

Mary Brook
University of Texas
Department of Geography
210 West 24th Street, Room #334
Austin, Texas 78712-1098, USA
(512) 471-5116
finleybrook@mail.utexas.edu

Cross-scale Linkages among Forest Management Institutions in the Miskitu Commons.

Work in progress—Please do not cite without author's permission.

Abstract: Cross-scale horizontal and vertical linkages between common-pool resource institutions have recently received research attention, but are not yet broadly understood. This paper evaluates institutional dynamics in multi-scale forestry projects in the Miskitu Commons of eastern Nicaragua. While all ten co-management initiatives have received international financing, support is asymmetrical between projects. Other vertical and horizontal linkages are heterogeneous as well. This paper analyzes (1) the nesting of multi-scale institutions, (2) mismatches in scale between institutions and forest ecosystems, and (3) natural resource management after simultaneous decentralization and globalization. **Key words:** Latin America, cross-scale linkages, common-pool forests, indigenous populations, governance institutions

Introduction: In Nicaragua's North Atlantic Autonomous Region (RAAN) Miskitu common-pool land use practices and customary leadership are in crisis.¹ Although these problems have not been adequately addressed, new governance scales and structures have rapidly increased institutional density. An influx of international development agencies spurred numerous donor-initiated forest management projects in communal areas. While the international scale is strong in each of the case studies chosen for analysis, initiatives also work across national and sub-national governance scales to varying degrees.

The projects involve co-management between the state, indigenous populations, private institutions, and nongovernmental organizations (NGOs). The ability of novice sub-national state structures to serve as an effective bridge between local and international actors appears limited. National state structures are also weak after decades of structural adjustment reforms aimed at reducing expenditures. In the face of these weaknesses, projects managers search for innovative methods to improve multi-scale networks while meeting international donor expectations and lending conditions.

¹ The RAAN is located along the Caribbean Sea and makes up approximately a quarter of Nicaragua's land mass.

Geographical scale assists in the determination of costs and benefits associated with natural resource management as it provides an organizational framework for defining boundaries related to social claims, activities, and behaviors (Blaikie and Brookfield 1987). What happens at any one scale must be understood within a nested hierarchy (Harvey 2000). Sub-national actors other than local community members are often overlooked in development analysis as predominance is given to local and global scales. This research aims to define how intermediary governance scales are important.

Institutions, which are made up of rules and norms that assign rights and duties, mandate how social groups use the natural environment (Berkes and Folke 1998). Yet, rules change as scales change. Appropriate incentive structures are created through the assignation of scaled property rights regimes, which link human and natural systems.

Although the focus of this paper is institutions, natural and social processes are interrelated and should not be analyzed in isolation. In the RAAN, ecological crisis appears linked to institutional crisis and may be an opportunity to motivate institution-building. Problems such as deforestation have drawn the attention of international donors as well as convinced a significant portion of the local population that they must act. International donors have enlisted the assistance of actors at multiple scales to help reach village members. Meanwhile, villagers have begun to network horizontally and vertically in search of assistance. Will re-scaling networks reduce the failure of Miskitu self-governance in common-pool forests?

There is currently no theory for the analysis of multi-scale resource management. However, recent insights by researchers will be summarized and then applied to the Nicaraguan case studies.² The researcher spent twenty months doing fieldwork in Miskitu villages on the interface between rainforest and pine savanna.³ Fieldwork consisted primarily of participant observation, interviews, household surveys, and case study analysis. Over the past eight years, the author has documented logging in Miskitu and Mayangna villages throughout the RAAN.⁴

While the research employs a multi-scale framework, issues of local empowerment, participation, and decision-making remain fundamental. There are many potential benefits from

² Conclusions in this work are primarily descriptive. Researchers, such as Berkes (1996, 2002), Hanna and Jentoft (1996), Holling and Sanderson (1996), McKean (1996), Young (2002), and Zimmerer (2000b), hope initial descriptions will lead to cross-scale institutional theory. Scalar models need to be highly complex because they depict dynamic processes involving various temporal and spatial ranges.

³ Fulbright-Hays, National Science Foundation, Lincoln Institute of Land Policy, and Homer Lindsey Bruce Fellowships supported this research. The findings and opinions expressed are solely the responsibility of the author.

⁴ There are approximately 80,000 Miskitu and 10,000 Mayangna in the RAAN.

cross-scale alliances, but these networks must be built upon the foundation of strong local institutions. A highly concerning trend in community forestry supported by international donors is external dominance in spite of rhetoric in support of local participation.

The first part of this paper provides a literature review of cross-scale networks. The second covers background information on the study region: it focuses on politics of scale involving Miskitu land tenure and self-governance. The third section analyzes ten cross-scale forest co-management case studies. Part Four presents lessons from the cases.

Part I: Literature Review of Cross-Scale Networks

Scale is defined in numerous ways across various disciplines. In this research, influenced by the field of human geography, it is broadly understood as “the level of geographical resolution at which a given phenomenon is thought of, acted on or studied” (Agnew 1997: 100). Past notions of political scales as permanently fixed areas are currently rejected by most geographers. Although governmental scales are generally less transitory than nongovernmental networks, such as development projects or social movements, the areal extent of Nicaraguan state scales often change as a result of territorial disputes and the process of decentralization.⁵

It is necessary to theorize and typify scale with greater rigor and precision (Gibson et al. 2000b). Scale is more consistently defined in the natural sciences, but it is central to several social science disciplines, such as geography, economics, and political science. Although there are important questions remaining on the subject of how exactly human scales are created, scale appears to be socially produced in an on-going relational process involving a multiplicity of actors at different levels (Smith 1992, 1993; Delaney and Leitner 1997; Cox 1998). At the same time, scale is seen as generative because it facilitates and constrains certain actors or activities.

Literature on scale in the commons generally addresses the applicability of findings from small-scale community resource management to large-scale global commons, and vice versa. Global and local levels often receive the most attention and the roles of intermediary levels (e.g., multi-village blocks, municipalities, departments, and sub-national regions) are diminished. Mediating networks to bridge the two extremes may be essential for cooperation. To draw out the role of intermediary structures, this work combines ideas on geographical scale from three

⁵ Nicaragua’s national boundaries are under dispute with Honduras, Costa Rica, and Colombia. The RAAN was created in 1987 and aspects are still being negotiated. RAAN municipal boundaries are often contested. Township territories shift with legislative reforms and as leaders stress different historical processes.

interrelated bodies of literature: political ecology, common-pool resource management, and politics of scale.⁶

Political Ecology: Political ecology examines the “constantly shifting dialectic between society and land-based resources” (Blaikie and Brookfield 1987: 17). Analysis often follows a “chain of explanation” approach by defining “site...symptom...practice...‘decision-making’...society ... state...world” (Blaikie 1995: 18). “Scale capabilities” of social actors are interwoven with biogeophysical processes at multiple levels (Zimmerer 2000a: 154). Political ecologists highlight the diversity of perspective at different scales and among stakeholders in various sectors. There can be social fissures within each governance layer as well as between them.

Development processes currently involve scales in addition to the standard hierarchy of global-national-local (Zimmerer 2000b). Intermediary scales provide an essential link between macro and micro institutions. However, poorly integrated governance scales can create jurisdictional confusion. Layers of competing claims may strain local capacities for forest management (Peluso 1999). It is important to evaluate how emerging development institutions can avoid heightening power and profit imbalances among and between scales.

Common-pool Resource Management: The persistence of environmental degradation may be related in part to the lack of attention to cross-scale linkages (Berkes 2002). Instead of looking for one “correct” management scale, it is helpful to determine how different levels are managed simultaneously. This includes defining horizontal and vertical linkages (Berkes 2002; Young 2002). Horizontal linkages occur across space but at the same level of organization: examples are multi-village blocks or agreements among municipalities. Vertical linkages connect institutions at different spatial scales, such as international financial support for village forestry.

