AN ASSESSMENT OF INDIGENOUS PARTICIPATION IN COMMERCIAL FORESTRY MARKETS:

THE CASE OF NICARAGUA'S NORTHERN ATLANTIC AUTONOMOUS REGION

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Washington, D.C.
December 8, 2003

First Draft of Report Prepared for Forest Trends

PREFACE: INDIGENOUS PEOPLES AND FORESTRY

Indigenous communities in the developing world have increasingly become central players in national and global forestry markets. The impetus for this integration has come both from national imperatives and local initiatives. The forestlands in which indigenous peoples reside often represent the last resource-rich forests within their respective nation states. Governments have increasingly looked to these areas – particularly in the context of expanding neoliberal reforms – as a means to generate much needed international revenues and stimulate economic growth and development. Indigenous peoples have often been excluded or exploited under this context, but land rights and human rights movements by and on behalf of indigenous peoples have increasingly begun to gain them participatory roles in state- and company-directed forestry activities. In addition, many indigenous leaders and support organizations have initiated grassroots strategies, taking advantage of valuable forest resources and/or traditional indigenous knowledge of forest resources as a means to economically and politically empower local communities.

Around the world, indigenous peoples' participation in forestry has resulted in a range of models encompassing varying productive activities, forms of organization and planning, and means of integration into the markets. As governments, development planners, indigenous advocates as well as indigenous leaders and their communities increasingly look to the potential of forestry for indigenous empowerment, it is useful to reflect on the opportunities and obstacles presented by varying models and the costs and benefits realized in order to generate proposals that can help indigenous communities derive the maximum benefit from their forest resources.

This paper examines the models of integration of indigenous communities into commercial forestry markets in Nicaragua's Northern Atlantic Autonomous region. The region is somewhat unique compared to many areas of the developing world that have been the focus of forestry in that many of its indigenous inhabitants, particularly the Miskito, have participated in foreign commercial exploitation of the region's natural resources for hundreds of years without ever being peasantized. In addition, the status of the entire region as "Autonomous" creates an interesting, and often indeterminate, political and regulatory context. Despite these distinctions, the costs/benefits and opportunities/obstacles of indigenous forestry participation in the region that are reviewed here generally reflect those seen throughout the world.

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ACRONYMS

ADFOREST	Administración Forestal Estatal
CIDCA	Centro de Investigación y Documentación de la Costa Atlántica
CONADES	Comisión Nacional de Desarrollo Sostenible
CONAFOR	Comisión Nacional Forestal
CRAAN	Consejo Regional Autónomo Atlántico Norte
DED	Deutscher Entwicklungsdienst (German Development Service)
FADCANIC	Fundación para la Autonomía y el Desarrollo de la Costa Atlántica
FAO	Food and Agriculture Organization
GTZ	Gesellschaft für Technische Zusammenarbeit (The German Agency for Technical Co-operation)
IDB	InterAmerican Development Bank
INAFOR	Instituto Nacional Forestal
INDERA	Instituto de Desarrollo de las Regiones Autónomas
INRA	Instituto de Reforma Agraria
MADENSA	Maderas y Derivados de Nicaragua, S.A.
MAGFOR	Ministerio de Agropecuario y Forestal
MARENA	Ministerio de los Recursos Naturales y del Ambiente
MEDE	Ministerio de Economía y Desarrollo
MIFIC	Ministerio de Fomento, Industria y Comercio (Formally MEDE)
PROFOR	Proyecto Forestal de Nicaragua
RAAN	Región Autónoma del Atlántico Norte
URACCAN	Universidad de las Regiones Autónomas de la Costa Caribe Nicaragüense.
WB	World Bank
WWF	World Wildlife Fund

Figure 1: Map of Nicaragua

Source: Perry Casteñada Map Collection online, The University of Texas at Austin

INTRODUCTION

Nicaragua's Northern Atlantic Autonomous Region (RAAN) contains a wealth of tropical forests and has a long history of forest exploitation. Nicaragua contains the largest tropical forest north of Amazonia with nearly 23,000 km^2 of broadleaf and nearly 6,000 km^2 of pine forest. Over three-quarters of these forests are located in the Northern Atlantic Autonomous region, which constitutes about one-quarter of the country in total area. For over 200 years, the forests of the region were the focus of an extractive economy in which foreign companies extracted timber under a concession system to remove valuable forest products, including broadleaf species such as mahogany and cedar, Caribbean pine, pine resin, and rubber. Many of the indigenous peoples of the region, who today make up a little over 60% of the population, participated in this economy by providing wage labor. Beyond providing employment, however, the extractive nature of the industry did little to develop the region. The more accessible forests were largely exhausted by the 1960s, and the industry collapsed almost completely following the successful Sandinista revolution in 1979.

With the return of democracy and the implementation of neoliberal economic policies in 1990, the RAAN has again become a focus of commercial forestry, this time as a means of national and regional development and with indigenous communities as potentially more central players. In this paper, I will briefly review the nature of indigenous communities of the region and the history of forest exploitation. I will then examine in more detail the nature of the current forest industry, focusing on indigenous participation in order to analyze:

1. the various models of market integration that exist for indigenous communities;
2. the costs and benefits of different models of commercial participation to indigenous communities; and
3. the opportunities and obstacles indigenous communities face to obtaining greater benefits from their forest resources.

It will become clear that indigenous communities are primarily involved in five models of forestry, including: extraction of non-timber products such as pine seeds and pine resin, production of charcoal and fuelwoods, sales of whole logs from community lands, small-scale sales of sawn wood in regional markets, and large-scale concession agreements with logging companies. These activities provide an important source of income to communities and their inhabitants, which is directly affected by both the scale of the operation and the degree of integration into the markets. Large-scale deals between communities and companies tend to provide greater employment and greater total benefits for the community, while sales of products in regional markets tend to capture a greater percentage of the value of the products but occur on a much smaller-scale and thus benefit a fewer number of community inhabitants. Only recently have examples begun to emerge where community enterprises are evolving that can capture both of these benefits.

Despite the somewhat limited benefits seen so far in the RAAN, many organizations of support and indigenous peoples see forestry as holding significant potential for these communities which are some of the poorest of Nicaragua and one of the most poverty-stricken nations in the world. The region contains extensive forests with a wealth of valuable species (Appendix 1 provides a list of some of these), and most of the land is titled to indigenous communities, identified as part of their historical or ancestral domain, or otherwise claimed by them. There is also a strong network of supporting NGOs in the region. At the same time, the lack of significant progress in this direction for communities of the region reflects the many obstacles that exist. The most significant of these include the lack of secure tenure, poor regional markets and difficulty accessing these or the better foreign markets, and the state of degradation of some of the forested areas.

This detailed review of the case of the Nicaragua's RAAN should prove valuable to the varied actors in the region looking to enhance the opportunities of indigenous communities in the RAAN. At the same time, many of the lessons concerning the costs, benefits, opportunities, and obstacles can be applied to much of the developing world.

METHODS AND DATA

Data reviewed for this study were obtained from both primary and secondary sources. An initial review of literature concerning indigenous forestry around the world as well as background literature concerning indigenous peoples and forestry in the RAAN was undertaken and an unstructured interview guide developed. In June of 2001, three teams composed of state officials, indigenous leaders, development workers, and researchers visited ten of the RAAN's 298 communities and gathered information on experiences with commercial forestry as well as general information relating to history, demographics, organization, economy, development priorities, and land tenure. Communities were selected in advance by research participants based on 1) relative accessibility, 2) the communities' experiences in forestry, and 3) our desire to observe a range of forestry models. Appendix 2 lists the members of three research teams and the communities that each visited. Three additional communities, which are located in a poorly accessible part of the municipality of Prinzapolka but for which considerable information was available through interviews and/or literature, were also included in the analysis. Unstructured interviews were also held in Nicaragua with key individuals concerned with forestry and/or indigenous communities in the region (Appendix 3 provides a list of the primary interviewees). Research and project reports concerning forestry in the RAAN and specific case studies were also obtained from a number of organizations, including MAGFOR, INAFOR, PROFOR, WWF, WB, GTZ, FADCANIC, CIDCA, and URACCAN. The final source of information was David Kaimowitz, Director of the Center for International Forestry Research, who provided considerable data that he has collected during his work in Nicaragua, including interviews with key players as well as his own reviews and analyses of the situation.

Data from the various sources was organized and entered into matrices relating to each of the 13 focus communities. The themes under which data was organized include: a) community background, b) community history, c) community organization, d) land tenure and security, e) economy and subsistence, f) non-commercial forest use, g) forested lands, h) forestry activities, i) forestry production, j) forestry marketing and sales, k) forestry planning, organization and management, l) forestry skills, knowledge and information, m) forestry technology and infrastructure, n) financial and technical support, o) other relations with outsiders, p) costs and benefits of forestry, q) obstacles, problems and concerns, r) development priorities and goals, s) lessons learned. A brief overview of some of the basic information concerning these communities is provided in Table 1, and the location of these communities across the RAAN is shown in Figure 2.

The 13 focus communities include five Mayangna and eight Miskito communities and are spread across six of the seven municipalities of the RAAN. They also represent a variety of the most important forestry models seen in the RAAN. Yet, it is important to note that this is not a complete view of all forestry activities in which indigenous peoples participate. This study focused on the activities undertaken in and by rural *communities* and so relatively little information was collected on enterprises of individuals on private lands or in cities. In addition, relatively little information was collected concerning crafts – a use of forest resources and a means of participation in forestry markets that should be given further attention. Finally, the information collected from each community is not necessarily comprehensive. For example, it may be that firewood and charcoal are collected in all communities, but *detailed* information was collected only in one. Also, it is likely that log and sawn wood sales were underreported, as individuals may have been hesitant to admit to the degree of forest exploitation given that many of these activities are done without permits and state employees were participating as members of the research teams.

Table 1: Focus Communities

Community	Ethnic Group	Municipality	Pop.[1]	Land Tenure	Primary Forest Type	Forestry Activities Reported
Alamikamba	Miskito	Prinzapolka	668	Yes (size unclear)	Pine Forest; includes a 21 km² reserve; also broadleaf	• State company extracting pine seed using local labor (see Box 2) • Pine cone sales to middlemen • Short-term contract with company to remove pine posts • Contract with company MADENSA for precious woods
Awas Tingni	Mayangna	Waspam	505	Yes; claim about 200,000 ha, much of which was under dispute by the state in 2001	Broadleaf. Includes highly valued mahogany and royal cedar	• Company MADENSA working a 43,000 ha; management plan through contract with community (see Box 4) • Timber and tabla[2] production for sale in local markets • Women do crafts of tuno to sell • One time contract with company Amerinique to take out illegally felled trees
Dibahil-Fruta de Pan	Mayangna	Rosita	207	Claim title from the Sandinista govt.; tenure dispute within community	Valuable broadleaf species	• Some reports that Fruta has made deals with company PRADA • Chainsaw operators in Fruta produce tabla
Koom	Miskito	Waspam	1124	Claim to have title to 3,062 ha	Young pine (reforested area)	• Some tabla production
Layasiksa	Miskito	Prinzapolka	483	Yes; claim to have title to 35,000 ha from early 1900s	25,000 ha broadleaf with highly valued species	• Tabla production by 20+ families • Community-based company formed and received funds from PROFOR to supply wood for shop (see Box 6) • Have a carpentry workshop in Puerto Cabezas • Production of boats • Some reports of deals with company PRADA

[1] Except where noted, population data are from Buvollen and Buvollen (1994). These data are significantly lower than those provided by community members as well as those provided in other sources. For example, Williamson et al. (1993) report populations of Wasakin at 897, Fruta de Pan at 370, Mukuswas at 308, and Awas Tingni at 695.

[2] Timber refers to a quartered log, while tabla is sawn wood (planks).

Community	Ethnic Group	Municipality	Pop.[1]	Land Tenure	Primary Forest Type	Forestry Activities Reported
Las Crucetas	Miskito	Prinzapolka	300[3]	Claim title to 12,000 ha	8,000 ha pine; also some broadleaf	CEPISA (family-organized company with most of the community as "partners") received PROFOR funds for management plan for production of sawn pine
Mukuswas	Mayangna	Bonanza	208	Agrarian reform title (8,500 ha between this and two neighboring com); half of land invaded by mestizos	Primarily broadleaf	• Reports of small sales to PRADA (50 m^3) • Sales to middlemen – unclear if log or sawn • Organization formed between some members of this and 2 neighboring communities; PROFOR funded project to work management plan on 1,500 ha as well as certify and sell seeds of valuable broadleaf species
Santa Marta	Miskito	Puerto Cabezas	582	Does not have a land title	Located in pine region	• Some craft production reported • Door company located in community • MADENSA once interested in placing a plywood plant there, but reported that the community requested too much
Saupuka	Miskito	Waspam	1775	Prewar title; reported to cover 1600 ha	98-99% pine	• History as laborers in pine resin and reforestation • Produce tabla for local markets • Produce charcoal for local markets • Worked with company American Caribbean in 2000 to extract pine resin (see Box 3) • IDB project POSAF
Sikilta	Mayangna	Siuna (also Bonanza and Cua Bocay)	338[4]	Report title to 432 km^2; problems with invading mestizo colonists	Broadleaf	• Historically worked for companies in extraction of rubber and mahogany • Some sale of tabla to meet basic needs and emergencies • Received funds from PROFOR to produce sawn wood from about 2000 ha degraded by fires (see Box 7)

[3] Self reported – not available in Buvollen and Buvollen (1994).
[4] Peralta and Indalicio (1996)

Community	Ethnic Group	Municipality	Pop.[1]	Land Tenure	Primary Forest Type	Forestry Activities Reported
Tuapi	Miskito	Puerto Cabezas	460	One of 10 communities to receive group title in early 1900s; claims 7,104 ha of this (Rodriguez 1998)	Pine; 4,247 ha identified as adequate for forestry (Rodriguez 1998)	• Long history of pine exploitation - both logs and resin • Report processing about 70m^3 per year of sawn pine • Some craft production
Tuara	Miskito	Puerto Cabezas	484	Also part of 10 communities; having conflicts with two neighboring communities	Pine; plantation of 3,000 ha 6-16 years of age; broadleaf along river (URACCAN 1999)	• Long history of pine exploitation - both logs and resin • Production of charcoal and firewood • Report processing about 24 m^3/year of sawn pine URACCAN (1999) reports 100m^3/year • Some craft production
Wasakin	Mayangna	Rosita	777	Title to 36,000 ha (de Camino 1997)	7,000 ha pine and the rest broadleaf	Community has 50-yr. contract with company Amistad covering all forests of the community; Amistad's management plan began with focus on pine

NICARAGUA'S NORTHERN ATLANTIC AUTONOMOUS REGION – THE RAAN

Nicaragua's RAAN covers 32,159 km², or 26.5% of the country (Argüello et al. 1999). It is bordered in the north by the Coco River and Honduras, in the south by the Southern Atlantic Autonomous Region (RAAS), and in the east by the Caribbean. On the west, it borders the departments of Jinotega and Matagalpa (see Figures 1 and 2). The RAAN was created in September of 1987 through the *Ley de Autonomía de la Costa Atlántica* as part of a Sandinista effort to reconcile with rebelling Miskitos. Since 1990, the Region has functioned with an Autonomous Government, seated in Puerto Cabezas (also called Bilwi), consisting of the Governor and a Council of regional representatives from each of the municipalities. The RAAN contains 175,405 inhabitants situated in 298 communities and 7 municipalities. Settlements are found primarily along the major rivers, roads, and along the edges of savannas (Rivera et al. 1997). The population consists of four basic groups: Miskitos (58.2% of the population, or 102,086), Mayangnas (or Sumu, 3.5%, or 6,139), Criollos (1.2%, or 2,104), and Mestizos (37.1%, or 65,075) (Buvollen and Buvollen 1994; Rivera et al. 1997).[5] This study focuses on communities that primarily include members of the Miskito and Mayangna groups, the characteristics of which I will briefly summarize here.

Generally speaking, Mayangna communities are smaller and more isolated than Miskito communities. The average size of the 8 Miskito communities examined for this report is 734 persons, while the average size of the 5 Mayangna communities is 407. Of the 149 rural Miskito communities surveyed by Buvollen and Buvollen (1994), 13 (or 9%) have over 1,000 inhabitants, while only one (4%) of the 25 Mayangna communities has this many persons, and only 4 have over 500 (two of which are included in this report). The Mayangna communities are concentrated in the inland forest areas and are distinguished by three linguistic subgroups: twahka, panamahka, and ulwa (Buvollen and Buvollen 1994). Miskito communities are found in all seven municipalities, but are concentrated in Waspám along the Coco River and along the coastal plain of Puerto Cabezas and Prinzapolka. The relative isolation of the Mayangna is due largely to adaptations of these communities to historical dislocations forced upon them by expanding Miskito and Mestizo populations.

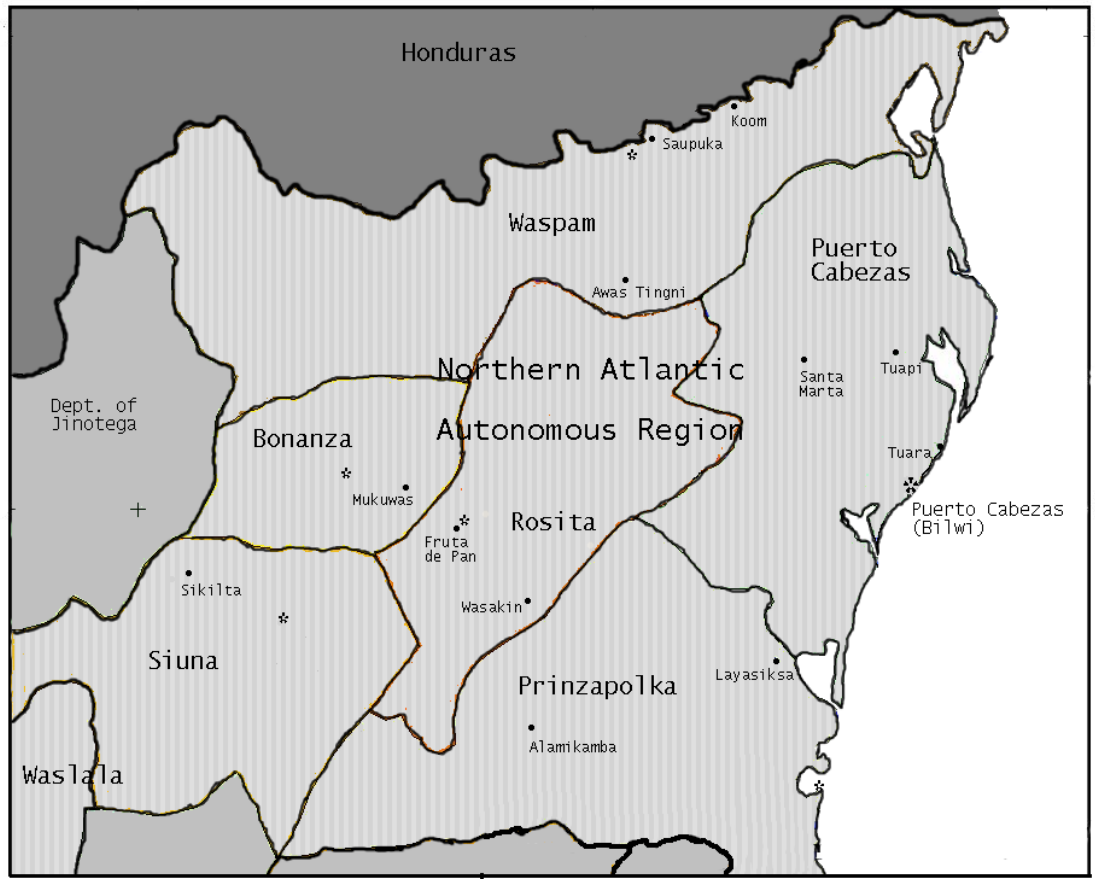
The political organization of most indigenous communities is similar. Leaders are elected by the community and include such positions as the *Wihta Tara* or *Juez*, the *Sindico*, and the *Consejo de Ancianos*. The *Juez* is the maximum authority of the community while the *Consejo de Ancianos* is made up of elderly leaders and serves an advisory role to other leaders and the community. The *Sindico* represents the community with respect to their natural resources, especially concerning the forests and communal lands, and is also responsible for guarding titles (when they exist) and other documents (Rivera et al. 1997). In most cases, land and natural resources are perceived as a common good to which all members of the community have rights. As will be discussed in more detail in the

[5] Numbers are obtained by taking the percentages of the population represented by each ethnic group from Buvollen and Buvollen (1994) and applying these to more recent total population numbers provided in Rivera et al. (1997).

analysis of opportunities and obstacles, few communities actually hold clear or undisputed titles to the lands that they perceive as their own. Some Miskito communities have decided to informally divide up rights of access to communal lands between members of the community.

Both Miskito and Mayangna communities practice diverse economic strategies that include small-scale swidden agriculture, raising domesticated animals, hunting, fishing, and the extraction of forest products. Primary crops include banana, plantain, manioc, rice, beans and maize. Fruit trees are also very common, including orange, lemon, avocado, coconut, and breadfruit. The economy is primarily subsistence-based, although it is common to transport excess produce, when available, to nearby commercial centers for sale. In the Miskito community of Saupuka, for example, the two main crops are rice and beans, about 20% of each might be sold, with beans being of greater commercial importance. Orange, lemon and grapefruit trees exist throughout the village, although the market for thses is small. Non-timber forest products gathered by both groups include firewood, medicinal plants, and bamboos. Wood is also used for canoes and house-building materials, and palm thatch is often used for roofing.

Figure 2: The Northern Atlantic Autonomous Region and Case Study Communities



** Municipal capitals*

Some community members also hold jobs outside of the agriculture sector. For the Mayangnas, this practice is more recent and less common. Some work in the mining sector in the western part of the RAAN, while a number of communities have also been involved in commercial forestry. Generally speaking, however, Mayangna communities are fairly isolated from the broader political-economy of the region and nation. Miskito have more commonly participated in the wage labor economy. Currently, they are commercially active in the urban centers, and rural Miskitos often migrate to work in the fishing industry as well as in mining, although off-farm job opportunities are now fairly depressed in the region. They also participate in the forestry sector, although this is considerably reduced from what it was before the Sandinista period. Miskito participation as wage-labor for export-based extractive economies has historically been a central part of Miskito culture. Helms (1971), for example, designated the Miskito as a "purchase society" to distinguish them from exclusively subsistence-based horticulturalists on one hand and peasant agriculturalists on the other. The distinction from peasant society is that the Miskitos have long been articulated with broader political economies through economic channels of trade and wage labor, while local political economies and social organizations have been maintained largely unaffected. Wage labor has been used to purchase outside goods, but the Miskito never became dependent on these market relations and they were not subject to government controls over produce, time or labor.

These differences are reflected in the views of the two groups concerning the forests. Miskito communities view these as a potentially productive resource for commercial purposes, to be utilized on an individual or familial basis, and as a basis for gaining wage labor. Many in the region recall working for foreign forestry companies in the past and desire such opportunities to return to the region. Mayangna communities, on the other hand, do not as readily view the forest with commercial aspirations. Norman Davis, president of the Mayangna supracommunal organization Sukawala, explained the views of the community of Wasakin towards the forests as follows:

> The trees are part of life and in order to fell them one needs to ask for permission from spirits or from the tree itself. From the forest, they take out their subsistence and the culture depends on these trees, for without the land and trees, identity and culture will disintegrate. Thus, forest resources were only used for the construction of *pipantes* and the extraction of thread to sew and make cloth for the indigenous family. There has not been wood market or even the idea of selling a piece of wood.

