

Decentralized Forest Management in Latin America: Looking for Institutional Fit

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ABSTRACT

This paper compares forest reserves from three different Latin American countries in order to further our understanding of how formal forest management policies may be better designed to fit with the local contexts in which they operate. The institutional arrangements discussed in this study include public, community and private reserve systems. Specifically, I compare the effectiveness of public and common-property management of forests in a frontier region of Central America, and regional and private reserves for forest management in the Colombian Andes. In the paper, I (1) identify how the formal forest policies interact with the local forest use norms and the benefits that local forest users derive from the forest; (2) examine the forest conservation outcomes in each forest; and (3) analyze how these outcomes are linked to the specific institutional arrangements in each forest policy regime. The objective of the paper is to identify how formal forest institutional arrangements might best be matched with local institutional contexts in order to provide incentives for local forest conservation.

The study is based upon fieldwork begun in 2002 in Central America and more recently, in 2008 in Colombia. Fieldwork in each of the forests was conducted using the International Forest Resources and Institutions (IFRI) protocols. IFRI is a validated framework to enable scholars to examine the impact of diverse ways of owning and governing forests on protection and management activities and their consequences for forest condition. Research methods include interviews with government personnel, forest users and others involved in the management and/or use of the forest, as well forest mensuration data and satellite images to examine forest conditions.

The findings highlight the importance of understanding local land-use institutions in designing forest conservation policies and programs in Latin America, and point to questions and guidelines when considering how to design and implement forest management in developing countries more generally.

I. Introduction

Over the past years, forest management policies have evolved beyond the traditional publicly managed protected area model to include more intricate arrangements that provide for a variety of rights and responsibilities. In light of demands from resource users for greater recognition of their livelihood needs and rights, funding limitations, and encouragement from donor agencies, many governments have introduced decentralized forest governance arrangements with a focus on collaborative or community management of forests (Molnar, Scherr and Khare 2004; Ribot et al. 2006; Agrawal 2007). This movement toward decentralized forest governance has resulted in diverse array of institutional arrangements that take vary widely in the degree of decision-making rights and responsibilities shared with local resource users (Nygren 2005; Lemos and Agrawal 2006; Ribot et al. 2006; Agrawal 2007; Barton Bray et al. 2008). While this growing institutional diversity is exciting in that it presents resource managers and resource users with innovative combinations to build more effective and just forest management regimes, this diversity can also become overwhelming for policymakers and planners assigned with constructing a cohesive forest policy.

Deciding on the appropriate institutional arrangement that fits with the local contexts while providing a degree of programmatic uniformity can be a daunting task for policymakers and program managers. Unfortunately, scholarship on resource management does not always address practical needs of policymakers. Basurto and Ostrom (2008) suggest that too often scholars fall into two analytical traps in which they either oversimplify the social and ecological complexities and offer management panaceas or contend that every resource management situation is unique and thus it is impossible to identify management patterns. In examining decentralized forest management systems, there is a need for scholars to provide analytical insights that help practitioners sort out patterns that contribute to successful governance arrangements; what works when and why.

This paper uses institutional analysis to examine the specific design and outcomes of different decentralized forest management regimes in human populated forest landscapes in Latin America. The case studies include public, community and private management systems that vary in the degree that resource management rights and responsibilities are assigned to state and local actors. The objectives of the analysis are (1) to illustrate how institutional analysis may

assist policy analysts and practitioners tease out patterns and conditions for different decentralized forest arrangement, and (2) to gain insights from case studies of decentralized forest management in Honduras, Nicaragua and Colombia. The findings reiterate the importance of local participation in forest management policies, highlight some of the challenges in designing and implementing nested management systems, and point to questions and guidelines that a practitioner might draw in diagnosing how to design and implement forest management in Latin America, and developing countries more generally.

II. The Approach: Making Sense of Institutional Diversity

“The embarrassment that we face is that policy analysis has yet to develop a coherent understanding of how our subject matter should best be expressed, how rules fit or don’t fit together to shape observable behavior and outcomes” (Ostrom, 2005, p. 181).

2.1 Dissecting Decentralized Systems

Decentralized environmental management is often offered as a policy recommendation that is presumed be more participatory and responsive to local demands than centralized management structures, and therefore, a more effective and efficient institutional arrangement. The term decentralized in and of its self, however, offers little insight into the specific rules and incentive structures actually in operation. In their review of decentralized natural resource management in six countries, Ribot, Agrawal and Larson (2006) find great variation in decentralization processes and note that the evidence of the benefits of decentralized systems is inconclusive at best. The authors emphasize that in order to better understand the outcomes of these systems, we need to consider *who gets which powers*, and how these actors or organizations are held accountable. Work by Agrawal and Chhatre (2007) on co-governance in the Indian Himalayas also illustrates the importance of considering who has which powers in forest governance. In the case of forest governance in India, their work finds that decentralized systems may be more effective given a more limited role of the state.

The emphasis on who has which powers demonstrates the importance of understanding how the rights and roles assigned to the various actors, and the respective rules that the actors create,

fit within the social and biophysical aspects of particular resource management context and thereby impact local resource decisions and the overall effectiveness of a policy or program (Gibson, Williams & Ostrom 2005; Wright 2005; Andersson et al. 2006; Agrawal and Chhatre 2007). The concept of institutional fit is a fairly ambivalent term that has been used to describe how different governance systems interact across spatial, biophysical and jurisdictional scales (Cash 2006; Young 2006). In their study of community based conservation initiatives, Barrett and colleagues (2001) note that one of the challenges for decentralized management arrangements is figuring out how to distribute decision-making authority across actors operating at different jurisdictional levels so that the institutional arrangement fits within a particular ecosystem or social and biophysical landscape.

If we consider institutions to be rules and norms that shape our behavior and dictate the “rules of the game” (Ostrom 1990; North 1990), then one particularly important aspect of institutional fit is whether those actors that have decision-making rights are, in fact, able to create rule systems that are coordinated and compliment one another, and ultimately, shape the behaviors that they are intended to affect. In his examination of cross-scale relations in resource management, Young (2006) maintains that institutions should be examined via jurisdictions and the way in which different rulemaking authorities operating across jurisdictional levels interact and coordinate (or fail to coordinate) their resource management rights and responsibilities. Likewise, Ostrom (2005) contends that if we are to understand how different governance systems shape behavior and outcomes, and how we might improve upon these governance systems, we need to look at the specific rules within a system and the incentives that these different rule sets create.