Vertical linkages across different scales of organization are important to provide technical and financial support to local institutions. Vertical networking also improves local access to information. However, when scaling up vertically from the village level, networks and higher-level institutions need to maintain mechanisms of accountability to local populations and to resist the centralization of control over resources and decision-making (Agrawal and Gibson 1999). While the dominance of decision-making by national and international actors is of great concern, it is local behaviors that produce cumulative outcomes (Gibson 2001). Rural populations often

⁶ The following section is limited to issues of scale in spite of the fact that additional connections could be made: for example, all three literatures address power, participation, and heterogeneity.

filter, alter, or ignore official forest policy. Village activities may diverge from expectations of national legislators and international donors.

Forestry initiatives linked horizontally across space may internalize costs that would normally remain external to smaller communal units or individual private property lots (Gibson et al. 2000a). For example, a producer is likely to be more concerned about negative downstream consequences (e.g., erosion, pollution) if networked with downstream producers. Some natural resource systems can be more productive when intact instead of fragmented (McKean 1996). Natural resource organizations need to be scaled large enough to generate sufficient human and material resources to monitor and enforce local management norms or rules (Agrawal 2000). Cooperation across larger areas can assure that neighbors practice compatible and complementary management. Contiguous villages can cooperate and effectively impede undocumented extraction by outsiders (McKean 1996). Multi-village blocks also assist small villages to obtain leverage when working with powerful state and private enterprises (Agrawal and Gibson 1999).⁷

With both vertical and horizontal linkages, having a large number of participants at multiple scales or in different areas may make organizational processes more time-consuming and costly (Ostrom et al. 1999), especially if there is duplication of work. It is necessary to find a balance between institutions at difference scales in order to reduce transaction costs. If the resource management process is perceived to be equitable it is easier to keep costs low (Hanna and Jentoft 1996).

Healthy social and natural systems functioning at appropriate scales use feedback loops to achieve a coupling of stimulus and response in time and space. Access and harvesting rules remain particular to the local environment. In contrast, uniform large-scale systems have the potential to fail in ecological niches of high risk (Ostrom 1995). In general, feedback loops at higher scales are looser creating less motivation to act (Berkes 2002). Yet, if institutions are too decentralized, feedback picked up by one group may not be communicated to others.

Politics of Scale: Scale is continuously contested and its formulation is linked to power (Jones 1998; Towers 2000; Kurtz 2003). The making of geographical scale contributes to, as well as results from, struggle based on social differences such as class, gender, and race (Smith 1992).

⁷ Multi-village networks may also be useful in addressing challenges from political and economic elites in any specific village.

The powerful may manipulate scale to prevent access by specific groups: since different scales provide varying types and amounts of resources, weaker groups may not be able frame their argument in terms of the appropriate scale(s) necessary for the resolution of their problems. Political action must be strategically targeted across multiple levels of organization with attention to where efforts are most relevant (Williams 1999; Towers 2000).

Communities involve complexities that are missed by some researchers: people and processes are seldom purely local. Too much focus on any one scale can obscure meanings and processes which translate across scales, which are the true foci of scalar research (Smith 1992; Herod and Wright 2002). Excessive prioritization of local processes could be described as scalar fetishism given the multi-scaled nature of most resource management.

There is a popular dualism whereby global is understood as strong, dominating, and active while local is seen as weak, acquiescent, and passive. Yet, specific places are often constructed as both global and local without being wholly either (Herod and Wright 2002). Many patterns of social practices or thoughts are not tied to a single location, but rather circulate separating and combining in complex, fluid ways (Latham 2002). Community forestry is an example of an idea or practice that has achieved global recognition but is different in distinct locations. While international donors often have preconceived notions of ideal management, on-the-ground practices must be flexible enough to concur with local realities.

Current Scalar Debates: The following discussion covers three subtopics relating to geographic scale and resource management. The first section explores the nesting of multi-scale institutions and touches on issues related to “scaling up.” The second addresses institutional and ecological mismatches in scale. The final part discusses simultaneous global-local processes, which have been termed “glocalization” (Swyngedouw 1997: 142).

Nesting Multi-scale Institutions: Large systems require that governance activities, such as appropriation, provision, monitoring, enforcement, and conflict resolution, be organized in multiple layers of nested enterprises (Ostrom 1990, 1995). Institutions should remain quasi-autonomous in a federal rather than hierarchical system. The dynamism and adaptation of nested structures is lost if vertical control dominates (Holling and Sanderson 1996). Nevertheless, oversight and coordination by a large-scale organization can make each smaller institution more viable and forward the collective claims of members.

Nesting theoretically remains a vague concept even though demonstrative examples have been presented (e.g., McKean (1996) and Hanna (1998)). It is necessary to further define patterns and processes. To do this, it is helpful to discuss hierarchies, networks, and co-management. Although not an exhaustive review, these are some ways that nesting is exhibited.

Gibson et al. (2000b) describe inclusive and constitutive nested hierarchies. In an inclusive hierarchy, phenomena grouped together at one level are used to describe higher categories (e.g., species included in a genus), but the lower units do not combine to produce new higher level units with distinct functions or emergent properties. In constitutive hierarchies, lower level units are contained in higher levels and do combine into new units with particular organizations, functions, and properties. An example of a constitutive hierarchy is individual, household, neighborhood, city, region, and nation.

Hierarchy theory eases the problem of scaling in natural science. It simplifies nature into levels or spatial-temporal resolutions (Costanza and Folke 1996). Processes at lower levels occur more rapidly and at smaller spatial scales than those at higher levels. The theory concludes that to understand a particular scale it is necessary to define driving forces and constraints in the layer below and above (Gibson et al. 2000b). The theory facilitates the analysis of multiple scales, but it has been criticized because it only takes into consideration one scale above and below the focus level in spite of the fact that more levels exist.

Hierarchy theory is not easily applied to social sciences because fast processes are not necessarily occurring in small spatial scales and slower processes at larger levels (Sheppard and McMaster 2004). There is also a problem with the general use of hierarchies in social science because they imply a sense of ranking with the upper scales seemingly superior to those at lower levels. To avoid modeling a hierarchy, geographers have used multiple metaphors to depict scalar networks, such as that of a ladder, concentric circles, or the root system of a tree (Herod and Wright 2002).

As previously mentioned, networks can be developed both vertically and horizontally (Berkes 2002; Young 2002). Networks are made up of social actors who become mutually interdependent through economic, social, political, and cultural interactions (Leitner 2004). Types of cooperation that participants seek can be broken down into thematic and territorial (Leitner et al. 2002). Thematic networks link together places with common problems regardless of location. Concerns over deforestation can engage villages in different parts of a nation with

international environmental organizations. Territorial networks link places in a common geographical region or in particular types of regions. An example is the countries of the Amazon Basin. Deforestation in the Amazon might interest networks with both thematic and territorial criteria. The type of network determines outlets for cooperation. Long-distance thematic networks may best share information, expertise, or financial resources. Contiguous territorial networks have greater ability to actively cooperate on joint projects, such as the management of a shared watershed.

Functional interdependencies occur when two or more institutions address problems or activities that are linked in biogeophysical or socioeconomic terms (Young 2002). These links occur whether sought after or not. An example would be the management of a river by conjoined municipalities: one cannot improve water quality if the other is dumping toxic waste. Strategic links, by contrast, are forged by actors looking to forward an individual or collective goal. This conscious political interaction is in the interest of the groups involved because cooperation is perceived as being able to enhance institutional effectiveness.

As a result of the globalization of technology, markets, and environmental problems, coordination at higher scales is increasingly necessary. Institutional arrangements do not occur in a vacuum; rather they are embedded in broader biogeophysical and socioeconomic settings (Young 2002). Users are guided by ethical principles, social duties, rules, and responsibilities particular to the groups to which they belong (Hanna and Jentoft 1996). These settings change at different scales.

Although nesting within higher scales improves access to resources, vertical interplay can be asymmetrical or unidirectional (Young 2002). National policy may dictate local actions while being insensitive to impacts. Negotiation is not allowed in unidirectional interactions and local groups are supposed to follow higher level mandates regardless of potential malignant results. Horizontal interplay can also be asymmetrical when certain groups dominate. Institutional bargaining is important to assure that policies are mutually beneficial.

The subsidiarity principle states that management authority should be vested at the lowest level of social organization capable of solving a particular problem (Young 2002). Higher level institutions may question the capability of lower-level groups to solve problems. Regional or global mechanisms may be needed to address national or transnational problems but local knowledge and solutions should not be overlooked when appropriate.

