave forest concessions on these lands to the timber industry, without any consultation with resident communities. These activities were suspended pending the definition of indigenous territories. The recognition of

[8] Abbreviated from: the Law for the Communal Property Regime of the Indigenous Peoples and Ethnic Communities of the Autonomous Regions of the Atlantic Coast of Nicaragua and the Bocay, Coco, Indio and Maiz Rivers.

[9] The community of *Awas Tingni* filed a Inter-American Court for Human Rights demand against the Nicaragua government for granting a forest concession to the Korean company SOL-CARSA, in 1995, on their traditional lands without community consent. In 2001, the International Court ruled in favor of Awas Tingni. The Court ordered the State to adopt the relevant legislative and administrative measures necessary to create an effective mechanism for demarcation and titling for indigenous communities "in accordance with their customary laws, values, customs and mores" (Judgment, cited in Anaya and Grossman 2002).

indigenous territories involves resolving boundaries with neighbors and outsiders that hold lands inside a territory. There are also issues of scale at which the territory is demarcated and the establishment of new territorial authorities elected from among traditional community authorities. While regional political leaders are promoting the demarcation of large territories in order to move more quickly, some communities prefer smaller territories at the community or smaller multi-community scale, which is more familiar and for which they have created functional territorial level institutions. An associated issue is that the elected territorial authority (*síndico*), a traditional authority existing previously only at the community level, has legal powers over natural resources as well as access to state tax income from resource exploitation on behalf of the territory; thus, community level authorities fear losing direct control over both natural and economic territory and resources.

The law recognizes a 'tenurial shell' (Fitzpatrick 2005) as defined by indigenous people and the right of communities to continue to manage the internal allocation of land and resources according to customary institutions; it does not attempt to codify these rules, although it does create a system for the recognition of existing, specific customary authorities. In practice this has meant the registration of communal and territorial authorities by the regional government. While in some cases registration occurred without incident, in our study sites the regional government has established arbitrary rules for the composition of the territorial authority in violation of the law, which states that communities should choose their authorities based on their own customary systems. Hence, the government has failed to register the elected authorities or has registered different authorities than those elected, and, in at least one case, an official colluded with the authority registered to gain access to community funds. Ultimately, it is important to note that the state decides who it will recognize.

The resources inside community lands are usually allocated to household agricultural areas and to common use, although there is some variation between communities. In the RAAN case studies the areas designated to households were treated as private property to be passed down from one generation to the next, and could also be traded among community members. In the study territory of Tasba Raya, which actually has individual land titles as well as a collective area, landowners have been able to transfer landownership to people from outside; they have also allowed some outsiders to obtain agricultural lands in common areas. Yet people considered 'founders', and their children, often obtain the best areas, without limits regarding number and size, and may even do so without the prior consent of community authorities. At the other extreme, outsiders or new members of the community are more likely to be granted use rights to small areas. If, over time, they are accepted into the community, they will be granted an area more permanently. Tasba Raya's remaining communal area is open for hunting and collection of firewood and other products as needed. In the second study area, Layasiksa, where there are no private parcels, a communal land area is designated for family agriculture, although there are some conflicts with residents who do not respect other families' areas.

Land sales in Tasba Raya are more common than in Layasiksa since many residents of the former have individual titles. Although these titles, as agrarian reform titles, are by law not transferable, there is an active informal market for lands granted under these titles. At various times, the state has also permitted their sale and has often legalized the registration of new owners. Sales have thus occurred both legally and illegally. While occasional suits are brought against new owners, depending on particular government administrations, illegal sales have usually been ignored. Currently, however, the Communal Lands Law adds an additional level of control over land sales, stating that 'improvements'[10] should be sold to the community, rather than to outsiders. Hence Tasba Raya's leaders have established a set of rules to try to stop outside sales. These include notifying the buyer and seller of the illegality of the transaction, expelling or undertaking actions to impede the buyer from gaining access to the land purchased, notifying the appropriate government authorities and prohibiting anyone selling land from acquiring new lands in communal areas. Hence, the (formal) land law has driven the creation of new (mostly informal) working rules, in an attempt to increase the control of the collective over individual areas, particularly with regard to the exclusion of outsiders.

The law does not recognize titles conferred after 1987, but the state itself continued to give out lands in both communities in the 1990s. Specifically, these are areas of forest, 5,000 hectares in Layasiksa and 11,200 hectares in Tasba Raya, known as Collective Blocs, given to groups of indigenous combatants as part of the peace accords. The ownership of these areas has not been challenged by the communities, probably for two main reasons. First, most of the beneficiaries also live in the communities; second, the Miskito population respects the combatants who fought for their rights to land and autonomy. However, changes in ownership and the sale of forest resources in these areas have raised concerns, and fall within the region over which Tasba Raya authorities are seeking greater control. In Layasiksa, beneficiaries living in the community were actively seeking to prevent the sale of land by one of the beneficiaries who was claiming to represent the group.

The local authorities in charge of overseeing land and natural resources have traditionally been the *wihta* (judge) with regard to internal allocation and the *síndico* with regard to relations external to the community. Both of these authorities are elected in community assemblies and often remain in their post until there is a reason to have them removed, though the formalization process now requires registration of the *síndico* every year. Over time, however, the role of the *síndico* has expanded, displacing that of the *wihta* with regard to land and natural resources (with the role of the judge staying focused more on internal crime, and conflict resolution). In recent practice, it is the *síndico*, then, that has represented the community in land and resource transactions externally, and allocated resource use internally. This has resulted in serious problems in many communities, as *síndicos* have become an easy target for corruption. For example, in one of Layasiksa's neighboring communities, with which Layasiksa has had the most conflicts over land and resources, colonists

[10] Since land itself should not be sold, 'improvements' refers to investments made by the landholder. This often includes clearing forest for agriculture.

have invaded part of their territory; many people believe that a *síndico* was selling this land, as has been a problem in other communities of the RAAN. *Síndicos* have also presented problems with regard to timber sales, by failing to provide accounts to the community or selling community resources for their own profit, or simply through their limited negotiating capacity or lack of knowledge regarding fair prices.

Guarayos: formal and informal rules eroding local governance

In Guarayos, informal property rights institutions have been given a certain degree of formality with the creation of the TCO. Within the TCO, the INRA law defines customary practices (*usos y custumbres*) as the guiding rules for allocating and using property and associated natural resources. However, in practice the formalization process has not spatially captured much of the area governed directly by the Guarayo peoples' informal rules; rather the areas included are far from their settlements. The result is 'competing' institutional frameworks in which formal institutions are inefficient, such that informal institutions continue to direct local behavior, while at the same time these institutions are under increasing pressure and contestation by outsiders. The incongruence between the two systems has created an opportunity for corruption and rent-seeking behaviors by powerful groups and individuals that have eroded territorial governance.

A key difference between informal and formal property rights institutions in Guarayos is related to the issue of scale: informal institutions function primarily at the village level, while the TCO is supposed to function at a territorial level with authority granted to the Guarayos representative organization COPNAG. There are functional reasons for this dichotomy as village level institutions, as will be explained, manage the organization and allocation of land for household subsistence production, while the TCO manages territorial governance, leaving local, internal rules open to interpretation by members. For practical reasons, local level institutions are well developed, while territorial institutions are still emerging and are not functioning well. This is partially due to the fact that as an entity the TCO is vague and incomplete, being a large territory that is not always contiguous and with a diverse ethnic mix that encompasses a significant non-indigenous population. More importantly, governance responsibility for the territory was passed to COPNAG, which was not designed as an institution to manage and administer a collective area of land and resources but rather as a collective movement to advocate more generally for Guarayo interests. Hence, mechanisms for collective decision making, clearly defined rights and responsibilities of leaders, as well as processes for oversight by constituents are not sufficiently developed within COPNAG.

Authority over the informal institutions that allocate land for agriculture is held by village councils called *centrales* composed of resident adults with elected leaders. Lands immediately surrounding settlements are divided into 'agricultural zones' (*zonas agrarias*). Beyond these, forest lands and wetlands are considered zones of influence (*zonas de influencia*) that are the loosely defined territories usually extending for 15 to 20 km from each community, depending on its size. Although it is not clear when this

form of territorial organization originated, it is similar to the agrarian unions formed by peasants when claiming land. It was likely influenced by outsiders who arrived with the frontier expansion that started in the 1970s, a time when Guarayos families felt greater pressure to develop a strategy for occupying territory.

Agricultural zones provide a means to distribute agricultural lands to resident households and are authorized by the village 'central' at the request of groups of local families looking for land to cultivate. The agricultural zones are communal areas with an assigned president. The size of the zones varies depending on the number of member families, although they usually include less than a couple dozen families. Each family is granted ownership of plot that typically contains swidden agriculture fields, fallows and forest areas. Ownership is based on use and can be passed from one generation to the next. However, by custom families can not sell their rights, and if the plot is abandoned the president can assign it to another local family. The number of zones depends on the size of the community (for example, the study site of Cururu has only one zone, while Santa Maria is one of eight zones of the community Yotau). The zone of influence is a communally held reserve area, where forests are used by community members for subsistence (hunting, extraction) and if necessary for the expansion of agriculture. Located outside indigenous communities, these zones have no formal or legal standing other than being manifestations of the *de facto* occupation of land.

To demarcate the TCO, INRA has to evaluate competing claims and 'regularize' legitimate property rights (a process called *saneamiento*) before titling lands for indigenous people. At the start of the process, INRA 'immobilized' the territory within the TCO demand: this was supposed to freeze land transactions while the agency sorted out contested property claims. There were legitimate third party claims to land within the TCO demand, such as landowners with long histories in the region or who had purchased land and received title prior to the initiation of this round of the agrarian reform process. Though these people's rights needed to be considered, the process did not effectively protect indigenous claims. Working at the territorial scale limited the effectiveness of the TCO as a property rights institution because mechanisms for resource allocation customarily worked at the village scale.

The polygons INRA defined combine multiple communities in large areas, which complicated distinguishing membership from an ethnically mixed population. Rather than focusing at the settlement scale and addressing customary properties delineated by agricultural zones, INRA instead grouped large expanses of territory into five polygons. These were independent of the pattern of indigenous land use, and apparently drew a distinction between distant areas that were unoccupied and the contested lands near the highway and settlements. INRA adopted a strategy of first concentrating on remote polygons with few inhabitants instead of attempting to affirm indigenous land holdings near settlements. This strategy allowed the agency to cover more territory rapidly by avoiding the need to resolve competing claims (i.e., the places where people live).

The long delays and focus on uncontested areas allowed illicit land transactions to take place in the accessible lands that were

highly prized by both indigenous people and outsiders. Some unscrupulous actors paid for forged titles or other documents, including certification from corrupt COPNAG leaders 'proving' the existence of property prior to the TCO demand (López 2004). The atmosphere of illegal transactions has also begun to undercut the customary system established by the Guarayos people to allocate land. Some families that had received individual title to their plots, or documents authorizing their occupation during earlier agrarian reforms, realized that they could sell these rights to outsiders and move further into the forest to establish new plots. During the long delay, members of some agrarian zones claimed by ranchers or non-indigenous farmers accepted payment to drop their claim to the land. In such cases it was apparently easier for indigenous families to make these decisions because of the perception that large areas were going to be titled in their favor (although under communal titles, which would hamper chances for future land sales).

The potential benefits of formal property rights, along with the legal regulation and authority they would entail, have not to date extended protection or greater security to most indigenous families in the province. Generally the areas where indigenous families live and the lands they use for production have remained in limbo, immobilized but not titled. In fact, the process appears to have started breaking down the customary institutions as indigenous people are pushed off (or sell) contested lands. Furthermore, conflicts over evidence of illicit land transactions have surfaced, splitting the indigenous movement represented by COPNAG (Moreno 2006). Although almost a million hectares have been titled, these lands are far from where most indigenous people live and are too remote to use. In most cases the customary institutional rules governing land use are only relevant to the areas where people actually live, and irrelevant for distant areas far from reach.