2.2 Application of Institutional Analysis

In this paper, I draw on institutional analysis to examine (1) who has what decision-making rights at which jurisdictional levels; (2) the specific rule configurations that are created to manage the forests; and (3) the outcomes with respect to forest conservation goals and sustainability of the governance regime. I consider institutional fit to be when institutions (formal and informal) operating across different jurisdictional levels attain established conservation goals and are perceived to be legitimate by local residents. The outcomes assessed in each case are

enforcement, compliance and perceived legitimacy. Given that one of the purported benefits of decentralized systems is that they are more participatory and socially just, perceived legitimacy of the rule system by the local residents is a basic measure of procedural justice.

The Institutional Analysis and Development (IAD) framework created by Ostrom and colleagues at Indiana University (Ostrom 1986, 1990, 2005) provides a context in which to understand how resource management rules and norms may impact governance outcomes. The framework asks the researcher to consider the biophysical and sociopolitical context in which resource management decisions are made. Within the framework are a set of conceptual components that serve as building blocks to understand the diversity of institutional arrangements that exist, their potential to structure incentive systems and, ultimately, resource management outcomes (Ostrom 1990; 2005).

Components used in this study are the decision-making levels and the specific property rights assigned to those decision-making levels. In IAD terminology, there are three principal levels that allocate decision-making rights¹: constitutional, collective choice and operational (Ostrom 1990, 2005). At the constitutional level, actors make decisions with respect to who can make and change the rule structure. Thus whether a state government or a local community holds constitutional decision-making rights will greatly impact local tenure security as these actors are able to determine who is eligible to craft rules and how these rules will be shaped.

The collective choice right holders, however, are the actors who are able to make management decisions about use and access to a particular forest system. In forest management, particularly important collective choice rights include management, exclusion and alienation (Schlager and Ostrom 1992). Those with collective-choice decision-making rights are entitled to make rules that *exclude* others and make *management* decisions that determine future access and withdrawal rights. *Alienation* is also a right decided at the collective-choice level and entitles one to sell or lease access and management rights. Finally, at the operational level are the decisions that regulate the day-to-day use of a specific good. In forest management, these often include the right to access and use a forest, and the monitoring and enforcement responsibilities as they are specified at the collective-choice level.

In this study, I focus on the collective choice and operational decision making levels. In particular, at the collective choice level, I am interested in who holds rights to make rules about

¹ There is also a meta-constitutional level that is not discussed in this paper. See Ostrom 2005, p. 59.

how land will be used and managed and who will monitor and enforce the rules. At the operational level, I am interested in who has access and use rights and who is responsible for day-to-day monitoring and enforcement.

In examining resource management institutions, if one looks only at the formal rights regimes, however, one may be missing half (or more) of the picture. In many instances, there are individuals, communities and other government units that are operating under their own informal institutional system that consists of perceived rights and the rules and norms that derive from these rights. In some cases, there may be two or three informal institutional systems operating irrespective of the formal governance arrangement. In understanding how decentralized forest institutions “fit” in a local context, it is imperative that we examine how the formal institutions mesh with the informal in order to understand forest governance outcomes.

The following analysis examines four cases of forest management that operate at and across different jurisdictional levels. The analysis identifies both the formal and informal rules systems operating at these levels in order to understand the interplay between right holders and forest governance outcomes.

III. Sites

The cases discussed in this study include: (1) Río Plátano Reserve, Honduras; (2) Bosawas Reserve, Nicaragua; (3) Robledal Regional Reserve, Colombia and (4) River Guacha Watershed, Colombia. The four cases were originally selected to compare two different institutional systems within lowland tropical forest conservation in Central America and two different systems for highland forest conservation in the Colombian Andes. The institutional arrangements in each case study illustrate the different forest management and policy reforms currently in momentum in most lesser-developed countries.

Appendices 1 and 2 show the study site locations and the principal forest site characteristics, and draws attention to several biophysical and related similarities between the cases in Mesoamerica and the respective differences in relation to the Colombian cases. In all cases, the forests have populations that live in or adjacent to the forest lands, and have traditionally used these lands for agriculture and forest products.

It is important to note that the case studies by no means offer a complete picture of forest governance institutions and outcomes in Latin America, but rather provide a basis by which to illustrate how institutional analysis may be used to define specific rulemaking systems and explore how specific components within particular institutional arrangements may contribute to or thwart successful forest governance. The hope is that institutional analysis might provide policy analysts with a structure to tease out how particular rule systems may or may not “fit” and to identify where specific reforms may be needed.

3.1. Mesoamerican Site Characteristics

The two forest reserves in Honduras and Nicaragua are located in the Mosquitia Forest Corridor, 20,234 square kilometers of tropical forest that run from eastern Honduras into Northern Nicaragua. The forested lands of the Mosquitia are difficult to reach, many areas are only accessible by boat or on foot, and the region remains largely isolated from market and political activities in the interior regions of the respective countries. In both forest reserves, the principal threat to the forests is agricultural expansion that is predominantly caused by settlers that began moving to the regions in the late 1980s in search of farm and pasture lands.

In Honduras and Nicaragua, indigenous peoples are the predominant residents in the region. The indigenous peoples in each forest reserve share similar ethnic backgrounds and histories, and have lived in the area for centuries. The residents consider themselves to be the rightful owners of all forest lands in the region based upon ancestral rights. Residents depend on the forest systems for small-scale subsistence farming, hunting and use of timber and non-timber forest products. Similar to many native peoples in Latin America, all forest lands are held in common and residents share access and use rights to the flora and fauna on these lands (Dodds 1994; Stocks 1996, 1998; House 1997; Schwartzman & Zimmerman, 2005).

In Honduras, the study focuses on the Miskito people that live in the cultural zone of Río Plátano reserve. The indigenous lands fall within four municipalities that are in the department of Gracias a Dios that covers much of the Mosquitia. Thus, management rules fall across three formal jurisdictions; the municipality, the department and the national government. In addition to the formal political jurisdictions, the indigenous residents in Río Plátano have created their own set of governing organizations that include community, regional and territorial governing bodies.

In Nicaragua, the study is of indigenous communities and their respective territories in Bosawas reserve. The territories fall within two municipalities that are both in the department of Jinotega. It is important to note that in the Honduran case, the municipalities have their municipal seats in indigenous communities in the reserve, whereas in the Nicaraguan case, the municipal seats are located in mestizo communities that are outside of reserve lands. Similar to the informal indigenous political system in Río Plátano, the indigenous residents in Bosawas have community and territorial governing bodies.

The principal difference between the Honduran and Nicaraguan cases are the decision-making rights that have been devolved to the local residents. In Honduras, in 1997, the President declared that Río Plátano reserve would be “co-managed”; the Honduran Ministry of Forestry would hold all management rights, but would make decisions in consultation with NGOs and communities in the region. In Bosawas, Nicaragua, indigenous residents obtained de facto territorial rights over their lands in 1997 and gained formal tenure rights in 2005.