For both groups, however, the interest in the forests as a means to meet community development needs is growing, particularly in the face of the severe poverty of the region.

The economy of the RAAN is extremely depressed, being one of the poorest regions of Nicaragua, which in 1998 had per capita GDS of US$445 (IMF 1999). In 1990, for example, the situation was critical, with a 92% unemployment rate and expanding drug trafficking activities (FADCANIC 1994). In 1998, the rural poverty rate of the RAAN was 79.3% (González et al. 2002). Currently, the economy is focused on five primary activities: agriculture, cattle ranching, fishing, mining, and

production and sale of wood (Argüello et al. 1999). Mining is primarily found in the municipalities of Siuna and Bonanza, while fishing is focused along the coast. Infrastructure of the region is poor and most was created by external investment and companies as part of the enclave economy that has historically characterized the region. There is a port in the capital that is used for the export of wood and import of combustibles, but it is of poor quality. Only 28% of households in municipal centers have electricity and only 15% have potable water. As of 1993, Puerto Cabezas was the only center with phones (Rivera et al. 1997).

FORESTS AND FORESTRY IN THE RAAN

The RAAN contains the largest concentration of both tropical broadleaf and pine forest in Nicaragua, which has the largest tropical forest north of Amazonia. The presence of a number of commercially valuable tree species (see Appendix 1) and the poor soils of the region have meant that these forests have played a significant role in the history of development of the region and suggest that they must continue to do so into the future.

Forest cover estimates for the RAAN vary considerably.[6] The Instituto de Desarrollo de las Regiones Autónomas (INDERA) estimated 21,021 km^2 of broadleaf forest and 4,891 km^2 of pine in 1991 (Reyes 1991). In 1999, MAGFOR (Ministerio Agropecuario y Forestal) adjusted these estimates to 18,034 km^2 of broadleaf forest and 4,195 km^2 of pine (see Table 2) by assuming a deforestation rate of 1.78% (Argüello et al. 1999). Taking into account CATIE's measures for Nicaragua (the source used by the FAO), the MAGFOR estimates would have the RAAN forests making up 79% of the country's broadleaf forest and 70% of the country's pine forests. While the measures for the pine forests seem fairly consistent, national and regional measures for broadleaf vary considerably. Rivera et al. (1997), for example put the RAAN broadleaf cover at only 7,500 km^2. Part of the difficulty of gaining precise measures of forest cover is that many of the forested areas of the RAAN are in a state of high degradation and/or regeneration due to the history of extractive forestry.

[6] Statistics for the total forest cover of the country and the RAAN vary significantly and some sources provide contradictory information. For example, Reyes (1991) provides data on the percentage of the national forest represented by the RAAN and RAAS that do not correlate to the numbers he provides, but could be used to suggest a national total of only 62,000 km^2 broadleaf (if we hold the RAAN and RAAS data constant). Rivera

Table 2: Forest Cover in the RAAN

	Broadleaf	Pine	Total (excluding mangrove)
National*	22,806 km²	5,930 km²	28,736 km²
RAAN**	18,034 km²	4,195 km²	22,229 km²
RAAN as % of national	79%	70%	77.4%

** National references from CATIE 1999*
*** Based on 1999 MAGFOR estimates (Argüello et al. 1999)*

These forests have considerable ecological, social, and economic value. Ecologically, the forests contain high biodiversity and serve an important role in local climate and hydrology and the central government has decreed protected status to 4,122 km². The Bosawas biosphere reserve is the largest of these areas, encompassing 3,200 km² in the RAAN (and another 4,800 km² in the department of Jinotega) (Argüello et al. 1999). As noted, the forests of the region and the resources contained within them also play an important role in the culture and subsistence of the Mayangna and Miskito inhabitants of the region. Finally, the RAAN forests contain a number of highly valued species. The broadleaf forests, which are found primarily in the municipalities to the west, have over 200 species with some commercial value (Rivera et al. 1997). Five of the most commercially important and commonly exploited of these (based on the species with the five highest authorized volumes of extraction for 1998) are crabwood (*Carapa guianensis* and *Carapa nicaraguensis*, known locally as cedro macho), royal cedar (*Cedrela odorata*, cedro real), mahogany (*Switenia macrophylla*, caoba), guapinol (*Hymenea courbaril*), and santa maría (*Calophyllum brasiliense*). A more complete list of the primary commercial species is provided in Appendix 1. The pine forests are concentrated in the northeast of the RAAN and are primarily composed of the highly valued Caribbean pine (*Pinus caribea*).

The forests of the RAAN have been the focus of an extractive economy for over 200 years that was dominated first by the English and later by Americans and in which indigenous inhabitants – primarily Miskitos – were central participants as wage labor. This historical relationship between foreign companies and inhabitants has been important in structuring settlement and economic patterns, as well as affecting Miskitos' ideologies of work and subsistence. Products exploited have included rubber, pine, and tropical hardwoods – particularly mahogany and cedar. These have generally been exported as logs, sawn wood, or plywood, with no additional processing (Reyes 1991). This economy collapsed following the 1979 Sandinista revolution, but since the return of democracy in 1990 there has been a renewed interest in the potential of forestry at both the local and national level. In the following sections I will review the history of forestry exploitation in the RAAN and then examine the current state of the forestry activities, paying particular attention to the role of indigenous communities and the costs and benefits of different models of participation in forestry markets.

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et al. (1997) state the RAAN contains 42% of the national forests, while Sanchez (2001) states that there are 43,000 km² of national forest lands.

HISTORY OF FOREST EXPLOITATION IN THE RAAN

Commercial forest exploitation for export began as early as the 17th century with the British extraction of logwood (or dyewood) for textile dyes. By the late 18th century, mahogany and other valuable woods had surpassed dyewood in importance. In the mid-19th century, exploitation of these valued woods took off with foreigners receiving large concessions from the Miskito King (Mueller 2000). Cedar and mahogany were shipped to Europe, and later to the United States. The logging economy slumped briefly at the beginning of the 20th century when labor scarcities were produced due to rapid growth of the mining sector, but regained impetus by the 1920s (Reyes 1991). Between 1917 and 1949, the region exported an average of 33,344 m^3 of sawn wood – primarily mahogany and cedar – per year (.97 million m^3 total), and between 1940 and 1960 an average of 39,505 m^3 per year (.79 million m^3 total) (Argüello et al. 1999).

Between the late 1800s and 1970, there were at least 19 different companies operating in the region (Reyes 1991); however, most of these were relatively small operations, and logging was dominated by a few companies. The major company in the region involved with the export of the precious broadleaf species was the John D. Emery Company of Boston, which in 1885 received a concession that covered about 10% of the region (Argüello et al. 1999). It developed a railway to remove trees, and employed as many as 1,300 people. After 1960, the most valuable species were largely exhausted and activities decreased significantly (Reyes 1991).

Another major set of logging activities evolved around the extraction of pine. While some logging of pine had been going on since the late 1800s, large-scale operations only began in 1921 with Bragman's Bluff Lumber Company, an American firm that received a concession of 80,000 hectares (Reyes 1991). By the mid-1920s, Bragman's had become the largest employer in Nicaragua, employing around 3,000 workers, mostly Miskitos and Garifunas. It produced as much as 55,000 feet of planks per day (about 130 m^3) (Vargas 1996) and essentially created the current capital of Puerto Cabezas by investing around US$5 million into its development (Reyes 1991). Operations were closed in 1931 as a result of the global economic crisis. Pine logging returned to the region after 1945, when Nicaragua Long Leaf Pine (NIPCO) set up operations in Puerto Cabezas. By 1950, their operations extended throughout the northeast as far as Rio Coco. NIPCO claimed annual earnings of US$1,200,000, and some suggest that it produced as much as 20,000,000 board feet/year (or about 47,170 m^3). The company closed in 1963 after exhausting the pine forests of those areas easiest to reach, and pine production decreased considerably (Reyes 1991).

Following the exhaustion of the pine forests for logging purposes, NIPCO gave rise to the Atlantic Chemical Company (ATCHEMCO). Around US$11 million was invested to build an installation in what would become the town of La Tronquera for the extraction and processing of pine resin for export of varied derivatives to Europe and Japan. The plant became fully operational in 1967 and employed as many as 500 workers. In the early 1980s, the company was taken over by the state and then later sold to Industria Resinera de la Costa Atlantica, S.A. (INRECASA), which continued to

operate until the early 90s (Gomez 1991a and 1991b), processing 450 tons/day of pine and 150 barrels per day of resin (Argüello et al. 1999).

Another non-timber forest export that has been important to the Miskitos of the region is rubber. The commercial extraction of rubber (*Castilla elástica*) began around 1860 in the southern part of the region and expanded rapidly north. In 1867, 400,000 liters were exported at a value of US$112,000, and by 1871 exports had reached 754,886 liters with value of US$226,465. Because of the abuse and degradation of rubber trees during the boom, workers would sometimes mix the rubber latex with the latex of tuno (*Castilla tunn*), which lowered its value. The industry declined through the 1870s, although in 1900 the Coco river area was still an important rubber center. During WWII, production rose again and in 1944 Nicaragua had the highest production index in LA, producing 4,295 tons at a value of US$1,078,096 (Reyes 1991). Rubber production decreased again after the war and the resulting unemployment led many to the mining regions to find work. Some turned to tuno extraction for chewing gum, and exports rose from small-scale in 1948 to reach US$389,000 in 1964 (1,251,800 pounds). Activities were centered in Waspam, where an intermediate for Wrigley was buying the latex. These activities ended in 1979 with the implementation of a US embargo (Reyes 1991).

Thus, up until 1979, forestry activities took place through large concessions throughout the northern Atlantic coast. This enclave economy provided wage labor for regional inhabitants and initiated the city of Puerto Cabezas but provided little sustainable development and investment into the economy of the region. In addition, activities caused massive deforestation, particularly in the pine forests, leaving the region exhausted of much of its forest resources by the 1960s. When the Sandinistas came to power in 1979, they revoked the foreign concessions and took control of the forests through the Corporación Forestal del Pueblo (CORFOP). Because of the termination of the concessions, the continuing war, and the economic embargos, what logging economy had existed in Nicaragua dropped precipitously in the following years. Exports dropped from US$70 million in 1976 to less than US$500,000 in 1986 (Castilleja 1993). Despite the exploitative nature of the forestry economy leading up to 1979, many inhabitants of the region remember this as a time when at least there were jobs available and the region was less impoverished.

FORESTRY RETURNS TO THE RAAN

The focus on commercial exploitation of the forests was renewed when the Sandinistas lost power in the 1990 election. Chamorro's government, anxious to restart the economy after the war and the flight of investment, promoted exports and sought to reinvigorate foreign investment through incentives. This new focus encompassed the forests of the RAAN, much of which the national government considered to be national lands. In August of 1991, Chamorro accepted a deal with the Taiwanese Equipe Enterprise Company for a 267,000 hectare concession that covered part of Waspam, Puerto Cabezas and Prinzapolka. The agreement provided the Taiwanese firm with a thirty-year concession, and the company agreed to invest US$1 million, reforest nearly 200,000

hectares of degraded pine forest, and provide 5,000 jobs for the region. The deal had been undertaken in considerable secrecy, however, which brought protests by local Mayangna and environmental groups and a great deal of negative media attention on the government (Tropical Conservation News bureau 1991, in Kaimowitz draft). The deal also largely ignored the designation of the RAAN as an Autonomous Region, as well as the land claims of numerous indigenous communities. In the face of protest to the deal, and after learning that the Taiwanese firm had no experience in forestry, the government rescinded the deal in February 1992 (Preston 1996). By this time, other companies, contracts and players had emerged.

Despite poor infrastructure, limited investment, and the historical degradation of the forests, forestry has again become an important industry for the RAAN. It is one of the top two regions in the country in forestry production (with the department of Nueva Segovia). As Table 3 shows, the amount of wood authorized to be extracted in the RAAN has increased steadily from 1997 to 2000, when 201,927 m^3 was solicited and 32,398.5 m^3 approved in 23 permits. The RAAN permits in 2000 represented 31% of the total volume permitted in the country (INAFOR 2000). As Table 4 demonstrates for 1999, the volume of wood approved through permits has generally been less than the identified permissible volume for the region, though this is even less than the estimated total volume of wood extracted, which was around 18 times of what was approved.

Table 3: Authorized Volume of Standing Wood in the RAAN

Year	Volume (M^3)
1996	39,033.5
1997	6,314.4
1998	9,965.9
1999	22,947.0
2000	32,398.0
Total	110,685.8
Average per year	22,137.2

Argüello et al. 1999:17; INAFOR (2000 statistics)

Table 4: Permissible, Authorized, and Real Volume, 1999

Products	Permissible Volume	Authorized Volume (M^3)	Actual Production (M^3)
Broadleaf Forest	125,000	22,321	163,112
Pine	40,000	626	
Wood for firewood and charcoal	-	-	246,492
Total	165.000	22,946	409,604

Argüello et al. 1999:19

The primary commercial uses of wood are for fuel, plywood, and sawn wood, and little additional processing takes place. Most extraction is focused on a small number of species. In 1998, three

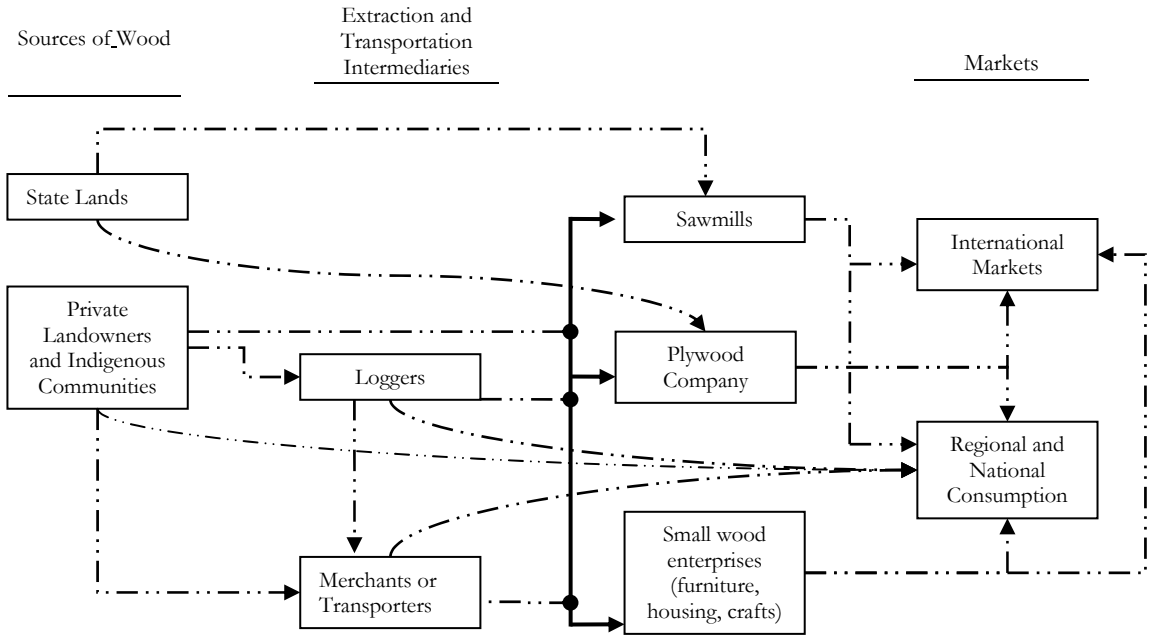
species – royal cedar, mahogany, and crabwood – made up nearly 45% of the total, while the next seven species of the top ten (guapinol, santa maría, nancitón, nancite, pine, come negro, and maría) accounted for just under 16% of the total (Argüello et al. 1999). There is also a small market for the seeds and resin of Caribbean Pine. Exploitation for fuel, including firewood and charcoal, represents the most significant production by volume. In 1999, it was estimated by MAGFOR to account for about 60% of production (see Table 4). During 1998-99, the total production of sawn wood was estimated at 103,380 m^3, nearly ten times what should have been possible, given the amount of cut volume authorized.[7] It is estimated that about 55,100 m^3 (53%) of this was processed by sawmill companies, while the plywood industry accounted for 39,120 (38%). The rest was produced by small chainsaw operators and others (Argüello et al. 1999).

OVERVIEW OF PLAYERS AND MARKET CHANNELS

The extraction and processing of forestry products involves a number of key actors, and it is here that the situation has most changed from the forestry models that characterized the region prior to 1979. On one hand, there are many fewer people formally employed in the forestry industry than was seen under the concession systems of the 1900s. As noted above, the John D. Emery company employed approximately 1,300 people, Bragman's Bluff employed 3,000, and ATCHEMCO employed 500. In looking to reestablish the concession model, Taiwanese Equipe Enterprise had offered to employ 5,000 people in the RAAN. The failure of the deal, as well as events surrounding the community of Awas Tingni (see Box 4), largely represented the failure of the reestablishment of the state concession system, particularly at the scale that had been historically common. In 1999, MAGFOR estimated that the forest industry generated only about 567 permanent jobs and 112 temporary jobs, not including approximately 183 loggers transforming trees by chainsaw (Argüello et al. 1999:23-29). On the other hand, the forestry industry has come to rely much more on local peoples and communities, not just for labor as was historically the case, but for the basic provisioning of trees. Figure 3 provides an overview of the primary players and market channels involved in forestry in the RAAN. I will provide a broad overview of these and in the following section, examine in more detail the role of indigenous communities and the costs and benefits of the various models of participation.

[7] The cut volume for this time would have enabled approximately 12,392 m^3 of processed wood.

Figure 3: Market Channel for Processed Wood from the RAAN



At the local level, there are hundreds of small-scale chainsaw and handsaw operators and farmers who sell timber that is obtained from private property or communal lands. The largest concentration of these are found in the frontier towns where resistance fighters and government soldiers were settled after the war, but this group also includes members of indigenous communities scattered across the region. Chainsaw operators produce timber (quartered logs) or tabla (planks) of varying size and transport it to the road, often by ox or by hand, where it is sold to merchants and sawmill owners from urban areas, including Managua. Alternatively, timber merchants may buy whole logs. A logger may also choose to bring the wood to a regional market, such as Puerto Cabezas, for sale. Many receive credit from the timber traders who order boards from the local loggers.

In addition, there are also perhaps several dozen large local timber merchants and loggers, many of whom operate in Siuna. These are generally local or regional authorities and/or elite. Some are former military officers. There are still many guns left over from the war, and some of the elite obtain access to forests and permits through threats and coercion (Kaimowitz draft).

Some of the wood transported by loggers and merchants goes to supply the local industry of housing, furniture and crafts. The furniture and craft industry involves small family producers and limited technology. As of 1999, there were approximately 51 small wood workshops of approximately 1-5 workers each in the RAAN with an estimated capacity to process 2,900 m^3 of sawn wood per year. Major products include: window and door frames, doors, furniture, and various

crafts. It is estimated that 90% of production is for local and regional consumption (Argüello et al. 1999).

Over 90% of the wood extracted from the RAAN, not counting fuelwood, supplies sawmills and the plywood mill located in the region. In 1998-99, there were 20 companies in the region, with six permanent and 14 portable sawmills installed for processing wood from the RAAN. Only 11 of these, however, were legally registered. In 2000, there were 13 permitted forestry industries: 7 were operating in Puerto Cabezas, 4 in Rosita, 1 in Siuna, and 1 in Prinzapolka (INAFOR 2000). One of these companies (PRADA) also runs a large plywood installation in the municipality of Rosita (Argüello et al. 1999). INAFOR (2000 statistics) reports that in 2000 the total capacity of production for legally registered companies in the region was 500 m^3/day, representing 26% of total national capacity. To obtain wood, companies pursue some combination of the following options: 1) request a concession from the state, none of which existed in 2000; 2) purchase wood directly from communities, either from individual loggers working community lands or from the community as a collective; 3) purchase wood from private landowners; or 4) purchase wood from middlemen, who obtain the wood from communities, landowners, individual loggers, and/or other middlemen.

Complete data on the total exports of wood from the RAAN are not available, but it very likely represents a significant portion of that produced in the region and the country. MAGFOR reports that 7 of the 11 companies legally registered in the RAAN in 1999 were exporting approximately 47% of their product. This includes the plywood company – by far the largest company in the region with an installed capacity of over three times the next largest company – which was exporting 70% of its product (Argüello et al. 1999). At the national level, export of sawn wood has risen from 4,658 m^3 in 1992 (Dirección General Forestal 1996) to an estimated 112,581 m^3 in 1997. Sixty-eight percent of this was pine, which is concentrated in the RAAN. Also, between 1996 and 1999, the RAAN exported 9,199 m^3 of mahogany, representing about 28% of the national total. The national income gained from wood exports in 1997 was US$25,962,501 (Argüello et al. 1999). From 1992-1995, the top six importers of wood from Nicaragua in order of total volume imported were El Salvador, Dominican Republic, Honduras, United States, Cuba, and Spain. Each imported over 5,000 m^3 over this period (Dirección General Forestal 1996).

The three companies that have the greatest productive capacity and that have continued to operate over the last 5 years include PRADA SA, Maderas y Derivados de Nicaragua (MADENSA), and Maderera La Amistad. In 1998, these 3 companies represented 69% of the productive capacity for sawn wood in the RAAN (Argüello et al. 1999). All have had some relations with indigenous communities examined in this study. PRADA (formerly SOLCARSA) works in area of Rosita where it both operates management plans and purchases wood directly from private landowners and communities, including the case-study communities of Fruta de Pan, Mukuswas, and Layasiksa. PRADA has a plywood factory in Rosita and takes out 50% pine, as well as cedar and mahogany. They are the only plywood factory in the RAAN and one of two in Nicaragua. MADENSA (see Box 1) obtains most of its wood through middlemen and, up until 2000, was also working a management plan in the community of Awas Tingni. While the contract expired, the company holds a 30-year

management plan for the region and will likely establish a new contract with the community. They work with a variety of wood beyond the precious redwoods and pine, and also do some additional processing of sawn wood for export markets. La Amistad was working a management plan in the community of Wasakin, focusing on pine but also taking some other valuable species. At the time of our visit in June of 2001, the community had decided to sever this relationship and the company was looking for a new area to work.

Box 1. MADENSA: Major Player of the Commercial Sawn Wood Industry

MADENSA is a Dominican company that was one of the first to begin working in the RAAN when the region began to open up to forestry and foreign investment again in 1990. They began with a portable sawmill, and are now one of the most capitalized companies in the region. The company's exports to the Dominican Republic and Cuba rose from US$600,000 in 1991 to US$2,000,000 in 1994 (MADENSA 1995). They have an approved 30-year management plan to 43,000 hectares in the community of Awas Tingni, though they have not worked there since 1999 because of land tenure disputes between the community and the state, and the expiration of their 5-year contract with the community. They are looking to renew the contract with the community. The company does not do its own extraction but gains wood from middlemen. The primary one of these is Martin Salgado, who exclusively supplies MADENSA. He was responsible for activities in Awas Tingni and also buys wood from other middlemen and directly from communities and private landowners through small contracts.

