

**Whose Support Matters Most?**  
**Self-Governance of Forests and External Actors**

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## **Whose Support Matters Most?**

### **Self-Governance of Forests and the Role of External Actors**

#### **ABSTRACT**

This paper investigates the role of external organizations in supporting local communities to govern their natural resources. I challenge the idea that any particular type of organization would always be best positioned to support rural communities and argue that effective institutional support can come from any organization whose support can reduce uncertainty for local people's decisions about the resource. Analyzing original survey data from a nationally representative sample of 200 rural communities in Bolivia—the first of its kind—I assess the prevalence of community self-governance of forest resources test the extent to which community relationships with four different types of external organizations affect the existence of different forms community self-governance. Contrary to conventional wisdom--which states that non-governmental organizations are more important community partners in countries where state actors have low capacity--I find that community relationships with non-governmental organizations have no discernible effect on propensity for community self-governance in Bolivia. The external relationships that matter the most for Bolivian communities' aspirations to self-govern their forests are those with local governments. I attribute these results to the particular institutional context of the Bolivian forestry sector and the incentives that this context generates for local resource groups' associational choices.

**KEYWORDS:** Bolivia, Self-Governance, Forests, Community-based natural resources management, Local Government, Non-Governmental Organizations.

## INTRODUCTION

International and national forestry policies and their apparent failure to curb tropical deforestation calls into question the effectiveness of state-centered approaches to forest governance. Critics of centralized command-and-control regulation of forestlands—such as the expansion of protected areas and the introduction of logging bans, individual privatization schemes, and centralized subsidy programs—claim that such approaches have not only failed to protect forests but have in some cases also marginalized people whose livelihoods depend on forests (Brockington, 2002; Covey, 1995; RRI, 2009). An increasing number of analysts and practitioners agree that the problem with the traditional centralized approach to forest governance is its lack of attention given to local forest users and their interests, rights, and capabilities related to forest use (Donovan, 1995; Poffenberger, 2001; Phelps et al., 2010).

Seeking to remedy these policy shortcomings, a large number of international and national programs now promote and fund programs that emphasize community-based natural resource management as a strategy for tropical forest conservation. Today, community governance of forests is considered a viable policy alternative to command-and-control regulation and privatization schemes. The new policy initiatives, often labeled community-forestry programs, have prompted a noticeable shift in the tenure of the World's forests: today rural communities control access to more than a fifth of the world's entire forest area (Martin and White, 2002, Sunderlin et al 2008).

The policy shift towards community-based approaches to forest governance is, in part, supported by research on common-property management: One of its key findings is that self-organized community governance can, under some circumstances, avoid a

tragedy of the commons by the implementation, monitoring and enforcement of self-organized rule systems (Ostrom, 1990; Gibson et al 2000; Nagendra and Ostrom, 2007; Agrawal, 2004). Research looking into the factors that make community self-governance more likely to materialize suggest that external actors can play a facilitating role (Ostrom and Nagendra, 2006; Ostrom, 1999; Lubell et al, 2002; Andersson and Ostrom, 2008). A core finding from these studies is that external organizations *can* facilitate the emergence of self-governance institutions by providing several important support functions, such as forums for conflict resolution, organizational learning, and information exchange (Ostrom, 2009). For example, Ostrom and Nagendra (2006: 19225) note that one of the key questions for future research on self-governance of forests is: “what types of policy interventions will help support or create local institutions, supported by higher-level institutions, to protect current forests and encourage positive local forest transitions?”

The actors or organizations that promote community-based approaches to natural resource management face two major uncertainties. First, while it has been shown that local communities *can* self-govern forests resources sustainably (i.e. Ostrom, 1999; Ostrom and Nagendra, 2007; Chhatre and Agrawal, 2009; Chomitz and x, 2009) it is often not known how common it is for communities to self-regulate their forest resource use in a particular region or country. Without such knowledge it is difficult, if not impossible, to assess the degree to which community self-governance represents a viable short-term policy alternative at a regional or national scale. Another unknown for forest policy makers concerns the types of domestic organizations that are suited to support communities’ efforts to self-govern their use of forest resources, be it NGOs, private firms, local, regional or central governments.

