

A Framework for Evaluating Forest Conservation Implications of Community-based Capacity Building: Experiences from the Northern Bolivian Amazon

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Abstract

Capacity-building projects in forest-based communities are implemented by governments, cooperatives, and non-government organisations to encourage sustainable management of community forests. While such projects are regularly evaluated on a case-by-case basis, they are rarely subjected to a landscape-level examination to explore conservation implications. To understand how environmental capacity-building projects address regional conservation goals, an interdisciplinary framework was developed to highlight the thematic focus, the geographic distribution, and the degree of community participation in environmental capacity-building projects. We demonstrate how the framework can be used by characterising projects in *campesino* communities in the Amazonian department of Pando, Bolivia, that were active during 2006–2008. While projects were too recent to affect forest cover, we describe how the framework elucidates three project themes (timber, Brazil nut, and agroforestry management); that project distribution was largely related to land tenure security, proximity to town, historical relationships, and motorised access; and that capacity-building strategies varied in participation, depending on thematic content and federal requirements for specific resources. We then discuss how the framework can be used to analyse forest cover implications over many years. Understanding the combination of thematic focus, geographic distribution, and degree of participation in project strategies offers a foundation for understanding how capacity-building initiatives can influence forest landscapes.

Keywords: capacity building, Bolivia, sustainable forestry, geography, NGOs, development

INTRODUCTION

Landscape ecologists recognise the variety of social and ecological factors that maintain ecosystem health and resilience (Gunderson and Holling 2002). The social factors primarily considered in landscape conservation are population size, markets, national environmental and development

policies, and resource management institutions (Poteete and Ostrom 2004). While communal resource management has been noted as an important factor affecting land-cover in many tropical forests (see for e.g., Scheik et al. 1997; Lambin and Geist 2006), only Sundberg (2008) has begun to explore how the presence and quality of projects intended to affect community-based land management influence land-cover change.

Capacity-building projects for community forest management (CFM) have the joint goals of improving living standards in poor communities and promoting forest conservation. In Latin America, structural readjustment policies and funding trends since the 1980s have shifted a majority of the responsibility for capacity-building projects to international and local non-government organisations (NGOs). Recently, funders have demanded greater accountability for NGO performance,

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implying a need to establish criteria to effectively distribute resources. An analysis of geographical locations and methodological strategies of projects allows insights into who is actually receiving support, whether important conservation areas and topics are being addressed, and how likely projects are to influence land use. This paper responds to calls for project accountability by presenting a framework for exploring potential forest cover changes based on the thematic content, distribution, and behaviour-change strategies of natural resource management. It then applies the framework to a region of the Bolivian Amazon to demonstrate its application and discuss how the data can be used to interpret potential land-cover changes due to community-based forest management projects. However, because many capacity-building projects have only recently been initiated in the region, this paper does not present final conclusions about the landscape effects of capacity-building projects.

CAPACITY BUILDING FOR CFM

Increasing the capacity of communities to sustainably manage their forests is one of the most important development activities to ensure sustainable natural resource use in populated forests (Eade 1997; Bray 2005; Cronkleton et al. 2006; Menzies 2007). While capacity building sometimes refers to any external intervention that assists communal resource management, this paper uses the term to refer to direct interactions with communities, usually extension projects, to increase knowledge about and access to sustainable management of natural resources. Such interventions may aim to improve technical skills to manage the resource, increase access to and participation in markets, strengthen relevant community-level institutions, and enhance economic administration to ensure retention of benefits from resource management (Eade 2007; Menzies 2007). Methods for developing these capacities are diverse and range from didactic information presentations to collaborative planning processes.

Due to national governments diminishing their role in development and resource management and international funds increasing for these purposes, many capacity-building activities for conservation and development are spearheaded by local and international NGOs (Arellano-Lopez and Petras 1994; Yadama 1997; Sundberg 1998; Edwards et al. 1999; Levine 2002; Bebbington 2004; Gordon 2006). Funders' faith in NGOs stems from the belief that they are private, efficient, and able to connect to local communities unlike cumbersome government offices housed hundreds of kilometers away (Tendler 1997; Keese 1998). This hypothesised benefit of NGOs is increasingly questioned, however, and mistrust between donors and NGOs has resulted in donors demanding observable results within a project's three- to five-year funding cycle in order to obtain future funding (Bebbington 2005). Regional governments and local cooperatives are often subject to the same critique as they frequently rely on identical international funding as NGOs. As providers of capacity-building initiatives, each type of

natural resource-based education project must be analysed so as to monitor and improve its potential for conservation. While the relationship between efforts to develop capacities and improved conservation is difficult to isolate, the practical implications warrant its exploration, as the results would be an essential addition to research on community-based natural resource management.

THE FRAMEWORK

To understand the potential landscape-level effects of community-based capacity building, we can draw from several fields of knowledge. From development geography, success is explored through the thematic and geographic distribution of projects (e.g., Vakil 1997; Bebbington 2004, 2005; Raberg and Rudel 2007). Published research in this field is limited, but existing manuscripts describe an important link between the distribution of projects and their ability to address the most pressing issues in conservation and human well-being. While development geographers generally do not measure land cover changes, their attention to project distribution is a first step to exploring the landscape effects of capacity building. From the fields of environmental learning, behaviour change, and international development, comes attention to educational strategies and their ability to influence individual and group behaviours (e.g., Leonard 1977; Chambers 1986; Keen et al. 2005; Monroe et al. 2007; Wals et al. 2008). Research in this field is vast and demonstrates that for individuals to sustainably engage in behaviours that benefit the environment, they must have ownership in the selection of appropriate behaviours, opportunities to practice and receive feedback, and be able to observe tangible positive impacts for themselves and their families. While research from these fields have found that capacity building can influence decisions, yet another field of research has demonstrated that land-use decisions are crucial factors in determining land cover changes (e.g., Lambin and Geist 2006). Joining these broad fields of thought, we can begin to explore how capacity-building strategies might achieve their conservation goals.