The MADENSA factory is located in Puerto Cabezas and claims to be the only company to work with both high-value red wood (about 40% of that processed) and lower-value white woods (60% of that processed). Twelve to sixteen species of wood are processed at the site into boards, parquet, wall panels and molding. The site includes two factories. The first is for the production of sawn wood, and has a dryer and two sin fin saws. About 75% of the sawn wood is exported, most going to the Dominican Republic and wood of lesser quality to Cuba. There is one shipment each 2-3 months, with a total annual production of 12-14,000 cubic meters. MADENSA is also working to establish contracts in the US. The second factory contains four small ovens and a Linea Parquet machine, which represents a recent investment of about US$1.5 million. They fill orders by request, being able to produce knives on site to the specification provided. They produce parquet (80% of production), wall paneling (15%), and molding (5%). Woods sold domestically represents a mixture of the lesser quality products from the factory, most of it going to Managua, where there are better markets.

Between the sawmill and the flooring factory, MADENSA employs about 100 people, and another 60 are involved in the extraction of wood. Salgado states that it is difficult to find labor because there are few workers in the region, they demand relatively high wages for Nicaragua, the fishing industry is more lucrative, and they are not accustomed to the kind of work that is necessary in a factory.

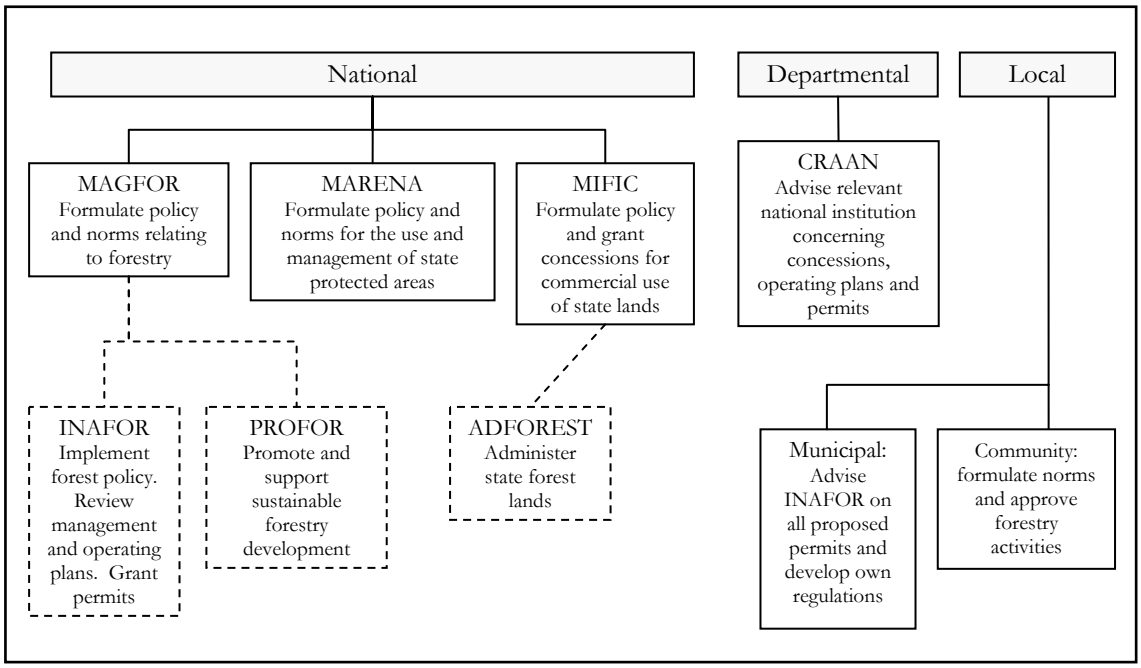
Other companies that work in the region and had contact with the focus communities include Amerinica and American Caribbean. Amerinica is based in Puerto Cabezas, and, according to one local logging expert that briefly worked for the company, they purchase exclusively fine woods (mostly mahogany) from communities, and generally do not make management plans. American Caribbean works in the extraction of pine resin, and in 1999, was the only company doing so. At this

time, they maintained a projected management area of 4,304 hectares with an estimated production of 3-5 kilograms/tree/year (Argüello et al. 1999).

THE ROLE OF THE STATE

Formulating forest policy, providing access to forests, and overseeing forestry activities is the responsibility of a handful of institutions at the state, regional, municipal, and even community level. Figure 4 provides a basic flow chart of the most relevant institutions that existed at the time of the study (2001), along with the each one's basic competencies. Since 1990, the state has gone through a number of changes in the policies relating to forests and forestry and the institutions responsible for formulating and implementing these. This culminated in 2003 with a new forestry law and several new institutions.

Figure 4: Administration of Forests in 2001



At the level of the state, the institutions responsible for policies, permits and regulation depend on the nature of the land in question, while the process of gaining state permission to log has depended to some degree on where you are within the RAAN, who you are, and what you hope to do. Until 1999, MARENA (Ministerio de los Recursos Naturales y del Ambiente) was the primary government agency responsible for allocating and to some extent monitoring concessions, annual operating plans and logging permits on protected, public, and private lands. The system, however, was viewed by most as inefficient at best, and as highly corrupt at worst. Kaimowitz (draft) notes, for example, that "local, regional, and national MARENA delegates all [gave] out their own permits, often for areas in which they had no jurisdiction." At that point, MIFIC (Ministerio de Fomento, Industria y

Comercio – previously MEDE, the Ministerio de Economia y Desarrollo) became responsible for allocating concessions on public lands. Conflicts between communities and the state in areas where land tenure is in dispute, which applies to most of the region, created considerable bureaucracy and problems with this option and so no state concessions now exist in the RAAN. INAFOR (Instituto Nacional Forestal), a decentralized institution of MAGFOR, is responsible for approving, and to some extent monitoring, all management plans, annual operating plans, and harvesting permits. Management plans are required for wood obtained for commercial purposes, while harvesting permits for small numbers of trees are available without the need to submit a management plan. Sanchez (2001) notes that these permits are for domestic use but also serve to supply local industries. MARENA remains responsible for developing policies relating to the use of protected lands, such as Bosawas reserve, and for monitoring these areas.

The primary responsibilities of these institutions have remained the same with the new forestry law, but several new institutions have also been created, largely for the purpose of coordinating policy and actions between the institutions and actors towards sustainable development. The most significant of these include: 1) the National System of Forest Administration (SNAF) which is made up of public and private stakeholders and is responsible for coordinating the efforts of various institutions towards sustainable forestry; 2) the National Forest Commission (CONAFOR) which will serve as the highest power and a forum for addressing forest policy and norms and is made up of the ministers of MAGFOR, MARENA, and MIFIC, the director of INAFOR, and representatives of other key stakeholders, including the Autonomous regions; and 3) the Office of National Forestry Registry which will be under the administration of INAFOR.

In the RAAN, the autonomous Regional Council (CRAAN), municipal authorities, and indigenous communities are also involved in the administration of forest lands, though none of these is legally empowered to independently issue logging permits. Legally, the CRAAN must approve any forest concession in the RAAN and may advise state agencies in relation to operating plans and permits. The municipal governments also have the right to advise the state on providing authorizations and permits and may also make additional regulations. In Bonanza, for example, the municipality hired a forest inspector in 1998 to review permits and then pass them to MARENA with the proposed action. Bonanza also required that chainsaw operators obtain a license to operate and fines illegal timber transportation (Kaimowitz draft). Indeed, according to Kaimowitz (draft) it is the local authorities that largely control access to forests. Yet the goals of those in control of local governments vary considerably. In some areas, local authorities favor outside merchants and companies, while in other areas efforts are made to keep outsiders away and favor local small-scale loggers. He further notes that while it is true that forestry in the RAAN in no way represents a mature industry with clear rules and regulations, this does not mean that the situation is a free-for-all. To be successful, one needs capital and connections – both national and local. While connections can often be purchased, personal and political ties, origin, and ethnicity are also significant.

INDIGENOUS PARTICIPATION IN COMMERCIAL FORESTRY

The failure of the reestablishment of large state concessions throughout the RAAN has positioned the inhabitants of indigenous communities as central players in the forestry market chain. There are several models by which communities participate in the forestry industry. An overview of these is presented in Table 5.

Table 5: Overview of Models of Indigenous Participation in Commercial Forestry

	Activities Involved	Market Chain and Markets	Case Studies
Craft Production	Crafts with wood and tuno; boats	Sold to middlemen or in urban centers; goods remain in region	Awas Tingni, Layasiksa, Santa Marta, Tuapi, Tuara
Non-timber Products	*Pine resin* extraction by families working blocks of forest; no additional processing in community	Resin purchased by company that established contract with the community; destination unclear - possibly international markets	Saupuka
	Pine Seeds extracted and processed under state company, but now only cones are collected	State company previously working in community; now cones purchased by middlemen; seeds sold nationally and internationally	Alamikamba
Charcoal (or Firewood)	Charcoal production involves felling and partial burning of trees (often oak) at location	Charcoal transported to urban areas by producer and sold to consumers	Saupuka, Tuara
Processed wood 1: Small-Scale Log Sales	Sale of whole trees standing or felled	Generally sold to middlemen; may involve contract; middlemen resell in urban center	Fruta de Pan, Mukuswas
Processed wood 2: Community Concession Contracts with Companies	Company works a management plan on community land; often includes community labor; may involve pine for posts, and pine and broadleaf for sawn wood or plywood	Company pays stumpage fee to the community; sometimes resold to sawmill; plywood, sawn wood, and some products (e.g. molding) go to national and international markets	Alamikamba, Awas Tingni, Wasakin
Processed wood 3: Production and sale of sawn wood	Logs cut into planks (tabla) or quartered (timber) by chainsaw or handsaw; extracted from forest with ox or by hand	Done through contract with individuals or companies, or sold directly in markets by community members	Awas Tingni, Fruta de Pan, Koom, Layasiksa, Mukuswas,

	Activities Involved	Market Chain and Markets	Case Studies
			Saupuka, Sikilta, Tuapi, Tuara

Three of these models are related to uses of non-commercially processed wood. These include craft production, non-timber products, and fuelwood and charcoal production. The final three represent distinct models by which indigenous communities participate in the processed wood industry (i.e. sawnwood and plywood). This section will explore 5 of these 6 models in greater detail, providing specific examples from the case studies. For each model, I will also review the costs and benefits to the individual participants and the communities as a whole. A number of individuals and communities are gaining valuable income from their participation, which is particularly significant given the high poverty levels of the region. Yet, indigenous peoples are generally capturing only a small portion of the value of the forest products extracted from their lands, and this has resulted in relatively little sustained development for the communities as a whole. While craft production is taking place in a number of communities, the model is not further explored here since it happens on a relatively low scale, little information was collected during the field visit, and little information is available in the literature. Taking into account the experiences of the communities participating in these five forestry models, the following section explores the opportunities and obstacles that indigenous communities face when looking for greater market integration and when trying to add value to their forest products.

NON-TIMBER PRODUCTS

The first model for communities participating in forestry has been the extraction of non-timber products. Historically, pine resin, tuno, and rubber all played an important role in the economy of the region. While no current examples of rubber extraction were identified, tuno and pine resin are still used for commercial purposes. In addition, some communities are participating in the extraction of pine cones for the valuable seeds of the Caribbean pine. Although several communities mentioned using and having an interest in tuno in craft production, no details of this activity were gathered.

The commercial extraction of pine resin has taken place at least since the 1960s, and many inhabitants and communities along the northeast coast have participated. Today, the scale is reduced from what it once was. American Caribbean is the only company involved and in 1999 was working in only 3 communities. In 2000, inhabitants of Saupuka (see Box 3) entered into a contract to extract pine resin and individually receive payments on the basis of their production. Their involvement with the company lasted for only about eight months, and they then kicked the company out of the community. Most families initially participated in the resin extraction, collecting enough to earn about US$23 per month; however, no one now perceives that any benefits were gained. Rather, the

case represents some of the worst problems that can result from such company/community arrangements. The contract was not particularly favorable to the community to begin with and the company generally ignored it anyway. Workers were required to pay for the materials of production, resin collectors were not paid according to the contract, health concerns were ignored, and the community tax was not paid. While they remain interested in working in resin extraction with a "fair" company, they will not be able to do anything with those trees until the current contract is resolved.

A much more positive experience is seen with pine seed extraction in the community of Alamikamba. This community has been involved in the extraction of the highly valued Caribbean pine seeds since the late 1980s, when the state-run *Banco de Semillas Forestales y Mejoramiento Genético* (Forest Seeds and Genetic Improvement Bank) established operations here (see Box 2).

Box 2. Saupuka: Pine Resin Extraction and Company Exploitation

In 2000, the Miskito community of Saupuka entered into a contract with American Caribbean which stated that community members would gather pine resin and the company would pay community members according to how much resin they provided and provide a "stumpage fee" for the community as a whole. A number of community members stated that there were only five leaders that participated in the contract meeting, while the Sindico reported that the professors and the whole community had participated. According to the Sindico, the contract stated that the company would pay US$.17 per kilo. Most families initially participated, each working a block of 800-1000 trees. A family would fill a tank of resin (about 200 kilos) which would then be collected by the company. In three months an average family could fill about 2 barrels which, according to the contract, should have resulted in US$68.

It was not long before serious tensions arose between the community and the company. While not stipulated in the contract, workers were required to pay for many of the costs of production, such as the sacks used in gathering the resin. Community members also reported that the resin hurt the women's skin and damaged clothing, and workers were not provided with any medicines or clothes. Most importantly, members believe that they were cheated by the company. Company employees weighed the product, kept records and reported to the family how much the product weighed, although it seems that no receipts were provided. Community members estimated that the company extracted about 80 barrels in total. The company had hired five supervisors from the community, who were paid a regular wage of 250 córdoba (about US$19) every 15 days. These kept records of what materials were used by the workers and how many people were working, but did not keep records of the production. After 8 months of work, some families had received only one payment while others had not been paid at all. Neither did the company pay the agreed upon tax to the community. After 8 months, there were only 7 people still working for the company and the community organized and kicked the company out.

In the end, community members feel that they did not benefit from the contract, but were deceived and taken advantage of. Community members are adamant that the company and its leader should not be allowed back in the community. Despite this very poor experience, the community remains interested in resin extraction. Most have memory of the companies that worked the coast before the war and good jobs having been available. If there were a new company that was willing to pay and would be fair, most agreed that they would be happy to have another company enter. One problem remaining is that American Caribbean has a 50-year

contract, and the community cannot begin working with another company without violating that contract. The conflict with the company was a recent one at the time of the field visit and there were no formal efforts underway to resolve it. It is not clear what (if anything) will happen with the company and the contract.

Community members were hired to collect, dry, and extract of the seeds from the cones which were then shipped internationally by the seed bank. The state enterprise collapsed in the mid 1990s due to lack of state interest and poor management. The oven is no longer in use, but there is still considerable interest in the community in this activity and recently a foreigner in the region began purchasing sacks of cones for US$10/sack. The level of participation is much lower than with the state seed bank project and is restricted mostly to younger men. The labor of cone collection is difficult, particularly since the community no longer has the collection equipment that had been provided by the state company.

Box 3. Alamikamba and the Banco de Semillas Forestales y Mejoramiento Genético

Magaly Urbina, past director of the *Banco de Semillas Forestales y Mejoramiento Genetico,* explained that the company was an autonomously run state enterprise that worked in several communities, including Alamikamba (the focus of the industry), Lemus, Waspam, and Miguel Bican. It operated in Alamikamba from 1989-1994. The state company trained both men and women in the community, provided the equipment necessary for picking pinecones (a cost of about US$1200/person), and installed an oven in the town for drying the cones. It employed 15-20 young men (up to 30) and 12-15 women of all ages from the community of about 500 people. Men were involved in the collection of pine cones during a harvest period of 5-6 months. Women received the sacks and processed and dried the cones, and another group took the seeds out of the cones. The Banco then sent the seeds by airmail to buyers in Colombia and elsewhere in SA, and even some to London.

Women were paid about US$3 per day. Men received about US$8 per sack, one dollar of which would go as a tax to the community. Each team of two men could gather between 1.5 to 2.5 sacks of cones per day (70 and 115 kg), thus earning US$5.25 to US$8.75 (after the community tax) for each man in the team. Each sack (45.5 kg) resulted in about 1 kg of seed. Thus, the total wages received by members of the community may have been about US$22,200 per year - US$840 per man, and US$360 per woman – while the community as a whole received perhaps US$2,400/year from the tax (these are based on estimates of 120 work days with 15 women and 10 pairs of men, collecting 2 sacks/day). For the first two years, the tax was paid through the Sindico and resulted in few permanent benefits. In the 3rd year, Urbina met with the community to discuss development priorities. After this, the tax was directed to community development projects. Funds went to rebuilding the school (both materials and community labor), replacing a bridge, and renovating a church.

The benefits of this activity under the seed bank model were quite significant while the current model is more mixed in its costs and benefits. The seed bank provided a very important source of

employment and means of income for community members. By collecting and processing the seeds in the community, nearly 10% of the community (a much larger percent of the adults) was able to be employed. Participants received US$3-8.75/work day depending on their role – a considerable wage for the region – and the community received collective funds that it was able to use for particular development priorities. In addition, the state company provided the training and costly equipment necessary for sustainably harvesting pine cones. Urbina noted that on her recent visit to the community, members responded very positively to her about the company's history in the region. Under the current system of selling to a middleman, however, only a handful of men are gaining any income. They are not provided with the appropriate harvesting equipment, often cutting branches to get to the cones, permanently damaging the trees. Yet, for those involved, the income potential of seed collection is quite high relative to other alternatives in the RAAN. In both cases, the percent of the value captured by the community is relatively low. One sack of pine cones produces about 1 kg of seeds, which sells on the national market for about US$200 and on the international market for about US$300. Thus, under both models, the community was capturing only a little over 3% of the final value of the product.[8]

FIREWOOD AND CARBON

Indigenous communities play an important role in providing firewood and carbon for households and merchants in urban areas. While it is certain that a number of communities are involved in this activity, particularly those close to urban centers, the most complete information was gathered from the town of Saupuka, located just outside of the municipal capital of Waspam. It was reported that about 4 people in this community of 427 families participate in making charcoal. This is generally done by burning the trunk of a felled oak tree. Pine is neither used for charcoal or for firewood because it does not burn cleanly. One oak tree provides approximately 20-22 sacks of coal, or 500-550 kg,[9] and participants note that one can do this about two times per month during the 4-5 months of summer. Sacks are carried out of the forest and then transported to Waspam and sold often to the food vendors on the street as well as to other merchants. Transportation costs about US .50/sack (7 córdoba),[10] and each sack of good quality earns about US$3.25[11] ($.13/kg), for a net profit of around US$2.75/sack ($.11/kg). Thus, if we assume that a person could produce an average of 21 sacks of coal 9 times during the year, one can earn about US$520 in a year through this activity. For comparison sake to other models, we can assume that an average tree might be equivalent to 1.25 m^3 of sawn wood. The value earned from charcoal sales is thus about US 54.6/m^3 gross and US$46.2/$m^3$ net, after transportation costs of US$8.4/$m^3$.

[8] For the state company, this figure rests on a very general estimate of a total payment (including extraction, processing, and community tax) of about U$11/kg.
[9] Argüello et al. (1999) note that a sack approximately weighs 25kg.
[10] All prices provided in córdoba are translated to US dollars, based on the average exchange rate for the year relating to the data (see Appendix 4).
[11] Argüello et al (1999) report a price of $3.50/sack in Puerto Cabezas.

Charcoal and firewood extraction provide an important supplementary source of income for some rural inhabitants and the markets are fairly stable. Yet, the work of charcoal production is very difficult and requires particular knowledge in order to fire the tree properly. In addition, the trees are far from the community and are decreasing in availability. There is no reforestation taking place and, given the significant demand for fuel woods, this is an activity that will contribute markedly to deforestation.

PROCESSED WOOD: SMALL-SCALE LOG SALES

Perhaps the most basic means by which indigenous communities participate in the forestry economy is through the sale of whole trees to intermediaries. This represents the first of three models of participation in the processed wood industry. The amount received depends to a large degree on the species, location (i.e. access to roads and distance from population centers), legality, who pays for the management plan and taxes (if anyone), and the amount of work done by community members. Argüello et al. (1999) state that the average price of standing wood varies between about US$10/m^3 for basic hard woods and US$20.00/m^3 for mahogany and royal cedar. This is then often resold whole to sawmills for US$70-90/m^3 (see Table 6), depending on the species. In the buffer zone of Bosawas reserve, for example, small amounts of mahogany and cedar are sold by Mayangnas to non-indigenous intermediaries with no ties to the communities, for US$30-$50 per tree (around US$10-20/m^3 standing) (Roman pers. comm.). This model may or may not involve a contract with the purchaser and a state permit. Such arrangements do not generally involve management plans as they will be considered under the community concession model.

The benefits of this model are that it represents relatively quick and easy cash for the communities. In addition, assuming that the middleman is trustworthy, there are relatively few risks assumed by the community. Yet, this is not always the case. David Kaimowitz (draft) notes that the region abounds with stories of loggers who made agreements and collected their wood but then disappeared without paying. Another cost of this strategy is that it generally does not involve forest management and/or reforestation. It generally takes place illegally or through one-time permits that do not require extended management plans. Finally, as Table 6 shows, the value gained from logs sold standing in the community represents only a small portion of the value of sawn wood on the international market. Under this model, the indigenous communities only receive about 3.4-7.3% of the trees' value.[12]

[12] This range takes as its low end the example of someone receiving US$10/m^3 for a standing mahogany or cedar tree (average international value derived from Table 6 and placed at US$590/m^3), and as its high end someone receiving US$20 for a common or semiprecious wood (average international value $275/m^3). Standing prices are doubled to compare them to international prices of sawn wood.

Table 6: Value of Wood Through the Market Chain[13]

Stage in Market Chain	State of Wood	Common and Semiprecious (US$)	Precious (US$)	Pine (US$)
Community	2 m^3 Standing	20-30	40-72	30
Sawmill	2m^3 Log	}---------- 140-180 ----------{		
Waspam	1 m^3 Sawn wood	~ 30		
Puerto Cabezas	1 m^3 Sawn wood	160-177	177-203	124-160
National Mkt	1 m^3 Sawn wood	212-233	360-371	93
International Mkt	1 m^3 Sawn wood	200-350	551-636[14]	242

Source: Argüello et al. (1999) and interview data

PROCESSED WOOD: COMMUNITY CONCESSION CONTRACTS WITH COMPANIES

A second model through which indigenous communities are involved in the sale of whole trees that enter the processed wood industry involves communities entering into contracts and concessions with large-scale intermediaries or directly with either sawmill companies or the plywood company. A common pattern is for a company to negotiate a contract with a community to access the community's forests and to submit a management plan to INAFOR. The community receives a stumpage fee and members of the community members are employed as wage labor.

Martin Salgado, for example, serves as the primary intermediary for MADENSA. He has contracts with the Miskito communities of Haulower and Kukalaya and holds management plans on these areas. In Haulower, he has a 20-year management plan for 4000 m^3 of wood. He views the deals with the community as better than buying from individual landowners because it requires fewer contracts to obtain wood. Community members prepare the wood, and Salgado then goes in with a skidder, tractor, and lifter to retrieve it and transport it to Puerto Cabezas. Salgado reports paying US$36/$m^3$ (measured standing) for red woods (e.g. mahogany and royal cedar) and US$15.25/$m^3$ for white woods.