As a result of these two uncertainties, it is hard for international donors and national governments to design cost-effective support programs for community-based resource programs. This paper seeks to address these problems by investigating empirically the occurrence of community self-governance of forest resources in Bolivia and how this occurrence is influenced by the relationships with different types of external organizations.

International donors and national governments around the world seem convinced of the positive effects that NGOs have on governance outcomes in forestry. According to OECD data on bilateral aid flows, the proportion of aid in support of forestry that was channeled through NGOs nearly doubled between 2004-2008 (OECD, 2009). Much of the community forestry literature are equally enthusiastic about the superiority of NGOs in facilitating community self-governance, at least compared to formal government organizations in developing countries (i.e. Johnson, 2001; Barry et al 2003; Teter et al 2004; McShane and Wells, 2004; White and Runge, 2005; Suich et al 2008; Child, 2008).

In this paper, I draw on polycentric governance theory to challenge the conventional wisdom of the inherent superiority of NGOs in the facilitation of community governance. I argue that the type of organization that is likely to be most supportive is *any* organization that is able to respond to the communities' specific needs for external support. Depending on the context, this organization may be a non-governmental organization or it may be a central government agency, regional government body, local government administration, or even a private firm.

In the Bolivian context, there are several reasons to believe that the municipal governments are uniquely positioned to provide meaningful self-governance support to

rural communities. I test this argument with data from 200 rural communities in Bolivia and find broad empirical support to reject the notion that NGOs play a more constructive role for community forestry than other organizations. In fact, the empirical analysis detects no systematic effect of NGOs on community self-organization, but finds that rural communities that interact most frequently with local governments are much more likely to self-organize their forest use. This result suggests that local governments, not NGOs, are the most important facilitators of community-governance of forests in Bolivia.

The rest of the paper is structured in the following manner: The next section reviews previous studies that have investigated these questions. I then develop an argument about the expected effects of a variety of different types of external organizations on community self-governance. This hypothesis is then tested in the context of Bolivia's forestry sector. After providing a general background on Bolivia's forestry sector, I describe the methods by which the field-data from 200 rural communities were collected. In section six, I test the hypotheses using multivariate statistical techniques. I close by discussing policy implications and explore prospective questions for future research.

## PREVIOUS RESEARCH

Three recent research findings highlight the importance of community governance of forests. First, most environmental policy analysts and practitioners now agree that a tragedy of the commons may be averted by resource user communities themselves and that community self-governance therefore represents an attractive environmental policy alternative to the more conventional approaches of central government command and

control, and privatization schemes (Ostrom, 1990; Baland and Platteau, 1994; Dietz, Ostrom and Stern, 2003; more). Second, research has shown that when self-organized communities are able to develop their own internal institutional arrangements for regulating, monitoring and enforcing forest use they often outperform governments as well as private firms and individuals in terms of maintaining stable forest resources (Gibson et al, 2000; Wily and Mbaya, 2001; Hayes and Ostrom, 2004; Nagendra and Ostrom, 2007; Agrawal and Chhatre 2006; Chomitz, 2007; Chhatre and Agrawal, 2009; Coleman, 2009).

Finally, research has shown that communities that try to self-organize their resource governance systems are likely to be more successful when supported by external organizations (Ostrom, 1990, 2005; Lubell et al 2002; Andersson, 2004; Andersson and Ostrom, 2008). At the same time, this literature is rather vague about the conditions under which external institutional support is essential for community self-governance.

Theoretical work on community-based approaches often mention the importance of external support for self-governance and offer descriptions of a variety of plausible support functions that external organizations may provide so as to improve the likelihood of successful self-governance (e.g. Ostrom, 1990; Andersson and Ostrom, 2008). While these studies have helped us appreciate the importance of considering the broader institutional context of self-governance--to move us beyond the study of the strictly local or national spheres--they do not offer much guidance when it comes to understanding the factors that affect local group decisions about whom to work with and the extent to which these choices make a difference for local groups' ability to self-organize institutional arrangements for forest governance. Without this knowledge, it is difficult to design more

effective support programs for community-based environmental policies and programs at any level: We need a contextual theory of external institutional support for local self-governance.