Using a hierarchy to depict social scales may be philosophically disagreeable but often it is at least partially accurate. Co-management by a range of institutions is often touted as a solution to the problem of higher scale dominance. Berkes (2002) discusses four types of potential co-management strategies: government agency-led, NGO-led, community-government partnerships, and government-NGO partnerships. Donor-led strategies are another potential form, although donors may use NGOs and state institutions as an intermediary. Remarkably few examples of co-management ever discuss a situation that is community-led, although co-management is often discussed as a means to assist rural villages.

Co-management is appealing if it can reduce scale problems in vertical networking, but on-the-ground experience is still limited (Young 2002). There is often little incentive for state, nongovernmental, or private institutions to share decision-making with local populations (Berkes 2002). Reasons for success and failure, avenues for institution and capacity building, and the design of supportive co-management policies still need to be systematically documented.

It is possible that nesting is not the only way that multi-scale development projects are structured. Nested vertical linkages may not accurately depict processes occurring in spatially diffuse alliances. “[P]olitics of scale is associated with vertical relations among nested territorially defined political entities, by contrast, networks span space rather than covering it, transgressing the boundaries that separate and define these political entities” (Leitner 2004: 237). Nested institutions and networks are articulated differently, but they are interconnected and closely related. Future research may differentiate between nested enterprises and networks to further shed light on spatial aspects of scalar cooperation.

Scalar Mismatches: The scale of observation influences how landscape patterns and ecological processes are detected. In both natural and social sciences, processes that occur at one scale do not automatically register at other scales. The same way that the world looks different when analyzed from household, national, and global scales, processes are quite different at the level of the cell, tree, and forest. Phenomena that appear dispersed at one scale might appear concentrated if viewed from another (Herod and Wright 2002). Researchers who blindly employ variables occurring at one level to explain phenomena at another scale may fall victim to causation fallacies (Gibson et al. 2000b).

There is often a lack of congruence in time and space between institutions and ecological area. Problems of fit between different institutions can also occur (Brown and Rosendo 2000).

Tension may develop from contradictory goals, different spatial or time scales, lack of adaptability, or inability to deal with complexity. The spatial scale of a resource system may not match the spatial scale of government and management jurisdictions (Burger et al. 2001). Ignoring functional requirements, sometimes spatial dynamics of species and ecosystems are arbitrarily defined to fit with management areas or research plots.

Fragmentation impacts scale dynamics. Humans cause the loss of connectivity with the construction of roads, urban centers, and agricultural fields. Resource management agencies can also be fragmented into different levels and branches. Seldom does an agency have a system-wide perspective or jurisdiction (Hobbs 1998).

The temporal scale used by decision-makers needs to match the temporal scale of the dynamics of the resources system in order to achieve ecological sustainability over the long-term as opposed to maximum yield rates in the present. The time frame for management is quite often too short in comparison with ecosystem processes (Hobbs 1998).⁸ Natural resource agencies are frequently restructured. Politicians are replaced after short terms. Many international donors commit to only five year blocks, which is insufficient time to build resilient common-pool resource regimes (Morrow and Hull 1996). It is also difficult to show sustainable forest management results in this short period.

There are both fast and slow variables in any given system. System dynamics may also involve variable rates at different phases. Likewise, species or processes that appear unimportant at one time may become important over time or as a result of changing environmental conditions (Hobbs 1998). By looking for constant yields, humans manage natural resource systems as if change was continuous and predictable (Holling and Sanderson 1996).

Human systems have greater power for both rigidity and novelty than natural systems (Holling and Sanderson 1996). Rigidity results from an institutional focus on the reduction of uncertainty. Novelty arises from social learning: in an uncertain environment people must adapt to survive (Hanna and Jentoft 1996). Novelty also results from innovative and intelligent leaders concerned with organizational survival, and continuity of their position within the group. This human trait can have negative and positive consequences. Institutional capture by powerful

⁸ Management myopia describes policies that force long-term natural processes into short human temporal scales (Holling and Sanderson 1996).

political actors can occur regardless of the appropriateness of the scale of governance or their particular ideas about resource management (Holling and Sanderson 1996).

Analyzing the interchange between natural and social sciences it would be vastly helpful to have a common language (Gibson et al. 2000b). Both natural and social systems have stocks, flows, and controls (Costanza and Folke 1996). Stocks include natural and human capital, species, and organisms. Flows involve internal flows and external inputs and outputs. Controls include physical and behavioral laws and selection mechanisms.

Important natural systems descriptors include dynamic, complex, unpredictable, non-linear, cyclical, episodic, patchy, redundant, and heterogeneous (Holling et al. 1998; Poiani et al. 2000; Berkes 2002). Although describing natural systems, application to social systems is often appropriate. For example, revolutions, civil war, and economic recessions create episodic and unpredictable change in Central American countries. Institutional heterogeneity occurs at all scales. Patchy is accurate because in some places institutional coverage is dense or effective, while in others it is absent or weak. In tropical forests, there are cyclical wet and dry seasons, and resource use and group dynamics changes. For example, loggers may migrate to or from an area in the dry season.

A requirement of healthy human and natural systems is resilience (Holling and Sanderson 1996; Berkes and Folke 1998; Adgar 2000). Resilience in an ecosystem means that it is able to absorb perturbations or recover after disturbance or shock (Berkes 2002). Institutional resilience refers to the ability to function in the long-term as well build capacity for self-organization, learning, and adaptation. An aspect of institutional success is the development of social capital, such as the building of trust (Adgar 2000).

Adaptive cycles at different levels within nested structures help maintain resiliency (Holling and Sanderson 1996). Human-environment systems that permit small-scale disturbances, such as prescribed burns, may avoid large-scale more destructive disturbances, such as crown fires. Small-scale cycles adapted to the local environment and social conditions probably assist the continuity of larger systems (Alcorn and Toledo 1998).

Due to the lack of ecological research in most places of Central America the understanding of ecosystems is inadequate to guide resilient cross-scale management. Site-specific studies show that various institutional structures are necessary for common-pool forestry due to cultural and ecological diversity. Appropriate models for multi-scale ecological and social interactions

may not yet exist because they require input from each of scales and sectors involved in management.

“Glocalization”: Figure One demonstrates cost and benefit arguments for “scaling up” or “scaling down.” Neither large-scale nor small-scale systems are a solution by themselves, but together they can make up part of an effective governance mix (Ostrom 1995). Balance between scales can help assure that the potential costs are reduced and benefits are actualized. In addition, there may be more complete capture of costs and benefits so that positive and negative incentives work more effectively (McKean 1996).

Figure One

Costs and Benefits from Resource Management at Higher and Lower Scales

(Ostrom 1995; Folke et al. 1998; Morrill 1999; Berkes 2002; Young 2002)

Potential benefits from scaling up:

- Efficiency in the use of administrative resources
- Comprehensive solutions to problems
- Access to regional, national, and international networks
- Access to markets and economies of scale
- Access to greater political clout, mobilization capacity, and media
- Technical support for ecosystem management and environmental monitoring
- Internalization of externalities and spillover effects
- Ease working across jurisdictions
- Ability to maintain ecological connectivity

Potential costs from scaling up:

- Formal rules and rights may be poorly suited to local areas
- Lack of flexibility
- Loss of local autonomy/Centralization of decision-making
- Shifts in systems of knowledge away from local or traditional structures
- Large-scale systems may destroy the diversity and complexity of local systems
- Increased economic dependence on outside agencies or markets
- Potential conflict between formal and informal institutions

Potential benefits from scaling down:

- Decision-makers live within the ecosystem or community
- Flexibility; Institutional diversity
- Greater local confidence in and compliance to local rules and norms
- Lower monitoring and sanctioning costs
- Quicker response to feedback about overexploitation or ecosystem failure
- Ineffective rules can be revised less expensively without bureaucracy
- Face-to-face interaction; Social capital

Potential costs from scaling down:

- Human, economic, and technical resources may be poor
- Institutional or ecological fragmentation
- Feedback picked up by one group may not be shared with others

When scaling up occurs historical factors can often be used to determine if higher level institutions will have positive or negative impacts on local groups (Berkes 2002). The speed of change involved in upward and downward shifts also defines the impact of transitions because institutions may be able to absorb a perturbation over a long period that would be destructive if adjustment occurred within the period of a few months.