3.2 Colombian Site Characteristics

The two Colombian case studies are located in a biological corridor in the Eastern Andean mountain range at an altitude of roughly 2,600-3,300 meters. The corridor encompasses approximately 10,700 square kilometers and contains the last remnants of Colombian oak (*Quercus humboldtii*). The forests are highly fragmented and the principal threats to the oak forests are agricultural expansion and timber harvesting for local consumption and some commercial sale.

The sites of Robledal and River Guacha are representative of many rural communities in the corridor. Robledal is located in two municipalities, Guacheta and Raquira, in the departments of Cundinamarca and Boyacá respectively. Three communities live in and around the reserve that encompasses roughly 400 hectares. The River Guacha Watershed is located in the municipalities of Encino, Santander and Belen, Boyacá. In total, the area contains 14, 970 hectares of which 2,500 ha are forest and 7,500 are paramo; both ecosystems are high conservation priorities. The watershed consists of approximately seven communities (Pers. Comm Fundacion Natura). Both regions are approximately four hours from Bogota; part of the travel is on rough dirt roads.

The communities that live in and near the oak forests are non-indigenous or mestizo (of mixed ancestry) peoples who settled the region over the last 100 years and use the forest predominately for small-scale agricultural and timber. The communities are fairly removed from the capitol, Bogota, but are linked to local markets by rough dirt roads and many residents sell agricultural products (principally potatoes) and dairy products to the local markets. Residents use the forests for fuel wood and construction materials and, on occasion, fell oak trees to make charcoal for sale to intermediaries.

Unlike the forests in the Mesoamerican cases where residents share access and use rights, all forests in the Andean case study communities are privately owned. Only the owner is permitted to use forest products on his or her land. There is no overarching informal governing body to regulate forest use. There are, however, a number of formal policies that have been implemented to regulate forest use on the private lands.

The cases in Colombia illustrate how the decentralized governance system has been applied in rural communities and the potential variations that may occur in both management structure and outcomes. In Colombia, forest management was largely centralized until the early 1990s when at that time, the constitution was reformed to give municipalities and regional governments more autonomy and a new law was passed that gave greater environmental governance authority to the Regional Autonomous Corporations (CARs). Under the new constitution and law 99 in 1993, the CARs were given fiscal and administrative autonomy to manage the natural resources within their regions and promote sustainable development (Blackman, Morgenstern & Topping 2006). As part of this mandate, the CARs were responsible for monitoring and enforcing national forest laws and creating and managing regional reserves for forest conservation.

Today, forest management in Colombia is regulated by a series of laws that are crafted, monitored and enforced by different governmental units operating at different jurisdictions. Communities in Robledal and in the River Guacha watershed are under the jurisdiction of federal forest laws that are monitored and enforced by the respective CARs. In Robledal, however, the CAR has created a regional reserve that further restricts resident land-uses. In contrast, in the River Guacha, NGOs have implemented a new program that attempts to grant local residents more management rights (at least informally) over their individual parcels of land.

IV. Methods

In each case, the investigation was structured by the International Forestry, Resources and Institutions (IFRI) protocols; a validated set of research instruments specifically designed to understand how different institutional arrangements impact forest use and management outcomes. Data on formal and informal institutions and socioeconomic information was collected via focus groups, key informant interviews, and observation. Key informant interviews were held with community leaders, forest guards, reserve officials and NGOs personnel working in the respective regions. In addition, I administered a short household questionnaire to approximately 10% of the households in each community. The questionnaire asked about local forest use norms and perceived legitimacy of forest rules.

The outcomes that I examine in each of these case studies are (1) forest enforcement; (2) compliance and (3) perceived legitimacy. Information on forest enforcement was gathered through interviews with national and regional ministries responsible for forest management and with community leaders and residents. In several communities I was also able to obtain records of denouncements and actions taken by the respective enforcement agency.

Compliance was measured by indicators specific to the nature of particular forest threats in each case. In Honduras and Nicaragua where agricultural expansion is the principal cause of deforestation, deforestation was measured by Landsat images classified by the Honduran Ministry of Forestry (1995-2001), and the Nicaraguan Ministry of Natural Resources and the Environment (2003) augmented by time-series land cover change conducted by Stocks et al. (2007). In Colombia, where forest patches are already highly fragmented, forest conservation was indicated by how well management institutions controlled illegal timber harvesting in the reserve. Timber harvesting was measured via stratified random vegetation sampling, in which all cut trees were censused within 300x 10m transects.

In addition to the forest condition data, I also conducted household interviews that asked people how likely it was that their neighbour would comply with the forest regulations and interviewed community leaders with respect to their own assessments of compliance. Key informant interviews and questionnaires are used to assess the perceived legitimacy of the forest rules

V. Institutional Reforms and Outcomes

The following highlights how institutional reforms in each forest study assigned rulemaking rights and management responsibilities and how these formal configurations compared to the informal norms and rules operating in the communities within each case. In each case, I present who holds which rulemaking rights and who is responsible for monitoring and enforcing the rules made by those right holders and assess the outcomes in each case. The institutional analysis of the formal and informal institutions illustrates how formal and informal institutions may compliment or thwart one another and the difficulties of nesting formal institutions across multiple jurisdictions in decentralized systems.

5.1 Management Reforms on Indigenous Lands in Mesoamerica: Río Plátano and Bosawas

Until the mid-1990s, Río Plátano, Honduras and Bosawas, Nicaragua were owned and managed by the respective national environmental agencies. In the 1990s, however, both Mesoamerican reserves experienced formal institutional reforms to address the swell of colonists that threatened the forests and peoples living in the Mosquitia. In Honduras, the reserve was declared a co-management biosphere reserve, whereas in Nicaraguan, the indigenous residents gained territorial rights to the reserve lands.

Table 1 illustrates how these reforms allocated decision-making rights at the collective choice levels and granted operational rights and responsibilities for day-to-day land use. The table shows how the formal policies in each reserve compared to the informal decision-making rights exercised by the indigenous residents.