## THEORY

This study seeks to contribute to new knowledge about how the local political context affects local group's preferences for external organizational support. I argue that in places where natural resource use is subject to great uncertainty--where formal property rights are frequently contested and the judicial process is highly politicized--it is rational for resource user groups to be risk-averse and discriminating in their associational choices. I propose that before investing in relationships with any external organizations local resource groups will carefully consider their perceptions of : (1) Relevance (2) Credibility of commitments, and (3) assurance of recourse.

- (1) **Relevance** is the local group's assessment of the degree to which any given organization's mandate, expertise, and staff apply to the need of the local group. What functions is the organization actually performing? How do the community members perceive the organization's capacity to actually help them to address their specific needs?
- (2) **Credibility of commitments** is related to the mobility of potential support organizations. Does a particular organization have a firm and credible commitment to a long-term presence and permanence? Local resource users are likely to assess the likelihood of exit for any potential partner or support organization. In this assessment several factors are likely to be considered, such as

the external organization's reputation, its record of helping other communities with similar needs.

- (3) **Assurance of recourse** refers to the degree to which local resource users have rights to appeal or even veto decisions that directly affect them. When things don't go as planned--are there mechanisms and resources in place in the partnership that can help to make things right? Local groups' perception of the likelihood that such corrective measures are plausible in the relationship, is likely to affect the group's choice of external support organization.

My proposed logic of associational choice would suggest that organizations that are stable, both spatially and temporally, have a relevant mandate for community forestry, and can credibly commit to assure recourse, are more likely to be perceived by local groups to be trustworthy partners. In any given context, there may not be many organizations that fit this bill. Central and regional government agencies may be stable but often lack credibility in their commitment to the community's cause, and their mandates to do so are often unfunded (Barry et al, 2003; Larson et al, 2009). Non-governmental organizations are highly mobile, are often more accountable to donors than target groups, and tend to select communities with high success rates so as to increase likelihood of continued funding from external donors (Burgera and Owensb, 2010; Gibson et al 2005). And although democratically elected local governments are often viewed as relatively stable and responsive to local demands, recent research has pointed out highly variable performance for natural resource governance among local governments (Ribot, 2004; Andersson et al 2009). Hence, we should not expect that

community relationships with any particular type of organization is inherently superior to its alternatives. The community's choice of whom to associate with seems highly dependent on the contextual needs of the local resource users and the availability of organizations that can match those needs with appropriate support functions. Risk-averse local groups will carefully consider at least these three evaluative criteria as they assess their associational options.

In the context of Bolivia's forestry sector, however, one would expect a general pattern to exist in local communities associational choices. There are several reasons to expect *local governments* to represent the actor that can offer most communities the most effective support to govern their forest resources. First, the particular mandate and associated resources given to municipal governments in the area of community forestry give them relevance and even though their capacity to local problem solving may be highly variable, it is often the best available option for rural communities because of their universal presence throughout the country. Second, the formal institutional structure of local government administration in Bolivia, which includes provisions for social control in planning and budget allocations, increases transparency and adds credibility to the formal commitment to respond to local needs.

Finally, municipal governments enjoy a comparative advantage when it comes to recourse assurance vis-a-vis many other organizations, especially non-governmental organizations because of their legal obligations to have permanent physical presence in their jurisdiction and to serve all people within their jurisdictions. NGOs do not have the same obligations and have more flexibility when it comes to selecting where to work and what to do. If municipal governments fail to live up to their legal obligations, central

governmental authorities and the judiciary can make them comply. This knowledge may give local communities in Bolivia more confidence that collaborating with municipal governments is less risky than the available alternatives. Hence, I hypothesize that community relationships with municipal governments are likely to be most supportive of community self-governance of forests. I proceed to test this hypothesis in a sample of 200 local communities in Bolivia.