Porto de Moz: imposing conservation-inspired formal rules

The creation of the RESEX 'Verde para Sempre' by Brazil's Federal Government in the Porto de Moz municipality recognized the territorial rights of a mix of local communities and landholders located on the western bank of the Xingu River. At the same time, the residents of communities on the eastern bank of the river, outside the reserve, are struggling to be recognized by the state land agency and have not attained formal land rights. The tenure rights in the RESEX are based on conservation principals linked to forest protection rather than to assuring the productive use of land. Local people - influenced by NGOs and conservation organizations – adopted the RESEX model to formalize their land tenure rights as an expedient way to gain rights to an extensive territory.

In its basic formulation, the RESEX is a mechanism for granting collective usufruct rights to people with some forest-based livelihoods whose land claims are at risk of encroachment. However, formal land ownership is still held by the federal government. The reserve lands form part of the area included in the national system of conservation units (SNUC) created in 2000. As such, strict land-use constraints apply for the RESEX, more so than for other property types or private landholdings. The

law prohibits the use of species threatened with extinction, or practices that inhibit the natural regeneration of ecosystems. Furthermore, commercial logging is only permitted under special situations, when it is complementary with other activities of residents, and in accordance with sustainable forest management plans. Finally, the area allowed for forest conversion is limited to a maximum of 10% of the RESEX.

Prior to the creation of the extractive reserve in Porto de Moz, some communities began demarcating collective forest lands to extract timber and Brazil nuts and to avoid invasion by loggers or other outsiders. The strategy offered an alternative for communities to ensure access to collective lands for extractive uses. The Sustainable Development Committee (CDS), as an association of several local institutions that promoted the creation of the RESEX, supported this initiative in response to pressure from timber companies on community lands. As a result, four communities demarcated their collective forest (with areas varying from 2,000 to 15,000 km^2), undertook timber inventories, formulated forest management plans, and developed some basic management rules. Six more communities have since initiated the same process.

An emerging issue is the allocation of individual tenure rights inside the RESEX, given that communities of smallholders coexist with medium and large-scale cattle ranchers that were included within the 'tenurial shell' when the RESEX was defined. However, if internal demarcation of areas for communities and individuals takes place, the implication is that the creation of the RESEX was just the first step to regularize the land tenure claims of smallholders and cattle ranchers, rather than to serve conservation purposes. Informal rules state that individual ownership is attained by the simple possession of the land. While families initially established possession of different sized areas, over time —as result of the parallel agrarian reform process in colonization areas, residents have tended to keep 100 hectare claims.

The formal rights granted in this land tenure model prohibit residents from selling land, mostly as a way to avoid land concentration that could dispossess poor people from their main asset. Though they are less dynamic in areas in which traditional land rights are recognized, land markets are quite active in other areas in spite of the restrictions. Given that land access is defined at the household level, even though the properties are collective, land transactions are allowed informally within the RESEX. Thus, the plots are divided by residents and then sold. State agencies are unable to oversee the entire territory and have not been able to create effective mechanisms to control these highly developed land markets. Furthermore, there are no effective mechanisms operating to stop encroachment into the RESEX, particularly on the southern borders of the reserve where there is an incursion of large-scale cattle ranchers (IEB 2006).

Pando: drawing on informal rules for formalizing rights

The property rights institutions in Pando's agro-extractive communities are derived largely from the informal institutions supporting customary livelihoods of residents and subsequent legal rights adapted to accommodate the forest holdings they encompassed. Pando's extractive

communities have traditional property rights that evolved over time, and the form taken today has been driven by the demands of forest extraction, which is carried out at the household level. Initially rural families were dispersed throughout the forest to facilitate the daily extraction of wild rubber (*Hevea brasiliensis*), but with the emergence of greater dependency on Brazil nuts, communities shifted to more nucleated settlements with seasonal occupation of forest holdings during the harvest. This household level production is linked to extensive networks of intermediaries and buyers that provide financing, materials, transportation and storage services to support the harvest and ship nuts to processing plants and abroad to global markets.

The customary property rights claimed by these families are based on a type of 'tree tenure' (Fortmann *et al.* 1985) which recognizes access rights to individual trees and related infrastructure held by individual households or family groups. Access rights are organized by '*castañal*', which are clusters of Brazil nut trees connected by trail networks to a simple base camp. Typically, a *castañal* can have anywhere from a few dozen to over several hundred trees, spread over hundreds of hectares.

The system does not emphasize control of contiguous territory but only the key resource (Brazil nut trees) and related infrastructure (trails and storage areas). Together the land claims of agro-extractive communities consist of a mosaic of individual rights to *castañales* held by residents. In addition, families claim usufruct rights to plots of land for agriculture and can extract other forest products from community areas as long as the activity does not infringe on neighboring *castañales*. In newer communities, the system may be less defined, but in established communities the customary tree tenure is well developed and quite specific even though no formal documentation of these rights exists (Cronkleton *et al.* 2007). Although lacking a clear legal foundation, the system has been sufficiently resilient to allow NTFPs to drive the regional economy and allow people to sort out forest property rights issues to maintain a very lucrative and important forest industry.

The formal recognition of the property rights of agro-extractive communities developed as a modification to Bolivia's tenure reform. The INRA law did not bring immediate change to the region as its implementation was hampered by a tense stand off between *barraqueros* and community level producers and their representative organizations. An initial decree in 1999 would have granted the *barraqueros* concessions to 3 to 3.5 million hectares of forest, which would have benefited only about 200 people (Aramayo 2004), sparking protests by smallholders who felt that their customary claims were being excluded. In response to protests, the government shifted course, determining that in Brazil nut producing territories (Pando and northern portions of La Paz and Beni departments), the minimum area provided to *agro-extractive* communities would be 500 hectares per family (rather than the 50 hectares usually granted to smallholders). This area corresponds roughly to the size of a territory traditionally used by families to harvest Brazil nuts. However, rather than attempting to title individual properties, the policy was interpreted so that communities would receive communal properties more or less equivalent to 500 hectares per

family. The internal rules for distributing resources within the property were left to the communities to determine but were assumed to reflect existing practice.

To determine which rural people qualified for the titling program, INRA focused on all agro-extractive communities that had registered for legal status (*personalidad juridica*) and formed representative organizations known as OTB, in response to the country's Popular Participation law to gain voice in local government. INRA used the OTB lists of resident families to determine the approximate size of their territorial polygon based on the 500 hectare per family rule. A review of unpublished INRA data from the end of 2007 shows impressive results in the titling of lands in favor of agro-extractive communities in Pando; of a total of 245 communities, 139 have been titled and received 1,807,320 hectares. An additional 24 communities are having their claims processed, which, once finished, will add another 112,384 hectares of forest. Once INRA finalizes the titling of communities, it will begin formalizing NTFP concessions for *barraqueros*, having registered 237 demands in Pando for a total area of 1.5 million hectares, also according to unofficial information provided by INRA.

Some problems have been encountered in defining the boundaries of community land, indicating the limits to which generalized formal rules can be applied to heterogeneous communities with locally adapted informal rules. Boundary markers for communities are placed by INRA with the assistance of residents to delineate the forests they use, while also taking into account the claims of other communities and private property owners. However, if the residents did not understand the process or it was rushed by INRA technicians, the resulting polygon did not always s reflect the traditionally used forest area (Cronkleton *et al.* 2007). Because families in these communities typically rely on natural boundaries for divisions, rather than the imaginary polygon outline, they can remain unaware that some of their forest resources have been left outside the property. If the excluded area is granted to a neighboring community, affected households quickly learn this when confronted by the new 'owners' during the Brazil nut harvest. While in most areas communities had reached agreement on traditional boundaries that were seen as legitimate, the polygon boundaries have created new conflicts. Depending on how these conflicts are eventually resolved, such circumstances can undermine the legitimacy of the new legal boundaries.

Because some communities occupied lands that were much smaller than the 500 hectares per family standard, and because some communities grew naturally during the years of the demarcation and *saneamiento* process, they were allocated additional lands called compensation areas. However, the way in which INRA has defined compensation areas has limited their benefits to communities. Ideally, compensation areas would enlarge community polygons into contiguous areas, which would be easy for the residents to access. Nevertheless, under pressure to complete the process, INRA apparently found it easier to identify land in remote areas. The agency also grouped small communities together for compensation area grants; for example, in one small community near Cobija, the residents learned that their compensation area had to be shared with three neighboring communities. In total, the four communities

were granted rights to approximately 20,000 hectares of compensation area located in an area relatively distant from their current homes. Since these communities have no tradition of working together, it is not clear how rights should be distributed among them. In addition, the community members learned that there were already families living in the forest with customary claims over the Brazil nut groves. Though they initially expected the government to remove these families, this has not been the case, and in spite of having title, some community members have had to purchase rights from families occupying the land to gain access. Such options are not open to those with fewer resources, however.

Petén: formal law reshaping existing informal land rights

This case study illustrates the process of formalization of rights in northern Petén through the creation of community forest concessions. For some communities, such as the study community of Carmelita, which is located inside the forest, rights formalization included the recognition of permanent physical presence and natural resource use. It is noteworthy that each successive process of transferring rights by the state incorporated those previously granted to the same community. For example, Carmelita enjoyed the formal recognition of settlement rights to 'permanently occupy' 40 hectares of forest land per family, which were granted in 1994, giving legal status to the presence of chicle gum tapping families in the remote forest regions. The National Law of Chicle Gum, issued in 1979, dictated that all Guatemalan citizens were entitled to extract this product within national borders. These laws that formally recognized community rights of settlement, and for the use and extraction of gum, were the only formal rights granted to these communities, and established the basis for the expansion of a broader set of rights under the community forest concessions in the late 1990s. During the same period, and within the same forestlands, private timber industries were also granted rights to extract timber, under short term (5-10 year) contracts. The industrial concessions prohibited Carmelita and the other communities from any rights to timber.

The families that make up the community of Carmelita had *de facto* informal rights to practice small-scale agriculture and to hunt, fish and extract two basic non-timber forest products for commercial purposes, *xate* (decorative palm) and others species, all of which made up their livelihood base. The criteria for determining the territory of the forest concessions granted to Carmelita were based on the claims made by the community itself, using the presence of gum tapping camps, gum tree groves and *xate* camps and the traditional areas where large expanses of *xate* grow on the forest floor. In other words, their *de facto* livelihood natural resource base and the scale of their practice, or the informal rules, strongly influenced the area claimed for formal rights.

Nevertheless, the original size of the territory claimed for the concession, 150,000 hectares, was reduced to less than half, 54,000 hectares, when it was granted. The criteria for negotiating the area included both the demonstration of historic resource use and the forest area that constituted the natural resource base for livelihoods, determined by the number of resident families. Neither timber stands nor some notion of stock commercial value were taken into consideration in establishing

the specific area or size of the concession, despite the fact that the model for the concession was based on sustainable timber management, rather than NTFP. In other words, while the use of NTFPs was the basis for establishing the concession area, the regulations focused on timber extraction, an activity yet to be introduced, which had repercussions for the decision-making sphere.

The new law required the formation of collective entity with *personería jurídica* to receive the concession right for a renewable 25-year contract. An informal community organization (*comité pro-mejoramiento*) was thus used as the basis for establishing the legal entity, in this case a cooperative. The concession contract modified the role and powers of the cooperative, because the community concession formed part of a larger conservation scheme, playing an essential role in the buffer zone for the protected areas and parks inside the Mesoamerican Biological Corridor. The regulatory framework that emerged for timber management introduced formal rules inspired by conservationist goals. The concession gave the communities use, extraction, and management rights to timber and NTFPs and exclusive rights to the concession area.

