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Can Decentralization Save Bolivia's Forests?
An Institutional Analysis of Municipal Forest Governance

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Environmental Change

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CAN DECENTRALIZATION SAVE BOLIVIA'S FORESTS?
AN INSTITUTIONAL ANALYSIS OF MUNICIPAL FOREST GOVERNANCE

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To my parents, Jan and Gullvi Andersson

TABLE OF CONTENTS

<i>Acknowledgments</i>	<i>xi</i>
<i>Abstract</i>	<i>xiii</i>

CHAPTER 1

Has decentralization improved the conditions for good governance of Bolivia's forests?

1. Introduction	1
1.1. Why Bolivia?	3
1.2. Structure of the Study	4
2. A Historical Perspective of Forest Governance in Bolivia	7
3. Contextual Factors Influencing Forest Governance in Bolivia	8
3.1. Biophysical Characteristics	9
3.2. Forest User Attributes	11
3.3. Institutional Aspects of Forest Use in the Bolivian Lowlands	15
3.3.1. Centralist Government and Political Instability	15
3.3.2. The Cultural Legacy of Agricultural Bias	16
3.3.3. The Collapse of Centralized, Coercive Governance	17
3.3.4. The Second-Generation Reforms	18
4. Open-Access Common-Pool Resource Problems in Forestry	20
4.1. What is the role of governmental authorities in solving CPR problems?	22
4.2. Can Bolivian forest users self-regulate the open-access regime?	23
4.2.1. Forest Tenure Security As a Collective Good	23
5. Conclusion	26

CHAPTER 2

Is the municipal mandate in Bolivia's forestry regime conducive for local problem solving?

1. Introduction	27
2. Background: Municipal Governance of Civic Affairs	29
3. Forest Governance in Bolivia: The Old and New Regimes	32
3.1. Short-Term Forest Concessions	33
3.2. Uncertain Property Rights	33
3.3. Volume-Based Logging Fees	33
3.4. Inequitable Distribution of Benefits	34
3.5. Weak Enforcement Mechanisms	34
3.6. Weak Incentives for Sustainable Practices	34
3.7. Political Manipulation of Sector Decisions	35
4. Decentralization of Forestry-Sector Competencies	35
4.1. The New Regime Actors and Their Powers	37
4.2. The Municipal Mandate	37
4.3. Financial Means to Perform	37
5. Is the municipal mandate conducive for collective-action facilitation?	41
6. Municipal Governments' Competence Related to Tenure	42
6.1. The Possibilities of the Decentralization Reforms	43
6.1.1. Leading the Participatory Planning Process	44
6.1.2. Facilitating Conflict Resolution	45
6.1.3. Creating Municipal Forest Reserves	45
6.1.4. Assisting User Groups with Management Plans	45

6.1.5. Inspecting Forestry Operations	46
6.1.6. Assisting Users to Deal with Bureaucracies	46
6.1.7. Carrying Out Technical Assessment for Land Clearings	46
6.1.8. Creating and Maintaining Urban and Rural Property Cadastres	47
6.1.9. Disseminating Information	47
7. Conclusions	48

CHAPTER 3

Under what conditions can municipal forest governance succeed?

1. Introduction	50
2. Institutional Analysis of Municipal Forest Governance	52
2.1. Using the IAD Framework to Specify Hypotheses	52
2.2. Defining the Desirable Outcomes	54
2.3. Barriers to Desirable Outcomes: Motivational and Informational Problems	56
3. Dealing with Motivational Problems in Municipal Forest Governance	57
3.1. Potential Financial Gains	58
3.2. Central Government Pressure	59
3.3. Constituent Demands	59
3.4. Interest Groups	60
4. Creating Accountability Mechanisms to Address Motivational Problems	60
5. Dealing with Informational Problems inside Municipal Governments	62
5.1. Learning about Local Context	64
5.2. Conditions Conducive for Learning	65
6. Designing the Empirical Inquiry	67
6.1. Research Design and Hypotheses	67
6.2. Hypotheses	68
7. Field Methods	70
8. Conclusion	72

CHAPTER 4

What motivates municipal governments? Uncovering the Institutional Incentives for Municipal Governance of Forest Resources