## **Data and Methods**

I chose to study the role of external institutional support on community governance in Bolivia's forestry sector for three reasons. First, Bolivian society is in the middle of a political transition, in which political and economic volatility is quite high. External organizations are likely to be especially important for self-governance in this environment of uncertainty. Second, a large variety of organizations work directly with rural communities in Bolivia, including central, regional and local government agencies, as well as international and national non-governmental organizations. Since Bolivia's forestry sector also has one of the most decentralized governance structures in the region, local governments have a formal mandate to work with rural communities' forestry activities. This means that one would expect a great deal of interactions between rural communities and a variety of different types of external organizations. Finally, Bolivia's government is currently developing a new community forestry policy at the National level, and this study seeks to inform the ongoing policy debate about the design of this new policy.

The data used to investigate the extent of community self-governance of forests and to test some of its institutional determinants were collected in a representative sample

of 200 road-accessible rural communities in Bolivia.<sup>1</sup> In each selected community, an experienced field team consisting of Bolivian social science researchers conducted a one-day workshop in which a series of issues related to local people's forest use were discussed. These discussions generated data on approximately 150 variables related to local communities' relationships with both forests and external governance actors.

### **Prevalence of Community Forest Self Governance in Bolivia**

As outcomes, I employ five binary variables that reflect whether communities have self-organized parts of or entire governance system related to local forest resources:

- (1) *Self-organized rule systems*: This variable measures the existence of autochthonous rules concerning (i) the type of forest use that is permitted; (ii) the quantity any local resident may harvest, or (iii) the specific location where harvesting may take place.
- (2) *Self-organized monitoring and enforcement activities*: The second dependent variable describes whether a community organizes its own monitoring and enforcement activities, and
- (3) *Self-organized sanctioning activities*: This variable indicates whether the community has its own system of sanctions that it imposes on individuals who violate any rules (regardless of origin) of forest use.

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<sup>1</sup> This was a two-stage sampling process. In the first stage of the process, I randomly selected 100 out of the country's 327 municipal territories. In each municipality, I first removed all urban communities and those rural communities that were located more than 50 kilometers from a major road or river (for accessibility and cost reasons). From the list of remaining rural communities, I randomly selected two communities in each of the 100 municipalities, ending up with a sample of 200 rural communities. To test the representativeness of this sample, I compared the mean values for several variables in the sample with variable means for all rural communities in the census. I found no statistically significant differences on these variables between the sample and the population of rural communities in Bolivia.

- (4) *All functions*: This variable was calculated by adding the values of the first three outcome variables for each observation and then assigning a value of 1 to observations that represented communities where all three functions had been collectively organized by the community, and a value of 0 to all others.
- (5) *Any function*: If a given community had self-organized at least one of the three governance functions, a value of 1 was assigned, if not 0.

The distribution of the three binary variables is presented in Figure 1 below. We find that more than half of all road-accessible, rural communities in Bolivia (53 percent) claim to have self-organized either rule-making, monitoring and enforcement, or sanctioning activities related to their use of forests. Only eight percent, however, have self-organized all three of these core governance activities. These figures represent, as far as the author can tell, the first estimate of the national prevalence of community self-governance of forest resources for any country in the world.

*[Figure 1 about here]*

The observed variation in the rate of community self-governance invites for empirical testing of the relationship between organizational support offered by a variety of external organizations and the likelihood of community self-governance. With the help of multivariate regression techniques, I proceed to test the importance of these relationships for community self-governance of forests.

To test the hypothesis that rural communities' relationships with local governments play a positive role in supporting forest self-governance activities, I construct an econometric model and regress the five different outcome variables on four

independent variables that measure the importance that each community places on their relationships with four different external actors, as well as seven control variables. The definitions and descriptive statistics for each of all variables used in the subsequent empirical tests are presented in table A1 in the Annex (possible online supplement).

## **Results**

The results are statistically robust as indicated by the outcome of standard diagnostic tests for logistic regression, as presented in the appendix/on-line supplement. The results broadly support the idea that local resource user groups seek to reduce uncertainty and risk associated with their forest governance decisions and that these objectives are important in local groups' choice of partner organizations. The results of the five binary logistic regression models, presented in Table 1, suggest that the prevalence of self-organized community governance of forest resources in Bolivia is systematically associated with the local groups' perceptions of the role played by municipal governments. In fact, the relationship with municipal governments is the only external relationship that has a statistically significant effect on the probability that any given community will have developed institutions for self-governance of forest resources. The results reject the idea that NGOs or governmental agents at regional or central levels are instrumental facilitators of community self-governance.