This paper builds an interdisciplinary framework to respond to the question: Does understanding the thematic content, geographic distribution, and capacity-building strategies of community-based capacity-building projects provide important information about the predictors of land-cover change in community forest landscapes? This paper suggests that understanding extension strategies and geographic distribution of thematic focus is an essential step to explaining the adoption of forest management behaviours that can lead to forest cover changes, a common proxy for conservation (Figure 1). To make sense of the data, the factors must be oriented within the greater political and demographic context of the study area. Updated over time, this framework could provide a solid foundation for understanding to what extent environmental capacity-building projects can affect conservation goals. In the context of this paper, forest conservation is discussed

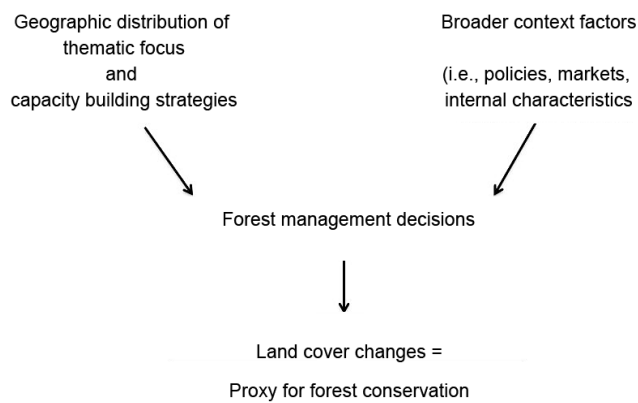


Figure 1
Framework for analysing the forest conservation impacts of capacity-building projects

entirely from the perspective of retaining forest cover, although it is recognised that forest conservation can refer to several processes, including the maintenance of genetic diversity or forest structure.

Thematic content

The thematic focus of capacity-building projects is an important criterion for differentiating the impacts of NGOs on a landscape (Vakil 1997). The focus of a communal forestry project can include the commoditisation of a non-timber resource, the implementation of silvicultural techniques (e.g., Walters et al. 2005), or integrated management schemes that combine agroforestry, timber or non-timber forest products (e.g., Assies 1997). Each focus could result in a distinct use of natural resources, which can be observed through land-cover analyses. Agroforestry projects in Guatemala, for example, resulted in an increase of land dedicated to agroforestry practices (Sundberg 1998). The effect was called “NGO landscapes” to describe the role that NGO-sponsored agroforestry projects had in determining land-cover at a regional scale. Similarly, a focus on fruit or seed extraction, if done sustainably, would be hypothesised to result in minimal forest cover change over time (Beekma et al. 1996), and the practice of sustainable, reduced-impact forestry would result in fewer trees lost and lower density of roads developed than conventional forestry practices (Pereira et al. 2002; Bray et al. 2004).

Geographic distribution

The distribution of capacity-building projects within each thematic type could result in visible patchiness on the landscape. Research on the distribution of development assistance has revealed some important trends (Bebbington 2004, 2005; Raberg and Rudel 2007). The first stage to understanding distribution is clarifying the criteria used for selecting participating communities, and these criteria are generally predictable. Short project timelines induce a selection process that favours recipient communities and individuals that

have the basic skills, education, and capital to allow them to adopt new practices quickly, rather than those that most need the support (Bebbington 2004, 2005). Infrastructural barriers are obvious determinants of capacity-building distribution, with project sites tending to be on roads or navigable rivers and near urban areas (Bebbington 2004). The selection of communities within these confines is also based on social factors such as political implications, the geographies of other social institutions, and social networks and life histories of extension professionals and allies (Sundberg 1998; Bebbington 2004; Raberg and Rudel 2007).

The accountability structure of the implementing organisation also affects who receives support (Eade 2007). Governments and cooperatives, for example, are responsible for their constituents, whereas NGOs are more responsible to external funders. The level of accountability plays out in their project distribution. Raburg and Rudel (2007) and Yadama (1997) compared the distribution of NGO projects to government-facilitated projects for community forestry. NGOs in Ecuador more closely followed the Central Place Theory, clustering near cities and important conservation areas, whereas government projects were more widely dispersed among Ecuadorian communities (Raberg and Rudel 2007). In Asia, competition among NGOs made for patchy distribution of projects that essentially replicated existing government projects (Yadama 1997).

Capacity-building strategies

Capacity-building projects that encourage the adoption of forest management activities tend to support knowledge acquisition, skill development, and governance structures. An important factor in considering the land-cover effects of capacity building is its potential for success. In this paper, we define success as the long-term adoption of a project’s overarching resource management goals. While an *a priori* definition of success is difficult, and potentially detrimental due to the unique characteristics of each community, there are general guidelines for developing successful capacity-building processes that allow for flexibility and tailoring to diverse situations.

Two strategies of capacity building have been found to be particularly effective for promoting sustainable behaviours in natural resource management (Monroe et al. 2007; Wals et al. 2008). Wals et al. (2008) call them instrumental and emancipatory learning, while Monroe et al. (2007) name the goals of the same techniques as skill application and sustainable actions, respectively. When applied to community-based management of forested lands, instrumental learning results in effective ‘skill building’ and emancipatory learning in ‘communal management’ (Table 1). When the activity can be practiced at an individual or household level, when the beneficiaries and extension agents agree on the activity they want to implement, and when the extension agent knows more about the activity than the beneficiary, it is best to use skill-building techniques. These techniques include modeling the activity, allowing the beneficiary to practice the activity and

Table 1
Factors that other studies have found to be associated with the success of two types of capacity-building strategies

	Skill building (i.e., technical training)	Communal management (i.e., social learning)
Purpose	Train community members in a specific land use	Foster joint learning to improve communal land management
Appropriate context	1) All agree on the land-use activity 2) The extension agent knows more about the activity than the learners 3) The activity is practiced by an individual or household	1) The land-use activity is undecided 2) Many have equally important knowledge to contribute 3) The activity is practiced on communal lands
Strategy components	Experiential learning Extension agents model the activity Community members practice the activity Extension agents provide feedback Community members commit to using new skills Incentives are provided to continue using the skill Long-term interaction between extension agent and community Trust between extension agent and community	Experiential learning Extension agent facilitates decision-making Diverse communal participation with open dialogue Multiple ideas are generated Meanings are negotiated Ideas and techniques are tried, practiced, and monitored Long-term interaction among all participants Trust among all participants

receive feedback, requiring a commitment from the beneficiary to practice the activity, and providing incentives and reminders to encourage individuals to practice the behaviour (McKenzie-Mohr 2000; Monroe et al. 2007). Skill building can also be seen as well-executed technical training.

When land-use activities take place at the communal level, when there is debate about the appropriate activities for that property, and if no one has more valid experience or knowledge than another, communal management techniques are more appropriate. Like skill application, these approaches place high value on experiential learning. Unlike skill application, however, communal management methods do not assume a specific activity. Rather, they focus on encouraging dialogue among diverse community members who jointly participate in the capacity building, share their perspectives, negotiate meanings, define alternatives most appropriate to their context, and practice the use of new ideas and techniques (Freire 1970; Melkote and Steeves 2001; Keen et al. 2005). Communal management methods aim to develop organisational and administrative capacity, marketing skills, or conflict management as appropriate to the needs of the community. With this intent, the focus extends beyond building technical knowledge and facilitates the establishment of governance structures essential for continuing resource management into the future (Cronkleton et al. 2006; Eade 2007). Communal management methods are those that incorporate social learning techniques (Schusler et al. 2003; Keen et al. 2005; Muro and Jeffrey 2008).