This community concession model is also seen between the larger processing companies and the communities, such as between MADENSA and Awas Tingni, and Amistad and Wasakin. PRADA also has made deals with numerous communities, but prefers to use its own laborers rather than employing community members. Awas Tingni is perhaps the best known case from Nicaragua and has been at the center of forest industry debates and conflicts in the RAAN since the Chamorro

[13] Costs of logs and standing wood are provided for 2 m^3 of wood in order to make the data more comparable, as 2 m^3 standing wood results in approximately 1 m^3 sawn wood.
[14] Prices vary considerably. In 1996, for example, the international price for Brazilian Mahogany was US$1,000 (Argüello et al. 1999). Local experts noted that the royal cedar gets about $520/meter^3 at the international level, while mahogany gets about $830.

government first looked to reopen the region to commercial logging. This case is presented in more detail in Box 4.

Box 4. Awas Tingni: Community/Company Contract and Tenure Issues

In 1991, MADENSA and Awas Tingni signed a 25-year contract giving MADENSA exclusive rights to harvest timber on the community's land. Logging began in 1992. Concerned for the welfare of the environment and the community, the World Wildlife Fund (WWF) brought in indigenous rights attorneys from the University of Iowa. They felt that the contract was vague and disadvantageous to the community and annulled the contract. In response, and hoping to bypass the community, MADENSA applied for a state concession, arguing that the land did not actually belong to the community. MARENA agreed that it was national land and in 1993 issued a 30-year permit to MADENSA. This brought considerable protest and pressure on the state by NGOs and the indigenous rights team, and so MARENA urged MADENSA to seek a deal with the community (Anaya and Crider 1996), but it then also tried to give another company, SOLCARSA, a concession on lands also claimed by the community. A new five-year contract with MADENSA was reached in 1994 with a management plan covering an area of 43,000 hectares

Tenure conflicts have continued. Overlapping claims with the community of Santa Marta led to a conflict in an area that MADENSA was working, causing them to abandon a large amount of felled wood on the ground. In 1999, MADENSA suspended its activities because of the ongoing land dispute between the state and the community. In 2000, the community was unclear on the status of their contract with MADENSA, and while they were interested returning to logging, wanted to know what other options were available. MADENSA holds the 30-year management plan for the region, and, at the time, planned to reinitiate negotiations with the community.

According to community leaders, MADENSA was taking logs of 16 species (including caoba, cedro real, santa maria, cedro macho, quiero sin, laurel, leche maria, cortez, quita calzon, quebracho, uipinol, granadillo, lanzitan, and cayote), although they focused significantly on the more valuable ones. A 1993 study by the WWF showed that MADENSA was going exclusively for mahogany (caoba) and cedar (cedro real). The 1996 operating plan indicates that mahogany and two species of cedar constituted 62% of the wood extracted (de Camino 1997). According to de Camino (1997) the total volume of wood annually extracted from the community's lands is unclear, as the company would often fill part of their approved volume of wood relating the Awas Tingni management plan with woods from other, less costly sources. The contract did not stipulate a minimum production.

With the 1994 deal, MADENSA committed itself to developing an annual timber-harvesting plan together with the community. An annual contract was signed on the prices and the purchase agreement between the company and community. Another annual contract fixed the prices and work conditions of the Workers Cooperative (Anaya and Crider 1996). The forestry cooperative felled trees with chainsaws, prepared trees and cleared a path, and MADENSA removed them with a skidder. Workers worked on a rotation of 15 days. The community coordinated who would provide labor for any given contract.

The community received several benefits from their relationship with MADENSA. Before MADENSA, there was no regular wage labor in the community. With the MADENSA contract, 25-35 members of the community received wage labor for forestry. Workers received 35 córdoba (US$3.72) per day per job, although most times there was no work. Over the first 5 years, the company paid out about US$30,000/year for labor (de Camino 1997) or what amounts to about US$1,000 per employee. In addition, the company paid a stumpage fee to the community. De

Camino (1997) reports that this amounted to another US$70,000 per year for the first five years and that community leaders were generally happy with that. He further estimates that on a per unit basis, the community received US$17.70/$m^3$ gross and US$9.64 net (discounting taxes and the costs for both reforestation and road construction). During our field visit, however, regional INAFOR officials, MADENSA leaders, and even the community leaders noted that the community received as much as US$220,000 in some years. Many of the funds were used to pay members of the community for various community labor tasks, as well as to pay local teachers and the doctor. An advisor was also hired to oversee the contracts with MADENSA. Other funds were used for a variety of goods and activities, including: an organ and two electric generators for the church, cows, a communal truck, trips to visit distant community members, paint for houses, supplies for the forest guard, construction of the pastor's house, and a trip to Managua to deal with tenure issues. Finally, MADENSA also agreed to build a road, although the community did pay a percentage of this out of the wood profits. The road is in poor condition, and during our visit, community members stated that they would have to carefully consider whether someone other than MADENSA should be contracted to finish the road.

Another community that has had an experience working a contract with a company is Wasakin, although their relationship with Amistad was severed shortly before the 2001 field visits. Initially, a deal was struck between the Sindico and the company without the knowledge of the community. After the community learned of this, they agreed to a 50-year renewable contract with Amistad that covered all 36,000 hectares of the community and gave the company the right to work with pine (its primary focus) as well as other woods. Amistad agreed to pay US$10/$m^3$ stumpage if the community undertook the reforestation and US$8 if the company did the reforestation. They also agreed to hire community members, invest 10% of "*capital accionario*" in the community and support a range of community services including: education, preservation of community customs and values, housing, public works, decoration, and healthcare. Amistad hired a sociologist to look for opportunities for the community and help them plan their development within their own cultural context (de Camino 1997). In 1997, de Camino (1997) estimated that the company would be able to extract about 16,000 m^3/year. On a visit to the community, he found that members were aware of the terms of the contract, believed that Amistad would carry out its agreements, and were anxious to start work. In 2001, however, the community reported that while the company had agreed to pay US$15/ m^3 (well over the initial contract amount) workers were "only being paid with food." The community organized and decided to kick the company out. Others have reported that the company simply created greater expectations that it could meet, and that the community demands grew over time to more than the company could provide.

There are a number of benefits to the community concession model represented by Awas Tingni and Wasakin. First, the concession model appears to capture more of the value of the wood for the community than is captured by small-scale log sales to small and medium intermediaries. The prices noted for small-scale log sales generally ranged from US$10-20/$m^3$, while Salgado reported paying US$15-36/$m^3$ in his contracts. While Wasakin was receiving only US$15/$m^3$, community members were also supposed to be paid for labor. De Camino (1997) reported that Awas Tingni was receiving

a total of about US$17.70/m³ gross (including all payments), although it appears that the community, in some years at least, was taking in three times than what he reported as the total community payment (e.g. US$220,000 vs. 70,000). In addition, the fact that MADENSA preferred to obtain wood from other sources than the community to fulfill its permissible volume suggests that the community was being paid a *relatively* large amount. Regardless of whether the per-volume amount is greater under this model, it is very clear that the total amount received is greater. Small-scale log sales undertaken without contracts or management plans would not enable a community to earn anywhere near US$220,000 in a year.

In addition, the concession model provides a number of benefits not seen in small-scale log sales. One of the most important of these is employment, which is one of the most commonly identified development goals of communities (see Table 10). In Awas Tingni, for example, 25-35 members of the community annually received wage labor of as much as US$1,000/person, while in Wasakin approximately 50 persons were employed during the installment of the sawmill in 1997. The stumpage fee also provides communities with a flexible option for pursuing development goals. Awas Tingni paid wages for labor to members of the community and made a number of community improvements. The concession model also enables the community to benefit from the scale of such an enterprise without requiring considerable financial investment, technology inputs, or special knowledge on the part of community members and in this respect represents relatively little risk to them. Neither does this model require significant modification in traditional organizations or, in the case of the Miskitos at least, culture, which would likely be the case for the community to independently achieve this scale of operation. Rather, the model closely represents the historical experience that most inhabitants of the region have had with forestry (i.e. wage labor), with the added benefit of community funds provided. Depending on the nature of the contract, these concessions models can also represent a fairly stable source of income and employment and provide the opportunity of training in forestry activities for community members. Finally, the contracts are also generally associated with management plans and/or reforestation that, if followed, would help to ensure long term sustainability, although the cost of reforestation is generally deducted from the stumpage fees paid to the community.

Many of the costs of the concession model represent common costs to any kind of market involvement by indigenous communities, while others represent problems that must be overcome but are not inherent to the concession model. These costs are both real and potential. They include the potential of increasing stratification in communities as well as organizational problems resulting from financial mismanagement or community mistrust. The management of stumpage fees, for example, creates new duties and stresses for a community's leaders. Many of the benefits also depend on the nature of the contract and adherence to the stipulations of the contract. Communities are often poorly situated to understand the broader forest markets or legal environment that is necessary to negotiate a favorable and fair contract, so they become susceptible to exploitation as was seen with the Saupuka resin extraction. In both the Wasakin and Awas Tingni case, the communities are questioning the value of the contracts, but are largely stuck with the concession models either

because the contract is long-term (Wasakin), or the company holds the management plan to the land (Awas Tingni and Wasakin). In many cases, the companies simply do not live up to the contracts, and their activities with regard to the communities do not appear to be susceptible to any state oversight. The road constructed by MADENSA, for example, is of very poor quality, and inhabitants of Wasakin report that Amistad was not paying workers as agreed. In addition, while the companies often contract to take out a variety of species, they often selectively extract only the most valuable. Finally, while most of these represent difficulties that could likely be overcome, a basic truth of these arrangements is that indigenous communities are still selling standing logs in their communities and thus capturing relatively little of the potential value (see Table 6). For this model, communities are obtaining approximately 7.1-12.1% of the value of this wood as sawn wood on international markets.[15]

PROCESSED WOOD: PRODUCTION AND SALE OF TIMBER AND TABLA

The model of participation in the forestry markets identified most frequently by communities is the extraction of wood as tabla (wood cut into planks) or timber (a log that has been quartered). This commonly focuses on the fine woods or "red" woods, primarily mahogany and royal cedar, but also includes some of the less valuable "white" woods as well as pine. Processing of the wood involves either a chainsaw or a two-person handsaw using a pit method.[16] In most cases, these activities must be approved by the Sindico of the community, and a portion of the value of the wood is required to be given to the community as a whole (i.e. a stumpage fee).

There are two common arrangements through which tabla and timber sales take place. In some cases, community members cut the wood, transport it to an urban area, and then find a buyer. In Awas Tingni, for example, inhabitants denied that they *commonly* participated in the sale of tabla, but provided a good overview of how this would work. Santa Maria and some other woods could be cut by hand saw in place and extracted from the forest on back. To legally take tabla, they explained, one needs a permit from the municipal Mayor and from INAFOR, which is difficult to obtain and associated with a tax of US$7.16/cubic meter of standing wood. Tabla could then be transported to Puerto Cabezas at a cost of US$31.50/$m^3$ and sold to the public for about US$158/$m^3$[17]. Eight to ten percent of the value of the wood sold would have to be given back to the community. Thus the

[15] This range takes as its low the $17.7/$M^3$ standing wood gross income reported by de Camino (1997) for Awas Tingni [average international price of primary species used by MADENSA based on Arguello et al. (1999) and estimated at $500/$M^3$] and as its high the 36/M^3 reported by Salgado for precious woods (average international value derived from Table 6 and placed at $590/$M^3$). Standing prices are doubled to compare with international sawn wood prices.

[16] In this method, a log is laid horizontally on platform raised off the ground. One person stands on top of the platform and another underneath to operate the two-person saw.

[17] These values were initially provided as 1 córdoba and 5 córdoba per boardfoot respectively. The value in cubic meters was gained by assuming 424 boardfeet in a cubic meter of wood, as reported in Argüello et al. (1999).

net profit received by the logger and community is about US$112.2/m^3[18] (accounting for taxes and transportation).

Another way that these sales are often arranged is that a middleman or merchant may come to a community and make a contract with local loggers or community leaders, often paying some amount up front. Either the middleman or the logger usually also has to pay some amount of the total value of the wood to the community (frequently 2%, although this varies by community and is not universal). The loggers cut the wood in the forest and carry it out with ox or by hand. The community of Saupuka, for example, receives 20-25 contracts per year for an average of 350-400 board feet each (or about .82-.94 m^3). Four people would generally work a single contract, and there are about 28 people in the community with hand saws and the knowledge to use them. There are no chainsaws. Two people using a hand saw can produce about .24 m^3 (100 bf) per day. Transportation to nearby Waspam costs about US$12.67/m^3, where the wood brings in about US$31.64/m^3, for net earnings of about US$19/m^3. Thus, four people fulfilling a contract for 400 board feet would work for at least two days and earn a total of just under US$18, or about US$4.5 each. Assuming 25 contracts (about 23.5 m^3), the total earnings for the community's loggers would be about US$450 (US$16.07 per person if all 28 able members of the community participated equally). If the loggers in this example paid their INAFOR tax of US$7.16/m^3 standing (US$14.32 sawn), which is unlikely, than their net earnings for all 25 contracts would have been US$113.5. Community tax would also likely take US$14.87 of this.

The community of Tuara also commonly works on a contract basis for pine tabla, processing a total of about 100 m^3 per year (URACCAN 1999). They sell to intermediaries in Puerto Cabezas, and the distinction in value derived compared to those selling in Waspam reflects the significant variability in forestry markets in the region. Community members report that production costs are about US$78/m^3 for pine, typically including bribes, taxes and transportation, which is the most significant cost. The wood is sold for US$160/m^3, leaving a net earning of US$82/m^3. The community generally receives about 10% of the value of the wood as a stumpage fee paid by the logger. Thus, the community is collectively receiving approximately US$820/year, while those involved in the logging are gaining a combined US$7,380 from this activity.

The production and sale of sawn wood provides a number of important benefits. Most significantly, these activities provide a valuable source of income for community loggers and to a lesser extent income for the broader community. This model provides the greatest capture of value compared to any of the other forestry models, even when taking into account the labor benefits of the concession model and the transportation costs of this model. The gross value captured ranged from 13-66% of the international value of the sawn wood, while the net value to the loggers and the community (deducting transportation costs and taxes) ranged from 8-34%. In addition, this model enables a considerable amount of local control over production.

[18] The INAFOR tax is doubled before deducting it from the total earned from sawn wood, taking into account that 1 m^3 of sawn wood is produced from approximately 2m^3 of standing wood.

By extending further into the market chain, the loggers are also assuming greater risks as well as greater direct costs. By law, loggers must pay INAFOR US$7.16/$m^3$ to gain a commercial permit, although this is frequently ignored. Some have also identified bribes as an important cost. The most significant direct financial cost is transportation, as communities generally must rely on middlemen to transport wood. The total amount paid varies depending on such factors as nearness to a market, road or river access, and quality of these routes. In the case studies examined here, transportation costs ranged from a low of US$12.62/$m^3$ (from Saupuka to Waspam) to a high of US$31.55/$m^3$ (from Awas Tingni to Puerto Cabezas). While Saupuka is the lowest total cost, it is one of the highest as a percentage of the value received at the market (40%), while Awas Tingni is the lowest at about 20%.

In addition, there are a number of drawbacks to this model when compared to other models – particularly the community concession model. First, the markets are relatively unstable, especially for those that work on a contract basis. In addition, these activities are resulting in a selective degrading of the value of the forests surrounding communities and likely decreasing the potential efficiency of any future managed forestry on these lands. This model rarely involves a long-term management plan or any reforestation, but is done with individual permits or illegally. Another difference with the concession model is that the benefits generally favor a small number of loggers over the community. The lower scale of production in this model as compared to the community concession model means less total benefits in terms of community employment as well as for community funds that could go toward local development interests. The individualistic nature of this model may also have an impact on community solidarity and stratification. Finally, while the value received is greater than any other activity, as Table 6 shows, it is still only a portion of the international value. Loggers bringing wood to Waspam are netting only 8% of the international value of the wood, while those bringing wood to the port capital of Puerto Cabezas are receiving 31-66%.

SUMMARY OF BENEFITS AND COSTS OF COMMON MODELS OF INDIGENOUS MARKET INTEGRATION

In summary, several models have developed through which indigenous communities currently participate on the production side of the forestry markets. The non-timber activities of pine resin and seed extraction are seen in relatively few communities, while the use of wood for fuelwood or charcoal is likely the most common activity, using the greatest volume of wood of any of the models (see Table 4). Many communities of the RAAN have also become central participants in the processed wood industry that has steadily grown in the region over the last decade, though it still does not equal what was seen at the height of the wood industry in the first half of the twentieth century. The three models identified here include: the small-scale sale of standing logs to intermediaries (likely the most common, but least reported due to its frequent illegal nature), contracts and concessions with larger companies (common), and the production and sale of tabla and timber (very common). All of these models present various benefits and costs for the individuals and

communities that participate. This information has been condensed from the above discussion and is presented in Table 7 (direct economic benefits and costs) and Table 8 (other benefits and costs).

Table 7: Direct Economic Benefits and Costs of Indigenous Forestry Models

	Gross Pay per Unit	Value as m^3 Sawn Wood	Costs	International Value Captured[19]	Employment and Income Benefits
Pine Resin	Insufficient Data				5 community supervisors paid $36/month
Pine Seeds	$10 - 11/kg	--	--	3-4%	$3-10/per person/day wage. Est. annual earnings with state company: wages $840/man for 20 men, $360/woman for 15 women, & $2,400 for the community
Charcoal Sales	$.13/kg	$54.6	Transport: $.02/kg (15% of gross)	--	Est. possible annual earnings of $520 (@ 9 trees/year)
Log sales	$10-20/$m^3$	$20-40	--	3.4-7.4%	(insufficient data)
Community Concession Contracts[20]	$17.7-36/$m^3$	$35.4-72	NA[21]	7.1-12.1%	Awas Tingni: Est. annual wages of $1,000 ea. for 30 employees; community funds of $70,000-$220,000 per year
Tabla 1: Pine - Saupuka to Waspam	$31.64/$m^3$		Transport: $12.67/$m^3$ (40% of gross)	Gross: 13% Net: 8%	Total earnings of $450 in 2000 divided by as many as 28 participants; community might receive $14.87 of this (2% of gross)
Tabla 2: Santa Maria. Awas to Puerto	$158/$m^3$		Transport: $31.5/$m^3$ (20% of gross) INAFOR tax: $14.32/$m^3$ sawn	Gross: 31.6% Net: 22.5%[22]	Earn 112/m^3 net for logger and community; community gets 8-10% of the gross value
Tabla 3: Pine. Tuara to Puerto	$160/$m^3$		"Transport, taxes & bribes": $78/$m^3$ (48.8% of gross)	Gross: 66% Net: 34%	$7,380 for loggers and $820 for community; community receives 10% of the gross value

(All values in US$)

[19] Figured as a percentage of the international value of the product for seeds and of sawn wood for the wood models. See footnotes in each section where % is first reported for basis of calculation.

[20] The Awas Tingni numbers are used here as the low number for the gross payment because they were estimated to include the benefits of wage labor. This information was not available for Wasakin, although given that their stumpage fee was $15/$m^3$, it is likely that the total gross benefits were equal to or greater than those identified for Awas Tingni.

[21] I do not deduct reforestation and road construction from the Awas Tingni payment, as the community agreed to pay these and perceived them as benefits.

[22] Assumes international wood price of 500/m^3

The most important of these benefits to individual participants and the communities in which they live is clearly the wages and income generated. The RAAN is one of the poorest regions of Nicaragua, which in 1998 had a per capita GDP of just US$445 (IMF 1999). From 1992 to 1998, extreme poverty of rural areas in the Atlantic Coast region (north and south) rose from 7.9% to 17% and the total rural poverty in 1998 was 79.3% (González et al. 2002: 14-15). In the community of Sikilta, for example, the average annual income in 1995 was US$67 (Peralto and Indalicio 1997). Communities have a range of self identified development needs (see Table 10), and the forest industry provides income, jobs (one of the most commonly identified of these needs), as well as some community funds that can be flexibly used to pursue community goals.

As is clear from Table 7, the amount of income generated and the percent of the value captured from the wood depends significantly on the model. As Table 8 shows, there are also a number of other trade-offs associated with the models as they increase in either their relative or total earnings. Small-scale log sales are relatively easy and risk free – although they are also often done illegally –, provide relatively little total income, and capture a very small part of the value of the trees that are sold. The income and value gained from log sales is increased considerably when communities enter into larger contracts with companies. Similar benefits are seen with the state contract for the extraction of pine seeds in Alamikamba. Such agreements enable communities to achieve high levels of production without the level of knowledge, skills, or organization that would be necessary to do so independently. As such, they provide the greatest total income of the various models. Community members are often employed and paid a wage well above the regional average, and the communities receive income that, in the cases reviewed here, is used for such purposes as wage labor and improvements to schools, churches and healthcare. Yet, this communal income also often places new management pressures on local organizations. Under a good contract, the work can be fairly stable and the wage labor aspect of these models reflects the historical experience that most communities have with forestry companies. These agreements also sometimes include the additional benefit of training, although some communities noted a concern that, once trained, youth often leave the community with their new skills. Yet the percentage of value captured from these products is very low (about 4% for the pine seeds and 7-12% for the log sales), as it is the companies that assume the risks and costs and thus realize the greater profits associated with planning, management, technology, transportation and marketing.

When individuals in the community assume more of these costs and risks by paying INAFOR taxes, processing logs, and transporting products to markets, as in the case of sawn wood, the amount captured by the individual can be quite considerable. Alhough transportation costs to Puerto Cabezas, for example, take 20% to 40% of the gross earnings for sawn wood, the net percent of value captured is still higher than any of the other models (32-66%). Similar benefits are seen in charcoal production, although the transportation costs are relatively less. Yet the total employment impact of these activities is relatively small as only a small number of individuals in any given community are directly participating. Many members of communities where such sales are taking place (particularly in the pine regions near the coast) referred nostalgically to the heyday of the

foreign concessions, when at least there were jobs. In addition, while it is common to pay fees back to the community, the small volume of wood processed under this model means that there are relatively few general community benefits.

Table 8: Other Costs and Benefits of Indigenous Forestry Models

	Benefits	Costs
Non-Timber Products	*Pine Resin* • Few or none for those extracting the resin in Saupuka case	• Workers paid for equipment • Workers not paid • Health concerns from resin contact • Community stuck in contract
	Pine Seeds • Employment through extraction and processing • Good income for collectors • Company provided equipment and training	• When harvesting equipment not used, trees are degraded
Charcoal (& Firewood)	• Steady demand means potentially regular income	• Selective degradation of forests and decreasing accessibility of appropriate woods • Time consuming
Small-Scale Log Sales	• Requires little special knowledge or equipment	• Selective degradation of forests • Low percentage of value captured by the community • Middlemen sometimes cheat sellers
Contracts with Companies to Log Community Land	• Large scale of contracts provides regular employment and income and the greatest total benefit for the community • Largely reflects historical experience with forestry • May involve road construction into community (though it likely pays in wood) • Companies provide knowledge and technology, and sometimes training in these • Involve management plans (companies generally pay the cost) and often reforestation (community may pay cost)	• Can lead to stratification and conflicts in community • Communities can get stuck in exploitative contracts and/or companies do not live up to their contracts • If contract with company ends, company generally still owns the management plan • Large part of the value of wood is captured by company • Companies focus only on a few most valued species
Production and Sale of Sawn Wood	• Highest capture of value of above models • Considerable local control over production	• Often done without long-range planning • Income concentrated to relatively few

There are also a number of costs and problems experienced in forestry participation that are common across several of the models. Many communities have experienced exploitation by middlemen or companies or become stuck in bad contracts, as seen in the case of resin extraction in the community of Saupuka. These experiences foster a strong sense of distrust and ill will towards loggers in the region as well as towards the state, which is often viewed as being concerned only with extracting taxes and not with the welfare of the communities. The integration into forestry markets has also led to internal conflicts within communities, and leaders have been accused of corruption in some cases. In Dibahil/Fruta de pan, for example, many inhabitants see the wood as a means to achieve community development, but conflicts have emerged over what exactly to do with the resources that have split the community in two. Finally, sustainability of the forests is a concern in all current models. Even in the cases where contracts call for reforestation, this is generally not being carried out. Many of these costs/problems can also be viewed as obstacles that indigenous communities face to gaining more benefits out of forestry, which will be considered in more detail below in the examination of opportunities and obstacles.