*[Table 1 about here]*

The positive effect of local importance placed on municipal government relationships is consistent across all five alternative measures of self governance. The magnitude of the influence of municipal interactions is consistently large across all five models, as shown by Figure 2. For example, holding all other variables constant at

their means, and moving from the lowest level of Importance of municipal interactions to its highest value, the probability a community will have developed their own rules to regulate forest use increase by 24 percent, and similarly, the probability it will actively monitor and enforce those rules increase by 30 percent.

I interpret these general patterns as a direct consequence of the institutional context of the Bolivian forestry sector. In this context, municipal governments constitute the most important functional support structure generally accessible to most self-organized forest user groups. It is part of the official mandate of municipal governments to assist communities in managing their forests and, as such, they often represent the only resource for communities that may need help in terms of technical expertise, legal protection and back-up, administrative assistance in acquiring harvesting permits, or a hand in the implementation of larger community actions.

Contrary to conventional wisdom, the analysis detects no significant impact of the NGO relationships on self-organized forest institutions. Although NGOS were present in all the 200 municipalities, their activities do not seem to matter as much for the self-organization of resource groups forestry activities. One explanation to this lack of statistically significant effects is that NGOs often choose to target specific communities and many communities in need may not benefit. In a similar fashion, the prefecture and central government representatives have representatives in all municipalities, but they often lack the human resources to engage directly with all communities that solicit their support. They are forced to be selective in the communities that they do decide to assist. Municipal governments, on average, appear to be the most widely supportive organization for Bolivian communities and their forestry-related governance activities.

## Conclusion

Although many scholars have expressed considerable skepticism towards the idea that governmental organizations are able to play a supportive role of self-governance in developing countries, the analysis here shows that these organizations' support can indeed be critical. Bolivian municipalities are uniquely positioned to provide self-governance support functions.

At the same time, the findings here demonstrate the need to look beyond the formal typology of organizations in order to understand the role of external actors in local self governance of forests. There is a reason that municipal government relationships matter most in the Bolivian context and it is important for scholars to be explicit about the ways in which any relationship may matter for self-governance. In this sense, what really seems to matter is the extent to which an organization is perceived by resource users as being relevant, credible, and providing assurances for recourse. The analysis provides robust evidence that, in the case of community forestry in Bolivia, municipal governments meet these criteria better than non-governmental organizations as well as regional and central government agencies. Applying the same logic to countries with different institutional contexts may, indeed, find that other relationships are most supportive of self-governance.

The main finding of the paper—that local users' relationship with local government representatives increase the likelihood of a community developing their own forest governance institutions—have implications for current efforts to promote community forestry in Bolivia. The new government programs, which constitute a central

pillar of Bolivia's forestry policy, would benefit from explicitly considering a more elaborate formal role for the country's municipal governments, especially in the rural areas where they are often the only organization that is generally accessible to local residents.

The surprising result that the importance placed on relationships with NGOs does not affect the prospects of community self-governance does not mean that municipal governments are always better or more effective than NGOs in facilitating community self-organization. The results are likely to be related to the fact that municipal governments are uniquely positioned and enjoy a structural advantage relative to other organizations because of their universal presence throughout the country, their relative geographical proximity to rural communities, and their all-inclusive mandate. They are also obliged by law to support communities who ask for their assistance in forest management.

This is hard to compete with for NGOs or any other organizations. NGOs can be more selective in their associational choices and are not constrained by the same formalities. Hence the institutional incentives to serve local user groups are fundamentally different for municipal governments and NGOs respectively. Forest user groups in Bolivia seem to perceive these differences very clearly.