In both skill building and communal management, effective capacity building demands a high level of contact and trust between the agent and the community members (Leonard 1977; Korten 1980; Chambers 1986). This means that organisations and individuals who have worked with a specific community over time and who have frequent interactions are more likely to be successful at their cause. It also means that capacity-building professionals who are willing to interact on a horizontal level with community members, allowing their ideas to be heard and implemented, are more likely to succeed at promoting sustainable land-use behaviours. The opportunities for community members to participate, practice, receive feedback,

and jointly develop new ideas over a period of time are components of what is generally called a participatory process that has been found to increase the likelihood of success for skill-building and communal management initiatives.

The broader context

As previously alluded to, whether community members adopt forest management behaviours that are promoted by extension agents is dependent on how the extension strategy interacts with the unique attributes of each community and how strong external barriers are at negating these attempts. Internal community characteristics such as the opinions of powerful members; existing social, human, and natural capital; historical uses of land; and prior experience with external institutions are some common barriers to a community's openness and ability to interact with an extension organisation (Leonard 1977; Korten 1980; Chambers 1986). External barriers such as excessive corruption, continual changes in regulations, and market fluctuations are common foes of capacity-building projects (Bebbington 2004; Eade 2007). Each community and region is unique in its combination of these factors and would result in varied implementation of land-use practices demonstrated by a diverse land-cover map. Thus, it is important to understand the characteristics of the context within which one applies the framework to effectively interpret the data obtained.

Considering the number of determinants and barriers to defining project theme, determining distribution, and ensuring that implementation strategies are effective, it is clearly challenging to apply capacity-building projects that fulfill the conservation and development goals of addressing the neediest human and natural populations. As substantial research in development has found, patchy distribution of development support does little to alleviate poverty in a larger context (Bebbington 2004). This observation begs similar questions about the distribution of capacity building for forest management and the resulting extent of forest conservation. The above framework was developed to include the factors that have demonstrated significant impact on the success of

conservation and development projects. The framework was then initially applied in Bolivia to demonstrate how to gather the information necessary for determining if environmental capacity building can influence landscape-level conservation. Because the projects were in initial stages at the time of research, final conclusions about the role of capacity building on communal forest landscapes will not be presented, although initial lessons will be discussed.

CAPACITY BUILDING IN THE BOLIVIAN AMAZON

Bolivian forest policy has supported community forestry since the 1990s, when indigenous communities were allotted special forest use rights in Community of Origin Territories (TCOs) (Stearman 2006). The push for community forestry did not fully develop, however, until the late 1990s when three laws converged to set the stage for communal management of Bolivia's northern Amazon forests. The Participation Law of 1994 decentralised some forest management decisions and funds to municipalities; the Agrarian Reform Law of 1996 redistributed land tenure to favour indigenous and forest-dwelling communities, and a subsequent decree allotted each community in the northern Amazon 500 ha per family; and the Forestry Law of 1996 allowed communities to commercially extract their forest products under federally approved forest management plans (Pacheco 2006; Benneker 2008). In formalising community forest management, these laws changed the rules by which communities could utilise their natural resources. New and old colonisers alike had to learn forest management skills that aligned with the requirements of

the federal government. The framework presented in this paper was applied to *campesino*¹ communities in Pando, Bolivia, ten years following these critical land reform and forest policies. The focus was on *campesino* communities because of their dominance in the area and their extensive participation in forest-based economic activities that could alter forested landscapes. It is recognised, however, that indigenous groups also hold title to land in Pando and that capacity building with these communities could similarly alter forest cover.

Pando, the northernmost Bolivian department, spans 63,000 sq. km, is 95% forested, and is inhabited by roughly 250 formally organised colonist communities (INRA 2008; Marsik et al. 2011). The forest is primarily old-growth, with extensive timber and non-timber resources distributed throughout the department (Beekma et al. 1996). As the first Bolivian department to preliminarily complete its land titling process in 2008, Pando had distributed over 40% of forest use rights to agroextractive and indigenous communities (de Jong et al. 2006; INRA 2008; Pacheco et al. 2009) (Figure 2). Approximately 139 agroextractive communities received 500 hectares per family under a single communal title and two indigenous territories had been titled covering multiple adjacent communities. Several agroextractive communal titles were also still in process. This substantial devolution of land to agroextractive and indigenous communities, although twelve years in the making and far from conflict-free, was the product of the 1996 Agrarian Reform Law and a political climate supporting rural peoples. The rest of Pando was reserved for five user groups: private landholders (4.5%), timber concessions (19%), Brazil nut concessions (24%), protected areas (13%), and other government land. Figure

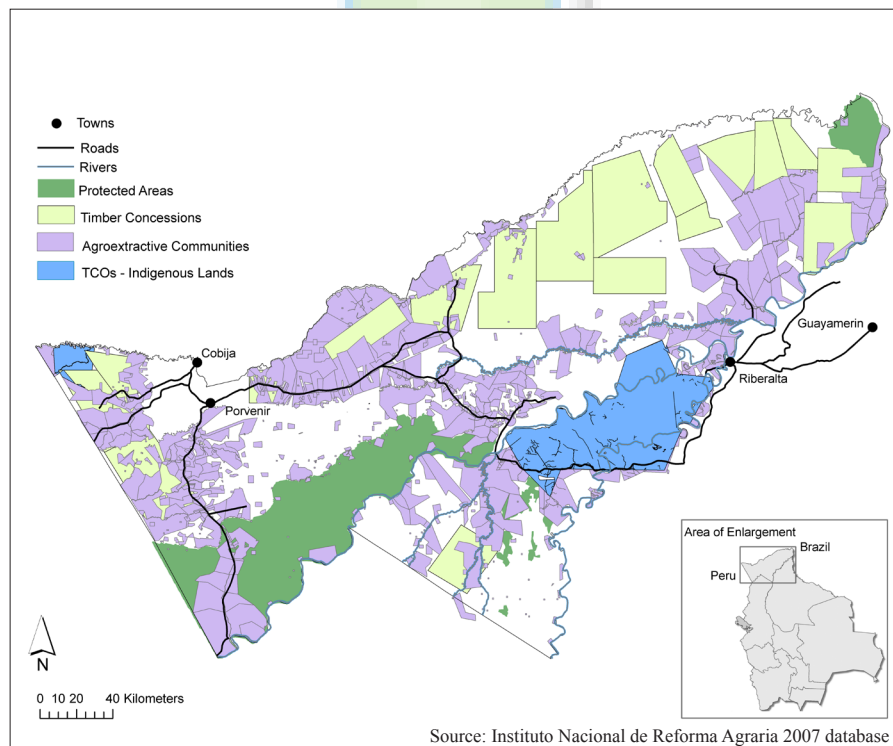


Figure 2
Location of communal landholdings, timber concessions and protected areas in Pando, Bolivia

2 presents the location of communal properties, protected areas, and prior boundaries of timber concessions as of 2008. The allocation of Brazil nut concessions was incomplete and private land had been minimal; as such, the majority of remaining areas on the map were 'other government land' that could be distributed to these users, among others.