5 Forest use and imposed management models

Management rights constitute a key component of the 'bundles of rights' that governments recognize in favor of indigenous people, traditional communities and smallholders. Two issues are central in assessing the role that formal and informal institutions play in the management of forest resources. First, most local groups that depend on forest resources for their livelihoods have, to some degree, crafted their own rules for the management of those resources. However, many of these rules have been devised for governing local territories and economies not integrated into larger markets. Second, formal rules for the management of forest resources emphasize commercial logging, while most local groups do not have well developed rules for managing their forests at this scale or organizational strategies for implementing these new formal rules. While in some cases indigenous communities and smallholders have learned to manage their timber within market economies, many have struggled to adapt to new models of forest management, with externally formulated rules and operational premises derived from large-scale entrepreneurial commercial logging.

A central argument developed here is that current forestry regulations tend to ignore the informal norms devised by communities for forest resource use, as well as their governing mechanisms for enforcing such norms. This is because forestry regulations have promoted management models for a heterogeneous range of forest users using a homogenous approach (see also Blaikie 2006), which does not necessarily correspond to, and sometimes contradicts, the norms for subsistence (or sometimes small scale commercial use) devised by communities. This has clearly led to situations in which formal rules neglect local knowledge and practices, impose organizational solutions similar to large-scale industrial models, encourage the adoption

of 'good practices' of forest management, mainly for logging, and ignore other forest uses relevant for people's livelihoods (Medina and Pokorny 2007; Pokorny and Johnson 2008).

Several problems have arisen from the imposition of external models for community forest management. First, state agencies have limited capacity for controlling and enforcing new forest management rules or the adoption of 'good practices' since most control takes place outside the communities. Second, it takes time for communities to develop organizational systems to enforce the new, externally imposed, set of rules. More importantly, smallholders and communities often lack the technologies and knowledge for implementing the recommended forest management practices and are thus forced to look to external service providers (i.e., local loggers, timber companies, forestry projects, NGOs) to provide the necessary technology, skills and capital to implement the 'sustainable forest management' project (Pokorny and Johnson 2008).

Formal 'rules of the game' for forest resource use

Table 3 summarizes the primary formal conditions imposed on communities for forest management, along with the existing informal rules. The model is relatively simple. First, to benefit from forestry rights, smallholders and communities must have formalized their ownership, backed with titles or formal certificates. Second, there are often no constraints for using forest resources for subsistence needs, but commercial uses of forest resources, mainly timber, require compliance with regulations established by Forest Laws. The restriction on commercial forest use is based on the assumption that traditional uses, particularly low-intensity subsistence activities, are less of a threat to the forest.

When communities engage with markets, they are required to develop management plans that attempt to introduce practices ensuring sustainable forest management (such as reduced impact logging or RIL) and pay forest fees or taxes. Forest Management Plans (FMP) usually require that planning be based on information gathered through forest inventories and estimates of the stock and allowable harvest rates of commercial grade timber species, along with other characteristics of the management area. Every year an Annual Operating Plan (POA) must be proposed based on a census of all potential species to be harvested. Both the FMPs and POAs have to be checked and approved by the state forestry agencies, which are also responsible for verifying compliance with management regulations and sanctioning contraventions to the norms.

In the different countries studied, the forestry laws require management plans for all commercial logging, although under different schemes. For example, in Nicaragua there were three types of plans until 2006, which made smaller scale logging easier and cheaper. Forestry regulations in 2003-2004 established a graduated system of requirements that included: (1) Replacement Plans for areas below 10 hectares, (2) Minimal Plans for 10-50 hectares, and (3) General Management Plans and Annual Operating Plans for areas over 50 hectares. In addition, logging in areas over 500 hectares requires

Table 3. Formal and informal rules for forest management according to different land tenure models

Type of rights	Indigenous territory in the RAAN (Nicaragua)	Indigenous territory in Guarayos (Bolivia)	Extractive reserve in Porto de Moz (Brazil)	Agro-extractive communities in northern Amazon (Bolivia)	Community concessions in northern Petén (Guatemala)
Formal rules					
Withdrawal for domestic consumption	Exclusive rights over forest and non-forest resource use defined by customary rules of the community	Indigenous members of the TCO have no limits to the withdrawal of resources from their lands	No limits to withdrawal of forest resources from individual or community lands	No limits to withdrawal of resources for non-commercial uses from allocated lands	No limits to withdrawal of resources for non-commercial uses
Harvesting with commercial goals	Logging requires approved FMP, no constraints to NTFP harvesting	Logging requires approved FMP, and NTFP harvesting requires specific plans to be implemented	Logging and NTFP harvesting require a development plan, zoning plan, and specific FMP	Logging and Brazil nut harvesting require authorized FMP	Logging requires approved FMP and certification, NTFPs require management plans (partially implemented to date)
Forest rights to third parties	Community authorities must authorize all contracts for resource exploitation by third parties.	Indigenous people have exclusive rights to use the forest within the TCO	Land transfer or contracts with third parties are not allowed for forest resource use	Land transfer or contracts with third parties are not allowed for forest resource use	Land transfer or contracts with third parties are not allowed for forest resource use
Authority and governance systems	Local indigenous authorities are recognized and registered by the state	General indigenous organizations exert formal authority in the TCO	Local residents forced to create a council to govern the extractive reserve	Authority exerted by agrarian syndicates elected by the community	Social groups need to constitute a productive organization to claim a forest concession
Informal rules					
Withdrawal for domestic consumption	No restrictions on the withdrawal of timber and non-timber forest products from collective areas	No restrictions on the withdrawal of non-timber forest products from collective areas	No restrictions on the withdrawal of non-timber forest products from collective areas, but restricted harvesting in private properties	No restrictions on the withdrawal of forest resources from collective areas, but constraints on trails and trees with existing rights	Pre-existing rights recognized and accepted
Commercial harvesting	Community rules prevent harvesting or limit the volume of timber extracted from collective areas	Allowed only in collective forest lands in exchange for a contribution to the community	Allowed only in areas demarcated for collective access by communities	No constraints to Brazil nut harvesting, and no rules for logging	No local rules developed for commercial logging, pre-existing rights for NTFPs largely recognized

Source: Elaborated by the authors based on Albornoz *et al*. (2008), Lewis Mendoza *et al*. (2008), Monterroso (2008), Nunes *et al*. (2008), Vieira *et al*. (2008), Wilson (2008).

an Environmental Impact Assessment. A fourth type of permit was created only in indigenous areas of the RAAN for logging pine for local markets. The simpler plans[11], however, were suspended with the implementation of a forestry emergency followed by a Moratorium Law in 2006. All logging now requires a General Management Plan. It is also now illegal for wood to be sawn in the forest; all logs must be milled at a registered industry. Prior to the moratorium sawing boards with chainsaws was permitted under the smallest permits. (Once again a simpler plan, known as a Forest Logging Plan, has been created recently and established temporarily to facilitate logging of salvage wood felled by Hurricane Felix in September 2007, but it still requires the signature of a forester.)

In Bolivia, there are several types of technical norms for forest management. The centerpiece of the legal framework is the technical norm for forest management on concessions and private properties larger than 200 hectares[12]. A similar technical norm was ratified for the development of FMPs within TCOs[13]. Recognizing that some owners of forest properties will lack expansive management areas or have relatively narrow interests in forest use, the legal framework also included other norms and mechanisms for these activities. For owners of small private properties, technical norms for management plans on areas less than 200 hectares were prepared. Rather than sustainable management plans, this mechanism defines a type of harvest permit since it does not maintain the polycyclic requirements of larger management that envision repeated cutting cycles of at least 20 years. The owner receives permission to harvest wood across the entire unit, and although it seems rather disingenuous, it is assumed that the owners will maintain the forest for additional harvests after 20 years have passed. The application process for the latter 'management plans' is greatly simplified compared to requirements demanded by the other norms, and they can be approved relatively quickly. Furthermore, between 2003 and 2006, logging was permitted in areas less than 3 hectares, as a means of allowing smallholders to access small volumes of timber as long as they respected some principles of sustainable management defined by other norms (for example, minimum cutting diameters and protection of environmentally sensitive areas). The 3-hectare mechanism had an extremely simple format but the mode included relatively high fees per volume harvested compared with the other types of management plan.

In Brazil, a distinction is made between high- and low-intensity plans, but both are subject to the same bureaucratic procedures, which increase transaction costs (these costs are discussed more specifically in Section 6). In all of the cases FMPs must be signed by a professional forester, and in community areas plans have to be signed

[11] Even these simpler plans could require a number of bureaucratic procedures. The indigenous local market plans, for example, still required the signature of the *síndico*, the mayor's office, and the Regional Council, tax payments and an inspection by the Forestry Institute before issuing the permit.

[12] Among the requirements is a management plan defining a minimum 20 year cutting cycle and a maximum annual harvest area of only 5% of the total; a complete inventory and annual census; planned harvests using reduced impact logging techniques; respect for minimum cutting diameters; the protection of environmentally sensitive areas and the maintenance of seed trees for natural regeneration.

[13] This establishes a similar technical standard to the industrial norm but adds additional requirements for the formation of local management organizations, documentation of discussion and consensus among residents of collective property about the development of the plan and other social aspects, such as the strategy for distributing benefits. Management plans in TCOs must also be supervised by a forest engineer who also signs off of on the plan and annual operational plans.

by leaders representing the community or territory. The professional forester, who helps to formulate the FPM, is at the same time responsible for the forestry operations in the area. In theory, this system should ensure relative transparency in both the formulation and implementation of the FMPs, facilitating central agency supervision of the plan's implementation.

In Petén, Guatemala, concession organizations were required to have an approved management plan and environmental impact study to obtain a contract. For almost all the concessions, these plans were carried out by NGOs, subsidized by USAID. Each year they must prepare a detailed Annual Operating Plan. The concessions are also required to obtain FSC certification for the enterprises and maintain this for the period of the contract, which involves annual evaluations and periodic renewal. The general management plan, which is not for the same period in all sites, also requires periodic updating and renewal (from 5 to 10 years). After a one to three years' grace period, the concession organizations pay an annual tax per hectare for usufruct rights. Because the concessions export timber, particularly mahogany, they also require export licenses and a CITES permit, which are renewed annually.

Under the FSC system[14], certification constitutes an additional ingredient in the model of sustainable forest management. Here it is believed that command-and-control measures are relatively inefficient in ensuring the implementation of FMPs, or reduced impact logging practices, and that voluntary mechanisms can contribute to maintaining appropriate management standards. In theory, certification provides an incentive for doing so either through market premiums or by securing access to specific markets (Segura 2004). In Guatemala, certification is obligatory for communities to obtain forestry concessions. In Nicaragua, specifically in Layasiksa, WWF has played a key role in strengthening forestry rules by deciding that all logging should occur on the basis of forestry norms and standards associated with FSC certification. In Bolivia, WWF and the BOLFOR II Project, implemented by TNC, have played an active role in helping to certify forestry operations in the indigenous community of Cururú in Guarayos.

Another important issue is that most traditional organizations created by communities and smallholders to regulate internal social issues and economic activities within their lands are not able to operate formally under national commercial norms and codes, nor have they been devised for doing business in open markets. Therefore, communities and smallholders are forced to create new organizations often labeled 'community enterprises'; their creation is inspired by entrepreneurial business models that do not necessarily rely on existing local institutions for forest use and management. In this regard, a whole business culture is imported along with the introduction of FMP and reduced impact logging. This issue has been partly explored in assessments of community forestry (Bray *et al.* 2005). In Nicaragua, Bolivia and Guatemala, forestry projects, in most cases, have assumed responsibility for devising the statutes for

[14] The FSC system allows the evaluation of forest management activities (forest certification) and tracking of forest products (chain-of-custody certification) through FSC accredited, independent 'third-party' certification bodies. These assess forest management using the FSC principles, criteria, and standards.

these 'community forestry enterprises', hence closing the circle on the process of imposing external models on local groups.