1. Introduction	73
2. Background	74
3. The Conditions for Successful Municipal Governance of Forests	76
4. Motivation Problems in Municipal Governance	79
5. The Approach of the Empirical Inquiry	79
5.1. Is the random sample representative?	80
5.2. The Dependent Variable	81
5.3. The Independent Variables	82
5.4. Analytical Methods	84
6. Are municipalities motivated to provide forestry-related services?	84
6.1. Central Government Funding	84
6.2. Central Government Coercion	86
6.3. Demands from NGOs and Externally Funded Projects	87
6.4. Demands from the Electorate	87
7. Conclusion	88

CHAPTER 5
Explaining the Mixed Success of Municipal Governance of Forest Resources:
Overcoming Local Information Barriers

1. Introduction	89
2. Background	90
3. Informational Problems	91
3.1. Information about the Performance of Public Officials	92
3.2. Information about the Local Circumstances	93
3.3. Information about What Other Organizations Are Doing and Learning	93
4. Empirical Analysis	94
4.1. Dependent Variable	94
4.2. Independent Variables	94
4.2.1. Conditions for Downward Accountability	95
4.2.2. Conditions for Municipal Staff to Learn about Local Conditions	95
4.2.3. The Conditions for Coordination and Horizontal Learning	96
5. Empirical Methods	97
6. Empirical Findings: Explaining Successful Municipal Governance	98
6.1 The Conditions for Holding Municipal Officials Accountable	98
6.2 The Conditions for Learning about Local Circumstances	99
6.3 The Conditions for Inter-Organizational Coordination	100
7. Discussion of Findings	101
8. Conclusion	103

CHAPTER 6
Can the new regime of formal property rights make forest management a more attractive
land-use option for rural smallholders?

1. Introduction	104
1.1. Structure of the Chapter	106
1.2. Definitions	107
2. Background	107
2.1. Empirical Evidence of Forest Tenure Insecurity	109
3. Property Rights and Incentives for Forest Management	111
4. Bolivia's Formal Forest Property Rights Regime	113
4.1. The Main Actors of the New Forest Property Rights Regime	117
5. Incentives, Tenure Security, and Property Rights	119
6. The Empirical Inquiry	123
6.1. Selection of Case Study Sites	123
6.2. Case Study Methods	125
6.3. Results	127
6.3.1. Does the introduction of de jure alienation rights make forest management more profitable?	127
6.3.2. The Significance of Municipal Governance in Smallholders' Land-Use Decision Making	131
6.4. Qualitative Hypothesis Testing	132
7. Conclusions	135

CHAPTER 7
Can decentralization save Bolivia's forests?
Putting Municipal Forest Governance into a Spatially Explicit Perspective

1. Introduction	138
1.1. Structure of the Chapter	141
1.2. Definitions	141
2. Background	141
3. Direct and Underlying Drivers of Deforestation in Bolivia	143
3.1. Direct Drivers in Bolivia	144
3.2. Underlying Drivers in Bolivia	145
3.3. Public Policy As an Underlying Driver to Deforestation	146
3.4. Public Policy As a Solution to Unauthorized Deforestation Problems	147
4. Methods	148
4.1. Dependent Variable	148
4.1.1. Unauthorized Deforestation Index	148
4.2. Independent Variables	152
4.3. Control Variables	153
5. Results	154
6. Discussion of Results	156
7. Conclusions: Can decentralization save Bolivia's forests?	158

CHAPTER 8

Conclusions	161
1. Summary of Main Findings	163
1.1. What motivates municipal governments to take forestry action?	164
1.2. What makes municipal forest governance effective?	165
1.3. Can the decentralized regime make forest management more attractive?	167
1.4. Can good municipal governance produce improved forest conditions?	169
2. Implications of the Study	171
2.1. Implications for Municipal Governance Actors	172
2.2. Implications for National Forestry Policy	173
2.3. Implications for Future Research	174
<i>References Cited</i>	176