One consequence of simultaneous decentralization and globalization processes is the apparent hollowing out of intermediate scales (Zimmerer 2000b). “Global-local” literature examines shifts to these two extremes without taking into consideration cross-scale processes and how actors at either end can network across intermediary scales to achieve governance benefits than cannot be obtained at any one scale alone.

Part II: Background Information on the Study Area

Nicaragua has developed a complex, multi-scale system of governance. “Glocalization” aptly describes the administrative decentralization (e.g., Autonomy Statute and municipal reforms),⁹ and integration with supranational structures. Due to decentralization in developing countries, sub-national scales are increasingly significant in natural resource management (Rondinelli and Nellis 1986). While fiscal decentralization continues to be impeded by the Nicaraguan central government, technical decisions about forestry projects are increasingly made in the RAAN. State institutions, such as the National Forestry Institute (INAFOR), take more seriously the fact that sub-national permission is necessary for legal natural resource concessions.

Although the presence of Autonomous Regions is rare in Latin America, their role in Nicaragua is important to protect the diversity and resource rights of regional populations that are ethnically underrepresented in the national government. With legally recognized indigenous village leaders in the RAAN, such as the *síndico* (natural resource chief), the municipal governments become an intermediary governance scale. In much of Latin America, as is true in Nicaragua’s Pacific, the municipality is the bottom scale of government; however, in the RAAN formal structures reach even further to the base.

The central government’s promotion of municipal governments and simultaneous alienation of regional and village communal leaders has fueled discord in the decentralization process.

⁹ In 1987, the Sandinistas created two autonomous regions (north and south); each is administered by a governor and council. The seven large RAAN municipalities contain an urban core plus dozens of satellite villages.

Conflict between different organizational scales due to overlapping mandates and competition for scarce resources impedes cooperation. In an international comparison, Nicaragua is advanced in the creation of decentralized structures, but the definition of the roles, responsibilities, and budgets of the various scales remains weak.

As far as globalization, multilateral and bilateral lending institutions, development consultants, and transnational companies play an influential role in Nicaraguan forestry. The pace of corporate logging rapidly increased in the RAAN after neoliberal economic reforms beginning in 1990 (Alves-Milho 1996). Valuable species, such as big-leaf mahogany (*Swietenia macrophylla*), were rapidly harvested. In light of ecological deterioration, and the continuation of extreme poverty, donor loans for sustainable forestry increased dramatically in subsequent years. Several of the case studies in this research originated as a result of these newly available international funds.

Land Tenure: Communal land did not exist as a Miskitu concept until the early 1900s (Hale 1992); a variety of institutional arrangements have since developed across the RAAN.¹⁰ With a large resource base and low population density, the demand for resource management was previously too low to justify the expenditure of time and energy in maintaining strong common-pool institutions. Open access currently leads to ecological deterioration in both pine savannas and tropical rainforests. Logging and ranching are the most profitable enterprises; requiring investment, they are dominated by local elite.

Few indigenous villages ever received state title to communal land. Tiny areas were recognized in each case. The Nicaraguan government has avoided demarcating indigenous communal lands since they were recognized by the 1987 Autonomy Statute. It took sixteen years for the regulation of the statute to pass in the National Assembly. During this time, powerful actors used the vague wording of the law to their advantage. Officials claimed that untitled lands belonged to the state, which could grant resource concessions without negotiating with indigenous populations.¹¹

In upcoming years Nicaragua will title indigenous common-pool territories based on the National Assembly approval in 2003 of Demarcation Law #445. Titling is a multi-scale process.

¹⁰ Most villages maintain family-based usufruct rights for small agricultural plots: these are generally fixed along floodplains and rotational in secondary forests.

¹¹ In 2001, the Inter-American Human Rights Courts decided in favor of Awás Tingni, a RAAN Mayangna village that sued the Nicaraguan government for violating their rights by granting a foreign logging concession within their traditional lands without consultation. Nicaragua has yet to comply with court sanctions and recommendations.

Pressure from international donors was forefront in the approval of the legislation. National level legitimization of communal land was also essential, but various sub-national institutions now share the responsibility for carrying out the process.

A difficult aspect of common-pool management is establishing territories and deciding rights of exclusion (Bruce 1999).¹² Land conflicts frequently involve power struggles at different scales; decisions to resolve disputes often require cross-scale alliances (Martin 1999). Actors that can transcend scale may be most able to secure their interests and identities.

Re-scaling Miskitu Governance: There is self-governance in most Miskitu villages but leadership roles have changed over time. Indigenous advocates have pressured for the recognition of *síndicos* as legitimate village representatives in resource decision-making. Training and accompaniment of local leaders by national NGOs and international aid agencies also promoted acceptance. Nevertheless, there are serious problems due to widespread *síndico* corruption, including illegal communal land sales. Customary Miskitu leadership roles permit considerable unchecked authority to a single individual. *Síndicos* sign deals with logging companies and often do not share forestry concession information with other villagers.

The *síndico* structure was historically successful for internal village-level leadership, but this role has become controversial as interactions outside of the village increase. State agencies justify the appropriation of international finances and power destined for Miskitu populations due to village governance problems. Donor agencies are cynical about working with *síndicos* due to corruption and do not respect village governance structures or decision-making as a result. Development projects encourage the adoption of national or international governance standards and therefore change the scale and role of customary leaders.¹³

Part III: Case Studies

Trends from ten cases are initially presented; specific examples are then analyzed from four projects. Demonstrating movement away from sole state control over resource management, the majority of projects work with non-governmental and private sectors, although the central government's role remains strong in some cases. Networks may or may not involve the

¹² In the RAAN there are contradictory land claims between state agencies, private individuals, corporations, ex-combatant groups, and indigenous villages. The most fundamental conflict may arise from the central government's recognition of "state" land and local rejection that such a concept exists within the majority of the RAAN.

¹³ Projects require transparency and democracy in order assure proper management of financial assets. Informal, hierarchical Miskitu structures may not meet expectations.

Municipal or Regional Governments. Although most projects claim to support local participation, the manner in which village representatives are involved is highly divergent. One horizontally strong network created a shared governance council with representatives from sixteen villages, which are divided into three multi-village blocks. Other institutions have focused on vertical integration and horizontal linkages do not exist or remain weak.

“Scales have consequences; so do their absence” (Judd 1998: 30). Table One depicts decision-making scales and sectors. It demonstrates that projects are hollowed out at intermediary scales when compared to both local and international levels.

Table One
Decision-making Scales and Sectors, 2003

Case Study	Government Scales						Other Sectors	
	Village	Block	Municipal	Regional	National	International	Private	NGO
Biological Corridor	X		NF	X	X	X		X
CEPISA, SA	X				X	X	X	X
EcoForestal, Inc.	DF					X	X	
Genetic Reserve	X			X	X	X	NF	X
PRADA, SA						X	X	X
Layasiksa/Sangni Laya	X	X			X	X		X
Limi-Nawâh	X	X				X	X	X
REPROMAB	X		X	X	X	X	X	X
Saupuka/Tasba Raya	X	X			X	X		X
Úbeda Brothers, SA						X	X	X

X = decision-maker

NF = near future decision-maker

DF = distant future decision-maker

Development projects seldom involve all sectors and scales to the same degree. It is not enough to define the actors involved in decision-making: it is also necessary to determine who makes specific decisions. Van Dam’s (2000) study of participatory South American forestry projects determines that donors and external agents, most often working at national or international scales, make decisions with greater power to alter forestry projects. Local populations seldom control project administration, finance, technical design, timeframe, or evaluation. Even the selection of participating villages is often outside local control.

Table Two shows preliminary project stages and demonstrates that power between scales is not homogeneous. The international scale is the strongest. Although localization has occurred, in many cases villages are weaker than actors at other scales and in other sectors. However, cross-scale processes are not static. The responsibilities of the village institutions are expected to strengthen and the role of international donors and national agencies will eventually phase out.

Financial administration in some cases will shift to private corporations run by indigenous villages, in other cases non-corporate structures are being developed. The sustainability of efforts is uncertain until it is demonstrated that local institutions can develop capacity.