Table 1. Decision-making rights and responsibilities in Río Plátano, Honduras & Bosawas, Nicaragua

Río Plátano: Public Co-Managed Reserve					
Collective Choice Decision Rights			Operational Rights & Responsibilities		
	Management	Monitoring & Enforcement	Access/Use	Monitor	Enforcement
Formal	National Forestry Ministry	National Forestry Ministry	All indigenous	Municipal committees created by Govt	National Forestry Ministry
Informal	<i>Territorial Indigenous</i>	<i>Territorial Indigenous</i>	<i>All indigenous</i>	<i>Indigenous community</i>	<i>Indigenous Community, Territory & National</i>
Bosawas: Indigenous Territorial Reserve					
Collective Choice Decision Rights			Operational Rights & Responsibilities		
	Management	Monitoring & Enforcement	Access/Use	Monitor	Enforcement
Formal	Territorial Indigenous	Territorial Indigenous	All indigenous	Territorial & Community	Community, Territorial & National
Informal	<i>Territorial Indigenous</i>	<i>Territorial Indigenous</i>	<i>All indigenous</i>	<i>Territorial & Community</i>	<i>Community, Territorial & National</i>

5.1.1 Reforms and Outcomes in Honduras

In Honduras, law 170/97 stated that the Honduran Ministry of Forestry was responsible for creating a new co-management plan for the Reserve. In creating the management plan, the Ministry of Forestry consulted with local communities and indigenous leaders to discuss their land-use practices and priorities. The resultant plan laid out several rules with respect to forest access and use (see AFE-COHDEFOR 2000). Post-1997 no new settlers were permitted on reserve lands. In addition, the indigenous residents and settlers were prohibited from cutting timber without explicit permission from the Ministry of Forestry and all forest clearing for new agricultural plots was prohibited. As part of the process, the Ministry of Forestry created municipal committees that were intended to help the Ministry of Forestry monitor for compliance with reserve regulations and propose development projects that the reserve could potentially fund.

Running parallel to the formal governance structures implemented in the late 1990s, were the informal governance structures of the indigenous residents. In the 1980s, upon learning of

settler encroachment onto their homelands, the indigenous residents in Río Plátano organized to defend their lands, restrict land sales and exert their ancestral rights over the region. Residents created community vigilance committees and regional governance bodies that demanded and exercised collective decision-making rights with respect to who could access and use forest lands in the region. Specifically, the regional bodies created rules to prohibit indigenous land sales to settlers and mandated that each community create a local land vigilance committee to keep settlers from moving onto indigenous lands. Monitoring was assigned to the land vigilance committees that were nested within the regional governance regime. Accordingly, if a community guard catches an outsider on indigenous lands, the committee first speaks to the settler. If that is ineffective, the committee may call on the indigenous governance body that may, in turn, call on the Honduran Ministry of Forestry to help enforce the regulation that prohibits settlers on reserve lands.

As can be seen in table 1, the formal management reforms coexist with a set of informal rights and rules exercised by the indigenous governing bodies and the two systems have relatively little to do with one another. Although both the Ministry of Forestry and the indigenous leaders have crafted similar rules with respect to settlers, the rules differ with respect to indigenous land-use rights and with monitoring and enforcement. Furthermore, rather than drawing on the vigilance committees to monitor the reserve, the Ministry of Forestry created a new municipal level organization to help monitor the reserve. Nonetheless, both the formal system of the Ministry of Forestry and in the informal system of the indigenous residents ultimately rely on the Ministry for enforcement of reserve regulations.

Enforcement of reserve regulations has for the most part, however, been virtually non-existent. Despite the Ministry's responsibility in managing the reserve, the government invested very little in enforcement activities on the ground. In 2001 the Ministry had hired four forest guards for the reserve, but in 2005 and 2006 there were none.

The outcomes of the reform process have been continued colonization of Río Plátano with little gain in local participation on the part of the reserve residents. According to reserve officials and residents alike, the resultant co-management plan reflected very little of the indigenous residents' organizational structures or their land-use norms (Hayes 2005). The absence of indigenous commitment to the management plan can be seen in the operations of the municipal level environmental committees. By the end of 1999, the Ministry of Forestry had created

municipal levels committees in every municipality in the reserve, however, by 2003 virtually none of them were active (Hayes 2005). Furthermore, in interviews, residents repeatedly stated that the Ministry of Forestry had no rights to the land, and there were numerous accusations that the forestry officials were exploiting the resources for personal benefit. Many residents stated that they did not comply with the Ministry of Forestry's rules because the Ministry had no right to tell them how they could use *their* land.

Although initially, several indigenous communities created their own forest guard groups (part of the land vigilance committees), after the reserve reforms many stopped monitoring. In interviews, vigilance committee members stated that they had hoped that the Ministry of Forestry would now prohibit settlers from entering the forests, but they grew tired of lack of enforcement support from the government (Hayes 2009).

The lack of enforcement, and resultant lack of compliance, is reflected by the increase in colonists in the western and southern regions of the reserve, and by land-cover change in the cultural zone of the reserve. Remotely sensed images of land cover in 1995 and 2001 show that, over this six year time period, the western edge of the cultural zone (a region particularly threatened by outside agricultural expansion) lost 10% of its forest cover. In 1995, 88% of the western region was covered in forest, but by 2001, the forest area was reduced to 76% (Hayes 2007). Furthermore, accounts of illicit timber harvesting, and the Ministry's of Forestry's facilitation of said harvesting, threaten the forests and the perceived legitimacy of the government agencies responsible for protecting them (del Gatto 2004; Wells, del Gatto, Richards 2007).

5.1.2 Reforms and Outcomes in Nicaragua

In Nicaragua, policy reforms in Bosawas reserve took a different approach. In 1997, The Nature Conservancy (TNC) began to work with the indigenous governing bodies and the respective communities to create reserve management plans and push for policy changes that would devolve greater land and resource management rights to the indigenous residents. Similarly to the participatory processes that occurred in Río Plátano, TNC worked with the indigenous residents to map out their traditional land-uses and create territorial land management plans that specified where the residents would farm, gather forest products, and conserve forest lands.

Furthermore, TNC and other NGOs working in the region supported the indigenous demands for territorial tenure².

Contrary to the process in Honduras, the resultant set of formal management rights and rules directly complimented and further strengthened the indigenous informal land-use rights and norms. As shown in Table 1, collective decision-making rights were granted to the indigenous communities and their territorial organizations. Furthermore, in working to develop territorial management land-use rules, TNC did not create new governance organizations; rather, it worked with those already in existence. In conjunction with TNC, the territorial organizations and their respective communities created a set of land-use rules that prohibited settlers moving in or buying land in the territories. They also set up a corps of guards to monitor community activities and the territorial boundaries.

Enforcement responsibilities were assigned to several actors operating at different jurisdictional levels. According to the residents and indigenous leaders, if a forest guard finds that a community member has failed to comply with a land-use regulation, community leaders are the first to talk with the offender. If community leaders are unable to resolve the problem, the territorial governing body will talk with the offender. Indigenous leaders stated that in the case of local community members, this is generally sufficient and the only sanction that has been applied to indigenous residents. If an outsider is found buying land inside the territory or invading territorial lands, the territorial governing body convenes to talk with the outsider. On occasion, leaders from the neighbouring colonist settlements are called on to tell the outsider that he/she cannot be on territorial lands. If the leaders are unable to resolve the problem, they may call on the Nicaraguan Ministry of the Environment and the military to remove and sanction the offender. The indigenous leaders must, however, cover travel costs for the military. Indigenous leaders said that an external NGO has generally helped them resolve conflicts with colonists, and on the rare occasion that they have called in the military, the NGO has covered the costs.