FIGURES

Figure 3.1. A Framework for Institutional Analysis	53
Figure 3.2. The Four Interrelated Action Arenas of Municipal Forest Governance	54
Figure 3.3. Casual Mechanisms of the Research Design	69
Figure 4.1. Forestry Service Provision in the Lowlands	81
Figure 4.2. Probabilities of Municipal Provision of Forestry-Related Services under Different Incentive Structures	87
Figure 5.1. Probabilities for Achieving Successful Municipal Governance	99
Figure 6.1. Simplified Causal Flow for Rules, Rights, Incentives, and Outcomes	122
Figure 7.1. Designated Land Areas for Exclusive Forest Use According to the Land-Use Plan for Santa Cruz, Bolivia	149
Figure 7.2: Authorized and Unauthorized Deforestation in Santa Cruz, Bolivia, 1993–2000	151

TABLES

Table 1.1. Land Tenure and Forest Access Rights in the Lowlands	13
Table 1.2. Forest User Group Characteristics	14
Table 1.3. Supportive Tasks for Self-Governance Compared to the Municipalities' Official Mandate	25
Table 2.1. Fiscal Transfers to Rural Municipalities in the Cochabamba	31
Table 2.2. Comparing Old and New Forestry Regimes at the Constitutional Level	36
Table 2.3. Forest Governance Competences after the Decentralization Reforms	38
Table 2.4. Distribution of Government Revenues from Forest Management Activities	39
Table 2.5. Main Formal Competencies of Municipal Governments in the Forestry Sector	40
Table 2.6. Possible Contribution of Municipal Governance to Secure Property Rights for Smallholders	42
Table 3.1. Supportive Municipal Tasks for Self-Governance Compared to the Municipalities' Official Mandate	66
Table 4.1. Formal Municipal Government Mandates in the Forestry Sector According to the 1996 Forestry Law and Subsequent Regulations	75
Table 4.2. Differences of Means Tests for Lowland Municipalities in Bolivia	80
Table 4.3. Survey Results from Lowland Municipalities	85
Table 4.4. Logit Regression Results (n = 50, r ² = .78)	86
Table 5.1. The Effect of Information Sharing by Municipal Governments on Resource Users' Ratings of Municipal Forestry-Sector Services (N=33)	98
Table 6.1. Results on Grassroots Perceptions on Most Serious Obstacles to Better Forestry Practices	109
Table 6.2. Bundles of Rights Associated with Different Types of Property Rights Holders	113
Table 6.3. Typology of de jure Forestry Rights for Rural Smallholders	116
Table 6.4. The New Forest Property Rights Regime's Main Actors, Mandates, and Main Challenges	117

Table 6.5. Main Characteristics of Selected Case Study Sites	125
Table 6.6. Returns for Forest Management with and without Formal Logging Permits	129
Table 6.7. Percentage of Forest Areas under Formal Forest Management Plans for Different Types of Municipalities in the Department of Santa Cruz (n=28)	131
Table 6.8. Comparing Economic Incentives for Smallholders' Land-Use Decision Making	134
Table 7.1. Forest Clearing in Santa Cruz, Bolivia	143
Table 7.2. Annual Areas of Forest Clearing by Type of Agriculture, 1986–1998	145
Table 7.3. Unauthorized Deforestation for 25 Municipalities in Santa Cruz, 1993–2000	152
Table 7.4. The Relationship between Municipal Forest Governance Performance and Unauthorized Deforestation Rates	155

TEXT BOX

Text Box 1.1. Definition and Discussion of Key Concepts Used in the Study	5
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MAPS

Map 1.1. Land Cover in the Bolivian Lowlands (1990s)	10
Map 1.2. Bolivia: Indigenous Territories, Protected Areas, Forestry, and Mining	12

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CAN DECENTRALIZATION SAVE BOLIVIA'S FORESTS? AN INSTITUTIONAL ANALYSIS OF MUNICIPAL FOREST GOVERNANCE

ABSTRACT

Decentralization has become a common policy strategy to address governance failures associated with natural resource management. Several international treaties, for example, point to the advantages of a decentralized government structure for addressing environmental problems. Yet, the scientific understanding of the institutional and environmental effects of decentralization reform remains quite limited in most developing countries. This study raises concerns about the prevalence of a decentralization panacea as it obscures a realistic assessment of the specific institutional arrangements that underpin decentralized governance structures.