INDIGENOUS ENTERPRISES

What is currently missing in Nicaragua is a set of indigenous forestry enterprises that combine the scale of concession-type models with the level of market integration of sawn wood sales. In this respect, the set of models of indigenous forestry participation seen in Nicaragua is fairly limited compared to what is seen in a number of other countries where community based enterprises have evolved. Some of these have focused on traditional wood products, while others have pursued niche markets, often based on non-timber secondary forest products. Box 5 reviews the experience of a number of Zapotec communities in Mexico that formed individual Community Forestry Enterprises as well as a Union that could provide technical and marketing support for constituent communities. Another example is seen in Box 8, which discusses Amazonian forest-dwelling communities in Brazil that were able to take control of the transportation, processing and marketing of Brazil nuts to considerably increase the amount and stability of their earnings.

Box 5. Zapotec Forestry Enterprises and UCEFO

The Union de Comunidades y Ejidos Forestales de Oaxaca (UCEFO) illustrates the power that communities can gain by creating indigenous enterprises. Up until the 1980s, the forests of Zapotec communities in Sierra Juarez and Oaxaca had been logged by large companies through government concessions. When the 30-year concessions came up for renewal, ten Zapotec communities formed Community Forestry Enterprises (CFEs) to manage resources, and in 1985, UCEFO was created to provide technical assistance and marketing support. Issues of corruption and distrust of leaders by community members that often occur with the management of collective funds are avoided by some communities through review commissions that evaluate administration and accounting (Castañeda 1992). Both the CFEs and UCEFO evolved out of traditional assembly structures, which continued to maintain a high degree of control over management and distribution of profits. Management posts are filled by election and receive salaries. Members of UCEFO, which is composed 80% of community members, are elected by an assembly of community authorities, CFE coordinators, and members of community oversight committees (Arzola and Fernández 1993). Newly elected members of local CFEs receive training from UCEFO in a range of skills, including accounting, preparation of documentation, measuring volume of wood, and classification of products. UCEFO also has an industrial plant for producing telephone poles, and another for charcoal production. The costs of UCEFO are paid by the CFEs on a sliding scale depending on the amount of wood the community produces. In general, this model of forestry has both helped to raise the standard of living in the communities and strengthened communities by helping to prevent exodus of members looking for work (Castañeda 1992).

Such enterprises enable communities to achieve a mix of some of the best benefits seen in the various Nicaragua cases. These include the high production, increased wage labor, and increased collective benefits common in the concession model, as well as the greater control over forest management and production, higher prices, and greater captured value seen in sawn wood sales. While the organization and management of these enterprises often involve skills, knowledge, and management institutions previously unfamiliar to indigenous groups, these have generally not been found to represent unsurpassable (or often even significant) "cultural" obstacles. Rather, many indigenous groups have used the benefits generated by such activities to purchase or protect lands, provide incentives for youth to stay in communities, support local educational opportunities, and pursue other activities that might be perceived as strengthening ethnic identity and community cohesion. While the benefits that can be derived from these models are greater than the models discussed above, so are the management demands and economic risks.

The absence of these enterprises in Nicaragua is likely due to a number of factors. First, forestry in the region is still young. While the industry has a long history in the region, it collapsed during the 1980s. The civil war caused a flight of businesses, communities, and investment. With the end of the war, many Miskitos returned to the region and many war veterans also settled there, creating an often tense and unstable political environment. Tenure conflicts are also universal. In addition, among the Mayangnas, there is not a culture of thinking of forests in this way – as a commercial object. While the Miskitos have long been integrated into commercial markets, and thus do view the forests in this way, they generally do not think in terms of community enterprises. Their historical

experience has been in working as wage labor on an individualistic or familial level, and community organization and cohesion is not as strong as that seen among the Mayangnas. The region is also weak in social and physical infrastructure. Roads are poor, poverty leves are high, levels of education are low, and markets are poorly developed. Finally, a few indigenous communities have developed an interest in such enterprises either independently (such as in Las Crucetas, discussed below) or through the work of NGOs (such as in Layasiksa – see Box 6); however, they have lacked the technical skills or financial resources to create management plans, the finances to obtain the necessary technology (e.g. portable sawmills, skidders), the means or finances to transport the wood, as well as clear market channels. All of these problems will be discussed in more detail below in the examination of obstacles to integration into commercial forestry markets.

While there are no mature examples of these enterprises in Nicaragua, the interest on the part of indigenous communities appears to be growing and there are several efforts to initiate indigenous enterprises that are at very early stages in their development. There are several main forces behind these efforts. First, there have been an increasing number of NGOs and other institutions of support available and they have been actively providing support to communities concerning forestry and forest management. These have included the WWF, GTZ-Bosawas, FADCANIC, URACCAN, CIDCA, Nicambiental, DED, Fundación Alistar, and the Nature Conservancy. Mayangna communities in the western RAAN have also organized the representative organization Sukawala in response to pressures by colonists, and forestry has begun to be seen as a way to generate funds to solve the tenure problems. Finally, the Nicaragua Forestry Project (PROFOR) was organized with a US$9 million credit from the World Bank and a three and one-half year duration (1999-2002) to promote private forest investment in sustainable forest management in Nicaragua (World Bank 1998). Part of these funds was directed to supporting indigenous community initiatives in the RAAN. Proposals were reviewed in the latter part of 2000 and four were selected that appeared to have the greatest initiative and support. These involve the communities of Layasiksa, Sikilta, Las Crucetas and Mukuswas.[23] Boxes 6 and 7 consider the first two of these projects in more depth. While disbursements of funds had begun on all three of the projects by mid 2001, none had entered a stage of production.

Box 6. Layasiksa: Indigenous Enterprise in the Making

Layasiksa is a Miskito community of about 140 families located in the municipality of Prinzapolka that is significantly involved in forestry activities. About twenty heads of family work in the extraction of wood and another six in processing (Layasiksa proposal). Wood is generally sold sawn to neighboring communities, middlemen, and/or to companies.

Since 1997, the NGOs WWF and FADCANIC have been working with the community to increase the value gained from forestry. Their idea has been to use a portable sawmill to process wood for a community-run carpentry shop and to gain forest certification. A carpentry workshop was constructed in Puerto Cabezas, hand tools were purchased and 22 students from the community were trained. With support from URACCAN, the community also developed a management plan for an area of 3,000 hectares of broadleaf forest.

In early 2000, the WWF/Fadcanic project began to falter and the idea of an indigenous enterprise seemed remote. NGO financing was used up and there was disagreement in the community between those interested in the project and those who preferred to sell the wood to PRADA or continue working as they had been. According to a community leader, PRADA wanted to work the management plan but only wanted to pay US$6/m^3 regardless of the species, so the community refused. Others report that PRADA has had some recent activities in the community, but without a management plan or permits. Many in the community, including the leaders at the time were apathetic about the project. They thought of it in terms of how NIPCO and banana plantations used to be run – people get a salary – not in terms of communal activities. In addition, project promoters could not get the necessary signatures of key persons (mayor, sindico, judge, INAFOR) without paying bribes.

Recently, there was a change in leadership and the project renewed momentum. In late 2000, PROFOR approved US$78,500, (37% of the US$211,740 project) to help with the purchase of a portable sawmill and materials for the carpentry shop. FADCANIC is the official counterpart of the proposal and has pledged to cover 35.6% of the total costs. There is also a plan for workshops on administration, technical aspects of forestry, and forest protection. While the project has been underway for two and one-half years, nothing is really working yet as a project. The workshop has been operating but its wood does not come from the community as the management plan needs revisions and has not yet been approved.

While the forest is perceived as collectively belonging to all 140 families, only 20-40 have been actively involved with project activities. A community leader reported that the initial idea that the project would involve the entire community has changed. After observing a project in Guatemala with a different model, the decision was made to work as "socios", or business partners. The leader noted that, with 50 partners, it would be possible to do the project, but with the whole community, it would be difficult. Earnings from the project would go to the partners (60%) and to the community as a whole (40%).

Basically, each project involves developing or working with an existing management plan on an area of community forest land and using a portable sawmill to produce sawn wood. The projects also involve fire control and training. In Sikilta and Las Crucetas, the wood is to be transported directly to markets. In Layasiksa, much of the wood is to be used to supply a carpentry workshop owned and run by the community in Puerto Cabezas. Each community is starting at a different level of

[23] Mukaswas is one of three communities that are collectively involved in this project.

preparedness and experience. In Layasiksa, there are a good number of families significantly involved in forestry. In Las Crucetas, there are families with experience from before the war, but little has been happening recently. In Sikilta, inhabitants have little experience in forestry markets.

Box 7. Sikilta: Tenure Stress and Indigenous Enterprises

Sikilta is a Mayangna community of about 80 families in the municipality of Siuna. Compared with many of the Miskito communities closer to the coast, the community is more isolated and has less experience with commercial forestry. Leaders report that it is not their custom to sell forest resources. Loggers who have sought to purchase standing wood have often been rejected because they offer little and are perceived as untrustworthy (Kaimowitz draft). Yet, some sales do take place as a means to meet basic needs and provide for emergencies. While indigenous inhabitants are not significantly involved in forestry, colonists in the region are taking wood out of Sikilta and making deals with companies. Local indigenous leaders complain that the state is doing nothing to help.

In 1998, fires in the region damaged a considerable portion of the forest, but left many valuable species standing. The idea of the project is to harvest an estimated 20,000 m^3 of broadleaf species on 2000 hectares of burned and degraded forest. The idea for the project came from SIMSKULT, the community-based Association for the Development of Sikilta. The proposal was prepared by Norman Davis, president of Sukawala, and Albert Hosius of DED, in consultation with SIMSKULT. Portable sawmills would be used to saw wood in the forest into planks. It would then be transported to Siuna for sale. The project also calls for planting 125 hectares of forest and fruit trees, establishing nurseries, fire control activities and a study of certification. As part of the reforestation plan, it is intended to establish several non-timber programs for women (Sikilta 1999). Community leaders complained that the value of wood at the municipal level is very low, and therefore plan to explore the market to find a set buyer and negotiate a price level by level (municipal, national, international).

The total project cost is US$200,040, of which PROFOR is covering 37%. Other support for the project has been pledged by SIMSKULT (42%), KEPA (1%), Fundación Alistar (7%), Nicambiental (1.5%), CICAFOC (1%), and BOSAWAS/GTZ (10.5%).

The primary benefit of the project from the perspective of community members is to generate funds in order to pay colonists that have invaded the region to leave. It will also provide wage labor and reforestation, and is anticipated to support study grants for students.

One important similarity in the projects is that in all three cases, the communities and local leaders came to the decision to have an organization distinct from the traditional community organization manage the project. These organizations would be made up of a limited number of community members and leaders of the community, who would receive direct benefits from their participation. A significant portion of the benefits would also be passed to the broader community. As noted in Box 6, Layasiksa project organizers, after viewing a model of community forestry in Guatemala, decided to limit those directly involved in the project and provide broader benefits to the community in payments. Speaking of Sikilta and the possibility of other indigenous enterprises, Norman Davis (President of Sukawala) noted that it is important to have a formal organizational structure in each

community that is legally recognized, stable and that is separate from the community political organization and ready to make deals. In the case of Sikilta, this is SIMSKULT. In Las Crucetas, Chavelo Andrews and his family have formed Companías Exportadora de Pino S.A (CEPISA) and gained permission from the community to make a management plan for the community's land. Andrews noted that he felt that it was important that the company and the project survive, despite whatever problems people might have using the funds generated from the project. If the company was run by the community, money management problems might lead to its demise. His idea is that the company will pay community members for labor and also provide 50% of all earnings to the community as direct benefits (e.g. grants for students, medicine, cattle, and other "products and projects") rather than as cash so that the community does not waste the funds.

Another commonality of the projects is that each has involved significant external support. Layasiksa has had the support of WWF and FADCANIC, who since 1997 have been preparing for the project through training and preparing the carpentry shop. URACCAN helped in creating the management plan and FADCANIC has signed on as the official counterpart of the project. CEPISA (the Las Crucetas company) has received support from WWF personnel, although this was less formal than the Layasiksa case. Sikilta has had the support of Sukawala as well as GTZ Bosawas, DED, Kepa, Fundación Alistair and Nicambiental, all of whom appear as contributors in the project proposal.

While it would be impossible to call any of these projects a success, they are perceived favorably by leaders in their respective communities. Each community views its projects as a means to raise employment for members of the community as well as to provide development for the community as a whole. In Sikilta, a main goal is to generate sufficient funds to "buy out" colonists that have settled on community lands and refuse to leave without being paid for the improvements they claim to have made. Another common benefit that is mentioned is the ability to provide grants for students.

Even at this early stage, the experiences of the communities undertaking these projects provide a number of lessons for the region. They show that the ideology of an indigenous forestry enterprise can be inculcated, that NGOs play an important role in forming indigenous enterprises, that communities can be trained to undertake their own management plans, and that communities can effectively organize enterprise organizations. The potential long-term effects of such modifications on the communities and cultures and the sustainability of these organizations is yet to be seen, but some obstacles are apparent. None of the projects are fully funded, and three of the four communities did not yet have a clear idea where they will sell their product. Indeed, the efforts to create these enterprises reflect many of the opportunities and obstacles that indigenous communities of the RAAN face in participating in forestry markets and these are all discussed in greater detail below.

OPPORTUNITIES AND OBSTACLES TO INDIGENOUS PARTICIPATION IN FORESTRY MARKETS

There are a number of opportunities and obstacles for indigenous communities to participate in forestry markets in Nicaragua's Northern Atlantic Autonomous Region. The fact that there are significant opportunities is reflected in recent efforts by international funding organizations, state institutions, NGOs, indigenous organizations and local communities to develop community forestry enterprises. At the same time, the lack of prior development of these opportunities, the low percentage of value captured by indigenous communities for their wood, and the difficulties faced by these early enterprise models also reflect a number of obstacles to indigenous forestry. Some of these impede the ability of indigenous peoples to participate in forest markets, some diminish the value that indigenous peoples can derive, others affect indigenous peoples' success negotiating and managing within the markets, and all create a lack of stability for investment and for forestry in the communities. An overview of these opportunities and obstacles is presented in Table 9. Many of these directly reflect development priorities that are identified by the communities themselves, which are presented in Table 10, while others become apparent through a broad analysis of the case studies and the political-economy of forestry in the region. Here, I will examine these opportunities and obstacles in more detail and provide a set of recommendations of actions that will help indigenous communities to access forestry markets and/or increase the benefits they gain from their participation in these. While the issues will be discussed primarily in reference to the situation of the RAAN, these can serve as broader lessons concerning indigenous participation in markets, as many of the opportunities and obstacles faced in the RAAN are common to those faced by indigenous communities throughout the world.

Table 9: Summary Analysis of Opportunities and Obstacles

	Opportunities	Rank[24]	Obstacles	Rank[25]
Forests & Soils of the RAAN	• The region has, or has the potential to have, lots of valuable forest • The soils are primarily good for forestry activities • Much of the coastal pine has been reforested and is in a state of regeneration	High	• Many of the forest areas are still degraded and pine regions are highly susceptible to fires • Forests continue to be selectively degraded	Mod-High
Land Distribution and Tenure	• Much of the land is claimed by or titled to indigenous communities • State efforts to title lands	High	• Lack of clear titles and general tenure insecurity • Overlapping land claims	High
Indigenous Ideology and Interest	• Communities are interested in forestry and reforestation • Some interest indicated in exploring other non-pine, non-timber products • Most are familiar with forestry due to long history in the region • Indigenous enterprise communities inculcated with the idea of community enterprises	High	• People don't think about community enterprises • Disagreements in community over how to use resources and/or what model to pursue	Mod
Markets and Market Access	• There are international markets for the wood and the secondary products such as resin and seeds. National markets exist, though prices are low • Have a coast • Steady regional demand for fuelwood and charcoal • Presence of companies • Possibility of certification	Mod	• Difficulties and costs of transporting goods to markets • Lack of good municipal and national markets Other markets are unknown • Exploitation by middlemen and companies • Lack of trust between communities and companies	Mod-High
Community Organization & Management	• Most communities are well organized - have community organizations • Indigenous enterprise communities have all created specific organizations to manage the projects • Some models require minimum community organization	Mod	• Corruption of leaders or perception of such • Difficulties in financial management	Mod

[24] High represents a significant advantage or opportunity for forestry, Mod an important advantage or opportunity, and Low some opportunity.
[25] High represents an absolute obstacle to forestry that is critical to overcome, Mod a moderate obstacle to forestry that is very important to overcome to achieve best potential, and low a minor obstacle that may hinder achieving high benefits.

Education, Knowledge, & Experience	• Many recognize the need for training • Many already involved in forestry • Relatively little special forestry knowledge or equipment required for log sales, fuelwood, charcoal, and company contracts. • Can be trained to do management plans • Presence of URACCAN	Low	• Lack of knowledge of forestry and regulations • Lack of technical and management knowledge for more complex models • Technical support and management plan are costly	Mod
Technology & Inputs	• Cone export does not require major infrastructure • Sawn wood can be produced with low technology (e.g. chainsaw or handsaw) • Communities have lots of labor	Low-Mod	• Lack capital and necessary technology of all kinds	Low-Mod
Funding & Support	• Several NGOs are present and active in issues related to forestry or the obstacles to it • PROFOR has provided partial funding	High	• Insufficient funds, and conflicts and delays in the disbursement of funds for indigenous enterprises • Relations between NGOs and communities can be fragile • Dependency on support	Low- Mod
The State: Legal and Political Climate	• State is interested in forestry • New set of forest regulations and land administration and titling project	Mod	• Tenuous relations with communities • Corruption in permitting and lack for control over illegal activities • Lack of stability	Mod

Table 10: Self-Identified Community Development Priorities

	Awas Tingni	Fruta de Pan	Koom	Layasiksa	Las Crucetas	Mukuswas	Saupuka	Sikilta	Santa [illegible]	Tuara	Tuapi	Wasakin	TOTAL
GENERAL													
Roads and/or Transportation	X	X	X	X	X			X	X	X	X		**9**
Wage Labor/Jobs	X		X		X		X	X	X	X	X		**8**
Health Care	X	X				X	X	X		X			**6**
Better Markets		X	X		X		X	X				X	**6**
Education Improvements	X			X			X	X				X	**5**
Ag and Animal Support	X						X	X		X			**4**
Land Tenure and Security	X					X		X		X			**4**
Craft Projects						X	X				X		**3**
FORESTRY													
Forestry (general)	X	X	X	X	X	X	X		X	X	X		**10**
Training and/or Support	X		X			X	X	X	X	X	X	X	**9**
Reforestation	X					X	X	X	X	X	X		**7**
Equipment	X			X			X	X				X	**5**
Fruit Trees	X					X					X		**3**
Value-added Products Projects								X			X		**2**
Non-timber Forest Projects	X												**1**

FORESTS AND SOILS OF THE RAAN

To begin, the forests of the RAAN represent the most significant opportunity for forestry in the region, while the level of degradation of these forests, the high incidence of fire, and their non-sustainable use represent a moderate to high obstacle. Forests cover nearly 70% of the RAAN and include over 1,800,000 hectares of broadleaf and nearly 420,000 hectares of pine. The broadleaf forests contain a number of valuable commercial species (see Appendix 1), including mahogany, royal cedar, and granadillo. It is estimated that the commercially exploitable volume of broadleaf forests range from 10-30 m^3/ha, while pine forests have an average of about 32 m^3/ha (Argüello et al. 1999). MARENA has estimated that the region could sustainably harvest 524,700 m^3 of wood (measured standing) per year (Rivera et al. 1997). Assuming an average international value of sawn wood at about US$350/$m^3$ (which is almost certainly a low average), the region could earn nearly US$92 million per year selling only sawnwood. This would be a per capita regional GDP of $525/person. In addition to wood, the pine forests also have a wealth of valuable seeds, as was seen in the case study of Alamikamba, which represent a significant development potential.

While much of the RAAN is covered with forest, the forestry potential has been considerably reduced by the history of unsustainable extraction. This degradation was particularly severe in the coastal region in areas such as Tuapi and Tuara that were once rich with Caribbean pine. For the

forestry potential to be realized there, much of the region will need to be reforested. FADCANIC has argued that with reforestation and proper management of these pine forests, the community of Tuapi, for example, could gain sufficient resources to meet the minimum needs of the entire community (Rodriguez 1998; FADCANIC 1994).

Efforts to reforest and protect the pine forests of the region have been undertaken, but have been insufficient. Recuperation and reforestation of the pine forests has been underway since 1961. With funding from the FAO and IDB, the *Proyecto Pinares del Noreste de Nicaragua* reforested about 13,000 hectares with Caribbean pine. In addition, fire protection towers have been erected and other fire protection measures implemented in an effort to cover 270,000 hectares (Argüello et al. 1999; Jimmy Webster pers. comm.). Yet, fires continue to represent a major threat to the pine, particularly to the regenerating forests. For example, about 30% of the area reforested between 1981 and 1988 was lost due to fires, representing a loss of approximately US$2,868,600 worth of young pine (Reyes 1991). Between 1996 and 1999, it is estimated that the RAAN lost around US$17 million due to fires. In 1998, the worst year, losses were approximately US$11,387,500 (Argüello et al. 1999). Many observers argue that the government is simply not giving sufficient attention to protecting the reforested areas.

In addition, degradation continues in both the pine and broadleaf forests through unsustainable exploitation. Only the concession model generally involves any effort at reforestation, and even when defined in management plans, it has often not been carried out. Pine cone extraction without the use of proper equipment is degrading the trees, extraction of logs and sawn wood is selectively removing the most valuable species from the forests without reforestation, and acceptable trees for charcoal production are to be found increasingly further away from communities.

LAND DISTRIBUTION AND TENURE

The opportunity to commercially benefit from these valuable forests beyond working as wage labor for large companies as was historically the case is provided by the fact that most of the lands on which forests are found are titled to indigenous communities, recognized as historical or ancestral domain, or otherwise claimed by indigenous communities. It is almost certain that the forests of the RAAN will be primarily controlled by indigenous communities well into the future. This is guaranteed by the high percentage of the population that is indigenous combined with the laws that resulted in the creation of the Northern Atlantic Autonomous Region and the recent recognition of indigenous rights in the *Demarcation Law*. For this reason, the distribution of lands in the RAAN represents the second of the most significant opportunities for indigenous communities to participate in forestry markets. In Awas Tingni, for example, (see Box 4) MADENSA made an effort early on to bypass the community and gain a concession directly from the state, which would have meant few if any benefits for the community. The community, with international support, asserted its rights over these lands and forced MADENSA to contract with the community. As a result, the community has benefited by a total of as much as US$250,000 annually.