Working rules shaping forest management in practice

In Nicaragua, formal rules were often largely irrelevant to communities in the RAAN, who, at least in the past, did not usually know if the buyer had a legal permit or not, nor were they concerned. It is noteworthy that informal rules appear to have emerged at a time when large-scale logging concessions operating in the region increased. Similarly, more restrictive working rules appeared with the recognition of collective tenure rights, and there has been a greater attempt, in some cases, to restrict individual appropriation of collective resources, which previously was not questioned. For example, in one of the two sites studied (the territory of Tasba Raya), local authorities reported that the person interested in selling timber should designate the quantity, species and location of the trees to be logged for a maximum of 5,000 board feet. In addition a small tax should be paid to the *síndico* if the wood is to be sold outside the community. If larger sales are to be made, the logging company or buyer should present a proposal to the community assembly for approval, and in this case all the income would accrue to the community.

In Layasiksa, the establishment of a community forestry enterprise led to an attempt to guarantee that the working rules fully reflected formal law. Hence commercial logging by individuals is not allowed except in exceptional cases.[15] As a working rule encouraged by the forestry management project, all benefits emerging from commercial use of communal forests should accrue to the community as a whole. Nevertheless community members still engage in informal timber markets, selling both timber and firewood semi-clandestinely, and claim they have the right to do so based on tradition and custom. There does not appear to be any sanction for doing this, although there are efforts to convince people to change their behavior. Wood is taken from all areas (family plots, the area owned by ex-combatants and an area in concession to a logging company), but the community's own managed area is respected.

WWF generated substantial controversy in the RAAN when it convinced the Layasiksa community that a new organization needed to be formed inside the community to manage the forestry operation. The decision to create a separate organization was based on the nature of forest management and the skills and knowledge required for market competition. WWF's model changed the rules for forest management, and this shifted the basis for the nature and role of authority in Layasiksa. After a review of all the available options of legally recognized (formal) organizations, the community chose to form a cooperative. To implement this model, however, an internal agreement was developed by the community under which only a few people formally joined the cooperative but all community adults

[15] Simplified logging procedures created for salvage wood felled by Hurricane Felix in September 2007 mean that there is a way to do so legally without a general management plan; and these individuals will use the income to pay debts accrued on behalf of the community when they were leaders.

were informal members. This organizational model makes a substantial effort to involve community members and communal authorities in decision-making. The Board of Directors is elected by the Community Assembly, and the Vigilance Committee, which oversees the cooperative, is comprised of the traditional authorities: *síndico*, *wihta* and council of elders.

The results have been varied. On the one hand there are tensions between traditional authorities and the cooperative, but these do not appear to be serious, particularly since the traditional authorities do play a role in the cooperative and take that role in earnest. There is also ongoing illegal logging, sometimes by these same authorities, who believe it is within their customary rights to continue to sell timber if they choose. Systems of governance, accountability and transparency have improved substantially, particularly in relation to the role of past *síndicos*, who at best failed to keep or share clear accounts and at worst absconded with community funds. Finally, there is far greater collective benefit from an activity that was previously managed by only a handful of residents.

In Bolivia, under the new forestry law, the development of management plans in Guarayos, as in other TCOs, promised substantial benefits for the indigenous population. In theory, the development of management plans – which is tantamount to undertaking timber production – could provide a much needed source of income to the impoverished population. More importantly, it was hoped that the development and approval of forest management plans would provide a unique opportunity to demonstrate their occupation and use of their territory. Yet preparing management plans under the formal norms has proved complex, costly and time consuming and not always fruitful. As a result, some communities have been able to adopt the sustainable timber management model dictated by the technical norms for TCOs, others have adopted formal FMP for individual properties in areas less than 200 hectares, or in areas less than 3 hectares, but most have sold their timber informally.

As mentioned previously, from 2000 to 2004, six indigenous groups obtained approval for management plans in forests around their communities, and a seventh is under evaluation, for a total of 211,178 hectares; the plans range from 2,433 hectares to 60,000 hectares. However, formal forest management is beyond the reach of most indigenous people in the areas claimed as TCO, because they are unable to fulfill the formal requirements: available forestlands are too far from their home, they would need to invest financial resources to undertake formal management, and they lack the accounting and technical skills that are required by the norms. Instead, the conditions that limit legal access to formal management open opportunities for alternative informal institutions that channel benefits to non-indigenous actors under a thin veneer of legality.

The development of forest management plans by indigenous communities as a strategy for demonstrating their hold on the land faces significant limitations. Because of the complexity and cost of developing FMPs, combined with the requirement

that the effort be guided by a trained forest engineer, all of the management initiatives were developed with substantial outside assistance and investment, mostly from NGOs. Although the NGOs promoting forest management are interested in expanding these activities, they seek out areas where indigenous people have large areas of production forests. Such areas are available in the remote titled areas of the TCO, but are rare near most communities, as remaining forests are often fragmented by agricultural expansion, degraded by earlier logging and contested by claims from outsiders. As a result, community forestry initiatives have not expanded further because suitable forests are difficult to find. Also, even if such management plans are approved, they do not guarantee greater security in untitled areas. These areas have still suffered invasions and competing claims from other land owners.

In Porto de Moz, the RESEX was established with the promise that it would help local people take effective control of their forest resources and benefit from their timber. In practice, rather than facilitating local control, declaring the area as a RESEX has transferred control to federal agencies, resulting in centralized, bureaucratic backlogs that have kept the communities in 'limbo' for years. Although the reserve was created in 2004, an emergency plan for land-use zoning in the reserve was only finalized in 2007 and has yet to be approved. Finally, it is not clear how the formal use of forest resources within the RESEX will be developed, given that the collective areas within the reserve are uncertain, since they are not demarcated, and forest management plans cannot be developed until the reserve's management plan is approved, except in special cases. Furthermore, timber management depend on cumbersome procedures.

Notably, only two out of six communities that demarcated their lands with the assistance of a forestry project have been able to develop forest management plans (Juçara and Arimum), thanks to an exception issued by the Brazilian Institute of Environment (IBAMA). The management plans, with areas ranging from 3,000 to 4,000 hectares, are adapted to the current forestry regulations. The communities received assistance from the ProManejo program, a federal government project that supports community forestry through the development of low-intensity harvesting and artisanal wood transformation projects. While Juçara recently stopped operating, the community of Arimum has been trying to develop a larger commercial logging operation that complies with current forestry legislations and could be approved by the state environmental agency. However, the community has not made progress since the formal authorization of the management plan must await the approval of the reserve management plan.

The communities outside the reserve have not experienced any formal change in their tenure rights, though they have begun to demand them. Interestingly, these communities are not petitioning for another RESEX but rather the implementation of a community-based tenure model. This would allow them to continue their livelihood activities without having to comply with all the bureaucratic procedures involved in RESEX management. Nevertheless, they will not be exempted from developing community land-use or forest management

plans, although these are likely to be easier to negotiate and develop. Six communities along the Xingu River are trying to formalize their rights as *quilombos*, a collective property recognizing the rights of descendents of escaped slaves. They believe that the *quilombo* classification will bring greater tenure security, in spite of the fact that they will lose their rights to individual landholdings upon the declaration of collective lands. The results could be problematic, however, since these communities have not developed strong institutions for governing community lands.

The case of Pando illustrates a major disjuncture between formal forestry norms and the informal rules and institutions that frame a key component of the forestry sector in the region. Specifically, Bolivia's formal regulations emphasize timber management while the region's economy has been and is driven by the management of non-timber forest products independently of existing regulations. Attempts have been made to adjust formal regulations to accommodate NTFP production, although they have had limited impact.

At the community level, Bolivia's forestry regulations and regulatory practices do not attempt to control subsistence use of forest resources by residents. Furthermore, the new tenure rights in Pando closely conform to the customary practices and use rights embedded in the livelihoods of rural people in extractive communities. Internal decisions and resource distribution are left to residents to determine, and the organization responsible for the community is the OTB. The new tenure arrangement gives residents the right to exclude outsiders, although communities with large territories in accessible areas find it difficult to completely restrict access to forest resources by non-residents. Properties cannot be divided, although some residents expect (incorrectly) that INRA will return and define their specific 500 hectare plot. Community members are not allowed to sell their rights to others. However, in practice, families that wish to leave communities are able to sell their 'improvements' (i.e. their house, cleared fields, pasture). The buyer can then occupy and work in the forest area traditionally used by the original owner.

Technically, to commercialize forest products residents of agro-extractive communities need approval from the Forest Superintendence, however under existing norms and regulations it is difficult for communities to gain approval for either timber or NTFP management plans, although for different reasons. In the case of timber management, as in Guarayos, most rural communities in Pando lack experience with collective sustainable management of timber and the capacity or capital to comply with required guidelines for preparing and implementing timber management plans. In contrast, community level informants indicated that it was not difficult to sell wood illegally to small-scale logging companies, particularly valuable species like mahogany and cedar, though this is difficult to quantify. There are currently a couple dozen communities with management plans approved in their name, but these have generally been prepared by timber companies and not on the communities' own terms. NGOs in the region are increasingly supporting initiatives to develop timber management plans for communities, although communities receiving such benefits are the exception.

One of the few mentions of NTFPs in Bolivia's Forestry Law (1996) states that in areas where NTFPs dominate, traditional holders of these rights can receive timber concessions, and that rights to timber and NTFPs would subsequently be 'harmonized' through related bylaws. Areas with Brazil nuts or other NTFPs were supposedly to be ceded preferentially to traditional users, specifically *campesino* (peasant) communities and local forestry associations (called ASLs) without competition with other forest users. However, this required the delimitation of the area, the preparation, approval and implementation of a management plan as well as annual operational reports[16]. While these clauses offered an opening for more secure access and formal approval for Brazil nut management, it took almost a decade for technical norms[17] to be issued. Though this was finally done in 2005, to date no management plans have been approved under these norms. One reason is that they suffer from the same problem as timber management norms in that they are costly and complex to implement and require oversight by a professional forester. More importantly, the technical norms do not address issues that would be crucial for promoting good management practices in communities. Nor is there any clear benefit for producers for investing in such management plans. The norms do not address internal diversity in communal properties and do not take into account the multi-stakeholder context found in *campesino* and indigenous communities; instead they implicitly treat the 'manager' as a single individual or entity. The new norms have thus been ignored, and the state lacks the capacity to insist on their use.

One of the government's main goals in increasing control over forest management was to develop a standardized system for fee collection. However, the logic used for timber did not initially work with Brazil nut producers because of the lack of clearly defined legal property rights. Initially the forestry law contemplated an area-based system of forest fees, charged to those granted management rights. For timber the fee was set at one dollar per hectare for industrial concessions. For NTFPs, the fee was set[18] at 30% of the value of the minimum fee (i.e. US$ 0.30 per hectare). But without defined property rights, the state had no grounds for determining what surface area to use for these calculations. As a result, the Forest Superintendence quickly established a weight-based fee system[19]. These fees are paid by the processing plants rather than the resource manager, as is the case with timber products. At any rate, the fee was set so low that it was largely symbolic.

In Petén, Guatemala, tenure reform was driven by a conservation agenda but through struggle and negotiation also included criteria for livelihood gains for local communities. Emphasis was not on developing their traditional natural resource based economies but instead introduced sustainable timber management[20].

[16] (paragraph IV).

[17] Resolución Ministerial Nº 077/2005 Norma Técnica para la Elaboración de Planes de Manejo de Castaña [Bertholletia excelsa Humb & Bonpl.]

[18] Article 37 II (Monto de las Patentes).

[19] Originally these fees were *Bs. 0,30/ Caja de 20 kg* for unshelled nuts and *Bs. 0,75/Caja de 20 kg* for shelled nuts, (Instructivo Técnico No. 003/97, June 3, 1997). However, two years later the fees where converted into dollars at $US 0,005/ kg for unshelled nuts and $US 0,013/kg for shelled nuts (Instructivo Técnico No. 003/98 February 27, 1999).

[20] This is true for most of the concessions. However, there were small groups who had been illegal loggers who took advantage of the reform, turning their illegal activities into legal and highly praised collective management, and profit from the same forest areas.