The institutional analysis carried out in this study finds that several *institutional* and *socioeconomic* factors are critical determinants of the success of a decentralized governance regime. Drawing on survey data from a representative sample of 50 municipalities as well as in-depth case studies from six forest-dwelling communities in the Bolivian Lowlands, the empirically grounded analysis assesses the influence of each of the hypothesized drivers of successful decentralized governance. The empirical research concludes that the prospects of successful decentralized forest governance in Bolivia rest to a great extent on how the decentralized regime's actors manage to develop institutional arrangements that can effectively overcome *motivational* and *informational* problems of collective action.

Finally, by applying the particular approach and methods of institutional analysis used in this study, monitoring programs can be developed to detect changes, and derive the causes of such changes, in the institutional conditions for decentralized governance. The information generated by such a monitoring program would be useful for the readjustment and fine-tuning of existing policy instruments, if the policy makers who receive the information are motivated to take this information into account when they make the decisions.

CHAPTER 1

Has decentralization improved the conditions for good governance of Bolivia's forests?

1. INTRODUCTION

Decentralization of political authority to municipal governments has become a very common policy strategy for addressing governance problems associated with environmental degradation in developing countries. Many international policy documents, including the United Nations Conference on the Environment and Development (UNCED) agreement signed in Rio de Janeiro in 1992, point to the advantages of a “decentralized government structure” for addressing environmental problems (UN 1992). The Agenda 21 initiative that came out of UNCED emphasizes the potentially positive role of “local authorities” in efforts to reverse processes of ecological degradation (ibid). Despite this almost universal acceptance of the supposed merits of decentralization reform and its extensive proliferation throughout the developing world, there is limited scientific understanding of the institutional and environmental impacts of decentralization reform.

Is decentralization meeting the expectation of a satisfactory policy response to environmental problems in the developing world? The question is important for policy makers and analysts alike because without an understanding of the effects of current and past decentralization efforts, they will be unable to adjust current policies in a way that benefits future outcomes. Without a continuous feedback of policy results to decision makers, the instruments' effects on natural resource users' decisions may not only remain unknown, but may even lead to unexpected and undesirable results. Ideally, decentralized governance systems would have monitoring programs that study the effects of natural resource management policy on resource users' decisions, but few non-industrial countries have such program in place (Burki et. al. 1999). One of the main contributions of this study is that it provides a structured method and principles for how policy monitoring programs could be designed. The methods of institutional analysis used in this study can help policy analysts, practitioners and other concerned citizens to learn about the policy processes that produce the observed outcomes of decentralized environmental policies. The study follows the principles of institutional analysis as it examines and empirically tests the causal linkages between government policy making, resource user decisions, and patterns of biophysical change in a concrete field setting: Bolivia's decentralized forestry sector.

The literature on both decentralization and natural resource management speak of many potential advantages of a decentralized regime for the governance of natural resources. Decentralization can lead to a better match of public services to local needs (Light et al. 2002; Crook and Manor 1998; Pacheco and Kaimowitz 1998; Fizbein 1997), more efficient delivery of public services (Oakerson 1998; Wunsch and Olowu 1995; World Bank 1988), facilitating self governance (O’Riordan 2001; Ostrom 1990), more equitable outcomes (Feldstein 1975; Maro 1990), greater citizen participation in public affairs (De Tocqueville 1945 [1835]; Ribot 2002), more flexible government policies (Johnsson 2000; Bish and Ostrom 1973), greater local institutional capacity (Rondinelli et al. 1989), and more accountable government (Agrawal and Ostrom 2001; Ribot 1999; Coen and Peterson 1998; Crook and Manor 1998).

Less common in the literature are discussions of the potential pitfalls that decentralization represents (but see Crook and Manor 1998; Ribot 2000; Ostrom 2000; Agrawal and Ostrom 2001). Yet, in theory, several potential problems exist. Decentralization can lead to difficulties in addressing spillover effects associated with problems that transcend the boundaries of the local political unit (i.e., watershed management, air pollution, etc.). If there are no direct and democratic elections of the political leadership in the local level of government to which power and resources are being transferred, such leadership may be less accountable to the citizens and less inclined to take into account the local variations of ecological conditions, citizen needs, and preferences for collective goods and services when making decisions. Even if local democratic elections exist, there are potential problems with decentralization. In many developing countries, there is often a highly segregated political tradition in which small, closed groups of political elites try to control the political arena so as to protect their privileged status in society. The relative power of such groups is likely to increase through decentralization, as it may give such individuals more unrestrained freedom to pursue their personal interests (Pacheco and Kaimowitz 1998). Such situations, in turn, are likely to produce less equity, more conflicts, and deteriorating collective goods for citizens who are not members of the privileged groups (Ribot 2002).