Table Two
Decision-making Power in Preliminary Stages

Case Study	Government Scales						Other Sectors	
	Village	Block	Municipal	Regional	National	Internat'l	Private	NGO
Biological Corridor	Weak			Intermediate	Intermediate	Very Strong		Intermediate
CEPISA, SA	Strong				Intermediate	Very Strong	Intermediate	Intermediate
EcoForestal, Inc.						Very Strong	Intermediate	
Genetic Reserve	Weak			Intermediate	Intermediate	Very Strong		Intermediate
PRADA, SA						Strong	Very Strong	Intermediate
Layasiksa/Sangni Laya	Intermediate	Intermediate			Weak	Very Strong		Intermediate
Limi-Nawâh	Strong	Strong				Very Strong	Intermediate	Very Strong
REPROMAB	Weak		Weak	Weak	Intermediate	Very Strong	Intermediate	Weak
Saupuka/Tasba Raya	Intermediate	Intermediate			Very Strong	Strong		Intermediate
Úbeda Brothers, SA						Strong	Very Strong	Strong

Weak = Weak Intermediate = Intermediate Strong = Strong Very Strong = Very Strong

With a widespread lack of incentives for resource management from debt-ridden Central American governments, NGOs and international donors who recognize the value of the region's common-pool forests provide support to local institutions. It is unclear if this is a transitory role or if it will become permanent. Some NGOs are national, but many are RAAN-based and supplement government structures at the intermediate scale. While NGOs were most often included in networks to provide technical and administrative support, they fill important communication gaps and advocate for local interests to officials working at higher scales.

Scalar Examples from the Case Studies: Each case demonstrates interesting patterns and processes in the re-scaling of forest management. However, four were chosen for further illustration. Two examples each demonstrate related processes. To illustrate the potential influence of size on scalar debates, each pair selected includes one geographically large project and one of small areal extent. The first two case studies exhibit the randomness of boundary decisions as well as conflict between governance scales. The second pair demonstrates how external actors can both positively and negatively impact Miskitu land tenure and self-governance. One case involves sixteen communities, and the other only three, but both exhibit problems with the process of networking. Although commons literature most often discusses nesting in large areas, projects that involve co-management and international donors require it even if the areal extent is small.

It is interesting to note that jurisdictional boundaries in none of the ten projects were defined based on ecosystem boundaries, although the general location of projects involving logging were influenced by ecological criteria, such as the densities of precious species. Political factors that strongly influenced project boundaries included land tenure conflict and the jurisdiction of other projects, villages, and municipalities. Other factors instrumental in determining placement included ethnicity and economic need.

Biological Corridor: The Mesoamerican Biological Corridor (MBC), covering 768,000 km², has been called the largest conservation project in the world (Laguna Benavidez 2000). Nicaragua's section of the MBC, the Atlantic Biological Corridor (ABC), covers much of the Autonomous Region and contains seven nuclei conservation areas connected by numerous corridors. Conservation corridors scale up benefits from isolated protected areas.¹⁴

The project was designed to be large enough to protect ecology at a bioregional scale, but Nicaraguan coverage is patchy and fragmented nonetheless. Areas of highest ecological value or risk for deforestation were not systematically included. Less than one hundred out of the more than three hundred indigenous villages in the RAAN were chosen.¹⁵ Assisted villages were frequently selected because of political factors. In some cases, lobbying appears to have influenced the inclusion of a certain village above others.

The ABC is strong at the international and national scales; fiscal aspects are centralized. While internationally recognized methods of participatory appraisal were used, local input was limited because of the project size.¹⁶ National activities are oriented towards appeasing international donors. US\$3.5 million were delayed until the government met donor conditions, including the approval of the demarcation law. The ABC project ends in October of 2004 and only thirteen pilot projects have been implemented.¹⁷ The scale of this project greatly surpasses the five-year funding cycle of the donors.

¹⁴ Biophysically, corridors expand areas for flora and fauna gene flow as well as increase interchange between forest patches. Socially, funding has been extended to indigenous populations in areas of interconnection between protected areas to develop ecologically sustainable subsistence and/or commercial production.

¹⁵ One factor was location along the agricultural frontier, but only a portion of these villages were chosen. Criteria also involved location on a corridor between conservation areas, but Nicaraguan protected areas are fairly arbitrary as rigorous ecological studies have not been done. Further, not all protected areas were connected by corridors.

¹⁶ Consultations were rushed and interactions with local institutions were superficial. Regional and national officials know few local leaders and are unaware of the idiosyncrasies of specific villages.

¹⁷ Community Development Plans (PDCs) were created in other selected villages and ABC representatives hope that their publicity will attract future donors. A multi-scaled commission has been created to continue the work of the initial project, but initiatives will require future international donations as national sources are insufficient.

Genetic Reserve and Seed Bank: A 1,100-hectare genetic reserve for Caribbean pine (*Pinus caribaea*) is the smallest case study.¹⁸ This project will harvest and market certified seeds. The boundaries of the reserve were chosen predominately to avoid conflict.¹⁹ It is located on common-pool land that has been treated with a policy of open access. Community members recently cut the best seed trees for personal use. Annual fires are set in the reserve in spite of the fact that seeds damaged by fire are unsuitable for marketing.²⁰ Even after an education campaign in 2003 some community members continue to burn to encourage palatable grass for deer and cattle, make it easier to hunt and gather, and because a burned area is perceived as cleaner.

This project has the most profound integration with regional institutions of any case study. The Secretary of Natural Resources, Production, and Territorial Demarcation (SERENA) of the RAAN Government wrote the original project plan. However, there have been some concerns over local representation. Although village representatives were established in 2002, poor transportation and communication infrastructure limited interaction with regional institutions.

The regional government's power is limited by higher scales. National institutions do not understand RAAN realities and must appease international donors. Serious technical planning is important and should be completed, but the World Bank's rigid demands made meeting stipulations for the release of initial project funds difficult.²¹ Enforcing inflexible global standards may not be appropriate for the preliminary stages of remote community projects.

Limi-Nawah: The Limi-Nawâh Corporation is an indigenous-to-indigenous forestry project initiated with support from the Meadow Lakes Tribal Council (MLTC) in Saskatchewan, Canada.²² In 2002, MLTC formed a partnership with sixteen Miskitu and Mayangna villages. Limi-Nawâh exhibits two types of horizontal linkages and is the strongest of the case studies in

¹⁸ A national forest reserve overlaps this location but the exact boundaries have not been mapped since its creation in 1991. The main village road cuts through the reserve and villagers are clearing land and building in the area since they are oblivious to its designation as a protected area.

¹⁹ Prior claims by a foreign project determined where the Seed Bank would draw its boundary on one side, in spite of the fact that the other project is not currently working in the area. On another side, the best pine forests are held in a private logging concession that was sponsored by just a few village members. Other nearby high quality seed areas are being used for cattle ranching by wealthy villagers who refuse entry by others: they are willing to defend their differential access to communal land at gunpoint.

²⁰ Proposed reserve management includes prescribed burns, but methods will protect seed harvests.

²¹ For example, it is expected that product administrators will get three competitive estimates before purchases and chose the supplier with the lowest price. Sometimes it is impossible to find three suppliers for an item in the RAAN. Further, prices are outrageous when compared to Managua, and technical products can be difficult to obtain, especially when trying to meet a strict project timeline.

²² Nine Cree and Dene First Nation groups make up this tribal council. "While the membership communities that form the MLTC maintain their independence, MLTC represents a pooling of resources ... on a scale which is beyond the reach of individual communities" (Contigo International 2002: 29).

this aspect. The organization of proximate Nicaraguan villages is one set of horizontal linkages: the villages are organized into three multi-village blocks united under a shared governance council. The Canadian indigenous villages' advisory role also extends spatial coverage. Although this second linkage is horizontal, since it networks indigenous villages, it is also vertical because of the movement across scales from the local to the international.

In spite of networking there are conflicts at numerous scales. Limi-Nawâh is predominately a global-local partnership. Unless sub-national institutions are brought in to assist implementation, than working with decentralized structures can seem like a burden as they require additional time and energy. Because they were not initially brought on-board, intermediary officials appear threatened by Limi-Nawâh and some have spoken out against the project as a result.