The new land owners were expected to follow established land-use plans that divided the region into five categories of resource management: protected areas, extensive agriculture, forestry, agrosilvopasture, and restricted use (i.e., river valleys) (Ministerio de Desarrollo Sostenible y Medio Ambiente 1997). The majority of Pando was designated for forestry, in which primarily non-timber forest products such as Brazil nut (*Bertholletia excelsa*) and natural rubber (*Hevea brasiliensis*) were to be extracted. With the development of the forestry law, agrarian reform, and a global interest in community forest management, timber gained in economic importance for Pando communities (Benneker et al. 2005). In reality, communities also practiced small-scale agriculture, agroforestry, and cattle ranching.

In Bolivia, as in many community forestry contexts, some activities were not necessarily communal, even though land was legally communal. Brazil nut collection and agroforestry, for example, continued to be household level activities conducted on communally-recognised individual trails and parcels. Timber management, however, required the collective action of community members as the process was complex, the extraction occurred on collectively-recognised communal property to everyone's financial benefit, and the law required everyone's signature before approving a timber management plan. These differences in activity characteristics necessitated different capacity-building styles.

External support for timber, non-timber, and integrated management practices in communal forests of the northern Bolivian Amazon was provided by departmental government and non-governmental institutions, as well as local cooperatives. In 1996, 28 organisations worked with natural resource management in Pando in the capacities of field and media extension, research, project execution, and policy development (Beekma et al. 1996; Ministerio de Desarrollo Sostenible y Medio Ambiente 1997). Only a few worked directly with communities, and they focused on agriculture and land titling. In the late 1990s and early 2000s, because of the new Bolivian laws supporting CFM and the completion of the land-titling process, institutions began expanding their thematic and geographic reach in Pando communities. Several worked specifically with timber management and, though they had increased the time and energy required of communities to manage resources, they had helped communities sell more timber, log continuously, and feel more successful than communities who did not receive support (Benneker 2008). Other organisations helped communities collectively market and sell Brazil nuts and become trained in agroforestry activities and market their products.

The incipient implementation of CFM projects in Pando provided a unique opportunity to describe how capacity-building

institutions distributed themselves thematically, spatially, and methodologically in a region whose government was committed to fulfilling an overarching goal of community-based natural resource management. The framework for analysing the influence of capacity-building projects on forest conservation was applied during three seasons of fieldwork from 2006 to 2008. Implementing the framework at such an early stage in this region's development of CFM was both an excellent demonstration of how to use the framework and an important contribution to future analyses of land-cover changes.

APPLYING THE FRAMEWORK IN PANDO

Applying the framework in Pando required several stages. The first was to select organisations for interviews based on a literature review and snowball sampling of all organisations implementing community-based capacity building between the years 2006 and 2008. Twelve organisation directors and ten project coordinators were interviewed on at least one occasion. In addition, 19 extension agents were formally interviewed. For two projects, data were obtained from presentations given by organisation directors at professional meetings. Project locations, the process and criteria for selecting participating communities, and project focus and strategy were gathered during these semi-structured interviews. Projects that prioritised land tenure security, general institutional strengthening, or political movements rather than natural resource management, were not included in the final analysis. The data thus comprise an essentially complete description of community-based natural resource projects in the department between 2006 and 2008.

Interviews with the director of the organisation and project directors elucidated the project's funding sources, thematic focus, objectives, geographic distribution, reason for selecting those communities, and the capacity-building strategies employed when working in the communities. This information was confirmed or modified based on seven field visits with extension agents from four active projects, interviews with ten community leaders, field-based interviews with 34 randomly selected community members in two communities receiving support, and reviews of project funding proposals and mid-term evaluations. Visits with extension agents and interviews with community leaders were based on convenience sampling due to timing and location of the author and the extension agents and leaders. During these visits, community members were asked about the perceived goals of the project, the types of activities the project implemented, how and how often project representatives engaged with the community, and the results of the project to date.

GIS maps were created to represent project distribution by thematic content. The names and municipalities of participating communities were used to generate a spatial representation of project distribution by thematic content within ArcGIS. Georeferenced polygons for communities were obtained from the 2006 land tenure database of the National Agrarian Reform Institute (INRA), and representational points were placed on the roadside or riverside section of the tenure polygon. For

communities not in the INRA database, GPS coordinates were collected on site visits. In a few instances, communities were omitted from the geographical analysis because of missing georeferenced data. This geographical representation of thematic distribution provides a visualisation of the distribution of potential land uses as a result of capacity building. To provide a rigorous analysis of the potential effects of capacity building would require delineating the exact communal areas where different projects were being conducted—a component beyond the scope of this study. Collated results of geographic distribution, community selection criteria, and strategies used to engage communities were confirmed with project directors and community leaders through informal and formal presentations.

Qualitative data on project focus, community selection process, and strategies were then transcribed and coded within NVivo qualitative data analysis software. Projects were classified along a spectrum of participation within skill building and communal management categories based on whether the organisation encouraged dialogue and action among a diverse portion of the community using techniques of skill building and communal management vs. whether the organisation worked with specific, often elite, individuals within a community using primarily didactic presentations of information. The remaining sections of this paper describe the data obtained from applying this framework in Pando and discuss the potential for the framework in future analyses.

FINDINGS

Number and types of organisations

Nineteen capacity-building projects for community-based forest management in *campesino* communities were found in the department of Pando (Table 2). A few projects were

executed by the same organisation, but had different funding sources and objectives, and are thus presented as separate units of analysis. All projects were distributed within Pando, though their implementing organisations were based in the towns of Guayamerin, Riberalta, Porvenir, and Cobija. The 19 projects were implemented by 17 different organisations. One project was a joint venture between two organisations, and three organisations implemented multiple projects. Many communities worked with more than one project, resulting in 244 project-community relationships for natural resource management in Pando. Forty seven per cent of these relationships were conducted by NGOs, 35% by cooperatives, and 18% by the Prefect's forestry office. The Prefect's projects, however, suffered from loss of funding and were never completed.