Yet, throughout the RAAN there is a lack of clear titles and tenure security that represents the most significant obstacle to indigenous forestry. As of 1991, only 16% of the communities in the RAAN (47 out of 298) had titles to land, covering some 85,095 hectares, or only about 3% of the land (Reyes 1991).[26] Throughout the RAAN, communities without titles are making land claims and those with titles are frequently making additional land claims, such that more land is claimed than exists. Through much of the 1990s, the national government generally considered untitled lands to be national lands, leading to conflicts between communities and the state. In addition, many of the community claims are overlapping, leading to conflicts between communities. There are also demobilized resistance fighters throughout the region that have titles to some land and others that are making individual claims. Indigenous communities in the western part of the RAAN are also facing an influx of colonists from the west. The situation surrounding land tenure and title conflicts is intense and has resulted in armed conflicts.

The lack of titles and tenure security inhibits the forestry industry in a number of ways. On a general level, the conflicts among communities and with the state represent serious distractions for communities from other development pursuits. More specifically, a community cannot initiate a forestry proposal or submit a management plan to INAFOR without a title to the land. Thus, most communities in the region are simply not in the position to either enter into legal contracts with companies or create indigenous enterprises. Martin Salgado, the sole middleman for MADENSA, noted that tenure insecurity makes legalizing contracts difficult, and as with many state and NGO actors in the region, identified the lack of clear tenure as the most significant obstacle to a more mature forestry industry in the RAAN. The problems caused by this are illustrated through the collapse of a part of the IDB funded *Programa Socio Ambiental Forestal* (POSAF) in the late 1990s. The program intended to undertake forestry activities in a number of communities and considerably raised expectations within these, but then failed to follow through when the management plans were rejected by the state due the fact that many of the communities involved did not have titles to their lands. It is unclear how project organizers could have been unaware of the tenure situation ahead of time (Kaimowitz pers. comm.).

Four of twelve communities identified land tenure and security as an important development issue, and the problems concerning land tenure issues were seen in nearly all of the cases examined. Awas Tingni (see Box 4) is one of the most notable communities in the region, and indeed in Central America, that has had land tenure conflicts, and these have significantly disrupted forestry activities. The community has had conflicts with the neighboring community of Santa Marta, for example, which made a claim on land where MADENSA had been logging that led MADENSA to leave a large quantity of felled trees on the ground. More significantly, while the state recognized the community's right to contract with MADENSA, the conflicts between the community and the state continued. The community gained international attention by filing a claim against the state with the InterßAmerican Human Rights Commission of the Organization of American States (OAS)

[26] These numbers are also used in a 1999 MAGFOR study, suggesting that the situation had not changed much (Argüello et al. 1999).

concerning the state's lack of full recognition of the community's land rights. In 1999, this conflict led MADENSA to withdraw its operations from the community's lands before its contract had ended, causing a sudden drop of employment and income in the community. In September of 2001, the Inter-American Court of Human Rights ruled that Nicaragua violated human rights of Awas Tingni and ordered the state to recognize and protect the indigenous lands and pay the community US$50,000 as well as cover the court costs.

Serious problems are also experienced by communities in the western part of the RAAN, in and around the buffer zone of the Bosawas reserve. Colonists are encroaching from the west, settling on indigenous lands, and some are also selling valuable trees at extremely low prices. Mukuswas, for example, reports that colonists have overrun nearly half the community's land. In the interview conducted with the community during the 2001 field visits, one member made the following statement:

> We are not content to be here speaking of things that are not going to achieve anything. If the World Bank[27] wants to come to ask about forestry, it should be clear that they fix our problem with the property, and then we will talk, for we are now being threatened by colonists in the campo. The limits of our territory are very dangerous and we are afraid to go because the colonists are armed with AK rifles.

Sikilta is one of the few communities located in Bosawas with a legal title, yet it faces similar problems and perceives the tenure problem as the most serious one facing the community. Local leaders report that fifty-nine mestizo colonists have occupied 500 hectares and are unwilling to leave unless they are paid for the "improvements" that they have made to the land. The tensions with the colonists have led to occasional violence, and some in the community want to surrender this portion of the territory and focus on protecting the rest.

Both Wasakin and Sikilta received funding from PROFOR to develop forestry activities, and much of the interest by these communities in the projects seems to be a means to remove colonists by paying them to leave. If this is indeed the primary impetus behind the entry of these communities into commercial forestry, this is an issue of serious concern, as it represents a kind of coerced integration of indigenous communities. Remote indigenous communities such as the Mayangna of the western RAAN should be empowered to control the nature and pace of interactions with and, if desired, integration into broader economies. It is not clear that these communities would choose to do so if they perceived other options to protect their lands and resources from the encroachment of colonists.

The tenure situation of the RAAN represents a critical but not a permanent obstacle. Some significant steps have been taken to address these problems, though they have had little impact on the tenure situation. From 1995 to 2000, the World Bank supported the Agricultural Technology and Land Administration Project. According to the World Bank (2003a), the goal was to support the

[27] This reference was made because the field research was conducted in coordination with and partly funded by the World Bank's PROFOR program.

"design and implementation of a national cadastre, land titling and land registration system." As it related to the RAAN, the project financed a study aimed at "establishing the legal administrative and technical groundwork for the future demarcation of the boundaries of indigenous lands and natural reserves." This included a land tenure diagnosis for communities of the Atlantic coast in 1998 by the Central American and Caribbean Research Council (CACRC) of Austin, Texas. This was followed by a four-year project that became effective in February of 2003. According to the World Bank (2003b), the Land Administration Project (PRODEP) is intended to "bridge financing between the recently completed Agriculture Technology and Land Management Project (ATLMP) and a future National Property Regularization Program." This project "adopts a gradual approach" in order to "resolve complex technical issues," enable stakeholder consultation and "build up the capacity of key land administration institutions." The project contains a Indigenous Peoples Component whose goal is to "support the implementation of an Indigenous People's Strategy for the legal recognition and on-the-ground demarcation of indigenous land claims, as well as for community capacity building related to the exercise of land and natural resource rights" (World Bank 2001). Most significantly, this will support the implementation of Nicaragua's *Demarcation Law Regarding the Properties of the Indigenous Peoples and Ethnic Communities of the Atlantic Coast, Bocay, Coco and Indio Maiz Rivers*, which was approved by the National Assembly in December of 2002. The law explicitly recognizes the rights of indigenous peoples to their ancestral lands and to the use and management of the natural resources on those lands. This is expected to give indigenous communities legal tools to fight land encroachment and provide confidence to potential investors, although the process is also expected to be expensive (Nicaragua Network 2004).

While it appears that much of the legal framework is now in place, and considerable funds have been spent on institutional strengthening, little has actually been achieved in terms of settling the many insecurities and conflicts. Until the situation is addressed, significant involvement for most communities will delayed, the forests will continue to be degraded through unmanaged extraction, and communities will continue to live in poverty.

INDIGENOUS IDEOLOGY AND INTEREST

The third of the most significant opportunities for indigenous forestry is that community inhabitants *are interested* in pursuing forestry as an economic strategy, as well as in reforestation and forest protection. Ten of 12 communities identified forestry as an important community development goal (the most commonly identified), 9 of 12 identified an interest in forestry training and/or support as an important goal, and 7 of 12 communities identified reforestation as an important goal (see Table 10), recognizing that this is a necessary step in realizing the potential of forestry and reflecting a general discourse of sustainability on the part of the indigenous communities. While the frequency with which these "needs" were identified was likely due in part to the fact that the case studies chosen were primarily ones already involved in forestry, it does appear that forestry is broadly viewed as an important means of income by communities in the RAAN. Part of this interest comes from

the familiarity with the history of forest exploitation in the region. Many associate better times with the presence of foreign forestry companies. This is particularly true for the Miskitos, but interest is also growing among the Mayangnas. Williamson et al. (1993) note that use of wood is one of the few activities increasing for commercial use, while hunting, fishing, and agriculture have all decreased. Part of the enthusiasm for forestry in the region likely comes from a lack of alternatives. The soils of the region are generally poor, with 33.3% of the territory appropriate only for forestry, 24.7% for forestry/pasture, 17.8% for forestry/pasture/agriculture, and 24.2% appropriate for conservation (Argüello et al. 1999).

At the same time, indigenous views of forestry represent an important obstacle that has prevented most communities from conceiving of indigenous enterprises and in some cases even of the community concession model. While the commercial use of wood products by Mayangnas might be growing relative to other products, in most communities there is little experience with commercial forestry and little interest in it except as a means to meet basic needs and provide resources for emergencies. Much of the impetus for current projects that are being undertaken in communities in the western part of the RAAN is as a response to pressures by colonists – a perceived emergency. The forest resources are seen as a means to remove colonists and solidify land claims.

Many Miskitos and some Mayangnas communities are interested in participating in commercial forestry activities, but do not think of forestry as an enterprise. This is partly due to a lack of knowledge of forestry and of the value of the resources being exploited. In addition, the history of forestry in the RAAN has influenced most indigenous inhabitants to think of forestry not as a long-term enterprise, but as a source of wage labor. The economic strategies of Miskitos as a "purchase society" are also historically oriented around individual or familial work units, not communal labor. Thus, many communities indicate an interest in having outside companies come to the community that would make fair deals and provide steady labor. In most cases, this is not an issue of a lack of a sense of communal goods or a lack of community cohesion. Both ethnic groups view the forests as a communal resource. Miskito communities, for example, generally require individuals that exploit resources commercially to give some percentage back to the community. Mayangna communities are generally well organized and often have explicit community norms for the use of natural resources. In addition, formation of a community enterprise does not necessarily require that a community work collectively. In the evolving enterprise cases of Las Crucetas, Mukuswas, and Layasiksa a limited number of individuals have organized to pursue forestry development on communal lands, with the permission of the community. While this ideology represents a near term obstacle to independent forestry enterprise initiatives, the emerging enterprises discussed above clearly show that local leaders, when provided information, have been quite able to conceive of enterprises and organizational forms that would best work in their communities. It is likely that as these cases begin to mature and others appear through outside support, communities of the region will note their neighbors' experiences and independent interest in these will increase.

Lack of cohesion in a community, while not necessarily responsible for the lack of an ideology for community enterprises, can cause difficulties for communities in pursuing a forestry model or

making use of the income generated from forestry. In some communities, inhabitants share a common ideology concerning development priorities and resource management, while in others this is not as common. In addition, ideological cohesion does not necessarily relate to all areas. For example, there does seem to be a unified vision concerning issues such as importance of education, need for employment activities, and need for better markets. Concerning the management of communal lands, however, some communities have a more unified vision than others. Many communities have norms concerning the use of communal resources, and local leaders – particularly the sindico – oversee these. In other communities, land is being divided up and distributed to families. The presence of commonly accepted norms was particularly noted in Mayangna communities. For example, the Mayangna community of Awas Tingni reports being together for 300 years and argues that they have long held the idea of protecting the forest. Sikilta has, with the help of NGOs, published its environmental management norms (Sikilta 1998), yet at the same time, there is a disagreement in the community between those that wish to pursue the forest enterprise and pay colonists to leave and those that feel that they should cut their losses by surrendering the land currently occupied and focus on protecting the rest. In Layasiksa, there was a divide between members of the community that wanted to sell wood to PRADA and those that wanted to start a community enterprise, although this did not prove to be irreconcilable. In Dibahil/Fruta de Pan there is generally agreement that forestry could be a means to achieve community development, but conflicts have emerged over what exactly to do with the resources that have split the community in two.

MARKETS AND MARKET ACCESS

Markets and market access represent a moderate opportunity and a moderate-to-high obstacle for indigenous forestry. They represent an important opportunity because there are good and steady local and regional markets for some products. In Puerto Cabezas, for example, sellers of sawn pine can receive as much as 66% of the international value (see Table 6). Here, as well as in other urban areas in the region, there is also a steady demand for charcoal and fuelwood. Companies working in the forestry industry in the RAAN also provide regional demand and under the right conditions (particularly concerning tenure security) there is considerable opportunity for communities to partner with companies to generate considerable total earnings, as Awas Tingni has done.

There are also very good international markets with relatively high prices (compared to agricultural products, for example) for many of the forestry products generated in the RAAN. In some respects, these do not seem far off for communities, as none of the forests of the region are more than 200 km from the Caribbean coast. Given that indigenous peoples are capturing only a small percentage of this international value for nearly all of the products extracted from their lands (see Tables 6 and 7), there is considerable space for moving up the market chain and capturing more. As Box 8 shows, the earnings of Brazil nut producers, for example, more than tripled following the formation of a cooperative that enabled increased integration and specialized marketing.

Box 8. Amazonian Brazil Nuts: Niche Markets and Grassroots Enterprises

In 1988, Brazil nut gatherers in Acre, Brazil were receiving only US$.07/kg, or about 2-3% of the New York wholesale price. Most of the value was being captured by traders and nut-shelling factories. Chico Mendez and other labor leaders formed the Xapuri Agroextractive Cooperative (CAEX), and with support from Cultural Survival (an indigenous and forest peoples advocacy group and NGO based in Massachusetts), began a program to improve their marketing power by removing middlemen, and increasing participation in transport and processing. A cooperative to transport nuts was organized, and in 1990, a nut-processing plant was constructed. By 1995, the price paid to the gatherers had increased to around US$.25/kg and the income of inhabitants of the Chico Mendez Reserve, where many gatherers lived, had increased by 13%. CAEX compensated for the increased costs of production caused by paying the higher prices by selling the product in "green" markets that paid a premium for forest peoples' products (Clay 1992; Anderson 2001). According to Jason Clay (1992), the case reflects the need of small producers to decrease their dependence on one product and buyer, in this case through the co-ops and diversification.

If the community of Alamikamba could follow a similar path for pine cones, the earnings generated could rise to over US$2,500/year/person for those involved in collection. Increased integration into the market also generates additional employment – a very common community development priority (see Table 10) – through the increased labor involved in processing, transportation, marketing, and management. In addition to the potential of the pine seed market, there are a number of other non-timber products available in forests of the RAAN, including medicines, foods, and resins used in manufacturing that might be harvested and sold through niche or other markets. Many of these products have been used traditionally and thus community inhabitants are already knowledgeable of them. Some interest has been expressed by communities in learning more about the commercial possibilities of these. Part of the project in the emerging enterprise in Mukaswas, for example, planned to involve collection of various broadleaf seeds, certification by INAFOR, and the identification of specialized markets.

Another market opportunity for the region is to pursue certification, and there is interest in doing so. Nicaragua has the lowest number of certified forests in Central America, and some industry leaders have noted that as a result, they are loosing contracts (La Prensa 2003). A study by Molnar et al. (2003) suggests that certification can benefit indigenous communities directly by opening up additional markets with greater potential earnings, as well as through the improvements in employment conditions it would bring in cases of agreements with companies. It would also help to ensure greater sustainability to forest exploitation in the region. In the RAAN, PRADA has indicated an interest in gaining certification for part of its operations. The emerging enterprise projects in Sikilta and Layasiksa both plan to pursue the possibility of certification, with the support of the NGO Nicambiental, which works in this field. A number of support organizations to these communities see this as a way to help identify and ensure markets for the products. Nicambiental has received funds from WWF to promote a National Initiative of voluntary forestry certification.

The Initiative is made up of a Working Group with participation from NGOs, the civil society and industry. The Initiative has drafted standards for voluntary forest certification according to the rules established by the Forestry Stewardship Council, and has maintained good relations and participation by the National Forestry Institute and the RAAN Regional Council (European Forest Institute 2003).

Despite these opportunities, lack of access to good markets is one of the top three major obstacles that indigenous communities face in deriving greater benefits from forestry. This is a problem both of the quality of the markets that are available and the physical access to these. The markets that exist within Nicaragua are poorly developed and do not provide stability for indigenous producers. Six of 12 communities identified good markets as an important development need (see Table 10). Prices available to communities for logs and roughly sawn wood are very low and there are a limited number of market channels available to communities. Indigenous loggers working independently from large companies can either sell to passing merchants or transport their wood to nearby towns where the market is somewhat better. These channels are insecure and unstable, however, and do not guarantee a steady demand. Municipal markets outside of Puerto Cabezas are poor, particularly in Siuna and western RAAN. This is clearly reflected by the fact that pine tabla sells in Puerto Cabezas for over five times what it sells for in Waspam (see Table 7). Community members from Dibahil complained of the poor markets in general, noting that there is demand in other municipalities for their products, yet no regional market where they can sell their products and negotiate a decent price. Currently, they must sell products in the street and the price is very unstable. Community members in Wasakin voiced the frustrations felt by many communities, stating that the lack of structure and regulation in local markets creates a situation where the indigenous sellers are subject to "cruel exploitation" by the buyers, who are defended by the state. Community loggers in Saupuka also noted that the market for pine tabla is extremely unstable and they must wait for an order from someone in Waspam.

Companies that strike deals with communities to log concessions on the indigenous lands provide a somewhat more stable situation and hire labor, but the prices paid for logs are still a small amount compared to the prices received on the international market (see Table 7). Even in these arrangements, there can be a great deal of instability. In Awas Tingni, for example, the contract established a maximum amount of wood to be extracted but not a minimum amount. As a result, MADENSA often tried to fill its logging allowance by purchasing trees more cheaply from private landowners and other communities before going to its community concession. Further instability is created by the lack of respect shown by some companies for the agreements made, as was seen in the case of resin extraction in Saupuka.

Another problem is that markets within Nicaragua are non-diversified. MADENSA is the only large company that is further processing sawn wood (aside from making plywood), exporting such products as molding and parquet in addition to boards. While most of the wood available in the region is "white" non-precious wood, there is little market developed for this and it serves primarily as plywood. Neither is there a significant market for non-timber products. While there is an international market for both pine resin and the seeds, there was only one company collecting resin

in 2001 and no established institutions focusing on the seeds. Communities of the region have no participation with niche markets in areas related to green production or forest dwellers. The lack of diversified markets leads to waste in the forestry industry. De Camino (1997) notes, for example, that the 10-15% of the usable volume of felled trees is lost in the forest as short pieces or thick branches that could be exploited by portable saws, but that communities they lack the tools, the markets, and the knowledge to take advantage.

Several communities have been interested in developing export channels of their own that might help them to gain higher prices and escape the exploitation by middlemen as CAEX has done in Acra Brazil (Box 8), but have been unable to do so. Community members of Wasakin, for example complained that they do not have access to international markets to negotiate better prices because of a lack of financial resources, the necessary laws, and technology/techniques to support the certification of the resources. Generally speaking, the costs associated with exporting are extremely high in the RAAN, and few companies let alone indigenous communities have been able to achieve the economies of scale and the necessary infrastructure to achieve this. Near the community of Awas Tingni, for example, there are countless piles of stacked pine on private land that were abandoned when a North American company with a contract from Europe for pine posts ran out of funds before they could fill the contract. Local forestry experts and industry heads note that this is not uncommon – forestry in the RAAN requires a significant investment in addition to political connections. Part of the problem seems to be the lack of infrastructure in the sea port of Puerto Cabezas. Martin Salgado explained that there is no infrastructure for container ships, so that anyone wishing to export must fill a complete ship. MADENSA is able to do this every several months. The options of smaller producers are limited.

The difficulties faced by such companies have resulted in a high turnover of industry and considerable instability in the forestry sector. The volatile nature of the business is suggested by the high variability from year to year in the number of registered companies, companies actually working with permits, and the number of reported sawmills. In 1994, there were only three sawmills functioning in the RAAN (Rivera et al. 1997). In 1998, there were 20 forestry industries operating permanent and/or portable sawmills (Argüello et al. 1999). By 2000, this had dropped to 13 (INAFOR).

Many communities have problems even accessing internal markets because of poor infrastructure and lack of transportation options. Nine of twelve communities identified roads and/or means of transportation as important development needs (see Table 10), particularly in terms of improving access to forestry and agricultural markets. For example, Las Crucetas, one of the communities trying to develop a forestry enterprise with funds from PROFOR, has a title to 12,000 ha and has been motivated to participate in forestry. They have very poor road access, however, and have failed in several previous attempts to get companies interested in buying wood from the area. WWF believes that this is due to the cost of transportation. Chavelo Andrews, a community member who is leading the effort to develop forestry in the community stated that a potential company had changed its mind because of the difficulty in transporting the wood. The current plan is to transport

sawn wood by river to sell in Puerto Cabezas or internationally, if an appropriate market can be found. Transportation to Puerto Cabezas will cost about half of the total value of the wood. The community of Layasiksa also lacks road access and is considering river transportation. In the case of Awas Tingni, the community paid MADENSA part of the cost for the construction of a road into the community, which was deducted from the stumpage fees paid to the community (i.e. they paid in trees). However, the road is of poor quality even as a seasonal road and lacks bridges over the streams. Communities also lack their own transportation and must rely on middlemen to transport wood. As was clear from Table 7 this is expensive, ranging from 20-40% of the gross earnings from the wood, and thus considerably decreasing the value derived from forestry activities. The total amount paid varies depending on such factors as nearness to market, road and/or river access, and quality of these routes.

Martin Salgado (MADENSA middleman) noted that the poor quality of roads in the RAAN makes the costs of production too high to compete well with many other countries in the region and in South America. In the country as a whole, the average cost of transportation (figured in volume for logs) is US$.32/$m^3$/km for pine and US$.14/m^3/km for broadleaf species (INAFOR 2001b). In addition to making access to markets difficult for rural indigenous inhabitants, the lack of internal infrastructure (roads, seaports, etc.) also depresses investment in forestry leading to a vicious cycle of underdevelopment of the sector.

COMMUNITY ORGANIZATION AND MANAGEMENT

Community organizations provide an important opportunity for indigenous inhabitants to achieve greater benefits from forestry, but the poor management capacity of these also represents a considerable obstacle, particularly to the formation of community enterprises. Effective local organizations can provide the means for communities to regulate their communal resources, interact with NGOs, logging interests and the state, manage funds generated by logging activities, and manage community enterprises. Most communities in the RAAN have some manner of representative organization, generally including a Sindico – the position most often concerned with the natural resources – a Council of Elders, and a Judge or *Wihta Tara*, among other charges. The strength and degree of cohesion of these organizations varies considerably between communities, but they are normally involved in any legitimate decisions involving the large-scale commercial use of communal resources. Some communities have also organized specific institutions in relation to forest management. Both Sikilta and Awas Tingni, for example, have organized a forest guard to patrol the respective territories, while the community of Las Crucetas organized a fire patrol. In all of the cases of the emerging enterprises, local leaders decided to form management organizations distinct from, but closely associated with, the traditional organizations, believing that such organizations would be the most effective way for communities to become more involved in forestry while avoiding piling responsibilities onto traditional organizations. These cases show that

indigenous communities can be flexible when they are provided with the appropriate information to make decisions about forms of management and enterprise structures

There are also supracommunal organizations in the region, which can support communities in pursuing forestry and gaining benefits from it by serving as a conduit for information and external support, as well as helping communities in their relations with companies, the state, and NGOs. For example, Sukawala, the Mayangna organization, has provided assistance to Sikilta in the preparation of their forest enterprise proposal, and will be involved in providing assistance to the management of this project. There are also a number of organizations at the subcommunal and supracommunal level, including over two dozen cooperatives involved in the management, production, and marketing of goods (see Appendix 6). While a number of these are not indigenous, and most do not involve forest production, they do provide a regional model of organization of which most inhabitants are aware.