On balance, there seems to be both potential advantages and disadvantages associated with the decentralization of natural resource governance responsibilities in non-industrial countries. The main argument of this study is that decentralization may bring important opportunities for forest dependent communities to get more and better public services to help them improve the quality of forest governance, but the delivery of this “possibility of decentralization” depends to a great extent on the performance of the local human institutions in place. Hence, one should not expect that the decentralization process will automatically yield successful governance outcomes. It would be more appropriate to view decentralization reform as

a *policy experiment* from which one should seek to learn about what factors seem conducive for creating successful governance outcomes at the local level (Lindblom 1979; Lee 1993). The Bolivian decentralization reform in its forestry sector provides an excellent experimental setting for this purpose.

1.1 Why Bolivia?

Several factors make Bolivia a most appropriate country for the study of decentralization reform. First, while many other countries in Latin America have introduced decentralization reforms in the natural resource management sectors, no other country has carried this process as far as Bolivia (FAO 1999). The country's 1994 Popular Participation Law devolved a broad range of responsibilities, functions and political decisions over education, health, urban infrastructure and natural resource management. The central government also transferred approximately 20 percent of the national government budget to the disposal of municipal governments. In addition, the 1996 Forestry Law gave municipal governments direct control over 25 percent of centrally collected royalties from commercial logging concessions within each municipal territory. In return, municipal governments are asked to create Municipal Forestry Units that are to provide a series of public services to forest users in their territories. Among their key tasks is the mandate to create municipal forest reserves for community forestry activities on up to 20 percent of all public forested lands within each municipality's territory (FAO 1999).

Second, Bolivia's rich natural resources base is undergoing rapid changes, which means that one can expect to find large variance in the patterns of land-use change in the different municipal territories. The fast pace of land-cover change is especially evident in the country's tropical Lowlands. Third, Bolivia has gained an international reputation as a "decentralization success story" (UNDP 1998). Consequently, one can expect to find a good mix of cases and experiences of municipal governance of natural resources. The study is particularly interested in understanding why some municipal governments do better than others and it is therefore important that at least some success stories at the municipal level can be identified.

Finally, there is a growing number of national and international scholars who study the results of the decentralization reforms in Bolivia, and an important body of empirical literature is beginning to emerge (see for example Pacheco 2000, 2001, 2002; Kaimowitz et al. 1998; Kaimowitz, Pacheco, et al. 1999; Kaimowitz et al. 2000; Urioste and Pacheco 2001; Contreras and Vargas 2001; Hernáiz and Pacheco 2001; Rowland 2001; Fauget 2000; O'Neil 1999; Thévoz 1999; Pacheco and Kaimowitz 1998). None of these studies, however, has studied decentralized forestry governance for a larger, representative sample of municipal governments. One of the

main goals of this research is to test some of the earlier research findings to see whether they hold water in a wider, more general context.

1.2 Structure of the Study

Because of their key mandate in the country's new forestry regime, the very success of Bolivia's decentralized forestry regime rests to a great extent on how municipal governments perform their new role in the forestry sector. However, some of the most pressing problems in Bolivia's forestry sector, such as the prevalence of forest tenure insecurity, cannot be solved effectively by municipal governments alone. Addressing problems related to forest tenure in particular requires the active involvement of a variety of actors who perform different complementary governance functions. Recognizing that such a collective effort is far from an automatic process, this study is an effort to understand what local conditions and factors influence the outcomes of decentralized forestry regime.