All but two extension NGOs were Bolivian; of those, all but two were regionally based. Project funding, however, was obtained from various bilateral and multilateral agencies as well as international NGOs. Private timber enterprises also worked directly with dozens of communities to fund their annual and long-term logging plans. In fact, 85% of communities who legally extracted timber had plans written by private industries that were interested in purchasing the timber (Superintendencia Forestal 2007; Benneker 2008). This relationship between communities and private companies was

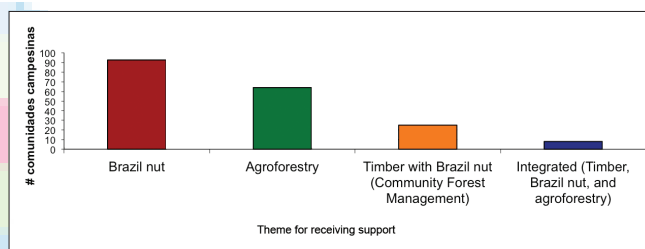


Figure 3
Number of communities receiving support by theme

Table 2
Forest related conservation and development projects in *campesino* communities in Pando, Bolivia between 2006 and 2008*

Project executor (No. of projects)	Year started	Thematic focus	Organisation type	No. of colonist communities	No. of municipalities	Office location
IPHAE	2005	Timber and Brazil nut	NGO	15	6	Riberalta
FJMP (x3)	2005	Timber and Brazil nut	NGO	4	2	Cobija
AMAPAN	2007	Timber and Brazil nut	NGO	1	1	Cobija
Prefect	2005	Timber	Government	8	3	Cobija
OCMA	2007	Agroforestry	NGO	22	3	Guayamerin
CIPCA Norte	1998	Agroforestry	NGO	29	6	Riberalta
CIPCA Pando	2007	Agroforestry	NGO	19	4	Cobija
CIPA	2007	Agroforestry	NGO	6	2	Cobija
Prefect	2005	Brazil nut	Government	26	3	Cobija
Herencia	2005	Brazil nut	NGO	20	6	Cobija
WWF	2004	Brazil nut	NGO	9	1	Cobija
CIFOR	2005	Brazil nut	NGO	3	1	Cobija
COINACAPA	1994, 2001	Brazil nut	Cooperative	41	9	Porvenir
CAIC	1980	Brazil nut	Cooperative	20	9	Riberalta
ACERM	2007	Brazil nut	Cooperative	6	1	Cobija
IPHAE	1996	Integrated management	NGO	8	2	Riberalta
Puma	2006	Sustainable development	NGO	7	≥3	Cobija

*Manuripi Reserve, Yangareko, and Mancomunidad Bolpebra were not included due to incomplete information

based more on clientelism than capacity building, and as such is only an aside to this analysis.

Since the implementation of agrarian reform policies, external support for community forest management had increased substantially. Of the 17 organisations present in 2006–2008, only three existed prior to the reforms of 1996 and none maintained the same projects. New organisations and their projects, largely based in Cobija, initiated as the land titling process, officially came underway in 2001 and international interest was focused on developing the local governance of natural resource conservation in the trinational region MAP (Madre de Dios, Peru; Acre, Brazil; Pando, Bolivia) (Chavez et al. 2005; Perz et al. 2010). As a result, a disproportionate amount of funding was allocated to organisations in Cobija, the largest, nearest, and most accessible Bolivian town in MAP (Zonta pers. comm. 2008).

Thematic focus

Capacity building for forest management in Pando had three general foci: timber management, Brazil nut management, and agroforestry (Figure 3). Residents from roughly 100 communities worked with Cooperativa Agrícola Integral Campesina (CAIC), Asociación Campesina Extractivista de la Reserva de Manuripi (ACERM), Corporación Integral Agroextractivista Campesinos de Pando (COINACAPA), Center for International Forestry Research (CIFOR), World Wildlife Fund (WWF), and Herencia, to map their Brazil nut stands, organise sales with other Brazil nut extractors, and/or extract Brazil nuts based on fair trade standards. Sixty three communities received agroforestry support from Organización Comunal de la Mujer Amazónica (OCMA), Centro de Investigación y Promoción del Campesinado (CIPCA), and Centro de Investigación para la Preservación de la Amazonia (CIPA) that focused on providing the raw materials and knowledge to maintain agroforestry plots on fallow parcels. Twenty six communities received timber support from Instituto para el Hombre, Agricultura y Ecología (IPHAE), Fundación José Manuel Pando (FJMP), and Amazonas Pando (AMAPAN) that resulted in the development of technical skills to create and implement annual (100%) and sometimes long-term (15%) timber management plans based on a low volume, reduced-impact extraction of a few high value species. Most timber projects also included the development of a Brazil nut management plan, as it was a relatively easy task. Only eight communities received integrated support from IPHAE incorporating all three activities. Finally, project funding was provided for Brazil nut storage facilities and timber management plans by the Prefect and by Puma for the design and implementation of community-based natural resource management plans ranging from timber to turtle management.

The thematic foci on timber, Brazil nuts, and agroforestry for capacity building in Pando were not surprising and were largely determined by the economic and cultural realities of the region and the interests of funders. With the increased global attention on communal timber management as a core

component of CFM came a push for projects to fulfill this goal. The large number of Brazil nut interventions was also not surprising. The rural economy was already based on Brazil nut extraction and the non-invasive methods used to collect Brazil nuts were highly valued by conservationists. Finally, agroforestry had long been considered an option for reviving fallow lands to increase productivity, improve soil structure, and enhance biodiversity. It was an ideal complement to the timber, non-timber, and small-scale agricultural practices prevalent in Pando.

Variation was found in the amount of experience each organisation had with the thematic focus of their projects. Some organisations, such as IPHAE with agroforestry and COINACAPA, CAIC, and CIFOR with Brazil nut strategies, had worked in these fields long before their recent projects. OCMA and CIPCA had similarly worked with agroforestry projects, in addition to community development, for over ten years. Other groups were relatively new to their project's thematic focus, such as ACERM with Brazil nut cooperatives, and IPHAE and FJMP with timber. These NGOs hired specialists in the field who often had more experience than the agency in the theme. Considering the non-profit's experience with the theme may be an important component to success, as one might hypothesise that more experienced organisations and staff benefit from lessons learned. At the same time, however, more experienced organisations and staff may be entrenched in outmoded ways of working with communities. For this reason it is important to consider both the level of experience and the actual capacity-building strategies.