Sustainable logging by communities was seen as the only option; the fears of conservationists were allayed by requiring certification, while potential timber incomes enticed communities to participate. USAID provided approximately US$ 40 million in funding which, together with another US$ 40 million from other funders, mostly went to setting up and sustaining the conservation agencies and operations to protect the MBR.

To obtain a concession, communities had to adopt an investment model that demanded substantial amounts of financial capital. Once the community concessions were negotiated, approximately US$ 8 to 9 million was invested in promoting the practices and conducting the studies necessary for certification, followed by enterprise development with the concessions to foster vertical integration at the 'macro' level. The community forestry model supported by donors and forestry projects in the Petén encouraged communities to form enterprises, acquire equipment and capacity to process wood (either at the concession level or collectively with other concessions) and then market the timber as a larger group. More recently, they created a supra community enterprise (FORESCOM) as a commercializing entity to help communities to export sawn wood, under the FSC forest certification scheme.

While this timber enterprise model did not initially regulate NTFP collection (though management plans are required, this has been implemented only recently), it established an extensive and complex regulatory framework for timber production. Hence, the concessions granted rights embracing resource use, extraction, and management, including commercialization responsibilities. It also ceded exclusion rights over the entire concession area to the community organization. One impact, in some communities, was to disenfranchise chicle gum tappers and *xate* palm harvesters who were not community members, but had historic, informal access and extraction rights.

The management rights to concessions - mostly focused on timber - were overseen and formalized by the state, which also retained the right to revoke the contracts. These rights were highly regulated and imposed completely from outside, as the community had no previous experience with timber resources management. However, buy-in to this model was offered as the only way to gain access to forest rights (including permanence of residency in some cases). It is through the management rights that the state continues to play a major role, through steep regulations. Certification of timber harvesting was based on international standards and adopted as the official management standard (though not always stipulated in all concession contracts). This required sophisticated management plans, annual operating plans (POAs) and environmental impact studies, to name just a few. Later, additional requirements were added, such as the expansion of timber production to include a certain number of 'secondary' species.

Problems arising from the interaction of formal and informal rules

The systems developed to allow formal access to forest resources for indigenous and traditional communities and smallholders under the label of sustainable community

forestry have resulted in several problems that have been difficult to resolve. First, formal forest management rules involve adopting a model of timber production that is inappropriate for the majority of communities. Most communities cannot cover the costs of developing management plans and other start-up requirements or navigate complicated bureaucracies. Hence most communities are excluded from formal forest management. This reinforces asymmetric power relations in access to forest resources, whereby a few influential actors tend to take advantage of the timber originating on community lands, often selling in informal markets with limited benefits accruing to the community.

Second, when communities do participate under formal rules, existing local institutions, which were more robust in regulating access to and use of forest resources under subsistence economies, tend to be ignored and overridden by a forest management model aimed preferentially at commercial logging. This process often involves substantial support from NGOs or projects, which may lead to a dependence on subsidies as well as undermine the long-term sustainability of local operations. Third, this 'preferred' commercial logging model tends to create or reinforce authority-related problems as it forces the constitution of new organizations that hold authority and substantial power but which have not been built on existing informal organizations, thus facing representation failures. These organizations often lead to new tensions and conflicts inside the community and, at times, to problems of corruption and patronage.

With regard to the first problem, the cases of Guarayos and Porto de Moz demonstrate the way in which outsiders, rather than communities, may reap the benefits of community timber. In Guarayos, in addition to the limitations previously discussed for expanding general FMPs in indigenous communities, the growth of the informal sector, masked by the small scale harvest mechanisms, undercuts the viability of management plans that have already been established. The informal sector drives down the price of wood in the region and makes it more difficult for communities to find service providers to assist with their timber harvests due to the lucrative trade in timber from unsustainable sources. The inability to manage the contested forests near settlement areas sets off a much more deleterious process. That is, rather than uniting to limit the unsustainable use of surrounding forests, smallholder indigenous families have little stake in maintaining forests over which they cannot secure control. On-going informal extraction, then, becomes a possible means for gaining some forest benefits, albeit small and probably short lived. Hence, communities tend to shift toward participation in short term rent seeking activities.

The expansion of an informal market has also constituted a trap for smallholders in Porto de Moz. Because communities were not able to formalize their rights over forest resources, a requirement for developing FMPs under the current forestry regulations, they continued doing what they had always done, since many smallholders depended on timber for their livelihoods. But the informal market tends to provide a level of income inferior to the amount that could be

obtained in formal markets. For example, smallholders cannot offer their timber openly, because markets are controlled by shadow networks established in the communities by middlemen who finance the sawyers, who, in turn, depend on local traders or loggers who provide the capital.

The sustainable logging model has apparently only provided a solution for a small number of communities that, for the most part, have better connections with NGOs or forestry projects, and are thus able to pay for forest management plans and operate in the formal market. This brings us back to the second problem, in which formal rules and a homogeneous external forest management model are imposed over a set of local institutions. In our cases, this occurred in the Petén, the RAAN and Guarayos. The first two cases clearly demonstrate that, with the right kind of external support, communities can learn and adapt to new situations driven by changes in formal laws and by models that impose new requirements and standards, and can develop effective new informal institutions and working rules. On the other hand, these models required substantial external investment and accompaniment, which was not always without considerable community 'push-back' to force adaptations (Taylor 2005).

The way in which existing community institutions were ignored brought about conflicts and tensions that probably could have been avoided; and the importance of external support and subsidies also leave open questions regarding the sustainability of the operations once the NGOs and projects withdraw. Also, although communities' benefits in the Petén and the RAAN have clearly been enhanced, in Guarayos the result has been the erosion of local governance institutions. Finally, many communities and smallholders still have local institutions - mostly devised in the context of poorly developed monetary economies - that cannot face the challenge of commercial logging. In the latter case, the formal regulations have constituted a straitjacket for communities and eroded the local working rules, leaving these people more vulnerable to changes taking place in the markets.

The third problem shaped by the interaction of formal and informal institutions is that of community organization and authority. In the cases studies, most formal regulations recognize the authority of traditional organizations related to broad issues of land administration but not necessarily for forest management. To the extent that forest use is directed at commercial logging, the formation of new organizations is encouraged or required for forest resources use and marketing. The decision to create separate organizations in RAAN, Guarayos and Petén was justified given the nature of forest management and the skills and knowledge required for market competition.

In this regard, there is rarely an existing legal model available that 'fits' with the nature of a community. This may lead to tensions between members and non-members, as well as between the authorities that have traditionally led the community based on different leadership criteria or merit and those involved with the new commercial enterprise. The external organizations that promote these new entrepreneurial

organizations tend to emphasize only technical issues, failing to take into account social and cultural considerations. There is no clear understanding of the nature and meaning of a community enterprise aside from a profit-oriented business (Antinory and Bray 2005). These new organizations may fail to represent all members of the community or group in a transparent and accountable way. In Porto de Moz, with its own specificities, the organization problem is even more challenging since social organizations at the community level are still weak, and there is a greater influence of government agencies in the constitution of the council for the reserve administration.

6 Avoiding the rules for engaging in forest markets

Most forest market interactions take place outside state control. Despite this, and often because of this, most states have developed regulations aimed at obtaining revenue from forest resources, such as fees and taxes, and assuring sustainable harvesting through compliance with management norms to control the origin of forest products. Further norms and policies outside the timber sector regulate or promote other economic activities undertaken by private actors that influence markets for forest products, such as labor regulations, investment and export incentives and, in some cases, commercial constraints. Commercial activities involving forest resources conducted outside the 'rules of the game' devised by the state are informal. Some informal activities break the formal law, and thus are considered illegal and criminalized by the state.

The reasons why forest actors operate outside the law are relatively complicated, and illegal behavior does not necessarily equate with unsustainable practices. For example, some local level stakeholders are unable to comply with burdensome regulations, but their practices for forest resources use – such as low impact logging – may not violate the intent of legislation to promote sustainable management. Other stakeholders, however, have found loopholes or contradictions allowing them to give the appearance of compliance while actually masking unsustainable practices that violate the intent of the legal framework. Understanding the interrelationships between formal and informal forest products markets requires further exploration.

Three main issues are relevant to this discussion. The first is to understand

why some smallholders and communities choose to engage with informal markets. The second is to understand how informal markets work in practice. The third is to determine what benefits local actors receive by selling their forest resources – primarily timber – informally instead of in the formal market. Although these three issues are related, for analytical purposes it is convenient to assess them separately. It is noteworthy that smallholders and communities constitute only two of the many actors involved in informal markets, which often embrace extended networks and multiple interactions of a diversity of players including local loggers, middlemen, chainsaw operators or sawyers, sawmill owners, timber companies and, in some cases, large-scale industries and even timber export agencies. This being the case, smallholders and communities rarely drive these systems but are key actors in supplying the raw material, as they are the ones with legal or de facto control of the timber being exploited.

As discussed in the previous section, formal rules for forest management, which establish the key criteria for participation in formal markets, often impose conditions that make smallholder compliance difficult, imposing high transaction costs and requiring capital and technical expertise that are not available. In such cases, unless they receive external assistance, smallholders are forced to choose alternative forms of forest production that are informal and technically illegal, or to participate in schemes that provide a mask of legality without necessarily complying with the intent of regulations. Both choices place local producers outside the legal frameworks intended to regulate and facilitate honest market transactions through state mediation and courts (to the extent that such frameworks exist in developing countries). As a result, they operate in markets with little transparency, where playing fields are not level and where they have little power to defend their interests. In some cases, being marginalized to the illegal end of the 'formal-informal continuum,' small producers are forced to agree to terms of sale that they would not otherwise accept. The benefits to smallholders and communities tend to shrink as a result of legal barriers and market asymmetries.

Factors driving smallholder engagement in informal markets

The factors that explain why smallholders engage in informal markets can be traced through the perspectives of both 'exclusion' and 'exit' introduced in the section on conceptual foundations, and discussed partially above. While the first refers to those legal and institutional obstacles that complicate or restrict the ability of forest users to comply with the required regulations, the second refers to an implicit (or explicit) decision made by forest actors to stay outside the law. They make this choice either because the costs of complying with the laws override the benefits they could obtain from the formal system, or because the penalty for not complying may be minimal, worth paying or non-existent, hence there is no cost to ignoring the added burden imposed by regulations. These two factors are complementary rather than exclusive and may be difficult to differentiate in practice.

As mentioned above, forest management regulations create exclusion problems for smallholders and communities for a number of reasons (see also Larson and Ribot 2007).

In addition to technical and organizational requirements, they usually require clear, uncontested property rights providing access to forest resources, which, despite progress with agrarian and forest reforms, is a condition not available to many rural people in forest lands in Latin America. One of the greatest obstacles is the cost associated with rigorous and complex standards for the development of management plans and sustained transaction costs to maintain approval for annual operations. Significant transaction costs, which are difficult to measure, could constitute an important factor encouraging 'exit' strategies.

It is not easy to determine the costs communities incur in making all the investments that prepare them for formal timber management operations as such costs are typically subsidized by external projects. Estimates of the costs of developing forest management plans are quite variable (see Table 4). For example, the direct cost for a general plan is about 10 US$/ha in the RAAN and 8 US$/ha in Guarayos but 42 US$/ha in Porto de Moz. In some regions, like Petén, foresters charge the same fee for small and large operations rather than by hectare or volume. Additional costs are associated with other requirements, such as environmental impact assessments and annual operating plans, as well as the bureaucratic transaction costs. Management costs are further increased if communities are compelled to adopt the 'voluntary' certification mechanism. The cost paid for certification for a community concession in the Petén was US$ 8,000, with annual costs of about US$ 1,500-2,000; in RAAN, Layasiksa paid US$ 13,000 in 2007 to comply with requirements, over and above the initial certification costs.