This first chapter provides an overview of historical and current conditions for forest governance in Bolivia, examining the main challenges and opportunities for forest users and policy makers. It starts out by laying out and clarifying some of the key terms and concepts used in the study (see Text Box 1.1). It then discusses the vital importance of collective action among different local forestry actors in addressing some of the sector's main problems, and how municipal governments could potentially facilitate such broad, inter-organizational cooperation. In the second chapter, the content and scope of the municipal government mandate in the forestry sector is presented and how it relates to the prospects for achieving solutions to current governance problems in the sector. The study's third chapter carries out an institutional analysis of the relationships between the main actors who need to interact regularly within the realms of municipal forest governance. The institutional analysis helps specify the study's core set of hypotheses that will be tested empirically in the subsequent chapters.

The fourth chapter is the first of four empirical chapters that examine four distinct causal mechanisms related to the institutional conditions for decentralized forest governance and the effects of this regime on resource users' decision making and the natural resource base. Chapter 4 focuses on the sources and degree of *motivation* among municipal governments to provide municipal services in the forestry sector. The chapter discusses and tests the importance of a variety of institutional incentives that may or may not motivate local government officials to take action in the forestry sector. In the chapter that follows, the empirical analysis considers what might explain the mixed quality of municipal forestry programs once activities are actually undertaken. The role of three different aspects of social learning is explored, first theoretically

and then empirically. A large number of semi-structured, personal interviews with municipal actors in 50 randomly selected municipalities in the forest rich, Bolivian Lowlands form the basis for the empirical testing in chapters 4 and 5.

Text Box 1.1. Definition and Discussion of Key Concepts Used in the Study

Decentralization is understood as the “the assignment of fiscal political and administrative responsibilities to lower levels of government” (Litvack et al. 1998). In this study, decentralization refers to government functions only. Rondinelli et. al. (1989) distinguishes between three different forms of decentralization, depending on the degree of decision making authority that is transferred: (1) Deconcentration is when lower levels of governments have very limited decision making authority and are asked to carry out the orders of the central government; (2) Delegation refers to the transfer of some decision making authority but the lower level of government is held accountable directly to the center, and (3) Devolution means that the lower level of government enjoys vast political autonomy to decide about what collective goods it should provide and produce and how this should be done. Because of the nature of reforms carried out in Bolivia, and their explicit targeting of municipal governments in the transfer of governance responsibility in the forestry sector, this study focuses principally on municipal governments and their performance in governing forestry activities in their respective territories..

Collective action involves the efforts of a group of two or more individuals to achieve a common good. A collective-action problem occurs when the actions of group members are interdependent: one person’s reward (outcome) is dependent on the actions of others (Sandler 1992). Collective-action problems are pervasive and exist at all levels of society. Sometimes collective-action problems are solved by the individuals immediately involved in the situation, but sometimes external intervention may be necessary. The very rationale of having a government has to do with the problem of solving particularly complex and large-scale collective-action problems, such as the provision of a national defense system and the construction and maintenance of major highways. For policy makers and analysts interested in proposing effective policy instruments it is crucial to understand when collective action can be expected to be provided for by citizens themselves and when external interventions by a government may be necessary. Both policy effectiveness and efficiency turn on this issue.

Local vis-à-vis municipal government. In the natural resource management literature these two terms are often used synonymously, suggesting that municipal government is the citizenry’s most local governance system. In the context of Bolivia, however, it is important to emphasize the difference between local and municipal governments. This distinction becomes essential when discussing local collective-action problems involving primarily local citizens because municipal governments are often physically very far away from large parts of the citizenry. In Bolivia, there are some municipal governments whose jurisdictions span over 50,000 square kilometers, which is equivalent to the land area of the entire country of Denmark. It is not uncommon that a Bolivian municipality hosts more than a hundred rural communities. Within each of these communities there may very well be a formal institutional structure, such as village by-laws, elected community representatives and even a village council. It would be more appropriate to call this local-level institution the local government.

Text Box 1.1 (cont'd)

Common Pool Resources (CPRs) are resource systems that are subject to rivalry among multiple users. For example, if one forest user has difficulty in excluding another user from extracting resources in a particular place and the extraction carried out by the users leaves less resource units available for future harvest, the resource system is a common pool resource (CPR). It is important to note that a CPR refers to a particular kind of resource *regime* and not the resource or its different products. The illustration below maps out the different regimes for a variety of forest products.