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**Table 1:** Binary logistic regression results

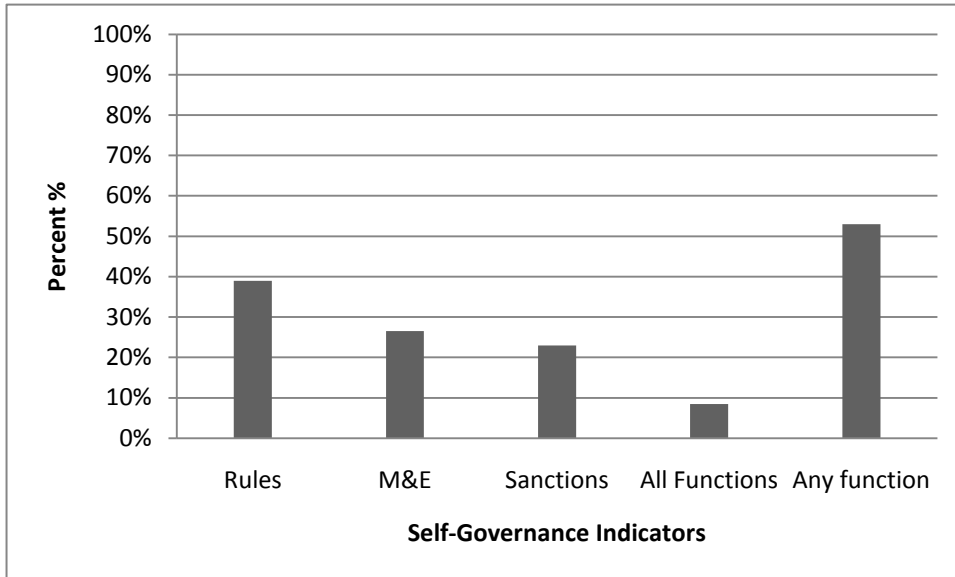
<i>Independent Variables</i>	<i>1: Rules</i>	<i>2: M&amp;E</i>	<i>3: Sanctions</i>	<i>4: All</i>	<i>5: Any</i>
<u>Organizational Support</u>					
NGO Importance	0.03 (0.14)	0.10 (0.15)	0.12 (0.15)	-0.18 (0.28)	0.13 (0.13)
Centr Gov Import.	-0.39 (0.25)	0.20 (0.24)	0.18 (0.24)	0.15 (0.38)	0.06 (0.22)
Reg Gov Import.	-0.14 (0.22)	0.15 (0.21)	-0.03 (0.23)	-0.19 (0.36)	-0.02 (0.20)
Muni Gov Import.	0.64 (0.15)***	0.42 (0.15)***	0.27 (0.15)*	0.92 (0.27)***	0.43 (0.14)***
<u>Controls</u>					
Forested land	0.03 0.07)***	0.15 (0.07)**	0.15 (0.07)**	0.17 (0.13)	0.07 (0.07)
Dist. to Clinic	0.06 (0.02)***	0.02 (0.02)	-0.05 (0.03)*	-0.10 (0.06)*	0.05 (0.02)**
Number of NGOs	-0.01 (0.02)	0.02 (0.03)	-0.01 (0.03)	0.05 (0.04)	-0.00 (0.02)
Population	-0.12 (0.17)	-0.10(0.20)	-0.45 (0.20)**	-0.66 (0.38)*	-0.09 (0.16)
Indigenous pop	0.02 (0.01)***	0.00 (0.01)	-0.00 (0.01)	0.02 (0.01)**	0.01 (0.01)
Wealth inequality	0.06 (0.07)	-0.25(0.09)***	-0.05 (0.08)	-0.30 (0.14)**	-0.02 (0.07)
Property rights	-0.50 (0.34)	-0.29(0.38)	-0.06 (0.37)	-0.07 (0.63)	-0.57 (0.32)*
Constant	-1.07 (1.00)	-0.92(1.13)	0.66 (1.10)	0.04 (1.93)	-0.18 (0.95)
Observations	200	200	200	200	200
LR chi2(12)	50.69	41.44	20.71	35.56	34.05
Prob > chi2	0.00	0.00	0.04	0.00	0.00
Pseudo R2	0.19	0.18	0.10	0.31	0.13