The governance outcomes in Bosawas have been fairly robust. In each community, two residents work as forest guards to monitor community activities and participate in the territorial boundary patrols. As of 2005, the guards continued to maintain the boundary clearings and

² In 1997 the native residents crafted an informal document that established their common-property rights to their territories, demarcated their territorial boundaries and created a management plan. The residents in Bosawas consider the 1997 agreement to be the establishment of “the law”. The rights were not formally recognized by the Nicaraguan government, however, until 2005.

monitor for mestizo encroachment as well as resident compliance with the territorial land management plan. It is important to note, however, that the guards are financially supported by external NGOs that also play critical roles in supporting the enforcement activities.

In general, indigenous residents and colonists report that there have been few infractions. Indigenous residents and colonists both stated that they perceived the rules to be legitimate. In interviews, colonists stated that they signed “the law,” a written agreement that granted the indigenous territorial governing bodies rights to their lands and prohibited colonist access and use on those lands.

An analysis of the current status of agricultural expansion in the communal territories of the forest reserve shows that the common-property rights and their respective monitoring mechanisms established in 1997 are working to stop outside encroachment and promote forest conservation. Remotely sensed images of forest cover in and outside the territories show that outsiders are not expanding into the territories (Hayes 2007; Stocks et al. 2007). An analysis of land-cover change from 1987, 1995/1996, and 2001/2002 by Stocks and colleagues (2007) found that the territorial boundaries are restraining agricultural expansion and that forest connectivity is statistically greater in the portion owned and managed by the native residents under a common-property regime than in the portion owned and managed by the Nicaraguan government. Likewise, the rate of deforestation between 1987 and 2002 was significantly less inside the territories than in the publicly managed portions of the reserve. Furthermore, land-cover analyses suggest that residents are complying with the territorial management plan that delineates where agriculture, gather forest products, strict conservation will be practiced (Hayes and Murtinho 2008).

5.2 Public and Private Governance Options for Decentralized Forest Management in Colombia

Of the three countries in this study, Colombia has developed the most nested decentralized systems. The formal rules governing forest use in the East Andes have evolved over the past 40 years to incorporate municipalities, CARs and national agencies in environmental governance. Table 2 illustrates how formal management rights and responsibilities are split across jurisdictions.

If we start with the smallest jurisdictional unit of analysis, the individual, the vast majority of lands in Robledal and the Guacha watershed are privately owned³. Residents in these regions use their lands for small-scale agriculture and dairy farming. Residents have historically felled trees to make farm or pasture lands, obtain construction materials, and to make charcoal. Today, however, the residents' management and use rights are heavily restricted. While residents retain their rights to make decisions regarding who can enter their lands and whether they will sell or rent their properties, residents hold minimal management rights. A national law created in 1974 prohibits cutting oak trees, in addition to other species. Originally, the national Ministry of the Environment was responsible for monitoring and enforcing tree cutting on all forest lands in the country (no matter who held formal tenure). As stated, in 1993 under Law 99, the regional environmental governance rights and responsibilities of the CARs were further strengthened. Thus, the CARs became responsible for enforcing the ban on cutting specific forest species, and also, responsible for creating, managing and enforcing regional reserves for environmental protection.

Communities in Robledal and River Guacha are both under the jurisdiction of the national law that is supposedly monitored and enforced by the respective CAR. In addition, in Robledal the CAR has created a regional reserve that further prohibits cutting forests and using forests for cattle grazing. In contrast in River Guacha, a pair of NGOs are working with individual landowners to develop informal contracts in which the land owner pledges to conserve forests on his or her land.

³ Note, titles may or may not be legally recognized as land is often passed down by grandparents. Nonetheless, residents pay taxes on their lands.

Table 2. Decision-making rights and responsibilities in Colombian cases

Robledal: Regional Forest Reserve					
Collective Choice Decision Rights			Operational Rights & Responsibilities		
	Management	Monitoring & Enforcement	Access/Use	Monitor	Enforcement
Formal	National & Regional CAR	Regional CAR	Individual	Regional CAR	Regional CAR
Informal	<i>Individual</i>	<i>Individual</i>	<i>Individual</i>	<i>Individual</i>	<i>Regional CAR & Municipalities</i>
River Guacha Watershed: Forest Conservation on Private Lands					
Collective Choice Decision Rights			Operational Rights & Responsibilities		
	Management	Monitoring & Enforcement	Access/Use	Monitor	Enforcement
Formal	National & Regional CAR	Regional CAR	Individual	Regional CAR	Regional CAR
Informal	<i>Individual w NGO</i>	<i>Individual w/ NGO</i>	<i>Individual</i>	<i>Individual</i>	<i>Regional CAR & Municipalities</i>

5.2.1 Reforms & Outcomes in Robledal Regional Reserve

In 1981, Robledal Forest Protection Regional Reserve was created. According to agency officials and community members, there was no local involvement in the creation of the reserve as it was originally designated on paper with little recognition of local land-uses or ecological systems (personal communication, CAR official). To date, CAR, in conjunction with the National Ministry of the Environment, hold management rights to all lands in the reserve. The residents retain their access to their lands, but their uses are restricted. Residents are prohibited from cutting oaks or clearing trees for agriculture. Residents are allowed to sell or rent their lands, however, many note that there are not many buyers looking for land that cannot be used for timber or agricultural purposes.

It is not clear how effective the rules themselves have been in shaping individual land-use practices and the resultant ecological outcomes. Officially, the CAR is responsible for managing, monitoring and enforcing forest use in the reserve. Resident knowledge of the reserve and reserve restrictions, however, is muddled. In all communities residents were very aware of the ban on cutting oak trees. They were less aware of who or how the ban was enforced, although many mentioned fear of the CAR and also of neighbors that might denounce illegal cutting. In

interviews, residents did recognize that they lived in a reserve, but they did not know where the reserve boundaries were, nor did they know of any other regulations associated with the reserve other than the prohibition of cutting oak.

A further complication is the division of rights and responsibilities between the CAR and the respective municipalities. Similar to a broader study of the effectiveness of the Colombian CARs (Blackman, Morgenstern & Topping 2006), conversations with CAR officials and municipal officials, and municipal police found conflicting ideas with regards to who was responsible for monitoring the timber ban and the regional reserves. CAR officials in the regional offices and in Bogota stated that they did not monitor the reserves or the ban, and that it was the responsibility of the municipal police or the residents to report any illicit activities regarding the forests or the reserves. CAR officials specifically stated that they do not investigate forest cutting in the Robledal region unless a complaint is registered. Municipal police and officials said that they do monitor for illegal forest cutting, but they do not monitor regional reserves. One municipal official said that she did not know exactly where the reserve was, nor did she know of any management restrictions for the reserve. Another municipal official said that unless the CAR specifically gives the municipality the responsibility for monitoring the reserve with management guidelines, land uses in a regional reserve are not the responsibility of the municipality.