Some village members feel that Limi-Nawâh has violated local customs by sponsoring the election of new leaders for the governance council instead of working through standing officials, such as village *síndicos*. Two competing power structures currently exist. There is disagreement among different development projects that support alternative models for local participation.

Within the sixteen member villages there is underlying conflict among the Miskitu and Mayangna ethnic groups as well as between different villages. Most villages are weary of managing the forest at larger scales because they question equity between villages. There are some areas where it would be appropriate to design forest management plans and initiate extraction. Other areas should be allowed to rest or not cut at all. Proceeds from harvest in the first areas would be used to assure that logging does not occur in the second.

Political and social factors have played a large role in project initiation in spite of the fact that Canadian organizers wanted ecological and technical aspects to be prominent. The Canadians were interested in managing the pine savannas due to their technical and marketing expertise, but community members pressured them to switch to working in broadleaf forests within the same villages.²³

Limi-Nawâh includes portions of two watersheds. Upriver deforestation has increased flooding in recent years and village populations are now more dependent on forest resources because of the frequent loss of crops planted along waterways. To work in the whole watershed

²³ Additional areas would have been ecologically appropriate and would have helped the project to reach an economy of scale for exportation, but the other villages belong to the South Atlantic Autonomous Region (RAAS). To include another regional government, as well as other municipalities, increases political complexity.

Limi-Nawâh would have had to partner with non-indigenous populations that confiscated and privatized communal land.²⁴

CEPISA, S.A.: This pine logging company and sawmill was formed in response to an external reward system created by foreign donors. The main stakeholders are 53 Miskitu families, many of whom are related to the founder and legal representative of the company, Chavelo Andrews. These families formed a village in the area called Las Crucetas, where a few homesteads were historically located. They have been able to use this historical settlement to claim traditional inhabitation when in fact most are new migrants from other Miskitu villages to the north. Organizers networked with two additional villages in order to receive a larger forest management plan, but the majority of project leaders are from Las Crucetas, where the sawmill is being constructed. Most core company officials are from the Andrews family.

The large management plan covers 11,200 hectares in an area where there are multiple claims and land tenure is officially undesignated. Since the creation of the project, Las Crucetas has gained hegemony over other nearby villages due to the assistance of international donors. Other villages have few political, economic, and human resources, which limits their capacity to oppose or legally challenge the project. Supporters of the project in the state and NGOs believe that nearby villages need to recognize efforts made by the Andrews family to bring investment to area. Although land tenure issues have not been fully resolved, they propose that it would be a shame for this project to fail because it is one of the few examples of indigenous-run forestry in the nation. They concur that even if projects are not ideal it is necessary to support them in order to prove that community forestry is possible in Miskitu villages. As a result, thousands of dollars of international assistance have been funneled to one group. Officials suggest that those that are able to meet donor conditions, such as forming a corporation, deserve assistance while those that cannot should not contest the benefit of others.²⁵

²⁴ Upriver villages are predominately *Mestizo*, or of mixed indigenous and Spanish descent. The Canadians were primarily interested in partnering with indigenous populations. Further, indigenous member villages may have been distrustful of the Canadians if they had initially included *Mestizos*, who are often seen as opponents.

²⁵ Therefore those who stayed in area, in spite of a civil war and extreme poverty, and maintained traditional ties to land as subsistence farmers have fewer rights than Andrews who abandoned the area for two decades. As a result of leaving, he was able to obtain the skills and assets necessary to form a corporation and attract international support.

Part IV: Discussion

These case studies exhibit significant problems: (1) Each demonstrates a hierarchy of power; (2) Communication often does not occur across scales; (3) External benefit structures vastly influence local activities; (4) Ecosystem management and economies of scale are not being actualized; (5) Villagers remain dependent on a few forest resources; and (6) There is ineffective monitoring and oversight of resource extraction by both village populations and outsiders. Although there are substantial problems that cross-scale networking cannot resolve, scalar alliances could potentially provide part of the solution in each of these cases. Alone no one change is going to resolve the magnitude of problems that exist in Nicaragua, but since problems are multi-scale, it is essential to look for cross-scale solutions.

There are power differentials between project levels, with each having more financial and human resources than the one below. Differences among actors within each scale also exist. Some villages are organized and have greater human resources. In horizontal networks, these villages tend to dominate others, as demonstrated by CEPISA.

In order to formulate or reformulate common-pool institutions, resource users have to believe that benefits will exceed current and long-term costs (Ostrom 2001). RAAN village populations are attracted to institutional formation due to structures set up by international donors. Yet, the availability of large quantities of external funds, seen as “easy money,” can undercut the capabilities of local institutions, increase inefficiencies, and create dependency (Ostrom 1995). If the connection between provision and use of resources is lost, fiscal prudence may be lowered and the diversion of resources may increase. Project design can become oriented towards maintaining the approval of outsiders in order to capture more funds. If institutions form due to an external benefit structure, what will happen when the funding ends?

Local populations know what their problems are and what types of development projects they would support, but this information is seldom communicated upward. Flow of information is unidirectional. Even so, national policy is not being effectively communicated to local populations. Due to pressure from international donors there are substantial reforms in land tenure and forest policy occurring in capital city, but rural populations are entirely unaware.

With the exception of elites in the case of CEPISA, case study projects were not instigated by the impacted villages. Villagers cannot be considered self-organized. Local populations generally do not feel that initiatives belong to them. Although villagers agree to management

plans with projects, some then turn around and illegally sell mahogany from the same area, as occurred with Limi-Nawâh. In other cases, community members have stolen trees or set fires within project areas, as with the Genetic Reserve. These have not been malignant actions against the projects but rather a continuation of open access use of communal lands. Projects will not be able to succeed unless community populations perceive themselves to be owners and managers. While this is the stated goal of several of the initiatives it has not been effectively communicated and demonstrated at the village level.

Issues of unequal power discussed under the politics of scale section in Part One hold true with one twist: powerful actors claim not to be working for their own benefit but rather for the benefit of more marginalized scales. Although there is a hierarchy, dominant actors claim to be assisting villagers, in spite of the fact that local populations are still limited in networking and decision-making.

Cross-Scale Constraints: Different processes dominant alternative scales (Leitner 2004). In many countries, resource management is concentrated at one scale. States may find it easier to concentrate efforts at one level as social capital is hard to build across scales, especially if populations do not share common values, such as among different cultural groups (Leitner et al. 2002). This holds true for Nicaragua. The national level dominates conservation policy. This is partially due to cultural differences between that state government and indigenous populations in the RAAN.

There is political disjuncture between the national government and peripheral areas. In the 1980s, the Miskitu went to war against the central government; trust has not been rebuilt since this historical conflict over communal land due to a lack of contact between the groups. The RAAN is a remote, rural region that is hard to access. Transportation and communication problems are common due to inadequate infrastructure.²⁶

Nicaraguan state institutions at all scales actively compete for scarce resources, which limits cooperation. Shifts in power are constantly renegotiated as legislation is reworked and funds are disbursed to different entities. With movement to both larger and smaller scales of governance, the national government's role may decrease. This process threatens the hegemony of the national economic elites, who are strongly linked to the central government. For this reason,

²⁶ Even within the RAAN remoteness makes cooperation among formal and informal networks difficult. Meetings are sporadic as the rainy climate makes ground transport and two-way radio contact difficult for months of the year.

state decentralization will continue to be actively contested at the national level. While the RAAN Government strives for autonomy through economic self-sufficiency from the sale of natural resources, municipal and village institutions, as well as development projects, also struggle for control over resource wealth.

Decentralized governance layers do not tend to perceive each other as allies and therefore work in isolation. Moreover, there are additional constraints at each scale that impede cross-scale networking, including: (1) limited economic and human resources, (2) control by elites, (3) corruption (4) political infighting, and (5) lack of enforcement of agreements and policies.

Potential Benefits from Cross-Scale Alliances: “Empowerment lies across scales; disempowerment results from being defined by one scale of action” (Williams 1999: 68). This holds true for all scales. It is often concluded that access to global networks is the key to success. However, speaking with international donors in Managua it is possible to detect frustration because in spite of the vast amount of financial resources invested in Nicaragua they have not able to actualize the improvements that they envision. One of the greatest constraints is the inability to convince local populations of the need for resource management. To meet this goal, donors need assistance from intermediary scales as well as the national government.