Geographic distribution

Over 150 communities received natural resource management support from at least one organisation between 2006 and 2008. The spatial distribution of these projects followed some consistent patterns. All were distributed along a road or river and specific organisations appeared to be territorial. One Brazil nut cooperative had a strict focus on communities within the largest protected area, another worked in communities that were relatively spread throughout the western half of Pando, and the last worked mostly in communities near its base town of Riberalta. Agroforestry projects spread themselves widely but, like the cooperatives, occupied certain regions of the department. One project focused on the northern region, another central, and a third the southern and eastern regions. These regional foci were usually, but not always, the closest to the organisation's base. The patchy distribution of specific projects did not result in a patchy distribution of thematic types, however (Figure 4). Agroforestry and Brazil nut management projects were spread throughout the department. The effort and resources required to train communities in timber management and ensure their access to markets, however, resulted in fewer communities receiving this support, and thus patchiness of timber projects near the principal towns of Cobija and Riberalta.

The locations of symbols in Figure 4 represent communities

with 10,000 to 100,000 ha of land. The amount of land within that property dedicated to the thematic focus of the project depended on land characteristics and decisions made by individual community members, which were not measured in this study. Projecting the thematic foci on the entire communal parcel would be misleading, although placing a simple symbol at the communal centre also inadequately represents the potential extent of impact. With a bias toward conservatism, this thematic map is a visualisation of the distribution of attempts to promote forest management activities rather than a confirmation of the land that is being managed for a specific purpose. Additionally, because non-overlapping symbols were used, two or three different symbols near each other likely correspond to the same community.

Understanding the distribution of projects requires understanding the community selection process. In Pando, community members did not commonly seek NGO support for timber and agroforestry projects. Rather, NGOs actively pursued communities that were willing to participate in their funded projects. This was less true for government and cooperative projects, however. To obtain the Prefect's support for writing a forest management plan, or to join a Brazil nut cooperative, *campesinos* frequently travelled to town to make the request. The decision to grant the request, however, was at the discretion of the government or cooperative.

When organisations selected beneficiary communities, they usually started with communities that had been participants in prior projects. As funding opportunities increased, organisations saw an opportunity to work with new communities to fill new project requirements. Several key

criteria were consciously used to maximise their effectiveness: travel costs, having secure land title, having minimal internal community conflicts, and the distribution of other projects focused on the same theme. The first made it feasible to visit communities frequently and efficiently. The latter three contributed to overall success. Without these, time spent with the community could potentially be wasted as no management plan can be approved without legal land titles (and assisting the titling process could easily occupy the project's 3–4 year cycle), existing conflicts could result in difficulty in making communal resource management decisions during the relatively short project cycle, and the presence of another project would needlessly duplicate efforts (discussed further below). Another criterion included expanding, within reason, the organisation's reach across multiple municipalities. As Pando is relatively homogenous in its physical characteristics, organisations never mentioned landscape quality as a criterion for selecting communities.

The criterion of not working where other projects of the same thematic category worked is worthy of further discussion. Though many communities received support from more than one institution, seldom were those institutions focused on the same theme. For example, communities often participated in a Brazil nut cooperative and a timber management project. They rarely, however, worked with two Brazil nut cooperatives, and never with two timber management projects. This division of labour among thematic organisations should not be interpreted as the result of a competitive atmosphere or lack of intra-organisation communication. Though competition did exist among some projects with the same thematic focus, there were

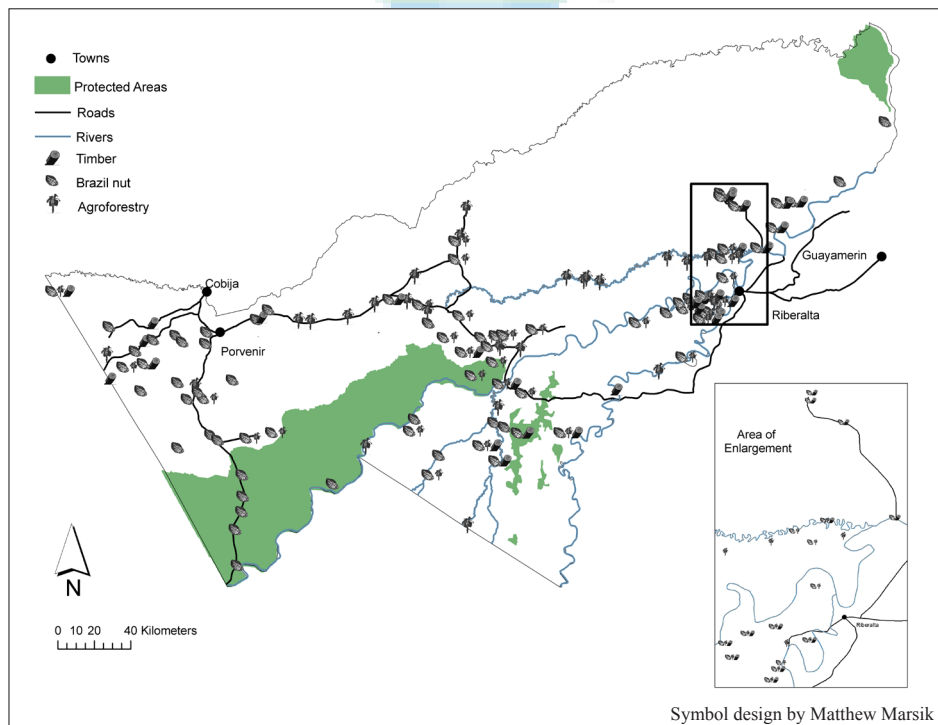


Figure 4
Distribution of capacity-building projects by theme in the department of Pando, Bolivia

also significant collaborations among these organisations. One NGO focused on Brazil nut management plans, Herencia, supported the founding of a Brazil nut cooperative, ACERM, and held a workshop to determine how the cooperative and NGO could collaborate with another Brazil nut cooperative, COINACAPA. Two NGOs focused on timber and Brazil nut management plans, Herencia and IPHAE, joined a consortium to work on a single project, PROMAB, from 2005 to 2009. Puma, a federal project to provide funding for sustainable development, agreed to give priority to communities who received management plan support from the Prefect. And another timber-oriented NGO, FJMP, had arrangements with the Prefect to partially fund the creation of timber management plans while they provided longer-term organisational and technical training. Many of these collaborations were essential for ensuring that communities received the appropriate level of support to succeed in the desired forest management strategy. Thus, the apparently territorial distribution of projects with the same thematic content was more likely related to efficiency.