The formal rules implemented in Robledal conflict with individual formal tenure and informal land-use institutions. In Robledal, residents have a strong commitment to private property, as all land is individually owned and another person must ask permission to use the land or trees on another's land. In interviews, many community residents felt strongly that the CAR should not have management rights on private lands. Residents frequently complained that they technically owned the land, but held no decision-making rights with regards to many potential land uses. Furthermore, residents were particularly upset that despite having the benefits that they could derive from their lands greatly reduced by forest policies, the residents still had to pay taxes on their lands. Many noted that their lands were now relatively valueless and that it was nearly impossible to sell their land given the use restrictions, but nonetheless, they had to pay taxes.

Despite the perceived illegitimacy of the forest regulations and the lack of monitoring by the CAR, some residents appear to be monitoring and, for the most part, are complying with the

restrictions. When asked who monitors for compliance with the timber ban, residents said that there is always “un sapo” (literally a frog), or someone who will report illegal activities. A list of denouncements placed at the respective municipalities and the CAR offices confirmed that residents have, on occasion, lodged complaints against neighbors. Some of these complaints had been followed up on by the CAR who either fined the offender or requested that the offender replant trees. Both municipal officials and CAR officials noted, however, that they often do not have the time or personnel to follow-up on all complaints or make sure that trees are in fact, replanted.

Transect data on forest use and species diversity shows that tree felling was highest in the mid-1990s and while it has since subsided, there is still evidence of oak cutting. The forest remains predominantly oak (71.3%). In all of the transects, 51.4% of the trees had been cut and of those trees, 75% were oak. Based on tree growth, it is estimated that the majority (approximately 40%) were cut in the base 11-20 years ago, ie the mid 1990s. While forest cutting continues to date, with some residents clearing stating that they continue to cut oak and sell carbon, the use has dropped, as roughly 12% of the tree felling had occurred over the past 10 years.

5.2.2 River Guacha Watershed: An alternative for private lands?

Robledal has managed to maintain its forest cover; however, it has done so in opposition to the local communities. Ultimately, it is difficult to directly link the forest conservation outcomes to the governing institutions. Other institutional arrangements in the River Guacha watershed, however, offer possible alternatives for promoting forest conservation, while respecting resource users' rights.

All forests in the River Guacha watershed fall under same national law that was created in 1974 and prohibited felling particular timber species, including oak. It is not clear, however, how well the forest law has been applied in practice. As in Robledal, the CAR has very little presence in the region. Residents state that the CAR rarely visits, and although all recognize that the forest law exists, it is not clear to what extent they have complied. Land clearing for pasture and farming continues to further fragment the forests, making the region a top priority for

international environmental organizations such as TNC and other domestic NGOs (Solana, Roa & Calle, nd).

In an effort to work with landowners to conserve the remaining forest remnants, two NGOs working in the region have taken a unique approach of working with landowners to designate what areas of forest will be conserved, areas for live fences to contribute to natural corridors and areas for agriculture and cattle. The program is designed so that each farmer actively participates in how the program will be implemented in his/her land and each farm design is unique. In addition, while there is no formal rule that requires the farmer to comply with the land management suggestions made by the NGOs, the farmers each sign a contract with the NGO that states that the NGO will invest certain materials (mostly trees) in their farms on the condition that the farmer continue to care for the trees and not cut any new forest lands. The forest contracts essentially ask the farmer to comply with the law that has been on the books for several decades. But, rather than recognizing the authority of the CAR to make management decisions, the program tries to instill management rights and responsibilities under the authority of the landowner.

The outcomes of the project have yet to be assessed. However, preliminary interviews find that with respect to procedural justice, the farmers perceive the informal contracts to be legitimate and comply with the management norms. There still, however, lacks additional monitoring and enforcement. The test is in how strongly these individual contracts hold and for how long.

VI. Discussion: Lessons from Institutional Analysis for Decentralized Forest Management

The case studies illustrate the various ways in which decentralized systems may allocate decision-making rights and responsibilities. Table 3 shows the different jurisdictional actors that share decision-making responsibilities in each reserve and summarizes the outcomes with respect to enforcement, compliance and perceived legitimacy. By examining who holds what rights to which jurisdictional region we can begin to understand the range of decentralized, co-management or community based governance arrangements along a rights-based spectrum. For example, if we lay the rights out along a spectrum from left to right on the left is the traditional centralized management regime with government having complete control over constitutional,

collective choice and operational decisions and the far right side being complete community control over collective choice right and responsibilities, we can see how the four cases in this study differ. For example, despite being legally defined as a co-management system, the Honduran reserve falls on the far left with resource users having only minimal consultation rights and the Honduran Ministry of Forestry owning the reserve lands and holding all collective choice decision rights. On the opposite side of the spectrum is the Nicaraguan reserve in which indigenous residents own the land and hold all collective choice rights. In the middle are the Colombian institutional arrangements in which forest management has been devolved to regional environmental agencies that are responsible for creating reserves in consultation with local communities.

Table 3. Rulemaking right-holders and outcomes

Rulemaking Rights across Jurisdictions				
	Río Plátano	Bosawas	Robledal	River Guacha watershed
National	X	0	X	X
Regional	0	0	X	X
Territorial	0	X	NA	NA
Municipal	?	0	X	X
Community	0	X	0	0
Individual	0	0	0	* Informal
Outcomes				
	Río Plátano	Bosawas	Robledal	River Guacha watershed
Enforcement	Low	High	Low	Low
Compliance	Low	High	Medium	Yet to be determined
Legitimacy	Low	High	Low	High

As illustrated in Table 3, only in Bosawas do communities (and the individuals within) have any rulemaking rights. Bosawas is also the case with the strongest governance outcomes. In terms of the assignment of collective choice rulemaking responsibilities, the Bosawas and Río Plátano findings echo the findings by Agrawal & Chhatre (2007) that communities do better when the state has limited collective decision-making rights. Nonetheless, it is important to note that indigenous residents in Bosawas, Nicaragua may be in a unique position due to their isolation from municipal, departmental and national governmental offices. Unlike Río Plátano, Honduras

or the Colombia cases where municipalities have offices in or near the forest communities, Bosawas residents were able to establish an informal governance system that remained fairly autonomous and has since, gained legal autonomy.

It is also important to note the enforcement limitations in all cases. Even though the studies found that residents wanted decision-making rights over forest and land management, in all cases, residents ultimately relied upon external governmental agencies for enforcement. In most cases, however, the links between local management decisions, monitoring and external enforcement were weak at best.