The core benefit from intermediary structures is improved communication. They are more accessible to villagers than national and international scales.²⁷ By providing a bridge between two systems, meso-scale institutions would improve the flow of information to both higher and lower scales. Middle-level institutions tend to be more aware of local realities than national or international organizations. Regulatory redundancy at intermediate levels can support local rules. Village institutions are currently not robust, but networking with intermediary organizations could assist in strengthening them.

Cross-scale networking could improve the potential for vertical integration leading to processing and marketing. It is especially important to find ways to add value to forest products as an incentive for management and to provide employment. Many Miskitu interpret forests as having a low value because they have already skimmed off the best products, such as mahogany. Forestry projects need to find new products and new markets. Due to past extraction practices, projects will also have to fund regeneration, but ecological studies are lacking to provide

²⁷ One limitation for members of indigenous villages is their inability to communicate well in Spanish, or their lack of confidence in speaking the language. Whether or not they are Miskitu, most people that are native to the RAAN understand the language. This holds true for most municipal and regional officials.

technical guidelines. Traditional Miskitu practices allowed for natural regeneration, but ecosystems have been disturbed to the extent that recovery is threatened.

State support is not necessarily enough to maintain local systems if internal weaknesses challenge the functioning of institutions. However, it is often likely that strong, national policy in support of community-based land and resources rights is critical to the persistence of local systems amongst national and global hierarchies (Alcorn and Toledo 1998). In Nicaragua it is necessary for forestry projects at every scale to cooperate with the state because all extraction, even on indigenous communal land, must be covered in a state-sanctioned forest management plan. These management plans are expensive and require technical knowledge to develop. One of the greatest potential benefits of networking would be for local communities to manage their own plans based on assistance from other sectors and scales. Several villages may need to cooperate in order to meet an economy of scale for marketing. Community-run plans are likely to reduce illegal logging.

Many projects want to continue to focus on harvesting precious species, although they propose switching to legal methods.²⁸ Precious species occur in low densities and this requires large areas to assure natural regeneration. If the switch to larger areas is to occur it should be used as an opportunity to focus on ecosystem management instead of species management. Successful ecosystem management may require a nested hierarchy of institutions.

Conclusion: It is not easy to either scale up or scale down resource management systems (Berkes 2002). These case studies are simultaneously attempting to do both. The key to success is the allocation of specific tasks to the scale that is appropriate and then working to forge cross-scale interactions that produce complementary rather than conflicting actions (Young 2002). However, it is important to recognize that entrenched power relations and inequitable access may remain embedded in new natural resource regimes (Bryant and Wilson 1998).

Lessons can be learned from work on the commons at other scales. While implications for management at one scale cannot be blindly generalized to another, there are important similarities between “scaling up” to work in the global commons and multi-scale networks at a regional or local level. Three points by Burger et al. (2001) about protecting global commons

²⁸ Illegal mahogany logging has made up the majority of forest extraction in the past decade and has reinforced a dependence on one species. Profit earnings have been disproportionate with only some villagers benefiting. Management alliances have not formed with other scales and sectors as it is hard to network around illicit activity.

often hold true for cross-scale organizing in relation to communal forests: (1) The framework for cooperation is seldom in place prior to negotiation; (2) Diverse parties use and value commons differently; and (3) Groups with contrasting economic levels have different options. Cross-scale forest management initiatives need to work on identifying common interests to strengthen alliances. New institutions at a supranational level need to complement organizations at other levels instead of trying to replace them (Ostrom 2001).

In the interplay between international and national institutions, Young (2002) defines important traits as competence, capability, and capacity. These points appear relevant to multi-level institutions at all scales. Competence refers to the political and legal authority to uphold and implement commitments that have been made. Compatibility involves the fit or congruency between institutional arrangements and the social practices of the individual member groups. Capacity is a measure of the social and material resources necessary to meet promises.

The ideal management system is complex, multi-tiered, and co-evolutionary with feedback between the ecosystem, economy, and society (Holling et al. 1998). In linked social-ecological systems, the community becomes part of the dynamics of the surrounding ecosystem. Resource crises can trigger the opportunity for renewal and redesign in social systems that can learn, adapt, and improve. Will this be possible for the Miskitu? Can external actors, such as international donors, reduce resource dependency and help build resilient local institutions, or are they just an additional threat? The projects under analysis in this research are relatively new and so final conclusions cannot yet be drawn. Nevertheless, to this point there have been both positive and negative consequences resulting from transnational alliances. Increasing the strength of intermediary scales within multi-scale networks may be one way to improve future project results.

There is frequently disjuncture between the level at which a problem is experienced and the political scale(s) at which it can be addressed (Williams 1999; Kurtz 2003). Since different decision-makers and user groups have different time horizons and values, state officials may adopt the interests of the most politically powerful group (Berkes 1996). Networks may be used to challenge the dominance of certain scale configurations and dissipate centralized state or corporate control. Network governance can reinforce the power of decentralized structures and therefore transcend governance hierarchies (Leitner et al. 2002). Cross-scale networks should be used as a tool for political change leading to participation, empowerment, and social equity.

References Cited:

- Adgar, W. N. (2000). "Social and ecological resilience: are they related?" Progress in Human Geography **24**(3): 347-364.
- Agnew, J. (1997). "The dramaturgy of horizons: geographical scale in the 'Reconstruction of Italy' by the new Italian political parties, 1992-95." Political Geography **16**(2): 99-121.
- Agrawal, A. (2000). Small is Beautiful, but Is Larger Better? Forest-Management Institutions in the Kumaon Himalaya, India. People and Forests: Communities, Institutions, and Governance. C. C. Gibson, M. A. McKean and E. Ostrom. Cambridge: MIT Press: 57-85.
- Agrawal, A. and C. Gibson (1999). "Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation." World Development **27**(4): 629-649.
- Alcorn, J. B. and V. M. Toledo (1998). Resilient resource management in Mexico's forest ecosystems: the contribution of property rights. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. F. Berkes and C. Folke. Cambridge: Cambridge University Press: 216-249.
- Alves-Milho, S. F. (1996). Dinámica del Sector Forestal en Nicaragua 1960-1995. Managua: ESECA/UNAN/UNA.
- Berkes, F. (1996). Social Systems, Ecological Systems, and Property Rights. Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. S. Hanna, C. Folke and K.-G. Mäler. Washington, D.C.: Island Press: 87-107.
- Berkes, F. (2002). Cross-Scale Institutional Linkages: Perspectives from the Bottom Up. The Drama of the Commons. Natural Resource Council. Washington, D.C.: National Academy Press: 293-321.
- Berkes, F. and C. Folke (1998). Linking social and ecological systems for resilience and sustainability. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. F. Berkes and C. Folke. Cambridge: Cambridge University Press: 1-25.
- Blaikie, P. (1995). "Changing Environments or Changing Views: A Political Ecology for Developing Countries." Geography **80**(3): 203-214.
- Blaikie, P. and H. Brookfield, Eds. (1987). Land Degradation and Society. London: Methuen.
- Brown, K. and S. Rosendo (2000). "Environmentalists, Rubber Tappers and Empowerment: The Politics and Economics of Extractive Reserves." Development and Change **31**: 201-227.
- Bruce, J. W. (1999). Legal Bases for the Management of Forest Resources as Common Property. Rome: FAO.
- Bryant, R. L. and G. A. Wilson (1998). "Rethinking Environmental Management." Progress in Human Geography **22**(3): 321-343.
- Burger, J., C. Field, R. B. Norgaard, E. Ostrom and D. Policansky (2001). Common-Pool Resources and Commons Institutions. Protecting the Commons: A Framework for Resource Management in the Americas. J. Burger, E. Ostrom, R. B. Norgaard, D. Policansky and B. D. Goldstein. Washington, D.C.: Island Press: 1-15.
- Contigo International (2002). Prinzipolka-Bambana Community Development Project. Managua: CIDA.
- Costanza, R. and C. Folke (1996). The Structure and Function of Ecological Systems in Relation to Property-Rights Regimes. Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. S. Hanna, C. Folke and K.-G. Mäler. Washington, D.C.: Island Press: 13-34.