Capacity-building strategies

While the geographic distribution of projects can indicate potential land-cover implications, the strategies used to work with communities can establish cognitive and social development that enhance the likelihood of adoption and retention of specific forest management activities. Strategies for working with beneficiary communities varied among the types of organisations (Figure 5). Some strategies focused on building specific resource management skills (skill building) whereas others incorporated organisational training and facilitated group decision making to improve communal resource management (communal management). As suggested in the literature, projects that incorporated a greater diversity of community members in the learning and decision-making processes and provided hands-on experiences for participants to practice skills over a longer period of time were considered more participatory than projects that worked with a select group of individuals, used didactic presentations to provide information, and engaged with communities in short meetings. The implementation of participatory methods happened in both skill-building and communal management strategies.

In Pando, capacity-building strategies varied little among specific thematic content. Instead, variation in strategies was more visible between the different types of thematic content. Within skill-building strategies, for example, both Brazil nut and agroforestry projects tended to focus on specific skill building with individual households. Brazil nut cooperatives worked with households to teach the skills necessary for collectively selling a certified fair trade product. An emphasis on the individual was logical because Brazil nut collection occurred along trails allocated to individual households (Cronkleton et al. 2010). The strategies of cooperatives were considered relatively participatory, however, because they worked democratically with all interested households from multiple communities. They made decisions that

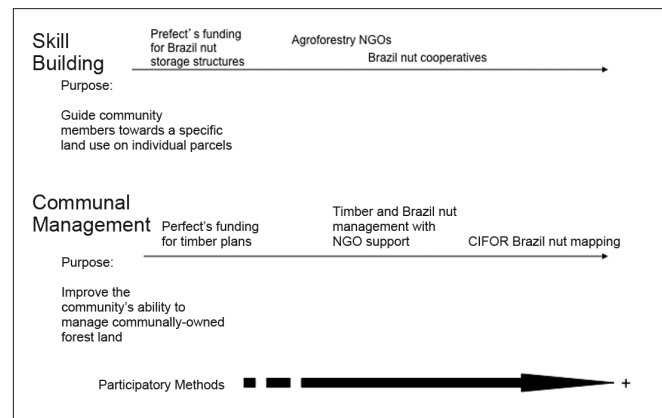


Figure 5
Author-based classification of capacity-building projects for land management in Pando, Bolivia, along a spectrum of participation

balanced the needs of diverse individuals and provided a network of support when cooperative members encountered difficulties. Additionally, members were offered regular hands-on training and various opportunities to participate in regional and international field exchanges over the course of their membership. Agroforestry projects were slightly less participatory because they worked entirely individually with households that wanted to learn and practice managing an agroforestry system on their fallow agricultural plot. While the strategy incorporated hands-on training over multiple short-term visits, as well as farmer-to-farmer regional exchanges, interactions were primarily one-on-one between the farmer and extension agent and decisions were made at an individual household level. The least participatory strategy within skill building was the funding provided by the Prefect to build Brazil nut storage structures. This project incorporated almost no training, required few interactions between extension agents and community members, and had no emphasis on communal decision making. It was considered skill building, however, because it had a set technical goal of building storage facilities near individual Brazil nut trails.

Communal management strategies were primarily implemented by projects attempting to develop communal resource management plans. Projects that focused on timber and Brazil nut plans concentrated efforts on the entire community because these plans, by law, required signatures from every community member before obtaining federal approval. The management plans did not require that everyone in the community engage in identical activities, but that everyone agreed to the community's overall plan. CIFOR's Brazil nut mapping project was the most participatory example in this category. Every member of CIFOR's beneficiary communities was invited for training in mapping techniques that included cartography, the use of GPS and GIS, and tree census techniques. Over the course of many months, community members identified and georeferenced all Brazil nut trees within the communal landholdings and indicated user rights over each tree with a unique coloured dot per family (Cronkleton et al. 2010). CIFOR extension agents lived and

worked with community members to assist with technical details and address conflicts over who had rights to which trees and how the region's new land delineations affected tree distribution between neighbouring communities.

Timber and Brazil nut projects with NGOs other than CIFOR were slightly less intensive in the amount of time they engaged with communities and the amount of effort they placed in communal training, decision making, and conflict resolution. They did, however, work intensively with subgroups from each community to build technical, organisational, and administrative skills, and facilitate decision making that would reflect the interests of the entire community. The majority of timber and Brazil nut management projects initiated their relationships with communities through a participatory intake session in which community members shared their current situation and future needs. They moved into prioritising those needs and setting a timeline with methods for meeting the goals. Finally, the sessions intended to meet those goals were conducted in such a way that community members could determine their own course of action or practice skills acquired from the extension agent, depending on the topic.

Each community working on timber management selected a committee of community members to be in charge of the management process and communicate directly with the NGO. While these committees were in concept open to everyone, participating households were often the local elite and historical leaders. Projects working with Brazil nut management also formed in-community work groups. The interactions between NGOs and the work groups were often extensive, requiring days to weeks of interaction at a time, and committee members were openly accepted and expected to make frequent visits to the NGO's office to make use of office supplies and information. The inclusion of communal stakeholders within communal management projects varied, however, sometimes the result of a programme's methods, but more often the result of internal communal dynamics and the relationships between communal leaders and extension agents. This variation in inclusion provides a potential factor that could effect long-term implementation and effectiveness of communal forest management practices.

As with the skill-building category, the Prefect's project to fund timber management plans included very little involvement of community members. Rather, it provided funding and technical support for external technicians to develop management plans that would then be signed by all community members. This lack of attention to behaviour change strategies, in addition to the obvious obstacle of running out of funding before completion, made the Prefect's projects unlikely to lead to any long-term land management.

USING THE FRAMEWORK TO ANALYSE LONG-TERM FOREST COVER CHANGES

The framework as applied to Pando shows that both technical training and communal management strategies were prevalent for promoting agroforestry, Brazil nut, and timber management.

A few projects used participatory techniques that are predicted to result in behaviour change, and if effective could lead to land-cover change. Because of the recent implementation of these projects, however, it is not likely that we will see land-cover implications for many years. Nonetheless, this baseline information provides the requisite data for testing whether and under what conditions capacity building for natural resource management can support the maintenance of forest cover in Pando.