While community organizations are very important, communities can gain considerable benefits from forestry for some models without significant local organization. In Alamikamba, for example, the state pine seed extraction company switched from directly paying the community organization to providing direct support to the community through projects that were agreed upon by community members. This placed less stress on the organization and provided benefits for the community that were collectively agreed upon and viewed as very significant. While such a strategy could help to insulate community organizations from some degree of disruption, or take place in cases where there is little organization, it also decreases the percentage of the value of a product that a community can capture and makes a community either susceptible to exploitation or dependent on external support organizations or the state to review contracts and provide some monitoring.

Community organizations also face considerable obstacles in playing a central role in forestry. Depending on the nature of the model, organizations might be responsible for such activities as providing the appropriate documentation on forestry practices to funding sources or the state and managing or accounting for funds received from logging activities. These require skills that might be unfamiliar to leaders due to a lack of education, training, and relevant experience. This can lead to problems that can undermine forestry activities, community organization, and communal cohesion. Sikilta, for example, which received funds from PROFOR, was not including the proper information in its reports, which led to conflicts between the community and PROFOR staff and an interruption in the flow of funding. Suspicions of corruption often develop out of the lack of accounting skills and inexperience with managing collective funds. For most of the cases under consideration, it is too early to tell how the organizations will handle the new pressures.

In other cases, organizations may not function well because of a lack transparency and/or legitimacy in their actions, or problems with corrupt leaders. This can inhibit or undermine relations with companies and support providers and jeopardize possible communal projects or benefits. These issues were seen in the case of the indigenous enterprise project involving Mukuswas. The project was initially proposed to PROFOR by the Fundación Tuahka, an intercommunity organization that

claimed to represent the interests of the three communities covered by the project. PROFOR initially granted to an individual US$1000 to travel to Mexico to examine other forest projects; however, the leader did not go and later claimed that he was robbed of the funds. Leaders of the community then approached PROFOR and informed the organization that the communities had never been consulted on the project and that it was all the idea of the Fundación Tuahka leader. They remained interested in the project and chose to have the mayor of Bonanza (a Mayangna) and Sukawala administer it along with a five-person management assembly elected from the communities. In Awas Tingni, which has the longest history of communal forestry, there has been a relatively rapid turnover in Sindicos, which some outside observers contribute to corruption. De Camino (1997) noted in 1997 that there was a problem in the lack of transparency on the contracts between the leaders and MADENSA.

Another potential complication in organization might be created by the forthcoming titling procedures for the RAAN. One of the important findings to come out of the tenure diagnostic undertaken between 1997-98 was that most communities in the Atlantic coast region (north and south) "present their claims in the form of multi-community blocks of land" (World Bank 2001). One hundred sixteen of 128 surveyed communities presented their claims in 17 blocks. An example of these blocks is the "10 communities" title in the municipality of Puerto (which includes Tuapi and Tuara). This could create greater pressures on individual community organizations and block-level organizations (should these arise) in such areas as coming to agreements concerning how collective resources should be used, whether deals should be struck with companies, and whether smaller groups of inhabitants should be allowed to create local industries.

It is important to note that the difficulties that indigenous communities and organizations face in taking on new management roles that might include forestry enterprises do not represent inherent cultural obstacles. As the emerging enterprises have demonstrated, a number of indigenous communities in the RAAN have already shown considerable flexibility in organizing for forestry activities. Certainly, this will involve some cultural change, but this is not inherently bad. Indigenous communities should not be conceived of as "tradition bound".

EDUCATION, KNOWLEDGE, AND EXPERIENCE

The combination of a lack of technical knowledge related to forestry, lack of knowledge on forestry regulations and markets, and lack of general education represents an important obstacle that disadvantages indigenous communities in their dealings with middlemen, merchants, or companies, and basically prohibits them from being able to independently pursue indigenous enterprises. While indigenous peoples are often seen as being natural stewards of forest resources, they have no experience with the kinds of technical and management skills necessary to participate in commercial forestry. Neither do traditional community rules necessarily transfer well into this new arena. In addition, many communities lack secondary schools and their leaders may be illiterate, or only barely literate. Concerning the degree to which specialized training has been available, one expert on

indigenous communities in the RAAN noted that communities receive considerable training in aspects of social development, but very little in technical fields. This lack of social capital limits the options available to indigenous communities and makes them largely dependent on technical experts, companies, or NGOs. The need to address these problems is well recognized by communities surveyed for this study. Nine communities identified forestry training as an important need and five identified basic improvements in education (such as teachers, better schools, more materials for students) as important (see Table 10).

For communities seeking to work with companies or merchants, unfamiliarity with the rules and regulations guiding forestry puts the indigenous people at a serious disadvantage in negotiating contracts and leaves them open to being exploited. Under the best cases, it makes them highly dependent on outside advisors or technical assistance. In most cases, inadequate or non-existent advising in making contracts has been a significant problem for the indigenous communities, who get stuck with contracts that they might not fully understand and/or that are disadvantageous. Communities might lock into long term agreements that restrict their use of their own forest. In Awas Tingni, despite the use of advisors, community members later discovered that their contract did not provide for stability in production because it did not define a minimum annual production. The company often used other communities where it could buy wood for cheaper to fulfill its permitted volume, only using wood from the community when necessary.

Another way that indigenous communities are disadvantaged by a lack of technical knowledge and expertise is through their inability to independently create a management plan, which means that communities must either purchase one or contract with a company if they are to pursue forestry on a large scale. These plans cost around US$6-12 per hectare (US$10.50 for Layasiksa and US$11.50 for Sikilta), which makes them prohibitively expensive for indigenous communities. As a result, companies wishing to contract with communities have usually created and thus controlled the necessary management plan. Regardless of the length of the contract between companies and the communities, the management plans are generally approved by INAFOR on a 30-year basis, during which time no other plan may be applied to the territory in question. For example, MADENSA holds a 30-year management plan on the land in Awas Tingni, and while some in the community are now becoming interested in the possibility of creating their own forestry enterprise, to do so they would need to purchase the plan from MADENSA. Similar problems exist for the communities of Saupuka (working with American Caribbean in resin extraction) and Wasakin (in a community concession model with Amistad). While both communities broke off their relations with companies working the community lands, the companies still hold the management plans. Lack of technical knowledge also inhibits indigenous communities from undertaking reforestation.

While private technical advisors are available, these are fairly expensive: the cost of training and technical assistance for each of the Layasiksa (Box 6) and Sikilta (Box 7) projects was around US$17,500. Sikilta has contracted with one forestry/agroforestry advisor for 23 months for US$4,370 and plans to hire a saw advisor for US$1,630. This does not take into account the cost of the management plan.

While increased knowledge and technical training would certainly empower communities and local organizations in their dealings with others in the industry and open up the option of community enterprises, some of the models of forestry provide opportunities for greater benefits without this. Log sales, fuelwood, and charcoal can be pursued with relatively little detailed forestry knowledge and can be improved upon by addressing some of the other issues discussed here (e.g. solidifying tenure, better markets and market access). In addition, community concession models would not necessitate much specialized knowledge if communities could be assured that their contracts were fair and that companies would live up to the contracts.

Many communities recognize the need for training and some have begun to pursue this. In the emerging enterprises, with the exception of Las Crucetas, the cost of training was fully funded by PROFOR, while the counterpart took responsibility for the cost of technical assistance. Community members of Layasiksa have received training in a number of areas leading up to the formation of their enterprise, including training to develop a management plan and for a range of forestry related skills (including administration, carpentry, and sawmill operation). In Las Crucetas, Chavelo Andrews, the president of CEPISA, has long recognized the potential of forestry in the region and the need for training to fully take advantage of this. He sent one of his sons to study forestry engineering and another to study administration in order to support the company that he has created. Both Awas Tingni and Wasakin, recognizing their dependence on advisors, have declared an interest in sending students to forestry school (de Camino 1997).

In light of the growing interest in education, a considerable opportunity is provided by the University of the Autonomous Regions of the Caribbean Coast of Nicaragua (URACCAN). This university began its first academic year in 1995 and by 1997 had over 2,250 students. Over half of its teachers are indigenous. The university has two campuses in the RAAN, one in Puerto Cabezas and one in Siuna, and also offers extension courses in Waspam, Bonanza, and Rosita (Stuart 2004). The mission of the University includes "contributing to the strengthening of the autonomy process of the Nicaraguan Caribbean Coast through the training and professionalization of human resources, providing the knowledge necessary to conserve and rationally and sustainably use the tropical forests, and the mining and fishing resources of the region" (URACCAN 2004a, my translation). The university's 5-year degree programs include forestry/agroforestry, and business administration with possible honors in natural resources. Postgraduate training is also available in community forestry, GIS, microenterprise development, natural resource management, and formulation, monitoring and evaluation of development projects (URACCAN 2004b). Individuals trained in forestry at URACCAN are already becoming important players in the region. The individual elected to head the community enterprise project involving Mukuswas (Boadilio Miguel Lino), for example, is a forest engineer with a degree from URACCAN. The poor quality of education at the level of the municipalities and communities, however, prevents many from having legitimate opportunities to reach the university. As discussed in further detail below, it is one of a number of NGOs in the region that represent a significant potential.

TECHNOLOGY AND INPUTS

Access to inputs for forestry activities represents a relatively minor opportunity for indigenous communities, but an important obstacle. On the positive side, indigenous communities have access to surplus labor – there are lots of inhabitants interested in working, which could serve as a local labor supply for companies in community concession models, as well as support the creation of indigenous enterprises. Also, given other changes, some of the forestry models could be pursued by indigenous communities either to a greater degree or with greater value captured even while using limited technology. Both charcoal production and sawn wood, for example, can be produced using only chainsaws or handsaws, while the benefits gained from these could be enhanced by increasing sustainability through reforestation and improving marketing opportunities, for example through cooperative transportation or marketing arrangements.

Significantly increasing the value that indigenous peoples capture in pine seed extraction and enabling the creation of indigenous enterprises, however, will generally require technological inputs that communities cannot independently afford. For logging this includes such things as sawmills, roads, skidders, and transportation equipment. For pine cone collection, this includes costly gathering and protective equipment that ensures the safety of the collector and the sustainability of the activity. The lack of necessary technology inhibits the ability of indigenous peoples to move up the market chain and decreases the sustainability of production. To access these, communities are dependent on government, private, or NGO grants and loans, which are limited in availability and difficult to obtain given the lack of collateral and skill that communities bring to the table. While indigenous communities may have surplus labor, it is generally not trained in forestry or even well educated. This creates additional obstacles, which are discussed above.

FUNDING AND SUPPORT

One of the most important opportunities available to indigenous communities in the region is the network of support organizations, many of whom have explicit interests and expertise in forest management and development. Organizations working in the region have included the international organizations WWF, GTZ, and DED, and the regional organizations Nicambiental, Fundación Alistar, Kepa, Centro Alexander von Humboldt, URACCAN, FADCANIC, and Sukawala. A more complete list of organizations working in the region and their relation to forestry in the case study communities is provided in Appendix 7. Through the work of these institutions, communities have received technical training and financial support to manage natural resources, pursue land claims, pursue forestry, develop project proposals, and develop management plans. The four emerging indigenous enterprises were all formed with NGO support and influence, which was further critical in their ability to apply for PROFOR funding. Layasiksa has had the support of WWF and FADCANIC, who have been preparing for the project by providing training and preparing the carpentry shop since 1997. FADCANIC appears as the official counterpart in the PROFOR project. The community developed their own management plan with support and training from URACCAN.

CEPISA (the Las Crucetas enterprise) also received support from WWF personnel, although this was less formal than the Layasiksa case. Sikilta has had the support of Sukawala as well as GTZ Bosawas, DED, Kepa, Fundación Alistair, and Nicambiental, all of whom appear as contributors in the project proposal. Forestry management and development in the region has also attracted international financial assistance of the IDB, which funded a regional project involving forest management and reforestation (Programa Socio Ambiental Forestal – POSAF), and the World Bank, which provided funding to strengthen the capacity of state forest institutions, promote investment in sustainable forestry, and support local forestry initiatives (PROFOR). Looking forward, it is clear that indigenous communities face a number of obstacles and will require institution building, management training, technical support, and basic investments in human capital if they are going to more efficiently manage community funds, operate indigenous enterprises, pursue market niches, or otherwise improve their standing in the forestry industry. Providing the necessary support will require long-term financial and technical commitments from state and/or non-governmental organizations.

These relationships also raise a number of potential obstacles that are even now beginning to be seen among the emerging enterprise projects. One problem that is immediately clear is that the financing that has been provided is insufficient to fulfill the goals of the projects, and in some cases it is unclear how the projects will be sustained or from where the remainder of the funds will come. Each relies on a significant counterpart financial obligation. For example, in the Sikilta project, SIMSKULT's counterpart funding is nearly US$84,000, well beyond the means of this community organization. Las Crucetas had initially sought US$150,000 from PROFOR to cover the costs of a portable sawmill, a tractor, technical assistance, a forest protection team, and other things. Their final proposal received funds only to pay for the management plan, and the project leaders are still looking for a way to get a portable sawmill.

Another problem has arisen as a result of insufficient communication between support providers and project participants. As noted, relationships in the Sikilta project between PROFOR, Simskult and Sukawala have been very tense at times. Norma Davis (Sukawala president) notes that the community has a lack of knowledge of PROFOR policies and that there is a need for better communication between the parties. One problem is that both sides signed an agreement without feeling that this was a final agreement, but more an expression of good will. The indigenous organizations have tried to maximize their support from PROFOR, without a clear idea of how they would use the funds. While a general flexibility in agreements is not necessarily a problem, in this case it led to problems because of the diverging views of the World Bank and the community on the use and accounting of funds. This led to stoppage of payments from the Bank to PROFOR and a disruption in the funding of the project. At the time of our visit everything was in negotiation.

Layasiksa has experienced similar problems. At the time of our visit, the project had been approved for nearly a year, but had only received one payment. There is also a lack of technical skill by Fadcanic, which is responsible for managing the project. The lack of regular disbursements of funds

(blamed on the bureaucracy of the World Bank by some of the participants in this project) has led to considerable frustration by the community.

The cases of Sikilta and Layasiksa also illustrate that communities often do not operate under the kinds of business or administrative frameworks with which government organizations or NGOs may be familiar and that support providers must be patient and flexible in their dealings with communities. In Layasiksa, in addition to waiting out a conflict between those in favor of the project and those less enthused over the project, FADCANIC and WWF have had to be adaptive to community meetings. Fausto Cepeda of WWF notes that neither NGO had experience in communal works. In the meetings, more than 20 people of the community would speak. The meetings were large and repetitive and people would speak for hours in Miskito among themselves before responding to the NGOs.

THE STATE: LEGAL AND POLITICAL CLIMATE

A final set of difficulties relates to the role of the state. The legal and political climate for the forestry industry in general is very poor and illegal logging is taking place throughout the region with relatively little regulation. At the time of this study, there was no coherent law concerning forestry, but rather regulations and state bodies guided by decrees. This was hampering long range planning by state and non-state institutions throughout the region. Together with the overall political and economic instability of the country, this created a very unstable situation for the forestry sector. This lack of political and policy stability is blamed by some industry heads as causing the lack of investment that is necessary to further develop the internal forestry markets and processing capabilities. One local INAFOR official, for example, explained that the main problem with the forestry industry in the RAAN is the fear of politics and investments. He stated:

> There is too much insecurity for investment. No one knows what the next government will do, and so no one wants to leave capital in the country, or they leave only the worst capital. The government also violates the law and changes the law. The image of the country is also a problem. Investors see the conflicts between people and are afraid. While there are natural conditions for a forestry economy, there are not adequate economic conditions.

An example of this instability and the problems it can cause is seen in the collapse of part of the Programa Socio Ambiental Forestal (POSAF) in 1998. POSAF ran with IDB funds and had several projects concerned with the management of forests, nurseries and plantations. One of the projects involved operating a management plan for 1,300 hectares of pine in the communities of Saupuka and Ulwa. The project was derailed before it ever got going due to Yatama armed movements, which prevented community visits necessary to approve the management plans (Argüello et al. 1999, Kaimowitz pers. comm.). Political and physical security remains a problem in Nicaragua, and cocaine traffickers are increasingly using the coasts of the RAAN in their trade. In addition, there are still many guns from the war and outbreaks of political violence are not uncommon.

In addition to the instability, many communities, NGOs, other outside observers, as well as some state insiders complain that those occupying positions of power are insufficiently enforcing the laws related to forestry that are necessary to support a sustainable industry and/or protect indigenous communities from exploitation. Illegal activities were identified by virtually every community interviewed. Communities were participating in unregulated forestry, losing trees to illegal loggers, or being cheated or exploited in their dealings with others. Part of this is blamed on the inadequate forestry training among those in power, who often represent political rather than professional appointments. In addition there are simply too few persons in the region responsible for regulating, policing, or supporting forestry. De Camino (1997) shows that in 1996, only 11% of MARENA's technical field personnel (14 persons) were located in the RAAN and that each was responsible for over 130,000 hectares of forest, representing the lowest ratio of personnel to forest in the country. An adequate ratio, he argues, would be closer to 15,000 ha/person. More recently, INAFOR officials have argued that they simply do not have enough resources even to monitor all of the *management plans* in effect throughout the country, not to mention all logging activities. Some officials have even stated that it is not the responsibility of INAFOR to monitor or control illegal activities, but only to provide permits (Larson 2001).

There has also been widespread corruption related to the permit approval process and the monitoring of forestry activities, and many seem to feel that, in the end, knowing the right people and greasing the right wheels is the only way to be a successful player in the forestry sector. Kaimowitz (pers. comm.) notes that, according to the technical director of INAFOR in 1999, Juan Francisco Degadillo, forest permits in the RAAN were 'disappearing by the ream'. The head of the Forest Institute, Alvaro Montalvan, was more specific, noting that one of his local INAFOR delegates had (improperly) given out some 200 blank permits to loggers because this was how things were historically done. Kaimowitz further notes that when illegal activities are reported to the police, for the equivalent of about US$40, the police will often come back and report not having seen anything. Several of the communities interviewed complained of these problems. In Awas Tingni, for example, the community's forest guard often comes upon individuals taking wood from the community's land with INAFOR permits but without the approval of the community. The head of the forest guard blames the government for this.

The inability and/or failure of the state to address illegal activities has amplified the mistrust that communities have for the government, who many communities perceive as being allied with the interests of companies and elite. There is a perception that the government bodies responsible for forestry have little concern for sustainable forestry and only care about the tax revenues that can be raised. Some community leaders, for example, spoke of INAFOR as government bullies that levy high taxes on the community or an indigenous inhabitant for each tree that it wants to sell to meet basic needs, while providing no resources to support the communities and often looking the other way when companies or influential loggers abuse the law. This is a common view in Sikilta, for example, where community members complain that despite the fact that they have legal tenure and many needs in the community, tables are confiscated by the police, Bosawas, and INAFOR, when a

family tries to sell 50 of them to meet basic needs. A member of the community of Wasakin stated that

> Now, the current government with the growth of forestry is destroying our forests. The meat is disappearing and the waters are being contaminated. The Mayangna or Sumu don't have government. INAFOR violates our rights with the high taxes because there are only mestizos in the administrative structure.

On the positive side, the state has taken efforts to address a number of these problems and has received support from institutions such as IDB and the World Bank. As discussed above, the World Bank has funded both the PROFOR program and a land administration project. The PROFOR program involves capacity-building in the forestry sector, including training for MAGFOR, INAFOR and MIFIC, as well as help in developing a national forest policy. The state has since created both a new forestry law and indigenous land law, both of which they perceive as creating a more favorable and stable climate for investment. While the passing of these laws has generally been lauded by organizations promoting sustainable forestry and/or indigenous concerns in the RAAN, it is too early to determine the degree to which these laws will be implemented and how this might affect indigenous communities and forestry. One key to the success of these new efforts will be how well the state and the regional government coordinate.

Another opportunity related to the state is the state's seemingly growing interest in forestry development in the region, which creates the potential that resources will be directed to alleviate obstacles that currently are in the way of a more mature forestry industry. This interest is partly suggested by the creation of the new forestry law, which many critics of the government doubted would ever come, as well as the specific language it includes. The law states that "the forestry sector in Nicaragua should constitute a focus of the country's economic and social development with the participation of all involved in forestry" (La Gaceta 2003). The Consulate of Nicaragua in the US also states that "the two thousand different pine and broad-leaf varieties that make up the natural forests of Nicaragua represent one of the country's greatest resources and offer excellent investment opportunities…and the potential of this sector is well-documented" (Consulate of Nicaragua 2003). As shown in Table 2, about 77% of these forests of the country are found in the RAAN. While there does appear to be a growing interest in forestry, many still question the state's commitment to the development *in* the RAAN.

SUMMARY AND CONCLUSIONS

Nicaragua's Northern Atlantic Autonomous Region has experienced a long history of forest exploitation in which indigenous peoples have been central players but have derived few sustained benefits. For almost two hundred years, Miskitos have participated in extractive and unsustainable forestry activities with large corporations by providing wage labor. While the forest industry collapsed under the Sandinista government, there have been efforts to revive this once central part of the economy since 1990. The failure of the reestablishment of the state concession model at a large scale early in this revival has positioned indigenous communities as central players in the industry.

This paper set out to examine the current state of indigenous participation in commercial forestry in the RAAN in order to examine:

1. the various models of market integration that exist;
2. the costs and benefits that different models of commercial participation offer to indigenous communities; and
3. the opportunities and obstacles that indigenous communities face to obtaining greater benefits from their forest resources.

Indigenous peoples participate in forestry markets by providing fuelwood, working in the collection of pinecones and pine resin, and through the sale of standing trees and sawn wood. In undertaking these activities, there are two basic sets of models of market integration that communities follow: 1) sales to middlemen and merchants, and 2) concession-type agreements with companies. In the former set, the net economic value that indigenous peoples capture per unit product generally increases both with greater processing and the further up the market chain they bring their products. Thus selling sawn wood to merchants tends to net more than selling standing wood to merchants, and selling sawn wood to merchants in Puerto Cabezas nets more than selling sawn wood to merchants who come to the community. At the same time, increased processing and increased transportation demand greater knowledge, investment and risk. For most communities, transportation represents the greatest cost at 15-40% of the gross value received for the product.

Sales to merchants and middlemen may provide more or less net value per product compared to concession-type agreements with companies, depending on many factors including, among other variables, the nature of the contracts, transportation access to community, the level of processing undertaken before sales, and the location of where sales take place. In those cases where indigenous peoples undertake processing and transportation to market centers, these models tend to provide greater benefits to the individuals involved, but fewer total benefits for the community as a whole than concession-type agreements with companies. This is largely because concession-type agreements involve technology and management plans that enable greater overall production. Communities gain not only from the labor that they provide to these activities, but also from the stumpage fees that are paid to the community as a whole. Regardless of the model of market integration, however, indigenous peoples of the RAAN net only a fraction of the value of the wood

compared to its value on national and international markets: 3-4% for pine seeds, 3.4-7.4% for log sales, 7.1-12.1% for community concessions, and 8-34% for sawn wood. In addition, participation in forestry has not yet underwritten sustained development for communities of the RAAN.