Government forest fees and taxes can be calculated either by volume harvested (which is complex, requires more monitoring and creates opportunities for corruption) or area managed or intervened (which as a standardized measure is easier to monitor but less responsive to variation in forest value). In Nicaragua, smallholders pay from 1.5 to 18.0 US$/$m^3$ in taxes on wood harvested, depending on the species, but no fees for forest rights. In Bolivia, forest fees for community management plans are US$ 1 per hectare harvested annually, substantially cheaper than the fees that would be charged to the same producers if they harvested wood as part of agricultural clearing (which requires a species specific charge by volume harvested). In the Petén, forest fees range from 1 to 1.28 US$/ha in the two concessions studied. These forest fees correspond to the total time for which the forest concessions were granted (25 years), although they are paid annually. Another 20% of income is paid in a variety of taxes. One study in the RAAN estimated total costs for meeting all of these obligations, including transaction costs, from beginning the process to cutting the first tree, at US$ 20 per cubic meter (Navarro 2008); the process of obtaining the permit took about 5 months.

In the five study areas, almost all the communities with timber management plans benefited from external support (from local NGOs or forestry projects) in formulating a FMP (including census and inventories), having this approved, and initiating logging operations. This external support was necessary not only for investment capital and technical needs, but also to navigate the bureaucracy. For neighboring communities without

Table 4. Main costs related to the formalization of community forestry operations

Type of rights	Indigenous territory in the RAAN (Nicaragua)	Indigenous territory in Guarayos (Bolivia)	Extractive reserve in Porto de Moz (Brazil)	Agro-extractive communities in northern Amazon (Bolivia)	Community concessions in northern Petén (Guatemala) (a)
Payments of forest fees	Forest Institute taxes according to species and volume (from US$1.5 to $18.0/m^3); municipal taxes 1% of export value & for milling 1.5% of local market value; income and value added taxes	Forest fees correspond to US$1/ha corresponding to the annual area intervened	The communities are exempted of paying forest fees in the reserve	Fees for Brazil nut extraction are not paid by producers but are charged at processing plants on a per volume basis (US$ 0,005/Kg charge for unshelled nuts and US$ 0,013/Kg for shelled nuts)	US$1 to 1.28 /ha (a) corresponding to the total time for which concessions were granted (25 years), although they are paid annually. Taxes amounting to approximately 20% of income.
Costs for obtaining the contracts	Not possible to determine the costs for establishing the organization since WWF and other donors invested several years and included substantial technical training, accompaniment and organizational support	Not possible to determine since there were important subsidies flowing to communities to establish community forestry enterprises	Not possible to determine the costs since forestry projects invested in the creation of community associations including training and organizational support	Costs do not apply since communities are not formulating plans for Brazil nut management, even though it is demanded by law	Include information dissemination, and contract negotiation (range from US$ 1,920 to 3,000) Costs incurred in the creating the productive organization equal to US$ 2000, which was paid for ACOFOP
Costs of management instruments	FMP direct costs US$10/ha, and Environmental Impact Assessment costs US$7/ha, these and costs of certification covered by donors	FMP direct costs are US$8/ha in the community of Santa Maria. These costs have been covered by donors.	The community Juçara spent about US$42/ha for the formulation of their forest management plan paid with external support	Estimated at approximately US$3/ha but requirement not enforced.	NGOs providing support cover the costs of forest management plans financed through USAID
Costs for complying with the contracts	POA costs are US$10-12/ha (covered by enterprise); US$13,000 (in 2006) to comply with certification requirements (covered by donors)	POA costs are US$8/ha in Santa Maria.	The community Juçara spent a US$ 64,000 for training, paper work and technical advice	Costs do not apply due to reasons mentioned above	Costs for POA formulation from 5%-8% of total operational costs First certification costs US$ 8,000 and annual evaluations from US$ 1,500 to 2,000.

Notes: (a) Correspond to the community concessions Arbol Verde and Carmelita
Source: Elaborated by authors based on Albornoz *et al.*(2008), Mendoza *et al.* (2008), Monterroso and Barry (2008), Nunes *et al.* (2008), Vieira *et al.* (2008).

assistance, these costs were the main factor 'excluding' them from adopting strategies attuned to forestry regulations.

Though 'exit' factors were not explored in-depth in this study, it is likely that the exclusion mechanism, described above, is decisive. Nonetheless, there are additional reasons for smallholders to exit the formal arena, some of which were already noted. The first occurs under conditions where there is little or no penalty for noncompliance. A second occurs when communities, such as indigenous communities in the RAAN, view government regulation as lacking local legitimacy; hence certain rules are followed, particularly local norms, but not the entire chain of formal regulations. This case is addressed below. The third, and perhaps the most common, is not an active choice to exit: when the conditions excluding communities and smallholders from forest management appear insurmountable, they simply drop it as an option.

In the latter case, communities are sought out by intermediaries and loggers looking for sources of raw materials. Hence the community plays a passive role since, in the absence of local buyers, they would either have let the trees stand or burnt them when clearing for agriculture. Given the opportunity they are offered, they sell the timber, albeit at lower prices, and the logger has to worry about marketing the wood.

Main interactions of actors in informal markets

Given their illicit nature, informal markets are notoriously difficult to document but will be quite familiar to observers who have visited forest frontiers in developing countries. Vigorous informal markets for timber operate in all of the study countries. For example, anecdotal evidence suggests that indigenous communities located in Guarayos, Bolivia, continue to harvest timber without complying with legal procedures, selling extensively in informal markets (Cronkleton and Pacheco 2008; Larson 2008b). In the RAAN, Nicaragua, unofficial estimates suggest that approximately half of all the timber produced comes through informal channels (Ampie 2002). In Porto de Moz, Brazil, informal extraction is the primary source of timber supply, even from inside the RESEX, to the main buyers (local loggers and sawmills) operating in the region (Nunes *et al.* 2008). Timber from informal operations seems also to supply much of the wood in local markets in Bolivia's northern Amazon (Albornoz *et al.* 2008). This section addresses the way in which informal market interactions work in practice, providing examples from the case studies.[21]

It has been noted previously that when smallholders choose to undertake formal forestry operations they often need help from other actors, usually in the form of a subsidy (i.e., grants, donations, government programs) to pay for the formation of a FMP and/or non-financial assistance, such as training. Nonetheless, when smallholders can not, or choose not to, formulate these plans, they often interact with other forestry actors in the informal market to access operational capital, to buy services (i.e., inventory, extraction, hauling, transport) and to establish a buyer channel for the

[21] In the areas around the selected communities in the Petén, informal logging was less prevalent so no example is being drawn from that site. It could be assumed that different conditions would have been found away from the community concession areas considered in the lowland Guatemala studies.

harvested timber. These interactions change over time and from place to place.

Indigenous communities in the RAAN are involved in selling timber through both formal and informal channels.[22] Informal operations work through a relatively well-established network of local buyers and middlemen. According to Roper (2003), timber is most often sold as standing trees, mostly to local intermediaries and timber companies, though some producers fell trees and saw them into planks for sale. Most of these activities are illegal as the timber does not usually originate from areas with a FMP. Transportation is facilitated in a variety of ways, including hiding the wood, using social networks or paying bribes. Intermediaries and logging companies also use existing permits to 'launder' additional wood.

Although regional authorities had tried to discontinue small-scale permits for pine at least since 2006, two were still in operation at the time of the research. These community permits were a formal procedure established several years ago by local agreement among a variety of authorities in the RAAN specifically to support indigenous communities. The experience with these permits identifies some of the underlying issues regarding informal markets and logging in the region. This type of permit does not exist in the law and, logically, it should have been suspended with the Forest Moratorium when other smaller permit options were shelved in favor of FMPs in 2006. Nevertheless, according to local authorities, social pressure has made these permits very difficult to suspend. In 2002, the process involved obtaining permission from the appropriate community authority (*síndico*), ratified by the local judge (*wihta*); harvesting was limited to 3,000 board feet twice a year, the wood was sawn with a chainsaw in the forest, a fee was paid to the Indigenous Forestry Cooperative, which was created for this purpose, for a transport permit, and it was delivered to the sale lot in town (Ampie 2002*)*. Tax payments were made to the mayor and the forestry institute.

Yet even this simple procedure did not result in 'legality', as apparently many participating communities did not bother to pay all the required taxes. Indigenous communities believed that the only legitimate authorization and payment was that of the *sindico* and judge from the community, and that this was sufficient. Also, because a typical truckload holds 5,000 board feet, it was common to take that amount rather than 3,000 board feet, since the transport price would be the same. In addition, under the Communal Lands Law it is legal to log for domestic use with the permission of the community judge. As many community members have homes in town, they are allowed to transport this wood from the community to their urban home, which may or may not then be used for domestic purposes. Fundamentally, communities see the government as only interested in obtaining tax income rather than in promoting good forest management, and hence only follow the rules they choose (Ampie 2002).

In the indigenous territory of Guarayos, informal timber networks are well developed and quite robust and extensive in their

[22] Further research on this was interrupted, however, by Hurricane Felix in September 2007, which damaged just under 1 million hectares of forest in the RAAN (INGTELSIG 2008). The hurricane led to changes in forest regulations and permits, which have been slow to implement.

geographical coverage, in spite of significant efforts to promote formal sustainable forest management at the community and industrial level. In several ways the networks observed here are characteristic of the dynamics driving local timber markets on forest frontiers in the country as a whole. Understanding the role of smallholders in these networks involves examining how the local logging sector operates. Prior to the TCO demand, the local timber sector was composed of several small- and medium-scale logging companies and sawmills, as well as numerous independent chainsaw operators, sawyers, and truckers, often at the margin of the law. These actors did not qualify for industrial timber concessions granted under the new forestry law, nor could they form logging associations (ASLs) to receive municipal concessions on state lands, because most of the region had been 'immobilized' (land transactions, including concessions, were suspended) while the Guarayos TCO demand was being formalized.

Policy makers expected these stakeholders to become service providers once community forest management plans came on line, or as private property owners developed sustainable management plans. However, much of this informal sector resisted complying with demands from communities (and the NGOs that supported them) to receive higher prices for their managed timber (in fact, at one point they formed a cartel of service providers to limit access to buyers from outside the region). At the same time, these actors quickly realized that in spite of the new forestry regulations, there were still a number of mechanisms that allowed them to maintain their informal operations, as will be described below.

Throughout the contested, and still untitled, area of the TCO land claim, logging is driven by informal institutions linked to smallholders by two new types of actors: *proveedores* (literally, providers) and consultants. These actors serve as intermediaries for brokering timber sales between smallholders and logging companies, sawmills or other buyers. The *proveedores* are woodsmen who know the territory and its residents, have links to local (small and medium) sawmills and other buyers, and have the basic skills needed to generate information for the documents required for logging permits. They operate below the 'official' radar, as there is no formal system for registering them or their activities. Local buyers contact smallholders and purchase standing trees (usually paying US$ 5 to US$ 10 per tree depending on the species), fill out the necessary paperwork in the landowners' name, and then harvest the wood, turning the wood and related paperwork over to the next buyer. They are used to work with land clearing permits when had no legal titles, and in titled areas worked extensively with FMPs on areas smaller than 200 hectares, and with 3-hectare logging permits intended for domestic use when these were permitted.

Consultants are a new phenomenon to appear in Guarayos. They are forest engineers who set up companies to prepare forest management plans (usually using the small scale plans on areas less than 200 hectares) and harvest permits for areas of forest clearing. Their arrival is associated with the intensification of the agricultural frontier in the region. It is noteworthy that many consultants previously worked for the Forest Superintendence, forestry projects or NGOs working in the region and have

in-depth knowledge of the bureaucracy, its processes and capacity to monitor and control logging operations. Because they understand the system, they know how to manipulate it to get access to timber and to act as intermediaries. Most are legitimate service providers, but anecdotal evidence suggests that some have become active players in structuring informal networks.