With the framework's wealth of information about the development, distribution, and strategies of capacity-building projects in a region, we can test several hypotheses about how capacity building may play a role in detected forest cover changes in the future. Continuing with Pando as an example, we can hypothesise that communities with extensive involvement in Brazil nut projects may experience fewer changes in forest cover than communities less involved in Brazil nut projects, based on our knowledge that Brazil nut management requires large tracts of forests. If this hypothesis is true, we can also explore the role of the various project strategies. If we assume that Brazil nut projects with more participatory strategies are more likely to be successful at influencing the attitudes and land-use behaviours of community members, then we can hypothesise that CIFOR's communities that were trained and empowered to make communal decisions about resource management will experience even fewer forest cover changes than communities where only a subset of individuals participated in Brazil nut cooperatives. As the framework explains, however, this must all be examined within a context that considers the internal communal dynamics, the history of Brazil nut markets, government policies, and other external factors that could differentially impact individual communities.

Similarly, agroforestry projects could have a distinct effect on landscapes, resulting in patches of fields converted to mixed agricultural forests or mature forests converted to agroforestry lands—both of which could be detected with land cover change analyses. Using the framework, we can hypothesise that communities receiving support for agroforestry projects may have the most land converted to agroforestry over time. We can also hypothesise that this effect, when present, varies based on the strategies used by different projects. Extension agents that work with many community members, facilitate information exchange, maintain continual contact, and regularly provide seeds, for example, could improve the technical knowledge of community members and enable the diffusion of agroforestry practices throughout the community. This may result in greater adoption and maintenance of agroforestry activities, as compared to communities where only a few individuals participate in relatively sporadic capacity-building activities. Thus, using the framework, we may find that specific capacity-building components are more important than others for enabling agroforestry adoption over time. Paying close attention to additional external variables, however, will ensure that we don't falsely attribute changes to projects when, for example, economic factors play an even greater role.

Because humans learn through examples of success, we might also predict that nearby communities or communities somehow connected to a successful land management scheme would soon adopt similar practices as well. We might thus see a diffusion of land management practices beyond the initial project locations. We could also use the framework to explore contexts where forest cover is lost. We might hypothesise that where capacity-building projects did not exist, or where strategies were weak, we would see land-cover changes similar to the growing trend of the southwestern Amazonian: large pastures for cattle ranching and agricultural production.

SHORT-TERM LESSONS FROM APPLYING THE FRAMEWORK

Field observations and interviews with programme directors, field agents, and community members made it apparent that the ability of this framework to incorporate the factors necessary to test these hypotheses was significant, but potentially skewed in Pando. At the time of data collection, capacity-building projects were widespread and critical for linking community members to external knowledge and markets for natural resource management. At the same time, however, many believed that the factors most likely to have a long-term effect on land-use decisions were external economic forces such as the fluctuating Brazil nut market, national and international demand for beef and the relative security provided from cattle ranching, and trade agreements that affected Bolivian and neighbouring country policies for promoting commercial activities. Pando is extremely dynamic, and rapid changes in the forestry sector, integration into international markets, and the roles and approaches of outside organisations in supporting communal resource management are likely to be important factors in forest cover changes. Brazil nut extraction, agroforestry, and communal timber management have become the focus of community-based capacity-building projects largely because funders, agencies, and NGOs consider them the best alternatives to large scale agriculture and cattle ranching. While capacity building is likely a crucial step in promoting these preferred alternative practices, their adoption will also depend on their ability to economically, socially, and cognitively surpass the regional tendency toward cattle ranching and agriculture. In the case of Pando, then, the framework in Figure 1 might be modified to place the external factors in a more central or larger position than the capacity-building projects. But the fact that external factors may be the most important determinants of land-use decisions should not override the exploration of the role capacity-building activities play in future land cover decisions.

Additionally, the hypotheses about the effectiveness of different programmatic strategies to influence forest management practices were found to have merit. Projects that placed minimal emphasis on information sharing, joint planning, and conflict resolution with the larger community often failed, as seen with the government-sponsored programmes for Brazil nut infrastructure and timber plans.

Communities that initially worked with the government timber programme were often unable to follow through with communal timber management unless they received support from an NGO. On the other hand, projects with more dedication to mentoring community members over a long period of time, with frequent interaction, and based on greater communal decision-making were more widely accepted and appeared to solidify the forest management theme as a component of the community's future plans. An example of this includes CIFOR's Brazil nut mapping project in one community that continued the mapping process even after staff no longer lived on site. OCMA and IPHAE succeeded in linking several individuals to markets for cacao, açai, and cupoçu² after providing substantial materials, instruction, and general support in agroforestry. Individuals who were less integrated to these projects eventually relinquished their agroforestry plots to secondary forests, pasture or small-scale agriculture. IPHAE's timber management project had similar success in a community that annually pursued timber extraction after working for over ten years with IPHAE on various topics. In this case, although it was clear that internal communal characteristics such as the leadership's support of IPHAE's efforts played a role in determining the effectiveness of the capacity-building process, it was also expressed that specific factors of the process such as the continual support, training, and open consideration of communal ideas influenced the community to practice and defend communal timber management.

CONCLUSIONS

Internal community characteristics; market forces; and regional, national, and international policies are some of the social influences known to affect forested landscapes (Ostrom 2009). The role of capacity-building initiatives, however, is still minimally understood. This paper suggests that capacity building for natural resource management can have impacts at various scales, from improved knowledge and skills to new resource management behaviours that manifest in physical changes to the landscape. Understanding the relationship between capacity building and landscape change requires establishing baselines and acquiring long-term measurements of land-cover while maintaining a pulse on other regional factors that could account for detected changes. The framework presented in this paper is a promising tool for developing a baseline of information about capacity-building projects to test the hypotheses that observed land-cover changes are related to the presence of capacity-building projects and their educational strategies. Because the capacity-building projects were only recently implemented in Pando, testing these hypotheses was beyond the scope of this study. Future empirical studies should use multi-variate models to test if, and under what conditions, capacity building for natural resource management influences cognitive development, technical and organisational skills, forest management behaviours, and land-cover change over time.

In addition to the theoretical implications of the framework, an analysis of the thematic content, spatial distribution, and

actual strategies employed by capacity-building initiatives is crucial for project accountability. The framework produces a broad contextual description of capacity-building projects and, when tested over time, may elucidate the role of capacity building in achieving forest conservation objectives. Such information is essential for improving existing projects, justifying future initiatives, and informing future policies so as to better achieve conservation and development goals.

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Notes

1. The term *campesino* refers to rural peasants, often of mixed races.
2. *Theobroma grandiflorum*, related to cacao and used for food, sweets, timber, and beauty products.

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