The cases presented in this study illustrate some of the challenges in constructing decentralized forest management systems that are perceived to be legitimate rule systems and that are able to achieve their forest conservation goals. While the cases by no means encompass all of the potential forest management contexts in Latin America, the institutional analysis highlights four commonalities and potential lessons for decentralized forest management.

First, is the importance of examining how decentralized systems recognize local tenure systems; the rules in use that mandate who has decision-making rights over a particular parcel of land. In Honduras and Nicaragua the informal property rights and land-use systems of the native residents were based upon communal tenure norms in which individuals did not hold private property rights to the forests. Likewise, in both Mesoamerican reserves, the indigenous residents had created governance bodies to regulate forest use in the region. Thus, the imposition of a public management system in Honduras with its own organizational structure made little sense given the pre-existing institutional and organizational structures on the indigenous lands in Río Plátano.

In Colombia, much of the forest land in the East Andes is privately owned. Once again, overlaying a regional reserve on top of private lands failed to build on any of the pre-existing institutional or organizational structures in the region. In the communities in the East Andes, there were no community level governing organizations to make rules for land-management; the individual landowner presumes to hold all management rights. The Robledal reserve restricted landowner decision-making rights without compensation and has been met with resentment and hostility on the part of the residents. In contrast, the private lands program in the Guacha River watershed recognizes the strong history of private property systems in the region and incorporates the individual landowner into the broader conservation planning process. The

informal process enacted by the NGOs in the region may provide landowners with the degree of decision-making rights needed for them to perceive the land-use rules to be legitimate and willingly comply with the forest restrictions. Future studies are needed to evaluate the results of this alternative system.

The second lesson is, taking local tenure systems as the starting point for policy analysis; the analyst or planner needs to critically assess how decentralized structures establish local decision-making rights. The findings in Honduras underscore the importance of distinguishing between consultation and decision-making rights. Meaningful participation requires the ability to exercise a decision-making right and see observable outcomes of this right. This distinction was succinctly made by Arnstein (1969) in her *Ladder of Citizen Participation*, and is also a critical aspect of institutional analysis.

Previous studies have shown that local decision-making rights are critical in sustained forest governance (Gibson, Williams & Ostrom 2005; Hayes 2006; Padgee 2006). This analysis, however, also points to the importance of how “local” is defined. In each context, the appropriate “local” right holder may depend on traditional tenure and organizational systems. For example, in Bosawas where forest land is communally owned and managed, community governance systems may sufficiently represent the interests and voices of the residents. In the Colombian cases, however, municipalities or CARs cannot be presumed to represent local interests. In these cases, unlike the Mesoamerica cases, land is individually owned and landholder consider it their individual right to be a part of the decision-making process.

Third, the cases illustrate the difficulty of creating nested systems, particularly with respect to monitoring and enforcement. Table 3 shows how few jurisdictional levels actually hold any rulemaking rights. In Río Plátano, Honduras rulemaking rights are almost exclusively retained by the Honduran Ministry of Forestry. Although municipal level committees were created, they did not hold any rulemaking rights and have essentially collapsed. Furthermore, the actual municipal offices that are located in the reserve have not been clearly incorporated into the management structure. The municipalities do, in some cases, regulate timber harvesting and provide land titles for homes located in the urban centers. It is not clear, however, what formal rights they have with respect to titling and regulating timber harvesting. In Bosawas, Nicaragua the decentralization process has devolved all collective and constitutional rights to the local communities and all other jurisdictional units have been left out of the process.

The Colombian cases are part of a country wide initiative for decentralization that attempts to grant greater participation to communities, municipalities and regions while integrating all within the national government system. While it all works well on paper, it has been much more difficult to implement in practice (Blackman, Morgenstern & Topping 2006). In the Colombian cases there is confusion amongst local, municipal officials and CAR personnel over who is responsible for monitoring and enforcing national and regional forest management regulations. And, as noted, individuals are left with minimal management rights in the forest management regimes.

Finally, the cases point to the consistent problem of enforcement. One of the hottest topics for debate between those that favor more centralized government managed systems versus those that support community management is the topic of monitoring and enforcement (Terborgh 2000; Hayes & Ostrom 2005). The cases in this paper show that local residents have generally been more consistent in monitoring for infractions. While Bosawas is the most evident case, in Río Plátano and in the Colombian cases community groups and individuals act informally as monitors. The problem, however, lies in enforcement. In all cases, external enforcement is called on to address either offenders that lie outside of communal sanctioning mechanisms or more grievous offenders. It is not clear, however, how enforcement responsibilities should be delegated as neither local residents, nor local governments, nor national agencies appear to be consistent in their enforcement activities.

In Bosawas, residents have been effective and monitoring and regulating their own land uses, but they rely on external assistance to monitor and regulate outside users. Similarly, in Río Plátano while there have been attempts by local communities to monitor their lands for intrusion, the locals are not sufficiently powerful to stop the colonists and the Honduran Ministry of Forestry is sought for enforcement assistance. This assistance, however, rarely arrives. In Colombia, the regional CARs are assigned monitoring and enforcement responsibilities. Although the study sites in Colombia are far more accessible when compared to the Mesoamerican sites, CAR officials report that due to lack of personnel and time, they generally do not monitor the forest lands and only sometimes enforce. Enforcement remains a critical issue for all institutional arrangements.

VII. Conclusion

One of the initial objectives of this paper was to provide policymakers and forest management practitioners with practical means of assessing how different institutional arrangements might impact forest governance outcomes. This work is still very preliminary and demands more research and applications of institutional analysis to varied contexts. While these studies do not encompass all of the forest governance situations in Latin America, they do highlight some commonalities and factors that policymakers and planners should consider when structuring conservation institutions. Thus, from a design perspective, how does institutional analysis inform the questions that policy analyst or planner might ask when considering how to structure a decentralized forest management system?

First and foremost, *how are local property rights systems structured for governing land and forest resources?* The studies demonstrate the importance of focusing on the smallest unit of analysis when considering how to build in rulemaking rights and responsibilities. Even if the environmental management plan is to be implemented at the landscape level, as were all of these case studies, the actual management needs to begin with the individuals living in and around the forest and how they use the forest resources. All of the case studies illustrate that property rights are deeply engrained institutions that are not easily changed. In both of the indigenous reserves, forest units were commonly owned and managed. Thus, these institutions constitute the smallest unit of jurisdictional analysis and a starting point for envisioning who holds decision-making rights over a particular landscape scope. Likewise, in Colombia, the smallest jurisdictional unit is the landowner that portends to hold rights to his or her private parcel of land.