\* Significant at the 90-percent level

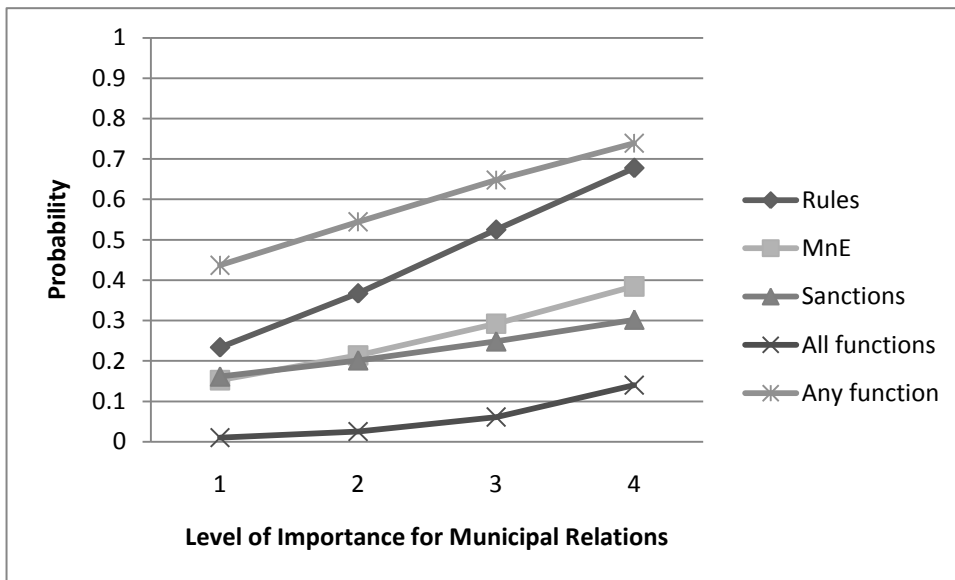
\*\* Significant at the 95-percent level

\*\*\* Significant at the 99-percent level

**Figure 1:** Distribution of Dependent Variables



**Figure 2:** Predicted Probabilities of Self Governance as a function of Community relationship with Municipal Governments



## **Annex 1 (for possible on-line supplement)**

### **Background: Community Forestry in Bolivia**

Like other rural populations throughout Latin America, rural communities in Bolivia rely on forests to satisfy many essential subsistence needs. Forests provide products such as fuelwood, fruits, nuts, fibers, medicinal plants, and wood for construction. According to the 2001 national census, 41.7 per cent of the country's entire population—rural and urban—rely on firewood as their primary source of energy for cooking (Government of Bolivia, 2002). Smallholder agricultural production constitutes a very important part of agricultural activities in Bolivia's total agricultural production, more so than in any other country in Latin America (FAO 1988).

Through the 1996 forestry law, the commercial extraction of forest resources became a possible source of income for all Bolivian communities. While timber extraction is often mentioned as the most significant income-enhancing activity, the law also provides for the possibility to acquire alienation rights for a variety of other, non-timber forest products such as nuts, grasses, and mushrooms. In an increasingly specialized market economy, rural settlers need cash to acquire many essential household items, such as food, farming equipment, healthcare, and school fees. Unlike household consumption, however, the commercial extraction of forest resources requires the forest users to comply with a large number of government regulations. The problem for many smallholder farmers in the Bolivia is that it can be both costly and complicated to obtain the necessary government permits. Recent government initiatives seek to overcome these hurdles to community-based forest governance through the promotion of community forestry that directly target rural communities.

In 2008, the Government of Bolivia introduced a new community forestry program that seeks to provide direct financial and technical support for forest management activities from central government ministries and agencies to rural communities. The details of how such a program will work in practice are still being worked out by the central government. For example, it is not the intended roles are for NGOs, local governments, and other agencies in the new program. The empirical analysis in the paper seeks to shed light on the importance of these relationships.

The new policy and its stated objective of empowering local communities to govern forests raises the question as to which actors are the most important for communities as they try to create the institutional arrangements for governing their forest commons. To answer this question I asked the forest users themselves about which external actors they find to be most supportive of their decision making regarding forests that they access and use. This question was left open ended so that respondents would not feel prompted to limit their answers to predefined categories of interest to the researchers. The answers to the open ended questions were coded ex-post into the four types of organizations that represent the main independent variables of interest.