Both the 3-hectare permits and smaller FMPs are less complex and costly than full management plans; they also benefit from streamlined approval processes at the local level that allow a quick turn around (i.e. days or weeks, rather than months or years). Because these mechanisms were seen as less significant, there was less supervision and control by the Forest Superintendence, allowing estimated timber volumes to be inflated to mask illegally harvested wood from elsewhere. The inflated volume allows brokers to receive additional 'certificates of origin', permits needed to transport wood. Since the actual volumes are much lower than the estimated volumes, the buyer can use extra permits to transport wood from other sources, probably harvested illegally. In some cases, plans are prepared on community lands by these outsiders only to obtain a certificate of origin, which can be traded in the informal market.

Due to the complete lack of control of the information contained in the management plans, altering species and volumes has become common practice in Guarayos. While the Forestry Law states that the Forestry Superintendence has to undertake a field inspection to confirm the validity of the data contained in the management plans, a resolution approved in the early 2000s states that verification is no longer needed. Though there have been subsequent attempts to increase regulation of the smaller plans, authorities retreated in the face of widespread protests in the region, suggesting that these practices will not change in the near future.

No data exists regarding the amount of forest affected by illegal logging, but it has expanded into non-managed forests within the indigenous territory. Local loggers justify this practice by arguing that they had to pay taxes on a volume of wood that turned out to be smaller than estimated, hence they were 'obligated' to seek out wood from other sources (Cronkleton and Albornoz 2003). In this context, smallholders in communities that were unable to develop a FMP, either because they had no support or because their forests were contested and not titled, found that they were sought out by loggers interested in their logging rights. Many of these impoverished households, without legal means to manage their timber, accepted their offers; even though prices were low, they were better than nothing. Usually there is minimal or no involvement by the landowner in these forestry operations, and in some cases smallholders do not have information regarding how the management plans were developed or the amount of timber to be extracted from their parcels.

An additional feature found in the informal markets in Guarayos is that illegal forest clearing – practiced by medium- and large-scale landholders and colonists – constitutes another informal source of timber for local sawmills, which competes with the formal supply. In 2006 there were only 9 sawmills in the Guarayos region, but the number has increased during the last year to almost

20 (BOLFOR II 2007). As mentioned earlier, a portion of indigenous lands is still contested. This provides an incentive for third parties to take possession of these areas, and to clear cut them to justify their ownership (under the agrarian law), which in most cases takes place without the required permits and thus without paying the taxes stipulated for forest clearing. The timber cut in these landholdings supplies local sawmills, probably using certificates of origin purchased in the informal market. It is difficult to estimate the magnitude of these activities.

Local buyers and sawmills are connected to other actors in urban markets, and it is likely that some of the timber extracted illegally from the indigenous territory is exported by a few plywood and wood manufacturing companies as wood originating from areas under sustainable management. There are several plywood industries working in the region (i.e., Laminadora Suto, FOBOL, SOBOLMA, CIMAL – IMR), which represent an important proportion of the timber demand (BOLFOR II 2007). Yet, as noted, since illegal timber tends to be formalized as legal, it becomes extremely difficult to differentiate the sources: virtually all actors participate in both formal and informal markets. The proportion of each depends on one's expected gains and assessment of risk.

In Pará, Brazil, informal markets are widespread in the municipality of Porto de Moz. Probably the most interesting implication of land regularization through the creation of the RESEX 'Verde para Sempre' has been the restructuring of local timber markets. Before the creation of the reserve, 22 timber companies were operating in the region (STR 2001). These companies had been working in collusion with the mayor of the Porto de Moz municipality to control the local timber market (Salgado and Kaimowitz 2003). The RESEX, besides making a fundamental contribution to the formalization of tenure rights for local people, also led to the closure of the large logging operations and weakened the mayor who defended their interests.

The timber companies had put in place a relatively extensive network for logging on community lands that mobilized numerous sawyers, local loggers, middlemen and truckers. This network was relatively intact after the creation of the reserve, in spite of the restrictions on logging within its jurisdiction imposed by the regulations. But with the closure of the large companies, there was insufficient capital to keep the system in motion. Over time, however, it has gradually been taken over by a new group of local politicians who now provide the financial resources, and use their influence and connections to supply timber, some of which is exported, to industries in Belem. Unfortunately there is no data for estimating the extent of these informal transactions, though there is less logging in the RESEX than before. One of the driving factors for continued logging is that many RESEX residents depend on timber sales for a portion of their livelihoods, particularly in the absence of other sources of income.

An unintended consequence of the creation of the RESEX, mentioned earlier, was to push the logging frontier east of the Xingu River into the surrounding untitled community lands and a national forest located in an area relatively close to the RESEX (called FLONA Caxiuanã). Because

these lands are less protected (mainly in the case of the national forest) it is easier to obtain timber breaking the law without the risk of being sanctioned. This has increased the pressure from local loggers on lands that had seen little intervention in the past. However, insufficient information is available to compare the intensity of the logging operations taking place east of the Xingu River with those taking place within the RESEX, or to analyze their evolution over time.

There are several actors involved in informal logging in Porto de Moz. Communities are the main timber suppliers, but also individual landholders provide timber mainly through selling standing trees to local chainsaw operators. The sawyers are generally from the same communities. Most sawyers transform round wood into planks, although they also sell logs if there is demand and transportation. They deliver the logs and planks to the riverbanks or road. Sometimes chainsaw operators enter into agreements with middlemen in return for a cash advance, but some also operate with their own capital. Once sold, timber is collected by middlemen. They need to pay for transportation services to the *bufeteiros,*[23] who are the owners of the timber trucks. In the Porto de Moz municipality there are roughly 50 to 60 active *bufeteiros*, although anecdotal evidence suggests that there were many more in the past. The middlemen deliver a portion of the logs to the three large-scale sawmills (Maruá, Maturu, and Grupo Galette) that are the main local buyers of the timber. The planks are sent on to the city of Belem and the neighboring municipalities of Breves and Gurupá (Nunes *et al.* 2008).

Finally, in the Bolivian northern Amazon the situation is drastically different since most producers rely on Brazil nuts as their main source of livelihoods. As mentioned previously, though the state has attempted to introduce the use of management plans, communities have not complied, and the state has little capacity or political will to insist on their use. In this case, the norms for Brazil nuts are not going to affect the highly developed Brazil nut market, in which almost all communities of the Bolivian northern Amazon participate, with more than 200 *barracas* and about 20 processing plants. The entire system of Brazil nut harvesting has been built upon informal land tenure rights and a system of forest products collection called *habilito*[24] (Bojanic 2001; Stoian 2000).

The *habilito* system, which was originally set up for rubber tapping and collection, lies at the heart of the commercial and labor relationships in the region's Brazil nut production chains (Pacheco 1992). The *habilito* is the lubricant for commercial relations, as it allows capital to flow from brokers to processing plants down to *barraqueros* and middlemen, continuing into the forest to finance local nut gatherers. These funds provide the means to initiate the harvest and allow those higher up the production chain to secure their Brazil nut supply for export. The system was historically a kind of debt peonage that bound workers to their employers but has persisted and been transformed into a variety of patron-client relationships.

[23] Bufeteiros are the owners of the logging trucks that carry the logs from the production areas to the sawmills.

[24] See footnote 5.

Habilito has shaped (and still shapes) the labor relations inside *barracas*, and between the *barraqueros* and *zafreros* (temporary migrant workers hired to gather Brazil nuts during the harvest season from January to March). While it proved efficient in articulating transactions in a remote undeveloped frontier market, it is becoming outdated in a context of better physical and market integration, and increasing prices for Brazil nuts, which are progressively leading to the development of a more open market. However, some residues of the *habilito* system still persist.

Smallholders are in a better position today to negotiate the price of Brazil nuts in the northern Amazon, mainly as a result of the formalization of land tenure described earlier. This has enhanced the contribution of Brazil nuts to smallholders' livelihoods. The harvesting process is not capital intensive and is well adapted to household production systems. Furthermore, there is a well developed system of transportation from the forest to the processing plants, and from there to Pacific ports, from which most of the production is exported.

Most residents of agro-extractive communities sell their Brazil nuts to middlemen. However, a growing number are becoming more organized to directly market their nuts collectively. The prices obtained by smallholders correspond to the prices agreed among the different actors along the value chain, which are negotiated among processing plans, *barraqueros* and *zafreros* at the beginning of the collection season, and tend to be adjusted depending on price fluctuations. There are two smallholder Brazil nut cooperatives: CAIC (*Cooperativa Integral Agroforestal Campesino*), based in Riberalta, and COINACAPA (*Cooperativa Integral Agroextractivista Campesinos de Pando*) in Cobija. The former has a processing plant, and the latter is in the process of obtaining the financial resources for buying one. The two cooperatives have made great strides for entering into the organically certified and fair trade markets, which have increased the benefits they can obtain from Brazil nut extraction. COINACAPA pays a premium to their members after the product has been negotiated in fair trade markets in Europe.

Economic gains derived by smallholders from their forests

There are few comparative studies of the costs and benefits accruing to smallholders and communities from formal timber markets, and even fewer on informal markets. Comparing five different cases of communities undertaking formal management initiatives, Pacheco *et al.* (2008) found that profits for Carmelita in Petén, Layasiksa in RAAN and Cururú in Guarayos are fairly comparable, ranging from about US$ 28,000 for Carmelita to US$ 30,000 for Layasiksa and US$ 34,000 for Cururú; though Arbol Verde in Petén had much higher profits of US$ 225,000.[25] Nevertheless, when considering these profits in relation to the number of families involved, they range from US$ 179 per family in Layasiksa to US$ 1,043 in Cururú. These data also suggest that profits per hectare intervened are much higher in richer forests such as the Petén, and that forestry operations tend to be more selective there

[25] These figures are rough estimates as community accounting systems are notoriously weak, and there is substantial variation in the way enterprises account for expenses and profits. Also, some of the operations still receive subsidies.

Table 5. Comparison of selected community forestry initiatives

	Petén, Guatemala (a)		Nicaragua (b)	Guarayos, Bolivia (c)	
	Arbol Verde (2006)	**Carmelita (2002-05)**	**Layasiksa (2007)**	**Santa Maria (2004)**	**Cururú (2007)**
First year of operations	2001	1997	2004	1999	2002
Total managed area (ha)	64,973	53,797	4,665	2,433	26,420
Annual harvested area (ha)	900	450	155	121	861
Annual volume harvested (m^3)	1,029	1,365	1,363	500	2,119
No. of families involved	344	88	169	35	34
Total net profits (US$)	226,315	27,745	30,264	-3,221	34,486
Volume harvested (m^3/ha) (f)	1.1	3.0	8.8	4.1	2.5
Net profits (US$) / Annual harvested area (ha) (f)	251.5	61.5	195.3	(26.6)	40.1
Net profits (US$) / No. families	657.9	315.2	179.1	(92.0)	1,014.3
Net profit (US$) / Volume harvested in the year (m^3)	219.9	20.3	22.2	(6.4)	16.3

Notes: (a) Data for 2004 based on NPV (NPV 1999), Stoian and Rodas (2006), Propeten (1997), and own calculations. Data for Carmelita correspond to annual average obtained from analysis of financial flows between 2002 and 2005; (b) elaborated by author based on Masangni/WWF/IFC (2006); (c) elaborated by author based on Albornoz *et al*. (2008), and financial reports from the Indigenous Forestry Association of Guarayos (AFIG), and the BOLFOR Project; (d) correspond to the hectares harvested during the year of reference (annual harvested area). Adapted from Pacheco *et al*. (2008).

as well, whereas logging is more intensive in poorer forests (Table 5).

While the net profits obtained from these forestry enterprises could be considered reasonable, they tend to be quite low on a per family or per hectare basis. Based on a financial assessment of 12 community initiatives pursuing formal forest management in the Brazilian Amazon, Medina and Pokorny (2007) concluded that most community operations have relatively high production costs that limit the profits they can obtain from their forests, since only large-scale initiatives are able to remunerate the labor force and still obtain additional profits for investments. Nevertheless, four of the five operations studied (all but Santa María) provided between $22,000 and $43,000 in labor payments to community members, in addition to net profits (Larson *et al.* 2008). For many rural communities, this is one of the most important livelihood contributions of community forestry operations.