Second, *how is the smallest jurisdictional unit incorporated into decision-making rights in the decentralized system?* Decentralization policies that do not recognize local resident rulemaking rights, or give residents only token rights, will not be perceived to be legitimate and therefore, will be more difficult to apply. In this study, the only cases where forest rules were perceived to be legitimate were where those in the smallest jurisdictional units was granted decision-making rights with respect to management of forest lands.

Finally, once local decision-making rights have been established, the question is how to build up from the bottom and construct an effective and efficient nested system. One challenge in particular is assigning the appropriate actors to provide relevant monitoring, conflict-resolution,

and enforcement services. The cases presented here, suggest that a first step is to ask; *where individuals and/or communities go to resolve land-use conflicts?*

In Río Plátano, Honduras for example, monitoring was initially assigned to a municipal level group that was not integrated with resident governance systems. Resident interviews and municipal files revealed, however, that residents rely on the indigenous vigilance committees for monitoring, and that most often community conflicts are resolved by indigenous elders or by the municipalities. The Río Plátano co-management plan, however did not draw on any of these local monitoring or conflict-resolution entities. Likewise, in Robledal, Colombia residents frequented the offices of their respective municipalities more often than they did the CAR. Nonetheless, the CAR was the official provider of conflict-resolution and enforcement services.

The difficulty of nesting across jurisdictions once again points to the importance of understanding how people actually make decision, and work to monitor and enforce those decisions in their day-to-day activities. Decentralized systems that start from the bottom-up may be better able to recognize more effective and efficient means of allocating monitoring and enforcement rights and responsibilities.

I contend that institutional fit ultimately depends on the ability to coordinate local land-use institutions within broader jurisdictional units. Institutional analysis serves as a starting point for identifying informal and formal property rights systems and systematically dissecting who is assigned which decision-making rights and responsibilities in a decentralized governance system. Working from the local unit of analysis up provides one way of understanding how institutions may or may not fit. Future research however, is needed to understand how rulemaking rights can be further nested, and most specifically how to create forest governance arrangements that not only make efficient and legitimate rules, but also effectively monitor and enforce them.

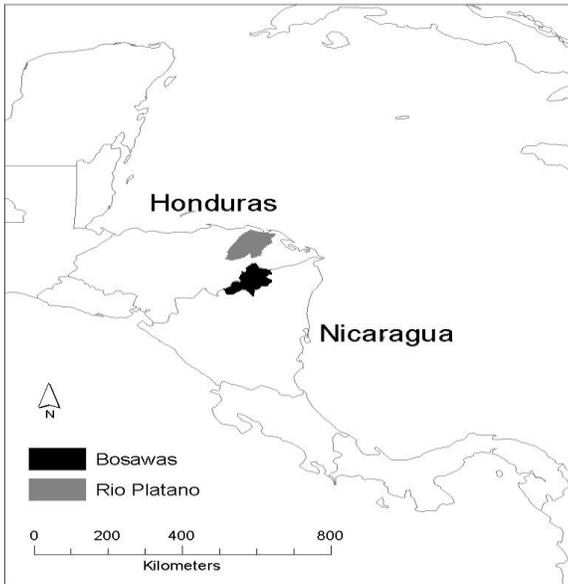
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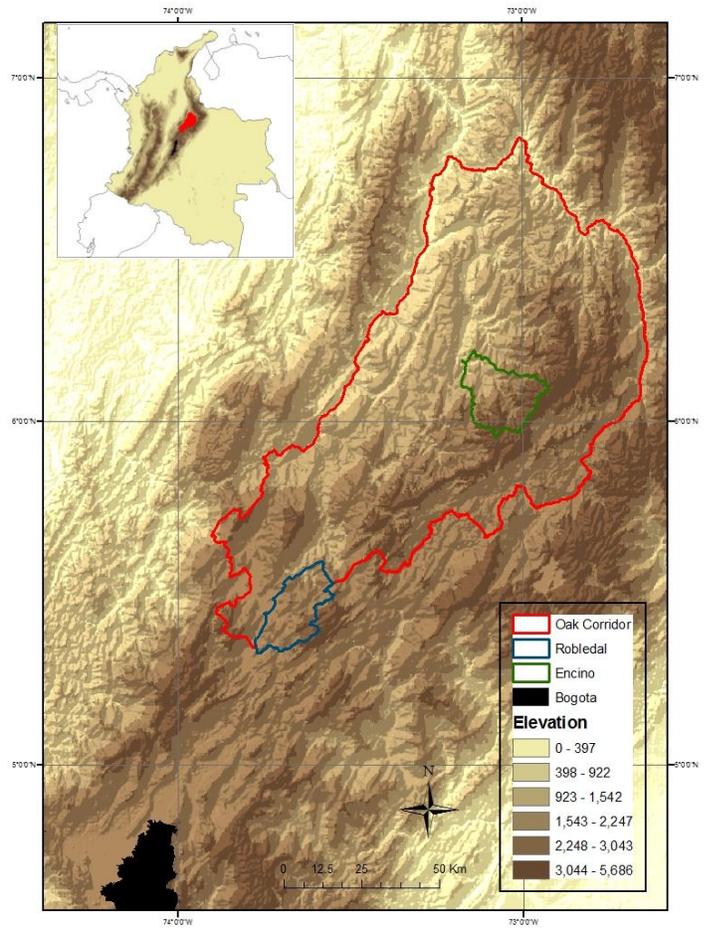
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Appendix 1. Study Sites

Mesoamerican Sites



Colombian Sites



Appendix 2. Principal Site Characteristics

	Río Plátano, Honduras	Bosawas, Nicaragua	Robledal, Colombia	Cuenca del Río Guacha , Colombia
Characteristics of Forest				
Size of Forest (ha)	389,500	123,497	400	14,970
Location (Accessibility)	boat/plane (road into souther buffer)	boat	dirt road	dirt road
Spatial Distribution of Forest	intact	intact	some fragmentation	highly fragmented
Clarity of Forest Boundaries	partial	partial	none	none
Principal Threat to Forest	Agricultural Expansion	Agricultural Expansion	Timber	Timber/Agriculture
Governance Systems				
Population	21,320	3,912	470	Not Available
Socioeconomic attributes	Subsistence Livelihoods	Subsistence Livelihoods	Local markets & subsistence	Local markets & subsistence
Local Forest Norms	Shared access and use	Shared access and use	Individual ownership and use	Individual ownership and use
Tenure rights (Land title)	Ministry of Forestry	Indigenous Territories	Individual	Individual
Collective choice rule making authority	Ministry of Forestry	Indigenous territorial government	Management decisions regulated by national government and CAR. Individual holds alienation rights.	Management decisions regulated by national government and CAR. Individual exercising informal management rights. Individual holds alienation rights.