There are also important potential models of indigenous forestry absent or only in very early stages of development, but that are seen in other countries. These include such activities as indigenous forestry enterprises, valued added processing activities, and taking advantage of niche markets. Such activities can combine the benefits of higher captured value, greater sustained production, and greater community benefits. There are several cases of such community enterprises at very early stages of development, and while it is generally too early to judge the success of these, they do reflect some of the important opportunities for and obstacles to forestry in the region.

There are a number of reasons to be optimistic about the opportunities of indigenous forestry serving as a significant means of development for communities in the RAAN. Most importantly, the region has a wealth of forest resources, most of which exist on lands now recognized as indigenous lands. Indigenous communities have considerable interest in forestry and there are a number of community-support NGOs in the region that are also focusing much of their attention on forest management and development. The opportunity of forestry is also supported by the presence of good international markets for the wood and non-timber products available on these lands and by the fact that indigenous communities have existing organizations and have shown the capacity to create alternative organizations that can play an important role in supporting community forestry. The state has also recently finalized a forestry law and an indigenous land tenure law, which are hoped to create a positive environment for forestry development and investment. Finally, many community inhabitants already have some familiarity with basic forestry practices (such as using a chainsaw) and some of the models discussed in this paper can be enhanced without significant additional inputs.

There are also a number of obstacles that have prevented indigenous communities from achieving the full potential of forestry in the RAAN. Most significantly, while most lands are now recognized as belonging to indigenous peoples, there is a lack of titles and a range of conflicts and overlapping land claims that legally restrict most communities from commercially exploiting their forest resources. Also, regional markets are generally very poor, while accessing the better international markets from the RAAN requires achieving relatively high-scale production and storage capacity, at least for sawn wood. Both types of markets are restricted to many communities due to the lack of transportation infrastructure. The history of forestry in the region has degraded many of the forests and this continues through unsustainable logging and frequent forest fires. For many communities, the interest in forestry relates to wage labor rather than the idea of indigenous enterprises, and many of the organizations have difficulties with the management of collective stumpage fees and are also lacking the knowledge and skills to form enterprises. Communities also generally don't have the technical experience and the technology necessary to undertake sustainable forestry or form enterprises. Finally, the state institutions responsible for forestry have experienced problems of corruption, lack the resources necessary to regulate forestry, and are generally viewed with great

distrust by many indigenous communities. Relations between communities and NGOs, which appear to be critical to the best cases of indigenous forestry, can also be tenuous.

In the end, none of these obstacles is insurmountable and steps have been undertaken by communities, NGOs, and state institutions to begin addressing many of them. There is much more that could be done, and I conclude with a set of recommendations aimed at 1) helping indigenous communities gain greater benefits from the models in which they are involved, and 2) enhancing the possibilities for the creation or expansion of additional models in which indigenous communities could capture a higher proportion of the value of products. My intention is to direct these recommendations to those organizations and individuals responsible for or concerned with forestry or indigenous communities of the RAAN so that they can build on or access the opportunities and avoid or overcome the obstacles identified in the above analysis. In some respects the RAAN provides unique case study, with its long history of forestry and commercial activity by Miskito in the region, its historical separation from the broader state and current autonomous status, and the recent war and its aftermath in the region. While the history is unique, many of the current opportunities and obstacles faced by inhabitants of the region are common throughout the developing world. In this respect, while the recommendations are directed at the RAAN, they are also much more broadly applicable.

RECOMMENDATIONS

LAND TENURE AND SECURITY

The forests of the RAAN belong primarily to indigenous communities, but the lack of clear titles and numerous tenure conflicts prevent most of these communities from being able to take advantage of this opportunity. Resolving this situation is essential to developing any possibility of forestry for most communities and very important in providing the industry with a more stable investment climate.

The process of administering land needs to be significantly accelerated through increased funding and the involvement of organizations of support and URACCAN. Indigenous communities and leaders and other regional interest groups must participate throughout the process of mediating conflicts. In addition, the state should immediately resolve conflicts between Mayangna and colonists in the western part of the RAAN. The burden to resolve this should not be placed on communities, and the issue should not be conflated with whether they wish to pursue forestry.

It is likely that after the initial process of identifying land claims there will be areas not in dispute, but to which title will have to wait until conflicts are resolved. This will significantly delay the ability of many communities to participate in forestry. The state should *consider* allowing communities to operate plans and gain harvesting permits to these uncontested areas.

MARKETS AND MARKET ACCESS

Better roads, means of transportation, better regional markets and means to reach international markets are very important if indigenous peoples are going to gain greater benefits from their forest resources and critical if they are going to form their own enterprises. The state must work to extend and enhance a system of all-weather roads linking communities to one-another and to regional markets.

Support should be provided for the creation of forestry producer cooperatives or indigenous enterprises involved in the transporting, purchasing, processing, and storing of sawn wood, fuelwood/charcoal, or non-timber products in order to strengthen regional markets, reduce costs, and help meet economies of scale necessary to export products internationally. The state should support forest certification in the region to help expand market options and product value, promote the region's varied forestry opportunities abroad, and help to identify and pursue possible international buyers of wood and other products.

Companies represent an important market alternative that enable communities to have the labor and income benefits of large-scale production without having to deal with the challenges associated with indigenous enterprises, and should not be overlooked by support organizations. In cases where communities do not wish to pursue greater market integration, promoting more long-term forestry solutions may not be desirable and settling for lower value of forest resources may be a reasonable trade-off in order to maintain other desired cultural traits.

HUMAN AND ORGANIZATIONAL CAPITAL

Indigenous inhabitants and representative organizations often lack knowledge and skills necessary to consider the costs and benefits of different forestry models, critically review contracts, develop or implement management plans, manage communal finances, and organize or manage commercial enterprises. Increasing forestry knowledge and organizational capabilities is very important for communities to be able to move up the market chain as well as reduce the incidence of exploitation on the part of companies, middlemen, and merchants and the degree of dependence on organizations of support.

Basic education and literacy training is a central need for all communities, but there are also more specific areas of training relative to forestry development that would considerably benefit communities. The state, URACCAN, and local NGOs should all play a central role.

a. Communities should be provided with opportunities for detailed training in technical aspects of forestry for some of its members, including but not necessarily limited to creating and administering management plans, as well as reforestation. Grant programs, possibly with community service obligations, should be established for students from rural communities.

b. Communities should be provided with a broad-based training on forestry related topics, including, but not necessarily limited to, reforestation and forest management, the legal framework for forestry, potential models of forest development (including enterprises), and concession contracts. These should be provided in both open workshops and some more detailed training for leaders. Training should be provided repeatedly due to the turnover of leaders, changing legal and economic/market circumstances, and loss of knowledge over time. Such training should also be used to explore alternative development options for forest resources and projects that incorporate women.

c. Political and management organizations should be provided training for institutional strengthening. This would include training in management and development planning so that organizations can better use community resources. Training in financial accounting is particularly crucial for organizations responsible for managing community funds.

d. Organizations and leaders involved or interested in forestry – particularly those involved in indigenous enterprises – should be provided the opportunity to visit with other communities in Nicaragua as well as elsewhere in Latin America. This is an important way for indigenous peoples to share their experiences and see first-hand various options for production, management, organization and distribution of benefits.

It will take time for such training to have a generalized impact across the RAAN. In the meantime, communities seeking to enter into contracts with companies should be provided access to lawyers and experts in forestry in order to assess the contracts for such issues as: basic fairness, clear identification of responsibilities, and labor and wood extraction provisions. The incentive system to provide for these advisors must assure that they are not beholden to the companies or state tax institutions dependent on commercial forestry. In cases where community organizations lack the skill or interest in managing collective funds, advisors and companies could determine if communities are interested in receiving direct benefits through projects rather than cash payments.

Communities interested in developing large-scale forestry activities should be supported in the development of management plans that the community would then own, as was done in the emerging enterprises. This leaves open the possibility that a community could choose to develop an enterprise and provides greater leverage in making contracts with a company.

FUNDING AND SUPPORT

The range of community needs required to improve their standing in forestry markets (i.e. human capital development, institution building, technological inputs, and market support) suggests a critical role for funding and support institutions. The PROFOR project has taken an important step in meeting these needs among some communities and funding of community enterprises should continue. PROFOR should work with NGOs and indigenous organizations to identify potential communities and ensure full and sustained support of approved projects. Before initiating further

projects, these must also ensure that the communities have market channels for their products. Funding should also be provided outside of the context of specific community projects to address the training needs identified above. URACCAN and regional NGOs that already provide such training should be provided with means to expand their programs. In addition, a separate fund should be established to provide low interest loans to communities and organizations sufficiently prepared to initiate forestry activities, but lacking only the necessary resources.

The effectiveness of the relationships between support providers and communities is critical to the success of projects. Support networks must recognize the often fragile nature of indigenous institutions and help to build independence in decision-making, management, and development. However, it is important to be careful not to *demand* independence – financial or technical – before communities and their institutions are ready. Support providers must be prepared to provide a long and stable relationship, maintain clear and consistent communication, and be flexible in the face of evolving circumstances and the needs of the community.

REFORESTATION AND FIRE CONTROL

Most of the pine forest of the RAAN is in a degraded state and threatened by regular fires, and unsustainable logging threatens the substantial forestry potential throughout the region. Reforestation, fire control, and management of plantations are important to opening up the possibility of forestry for many communities. Programs such as those that existed in the 1980s should be revived to bring the pine forests back to their full potential, and the state must work to ensure the sustainability of current practices by enforcing regulations regarding reforestation and promoting reforestation and sustainable extraction to support the fuelwood/charcoal industry.

THE STATE: LEGAL AND POLITICAL CLIMATE

It is clear that the state must play a central role in ensuring a stable climate for forestry development and the enforcement of related laws. Important steps have been taken with the creation of a new forestry law and indigenous land law. The state must now carry through with the implementation of these, coordinating with the regional government to ensure a stable legal framework for forestry, land use, tenure, and development. The state must ensure the monitoring of forest laws and be responsive to community claims concerning these. Sustainability of the forestry industry will require that communities perceive benefits from forestry taxes and regulations. Finally, every effort must be made to eliminate corruption when it is identified.

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- Permisos de aprovechamiento forestal por departamento. Período del 01/01/00 al 31/12/00.
- Permiso de aprovechamiento forestal consolidado por departamentos. Período del 01/01/01 al 31/03/01.
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APPENDICES

APPENDIX 1: SAMPLE OF COMMERCIAL TREE SPECIES FOUND IN THE RAAN

Local Common Name	Scientific Name
Banak blanco	*Virola sebífera*
Banak Colorado	*Virola koschnyi*
Barazón	*Mirtella Spp*
Caoba	*Switenia macrophylla*
Cedro macho	*Carapa nicaraguense*
Cedro real	*Cedrela odorata*
Cedro macho	*Carapa nicaraguensis*
Ceiba	*Ceiba pentandra*
Chaperno	*Albizia adinocephala*
Coralillo	*Ormonia sp*
Coyote	*Lonchocarpus latifolius*
Coyote y cerezo	*Lonchocarpus spp*
Genízaro	*Pithecellobium saman*
Granadillo	*Platymiscium pinñatuns*
Granadillo Amarillo	*Dalbergia tucurensis*
Guanacaste	*Enterolobium cyclocarpum*
Guapinol	*Hymenea courbaril*
Guayabo Negro	*Temrinalia amazonia*
Guyacán	*Guaiacum sanctum*
Hule	*Castilla elástica*
Kerosén	*Tetragastris panamensis*
Lagarto	*Zanthoxylum belizense*
Laurel	*Cordia alliadora*
Leche maría	*Symphonia globulífera*
Liquidámbar	*Liquidambar styraciflua*
Macuelizo	*Tabebuia rosea*
Nancitón	*Hyeronima alchornoides*
Negro	*Dialiun guianense*
Nogal	*Juglans olanchanum* var. *olanchanum*
Ñambao	*Aspidosperma magalocarpon*
Ojoche Colorado	*Pseudolmedia oxyphyllaria*
Ojoche blanco	*Brosimum costaricanum*
Pino	*Pinus caribaea*
Palo de agua	*Vochysia hondurensis*
Palo de rosa	*Hemiangium excelsum*
Pansubá	*Lecythis ampla*
Quebracho	*Pithecellobium arboreum*
Roble blanco	*Quercus oleoides*
Santa maría	*Calophyllum brasiliense*
Tapabotija	*Apeiba membranacea*
Teca	*Tectona grandis*
Tuno	*Castilla tunu*
Zapote mico	*Couropila nicaraguensis*

Reyes (1991)

APPENDIX 2: RESEARCH TEAMS AND SITES VISITED IN 2001

	Group Members and Professional Association	Communities Visited
Team 1	• **Norman Davis** - President of Mayangna organization, SUKAWALA • **Carlos Cruz** - MARENA representative working in Bosawas • **Cicilo Carlos** – Member of SUKAWALA	Fruto de Pan, Mukuswas, Wasakin, Sikilta
Team 2	• **James Webster** - Director of Recursos Naturales y Tenencia de la Tierra, of the RAAN Government. • **Powel Warman** - Forestry Inspector for RAAN, INAFOR • **J. Montgomery Roper** - Anthropologist and study leader • **Mireya Izquierdo** - Corredor Biológico Mesoamericano, MARENA	Saupuka, Awas Tingni, Koom
Team 3	• **Edwin Taylor** – Professor of the Universidad del Caribe de Nicaragua • **Zayda Zúñiga** - Fomento Forestal, INAFOR • **Fausto Cepeda** - World Wildlife Fund Nicaragua • **Magaly Urbina** - Proyecto Forestal de Nicaragua (PROFOR) • **Chavelo Andrews** – President of CEPISA and member of the community or Las Crucetas	Santa Marta, Tuapi, Tuara

APPENDIX 3: PRIMARY PERSONAL INTERVIEWS

- Marvin Centano - Director of PROFOR
- Magaly Urbina – PROFOR employee, past director of the state-run Banco de Semillas Forestales y Mejoramiento Genetico
- Roger Roman – Director of GTZ-BOSAWAS.
- Anuar Murra Garay - Fundación Alistar
- Mario Rizo -- Anthropologist, Instituto de Historia de Nicaragua y Centro America
- Powell Warman – INAFOR forest inspector
- Chavelo Andrews – Community member of Las Crucetas and President of CEPISA
- Jimmy Webster – Director de Recursos Naturales y Tenencia de la Tierra del Gobierno de la Región Autónoma Atlántico Norte INAFOR
- Martin Salgado – Primary provider of wood for MADENSA
- Moeses Lwes - Vicegerente of MADENSA
- Edwin Taylor - Profesor de la Universidad del Caribe de Nicaragua
- Norman Davis - President of Mayangna organization, SUKAWALA

APPENDIX 4: IMPORTANT RATES OF CONVERSION

Wood measurements

- 1 cubic meter of sawn wood = 424 Boardfeet (Argüello et al., 1999: 31)
- 1 cubic meter of sawn wood = about 2 cubic meters of standing wood (PROFOR)

Nicaraguan Córdoba/US Dollar Exchange Rates[28]		
Year	1 Dollar to Córdoba	1 Córdoba to Dollar
2002	14.25	.070
2001	13.44	.074
2000	12.68	.079
1999	11.81	.085
1998	10.53	.094
1997	9.4	.11

[28] Rates for 1999-2002 are the average rate for the year. Rates for 1997 and 1998 are the average of the listings for the first of each month.

APPENDIX 5: LOCAL ORGANIZATIONS IN THE RAAN*

Organization	Location	Activities
1. UNAG; Programa Campesino a Campesino	Siuna, 1500 producers	Technology Transfer, Environment
2. Unión de Cooperativas Agropecuarias (UCA)	Siuna, 19 coops., 1086 partners	Financing, training
3. Coop. Servicios Múltiples Las Minas (COOPEMINAS)	Siuna, 139 partners	Stores basic grains
4. Caja Rural (CARUNA)	Siuna, Rosita	Rural credit, productive activities
5. Coop. Multisectorial de Campesinos Agropecuarios (COMCAR)	Rosita	Commercialization of agriculture & livestock
6. Sumu Kalpapakua Wahtani Lani (SUKAWALA)	Bonanza, Rosita, Siuna	Community Development
7. Federación Indígenas WAULA	Bosawas – representatives from each of 6 groups of communities.	
8. Asociación de pequeños mineros (ASPEMINA)	Bonanza	Small crafts
9. Asociación de Miskitos y Sumus de la Cuenca media del Atlántico Norte (ADENCUNS)	-	-
10. Cooperativa para el Desarrollo de la Costa Atlántica (COPRODECA)	Bilwi, 20 partners	Agriculture, also has forests
11. Cooperativa Agroforestal Sil Odil	Waspán, 20 members	Agriculture, also has 1000 mz.[29] of broadleaf forest
12. Cooperativa 17 de mayo	Bilwi, 30 members	1500 mz. of forest
13. Coop. LaKiatura	240 members	12,000 mz.
14. Coop. Rafael Thomas	45 partners	2,250 mz.
15. Coop. Rafael Mudy	70 partners	3,500 mz
16. Coop. Maniwatla	65 partners	3,100 mz.
17. Coop. Victor Paskier	37 partners	1,850 mz.
18. Coop. Cien Fuego	100 partners	5,000 mz.
19. AMIR- ARMIGOB	Bilwi, 240 partners	12,000 mz.
20. Coop. Francis Sirpe	Río Coco, 10 members	500 mz.
21. Coop. Miguel BiKan	Río Coco, 10 members	500 mz.
22. Coop. Kum Río Coco	Río Coco, 46 members	5000 mz.
23. Cooperativa de Pescadores Artesanales	Bilwi, 39 partners	
24. Asociación de Trabajadores de Desarrollo Rural Benjamin Linder (ATRDL).	San José Bocay	Construction of small electric center, conservationof soil, forests and water
25. Consejo del Territorio Mayangna Sauni (MASAKO)	RAAN, attends to 15,000 Mayangnas	-

[29] 1 manzana (mz.) = about .76 hectares

Organization	Location	Activities
26. Cooperativa de Muebles San José de Siuna	Siuna – 26 members	
27. Simskult (Asociación para el Desarrollo de Sikilta)	Sikilta	Involved with forestry enterprise development.
28. FEDUBONIC	Sikilta	Federación de Dueños de Bosques de Nicaragua
29. Fundación Tuahka	Communities along Río Tunki (Tuahka). Includes Mukuswas	Initiated forestry enterprise planning that involves Mukuswas.

**Adapted from Argüello et al (1999, Appendix 19) with additional information from field study*

APPENDIX 6: ORGANIZATIONS OF SUPPORT FOR THE RAAN

Organization	Focus Communities (or Region) Involved	Relevant Activities
International Organizations of Support		
CATIE	Awas Tingni, Mukuswas, Sikilta	Environmental studies, training in natural resource management and development; Awas Tingni trained in use of chainsaws; Mukuswas and Sikilta anticipate technical assistance in developing "rodales semilleros"
The Nature Conservancy	Sikilta (Bonanza, Rosita)	Research, land tenure claims, management of protected areas, institutional support; worked with Sikilta to prepare territory management plan, in issues of forest management, & forest guards
World Bank	(RAAN)	Funded PROFOR and Land Administration Projects
IDB (Inter-American Development Bank)	(RAAN)	Funding of POSAF (the Programa Socio Ambiental Forestal) through MARENA; involved forest management, nurseries, & plantations; reforestation program of pine forests.
WWF (World Wildlife Fund)	Awas Tingni, Las Crucetas, Layasiksa, Sikilta	Environmental management, studies, support for forestry training, proposal preparation, certification; helped Las Crucetas prepare PROFOR proposal; integrally involved in multiple aspects Layasiksa's indigenous enterprise; study of MADENSA activities in Awas Tingni
GTZ (German Agency for Technical Cooperation)	Sikilta, Mukuswas (BOSAWAS)	Natural resource management & territorial claims. Integrally involved in management of BOSAWAS; forestry diagnostic for Mukuswas project; worked with Sikilta in forest protection and land tenure issues
DED (German Development Service)	Sikilta, Wasakin	Training, advising, funding; helped Sikilta develop forestry plan; forestry diagnostic in Wasakin
Local, Regional, National Organizations of Support		
PROFOR (Programa Forestal)	Las Crucetas, Layasiksa, Mukuswas, Sikilta	Partial funding of commercial forestry projects
FADCANIC (Foundation for the Autonomy and Development of the Atlantic Coast of Nicaragua)	Layasiksa, Tuapi (BOSAWAS, Rosita, Bilwi)	Natural resource management & development (including forestry), organization building, commercialization, participatory planning, credit; integrally involved in Layasiksa's community enterprise; participatory planning and community diagnostic in Tuapi

URACCAN (University of the Autonomous Regions)	Layasiksa, Tuara, Sikilta	Education, research/studies & training on environment, community development, forestry; community diagnostic in Tuara; trained and supported Layasiksa in creation of forestry management plan; Sikilta plans to ask a member of URACCAN to help make the management plan
Transforma	Layasiksa	Anticipating support in administrative workshops, forest protection, & technical aspects of forestry
Nicambiental	Mukuswas, Sikilta	Forestry training & certification; will facilitate training in enterprise project involving Mukuswas; hve advised Sikilta and offered to create certification management plan and provide training on fire protection.
Fundación Alistar	Sikilta (Bosawas)	Evolved out of The Nature Conservancy's work in Bosawas Region; funding and training to Sikilta for forest management, forest guard, nurseries, & firefighting
KEPA	Sikilta	Will provide workshops on reforestation, funding & training on fire control
Centro Alexander Von Humboldt	Awas Tingni (Bonanza, Siuna, Rosita)	Local development, environmental management and research, tenure issues; involved in organization against SOLCARSA on Awas Tingni lands
CEPAD (Consejo Evangélico pro Alianza Denominacional)	Sikilta (RAAN)	Education, training, credit, environment, community development
CIDCA (Centro de investigación y Documentación de la Costa Atlántica)	Las Crucetas, Saupuka (RAAN)	Sociological and biodiversity studies, training in natural resources; helped Las Crucetas in preparing PROFOR proposal; involved with POSAF Project in Saupuka
PANAH-PANAH	Saupuka (Bilwi, Waspán)	General development; coordinate technical training with regional government
WANGKI LUHPIA (Hijos del Río Coco)	Saupuka (Waspán, Río Coco – 20 communities)	Coordinate integrated development project, promotes Miskito enterprises; helped coordinate POSAF Project in Saupuka
MIKUPIA (Corazón del Ambiente Miskito)	Layasiksa (Communities in Bilwi)	Primary focus on environmental protection. Layasiksa forestry projected evolved out of work being done with Mikupia; reported that organization dissolved after financial management difficulties

Organizations Working in Region Not Identified during Field Visits		
IDSIN (Instituto de Desarrollo social de la Iglesia Moraba)	(Bilwi, Waspán)	Participatory planning, production support, technical assistance, financing
CIEETS (Centro Interclesial de Estudios Ecuménicos, Teológicos y sociales)	(Mayangnas communities)	Rural development & technical support
FURCA (Fundación por la Unidad y Reconstrucción de la Costa Atlántica)	(Rosita & Bonanza)	Agriculture, nurseries & plantations, training, technical assistance, environment
OPDHESCA (Oficina de Promoción Humanitaria y Desarrollo de la C. Atlántica)	(Rosita, Siuna, Prinzapolka, Bonanza)	Integrated rural development, training, environment, sustainable agriculture
Fundación Cayos Miskitos	(Bilwi, Waspán)	Development, conservation, environmental education

Adapted from Argüello et al (1999: appendix 18) with additional information from fieldwork