Outside of communities like these that have received substantial external support, however, it is difficult for communities to find capital and service providers to assist them in their forestry operations, since service providers and local loggers tend to take advantage of them. The communities' chronic lack of financial resources leads them to sell their timber resources as standing trees to local loggers, while in some cases they also transform the wood into planks with the use of chainsaws in order to get a better price. Nevertheless, a characteristic of informal markets is that

the logs, in most of the cases, tend to be undervalued just because they originate in areas without an FMP. There is anecdotal evidence suggesting that, in some cases, such as the RAAN and Porto de Moz, communities capture a higher portion of the benefits when they saw the wood with chainsaws to produce planks, and sell these to local buyers. The higher portion of the rents obtained from roughly processed timber could offset the lower value of timber in informal markets, and contribute to generating additional jobs as well.

In the RAAN, Roper (2003) found that the production of timber planks gave communities a greater benefit (10% of the gross benefits) than the sale of standing trees. The problem is that this is usually illegal, and thus presents risks. A comparison of Layasiksa's two (formal) operations, one involving the sale of standing trees in concession and the other, its own community forestry enterprise, demonstrates that the former leaves less than 3% of the total value generated, from logging to sale in the capital, in the community, whereas the latter leaves 43% (Arguello 2008). Flores and Mendoza (2006) found that the illegal sale of mahogany by organized community members in the RAAN paid substantially higher prices than sales to exporters or local intermediaries; value chains with the participation of more intermediaries also resulted in lower prices to communities, since a larger number of actors are taking a share of the rent.

Frequent distortions observed in timber markets, which are influenced by constructed asymmetries of both power and information (Larson and Ribot 2007), tend to produce a negative final outcome in the distribution of rents among forest stakeholders. The distribution of benefits, in the end, tends to penalize smallholders and communities due to their lack of assets, financial capital and information, which limits their ability to compete, as does their small scale of operation. As a result, local timber buyers tend to control these markets and prices, leaving communities as simple raw material suppliers, in both formal and informal markets.

In short, there are two structural factors explaining the distribution of economic rents from timber resources along the productive chain. The first is related to the aggregation of value along the chain: it is widely known that selling logs leaves limited benefits in comparison with selling processed wood in planks or boards. Hence higher profits can be obtained, for example, by producing planks with chainsaws, the technology closest to communities. The second has to do with whether or not the activities are carried out in compliance with the law. Since regulations usually penalize the production of planks with chainsaws, in order to operate within the formal rules, it is often easier to sell standing trees, since the only alternative appears to be launching larger scale operations with substantial external support. Hence, communities and smallholders, in the majority of cases, are trapped in the dilemma of earning less but complying with the law, or obtaining larger benefits but breaking the rules of law for timber resources use and processing.

7 Conclusions: putting the pieces together

The case studies assessed here suggest that attention to the working rules, based on the interaction of both formal and informal institutions, constitute the key focal point for understanding social behavior in forest resource management and benefit generation and distribution. These cases suggest that although formal rules are becoming increasingly important for influencing forest resource use in the context of expanding markets, mainly for timber products, their outcomes depend on their interactions with existing informal rules. In this regard, understanding the informal arenas becomes extremely important for shaping state efforts for the formalization of property rights and regulation of forest resource use. We assert that this realm of consideration will later have decisive implications on the generation and distribution of economic benefits throughout the forest sector.

The latter is even more important as formalization of rules faces a highly constructed reality of informal rules guiding the behavior of both individual and social groups in their relation to land and forest resource access and use. Furthermore, homogenous recipes for regulating forest resource use, often adopted by governments, tend to neglect complex realities and existing working rules for land access and forest use. The latter, however, were often not conceived for operating in open market situations, and hence need to be altered and adapted to the new and evolving contexts. In addition, the organizational solutions for communities to manage their forest and organize their forest production, that are inspired in entrepreneurial models, often ignore existing local institutional arrangements, and thus create new problems related to land access, decision making for forest resource use, and benefits distribution.

It is evident that states have made significant progress in land tenure formalization through different tenure models, some more sensitive to local rights and conservation concerns. Most of these models recognize collective land rights, based on claims of either indigenous, traditional or agro-extractive communities. Internal land allocation is often left to existing customary rules, though the creation of multi-community territories has added new challenges involving the construction of new layers of governance and management systems to administer these land claims and to exclude outsiders. In this regard, some indigenous communities have developed relatively more complex rules for collective land management than other traditional communities and smallholder settlements, but this is not always the case. The others may have rules that regulate forest access and management in both individual and collective lands.

The outcome of land formalization in indigenous territories does not depend greatly on the content of the formal law – since most schemes tend to recognize customary rules – but in their modes of implementation. The approach to recognizing collective rights seems to have worked relatively well in the RAAN, but it has led to substantial conflict around rights and land speculation in Guarayos. This is mainly due to the construction of new (informal) rules of the game in the face of multiple competing demands, first for expanding the occupation of community lands, and second for certifying illegal rights of third parties inside the TCO. In contrast, in the communities studied in the RAAN, leaders have created new working rules to control the presence of third parties on indigenous lands. In the RESEX in Porto de Moz, the lack of clarity about internal land allocation has not constituted a problem to the extent that the previous internal land rights were not affected. In all cases, the growth of informal land markets, forbidden by formal law and tolerated by local informal rules, tends to become the primary mechanism for land redistribution, mainly in the areas more exposed to pressures from external agents and relatively weak local governance structures.

In most of the cases studied, there are few formal rules regarding the management of NTFPs, hence working rules for using these resources are largely influenced by existing informal rules which are relatively well developed, as local populations tend to depend more on them for their local livelihoods. Yet, these rules tend to erode to the extent that formal rules and management models for timber are introduced into communities. The formal rules devised for introducing reduced impact logging practices, as a way to ensure sustainable forest management, are based on the model of large scale commercial forestry, with implied logging and silvicultural practices from an industrial scale and modus operandi. The results tend to be at 'cross-purposes' in the field, reinforcing the abandonment of NTFPs and unnecessary complexity and time to access formal timber markets.

This commercial forestry model is relatively homogenous in the different countries assessed here, nuanced by the fact that imposed regulations vary in terms of bureaucratic and technical requisites. In Petén, where land rights were granted on a concessionary basis, the pre-existing

informal rights to withdrawal of non-timber forest resources (like *xate* and *chicle*) were ignored. Also in Petén, and in the participating communities in indigenous territories of RAAN and Guarayos, quite orthodox models for sustainable forest management were imposed as result of a the active intervention of conservation NGOs, like WWF and TNC, often tied to schemes of 'voluntary' certification. In the RESEX in Porto de Moz, forest management was halted by additional conservation-inspired land-use regulations that require the formulation of a plan for natural resource management in the reserve, which has progressed quite slowly. This has constituted an administrative barrier for the development of sustainable forest management in the reserve.

It is not surprising that sophisticated forestry regulations, recently approved in the different countries, so far have succeeded poorly in achieving their expected outcomes regarding sustainable management and increased prosperity from timber management for forest-based communities. The inability of smallholders and communities to afford the FMP, or the transaction costs involved in their approval, is complicated by the fact that the rules of the game neglect local working rules, often tied to existing governance structures. Formal rules have tended to favor forest actors with better asset endowments and greater bargaining power in the market. Forest user groups must constitute formal enterprises and register them, pay the stipulated taxes, and comply with labor regulations, all designed for larger scale operations. Compliance with these regulations makes it difficult to enter into formal markets, as those with limited resources and conditions for meeting them tend to be excluded. Those unable to comply are thus forced to seek informal and/or illegal market alternatives. In this context, external support and subsidies have been crucial in helping some communities to overcome such barriers and sustain formal forestry operations.

Market access, per se, however, is not often a problem. Extensive shadow networks, operating informally, offer alternative market channels. These informal networks are problematic, as they tend to concentrate economic benefits outside the communities, with little security, such as legal protection or recourse, as well as risks associated with illegal practices. Wood prices also tend to be lower, though this is not always the case. Most forest actors engage in both formal and informal markets, which makes it difficult to distinguish the entangled interactions that they establish in the market place.

Two central issues arise in relation to the formalization of land tenure, implantation of forest management models in smallholder and community lands, and engagement with timber markets. First, although local forest users have gained formal rights over their land and forest resources, the state still holds essential management rights through the regulation of these resources, limiting community decision-making power regarding resource use. Second, this in turn restricts local capacity to capture the economic benefits from the use and sale of these resources; their capacity to compete in the market is mediated by managerial skills, bargaining power, and market knowledge, among other factors inherent in the industrial model. At the

same time, structural inequities shape power and information asymmetries in the market place. Few external support policies and forestry development projects address these crucial topics.

The trends described above are difficult to reverse. However, there is still scope for improving the way in which land tenure formalization is put into practice by the state, as well as for correcting the imperfections and failures of forest policy implementation by taking greater account of informal rules in shaping these policies' actual outcomes. Below we summarize some recommendations that may help in this regard.

The shortcomings of land tenure formalization need to be urgently addressed to avoid further conflict, reduce negative impacts from power asymmetries in illegal land appropriation, and ameliorate improper land-use practices. There is a need to make existing (mostly informal) tenure rights to land and forest resources more visible. This could be done by establishing mechanisms for explicit 'negotiation' between the formal rules and existing working rules regarding land access, possession and use. This means moving beyond land-use mapping to tenure rights mapping, linked to other forest resource uses besides timber, including NTFPs and environmental services. Clear procedures should be defined and implemented for recognizing indigenous claims over territories and for the fair and transparent negotiation of the rights of third parties within them. Furthermore, the state should play a more active role in defense of these territories, supporting and defending community exclusion rights and placing a priority on securing the indigenous land claims within the territories in order to avoid perverse situations like those in Guarayos. Finally, serious consideration has to be given to the governance organizations that are granted titles. These issues should be taken up not only by states, but also by NGOs and donors as well as the indigenous and smallholder organizations who are at the forefront of land and forest claims.

The resource management realm also merits some suggestions. The most important is that it makes little sense to rely on a single model for achieving sustainable forest management – the one inspired by entrepreneurial models of large-scale commercial forestry. This model neglects a diverse range of forest management practices and organizational models that are used by indigenous, traditional and agro-extractive communities and that are also appropriate. The imposed model does not work without very high levels of investment, substantial community upheaval and, most often, ongoing dependence on external subsidies and support. In this context, over-regulation of forest management, such as the requirement of FSC certification, is likely only to tip the balance of an already asymmetrical situation even further. Future policies and projects should acknowledge that diverse systems of forest resource use are possible, and hence advance more explicitly towards pluralism in forest management.

With regard to timber markets, for the vast majority of communities, informal actors and linkages appear to have a more decisive effect than formal networks on forest resource management and the distribution

of economic benefits accruing from such resources. This is a topic that needs to undergo more in-depth scrutiny. First and foremost, however, operating under formal, legal conditions has to be (1) accessible and (2) in the interest of communities. Though markets cannot be mandated, policies can aggressively tip the playing field in ways that support communities, such as by reducing transaction costs, explicitly facilitating community management, researching markets for a variety of products, placing vigilance authority in the hands of communities themselves, promoting community-company partnerships and fair trade policies, facilitating access to credit and information, and training in organization, accounting and technical support.

In the end, forest management should begin with the community and be rooted in effective and locally legitimate working rules; new innovations should based on community members' interests and aspirations, and their levels and types of assets, skills, experience and technical capacities. From this starting point, productive activities could be developed incrementally, as needed, from simpler to more complex, from smaller to larger, allowing for more gradual adaptation and learning-by-doing. Explicit concern for equity and for building or strengthening transparent and accountable governance structures throughout this process will lower the risk of elite capture of the benefits of new developments. The result should be forestry activities built on a solid and more sustainable foundation.

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