- Cox, K. R. (1998). "Spaces of dependence, spaces of engagement and the politics of scale, or: looking for local politics." Political Geography **17**(1): 1-23.
- Delaney, D. and H. Leitner (1997). "The political construction of scale." Political Geography **16**(2): 93-97.
- Folke, C., F. Berkes and J. Colding (1998). Ecological Practices and Social Mechanisms for Building Resilience and Sustainability. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. F. Berkes and C. Folke. Cambridge: Cambridge University Press: 414-436.
- Gibson, C. (2001). Forest Resources: Institutions for Local Governance in Guatemala. Protecting the Commons: A Framework for Resource Management in the Americas. J. Burger, E. Ostrom, R. B. Norgaard, D. Policansky and B. D. Goldstein. Washington, D.C.: Island Press: 71-89.
- Gibson, C. C., M. A. McKean and E. Ostrom (2000). People and Forests: Communities, Institutions, and Governance. Cambridge: MIT Press.
- Gibson, C. C., E. Ostrom and T. K. Ahn (2000). "The concept of scale and the human dimensions of global change: a survey." Ecological Economics **32**: 217-239.
- Hale, C. R. (1992). "Wan Tasbaya Dukiara: Nociones contenciosas de los derechos sobre la Tierra en la Historia Miskita." Wani **12**: 1-19.
- Hanna, S. (1998). Managing for human and ecological context in the Maine soft shell clam fishery. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. F. Berkes and C. Folke. Cambridge: Cambridge University Press: 190-211.
- Hanna, S. and S. Jentoft (1996). Human Use of the Natural Environment: An Overview of Social and Economic Dimensions. Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. S. Hanna, C. Folke and K.-G. Mäler. Washington, D.C.: Island Press: 35-55.
- Harvey, D. (2000). Spaces of Hope. Berkeley: University of California Press.
- Herod, A. and M. W. Wright (2002). Placing Scale: An Introduction. Geographies of Power: Placing Scale. A. Herod and M. W. Wright. Oxford: Blackwell Publishers: 1-14.
- Hobbs, R. J. (1998). Managing Ecological Systems and Processes. Ecological Scale: Theory and Applications. D. Peterson and V. T. Parker. New York: Columbia University Press: 459-484.
- Holling, C. S., F. Berkes and C. Folke (1998). Science, sustainability and resource management. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. F. Berkes and C. Folke. Cambridge: Cambridge University Press: 342-362.
- Holling, C. S. and S. Sanderson (1996). Dynamics of (Dis)harmony in Ecological and Social Systems. Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. S. Hanna, C. Folke and K.-G. Mäler. Washington, D.C.: Island Press: 57-85.
- Jones, K. T. (1998). "Scale as epistemology." Political Geography **17**(1): 25-28.
- Judd, D. R. (1998). "The case of the missing scales: a commentary on Cox." Political Geography **17**(1): 29-34.
- Kurtz, H., E. (2003). "Scale frames and counter-scale frames: constructing the problem of environmental injustice." Political Geography **22**: 887-916.
- Laguna Benavidez, D. (2000). Corredor Biológico Mesoamericano. El Nuevo Diario. 20 de julio. Managua. <http://www.elnuevodiario.ni.com/archivos>. Viewed June 9, 2001.

- Latham, A. (2002). Rethorizing the Scale of Globalization: Topologies, Actor-Networks, and Cosmopolitanism. Geographies of Power: Placing Scale. A. Herod and M. W. Wright. Oxford: Blackwell Publishers: 115-144.
- Leitner, H. (2004). The Politics of Scale and Networks of Spatial Connectivity: Transnational Interurban Networks and the Rescaling of Political Governance in Europe. Scale and Geographic Inquiry: Nature, Society, and Method. E. Sheppard and R. B. McMaster. Malden, MA: Blackwell: 236-255.
- Leitner, H., C. Pavlik and E. Sheppard (2002). Networks, Governance, and the Politics of Scale: Inter-urban Networks and the European Union. Geographies of Power: Placing Scale. A. Herod and M. W. Wright. Oxford: Blackwell Publishers: 274-303.
- Martin, D. G. (1999). "Transcending the fixity of jurisdictional scale." Political Geography **18**: 33-38.
- McKean, M. A. (1996). Common-Property Regimes as a Solution to Problems of Scale and Linkage. Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. S. Hanna, C. Folke and K.-G. Mäler. Washington, D.C.: Island Press: 223-243.
- Morrill, R. (1999). "Inequalities of power, costs, and benefits across geographic scales: the future uses of the Hanford reservation." Political Geography **18**: 1-12.
- Morrow, C. E. and R. W. Hull (1996). "Donor-Initiated Common Pool Resource Institutions: The Case of the Yanasha Forestry Cooperative." World Development **24**(10): 1641-1657.
- Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. New York: Cambridge University Press.
- Ostrom, E. (1995). Designing Complexity to Govern Complexity. Property Rights and the Environment: Social and Ecological Issues. S. Hanna and M. Munasinghe. Washington, D.C.: The Beijer International Institute of Ecological Economics and The World Bank: 33-45.
- Ostrom, E. (2001). Reformulating the Commons. Protecting the Commons: A Framework for Resource Management in the Americas. J. Burger, E. Ostrom, R. B. Norgaard, D. Policansky and B. D. Goldstein. Washington, D.C.: Island Press: 17-41.
- Ostrom, E., J. Burger, C. B. Field, R. B. Norgaard and D. Policansky (1999). "Revisiting the Commons: Local Lessons, Global Challenges." Science **284**(5412): 278-282.
- Peluso, N. L. (1999). The Role of Forests in Sustaining Smallholders. Forests to Fight Poverty: Creating National Strategies. J. Berry and J. Gordon. New Haven: Yale University Press: 38-64.
- Poiani, K. A., B. D. Richter, M. G. Anderson and H. E. Richter (2000). "Biodiversity conservation at multiple scales: Functional sites, landscapes, and networks." BioScience **50**(2): 133-146.
- Rondinelli, D. A. and J. R. Nellis (1986). "Assessing Decentralization Policies in Developing Countries: The Case for Cautious Optimism." Development Policy Review(4): 3-23.
- Sheppard, E. and R. B. McMaster (2004). Scale and Geographic Inquiry: Contrasts, Intersections, and Boundaries. Scale and Geographic Inquiry: Nature, Society, and Method. E. Sheppard and R. B. McMaster. Malden, MA: Blackwell: 256-267.
- Smith, N. (1992). Geography, Difference and the Politics of Scale. Postmodernism and the Social Sciences. J. Doherty and E. Graham. New York: St. Martin's Press: 57-79.
- Smith, N. (1993). Homeless/global: Scaling places. Mapping the Futures: Local cultures, global change. J. Bird, B. Curtis, T. Putnam, G. Robertson and L. Tickner. New York: Routledge: 87-119.

- Swyngedouw, E. (1997). Neither Global nor Local: 'Glocalization' and the Politics of Scale. Spaces of Globalization: Reasserting the Power of the Local. K. R. Cox. New York: Guilford Press: 137-166.
- Towers, G. (2000). "Applying the Political Geography of Scale: Grassroots Strategies and Environmental Justice." Professional Geographer **52**(1): 23-36.
- Van Dam, C. (2000). "Dos décadas de desarrollo forestal participativo... ¿qué fue lo participativo?" Revista Forestal Centroamericana **31**: 5-10.
- Williams, R. W. (1999). "Environmental injustice in America and its politics of scale." Political Geography **18**: 49-73.
- Young, O. R. (2002). Institutional Interplay: The Environmental Consequences of Cross-Scale Interactions. The Drama of the Commons. Natural Resource Council. Washington, D.C.: National Academy Press: 263-291.
- Zimmerer, K. S. (2000a). "Rescaling Irrigation in Latin America: The Cultural Images and Political Ecology of Water Resources." Ecumene **7**(2): 150-175.
- Zimmerer, K. S. (2000b). "The Reworking of Conservation Geographies: Nonequilibrium Landscapes and Nature-Society Hybrids." Annals of the Association of American Geographers **90**(2): 356-369.