## **Data: Independent Variables**

*NGO importance:* An ordinal variable 0-3 that is derived from an open ended question that asked respondents to list the three organizations that they consider to be the most important for their use of forest resource. If the respondent listed an NGO as the most important external organization, a 3 was assigned, if no NGOs made the top three, a value of 0 was assigned to the variable. For all the variables that describe the relative importance of different external relationships, I predict that the more frequent the encounters, the higher the likelihood of observing self-organized governance activities. I support this prediction with findings from literature on polycentric governance that states that more connected communities tend to be more effective problem-solvers.

*Central government importance:* An ordinal variable (0-3) that was constructed in exactly the same way as NGO importance that gauges the importance of central government agencies organizations and projects.

*Regional Government Importance:* The level of importance of regional government relationships (0-3).

*Municipal government importance:* An ordinal variable (0-3) that denotes how important the local government relationship is for a local resource user group's efforts to self-govern their forest use.

*Forested land (%):* We asked respondents what proportion of their community's land is currently covered by forest. We predict that the less forest cover a community has, the more likely it is to engage in self-governance activities to protect the little forest they have.

*Distance to Health Center:* We asked respondents about the distance (in km) to the nearest clinic. We predict that this variable, which is a proxy for infrastructure development, is negatively correlated with self-governance activities because residents of communities that enjoy better infrastructure are less likely to be economically dependent on forest resources (less salience of forest for subsistence).

*Population:* We asked local community members about the current population count as well as the corresponding figures for ten years ago. Based on these self-reported figures we calculated the ten-year population growth rate. We predict that places with high growth rates are more likely to self-organize forest governance because of the increased pressure on the forest resources.

*Wealth difference:* In one of our final questions, we asked community members who attended our one-day workshop about how they would characterize disparities of wealth within their community. We asked them to think about community members' individual land holdings and assign a number from 1-10 to describe the intra-community differences. Our prediction is that the higher the perceived wealth disparities, the more difficult it is for the community to collaborate and to agree on institutional arrangements to regulate forest use.

*Formal title:* In Bolivia all communities are going through a national program for land titling. We asked community members at what stage in this process they were. If they had had the initial study concluded we assigned a value of 1, if they had already received their title, we assigned a 2.

*Table A1: Variable definitions and descriptive statistics (n=200)*

<i>Variable</i>	<i>Description</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>Min</i>	<i>Max</i>
<b>Rules (1)</b>	Community has created some of their own rules for use of forest resources	0.39	0.49	0	1
<b>M&amp;E (2)</b>	Community organizes regular community monitoring of resource use	0.27	0.44	0	1
<b>Sanction (3)</b>	Community applies its own sanctions to punish violators of resource rules	0.23	0.42	0	1
<b>Any function (1,2, or 3)</b>	Community self-organized at least one governance function	0.30	0.33	0	1
<b>All functions (1,2, and 3)</b>	Community completely self-organize all three governance functions	0.08	0.28	0	1
<b>Importance of NGOs</b>	Importance given to relationship with NGOs for forestry activities	0.83	1.25	0	3
<b>Importance of Centr Gov</b>	Importance of relationship with central government for forestry activities	0.26	0.72	0	3
<b>Importance of Reg.Gov</b>	Importance of relationship with regional government for forestry activities	0.35	0.84	0	3
<b>Importance of Mun Gov</b>	Importance of relationship with municipal government for forestry activities	0.99	1.31	0	3
<b>Forested land</b>	Forest area in community logged (ha)	4.34	3.07	-2.30	14.77
<b>Distance health clinic</b>	Distance to health clinic (km)	6.09	9.20	0	65
<b>Total number NGOs</b>	The total number of registered NGOs in the municipality	8.01	7.25	0	47

<b>Total Population</b>	Community population logged	2976	1.00	-2.30	8.52
<b>Indigenous population</b>	Percentage self-identified as lowland indigenous	0.71	29.37	0	100
<b>Wealth difference</b>	The perceived intra-community inequality of wealth (ordinal)	5.25	2.62	1	10
<b>Formal property rights</b>	The degree to which the community has gone through a formalization process of its land property rights (ordinal)	0.57	0.51	0	2

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