Illustration: Attributes of Forest Resources and their corresponding regimes (adapted from Varughese 1999; Ostrom and Ostrom 1977)

	Subtractability	
	High	Low
Excludability		
High	Private Harvested products such as fodder, wood, herbs, fruits and water	Club Scenery of landscape and wildlife as well as other non-consumptive goods that only local residents enjoy
Low	Common pool Unharvested resources such as fodder, wood, herbs, fruits and water	Public Watershed protection, Carbon sink, biodiversity conservation

As illustrated above, it is possible that some products in a forest are *private goods* while others take on characteristics of a *common pool resource* or even a *public good*. For instance, if forests are protected or planted for the purpose absorbing carbon dioxide from the atmosphere, the forest resembles a *pure public good*. The regime for a particular product is defined by the *interaction* between humans and the resource system where the product is located. In the Bolivian context, for reasons that will be discussed in this chapter, most of the forest resources are considered common pool resources (CPR).

Property rights are defined as the “capacity to call upon the collective to stand behind one’s claim to a benefit stream” (Bromley 1991, p. 15). In the realms of natural resource management, property rights specify the different types of claims that people have to natural resources by specifying what one can and cannot do and what benefits one is entitled to. As such, property rights influence the incentives to invest in, sustain and improve the condition of natural resources (Meintzen-Dick and Knox 2001).

Institutions are defined as formal and informal rules that are, in fact, followed by most affected individuals. Such rules structure *incentives* in human exchange, whether political, social, or economic. **Incentives**, then, mean the rewards and punishments that are perceived by individuals to be related to their own actions and those of others. **Institutional incentives** are the incentives, both material and non-material, which are generated within institutions. Carefully crafted institutions can generate positive incentives that help actors solve their collective-action problems (Ostrom et al. 2002).

Common-Pool Resources (CPRs) are resource systems that are subject to rivalry among multiple users. For example, if one forest user has difficulty in excluding another user from extracting resources in a particular place and the extraction carried out by the users leaves less resource units available for future harvest, the resource system is a CPR. It is important to note that a CPR refers to a particular kind of resource *regime* and not the resource or its different products. The illustration below maps out the different regimes for a variety of forest products.

Text Box 1.1 (cont'd)

Forest Tenure is understood as the set of rights which a person or some private entity holds in trees and other forest resources (Bruce 1989). As such, the concept includes questions of both ownership and access. Forest tenure relations in rural communities in Bolivia are often quite complex as local tenure systems may incorporate aspects of official legislation, and vice versa. *Forest tenure security* refers to a situation in which forest users hold a high degree of uncontested property rights, and are able to protect forest resources by way of effective exclusion of unauthorized users.

Deforestation, defined as the conversion of forest to another land-use class or the long-term reduction of the tree cover below the minimum 10 percent threshold (FAO 2002a), is the process of manipulation by humans to achieve a controlled flow between the rate of extraction and regrowth of forest resources. Such resources may include wood, water, wildlife, forage, and even recreation. What might be labeled as the golden rule of sustainable forest management is the concept of *sustained yield*; which means that the volume of resources extracted from a given forest and time period should not exceed the volume that grew during that same period within the boundaries of the specific forest.

The sixth chapter shifts its focus from the municipal government arena to the local forest users in forest-dwelling communities in the Lowlands. The chapter looks at how the forestry sector and land reforms have affected forest users' land-use decisions, by comparing the incentive structures of users in communities with two different forest property rights regimes. Finally, in the fourth and last empirical chapter, the environmental impact of the decentralization reforms are assessed and discussed. Using high-resolution satellite imagery and Geographical Information Systems, a spatially explicit analysis is carried out, which establishes a more precise definition of the environmental effects of decentralized forestry-sector governance in Bolivia. In the study's conclusion the main findings of the study are summarized and discussed in light of their implications for Bolivian society and efforts on behalf of many of its actors to solve a variety of critical problems in the country's forestry sector.

2. A HISTORICAL PERSPECTIVE OF FOREST GOVERNANCE IN BOLIVIA

Bolivia is one of the poorest countries in Latin America. According to a 1992 poverty assessment applying the United Nations poverty index, 94 percent of the country's rural population and 70 percent of its urban population were classified as poor or extremely poor (UDAPSO et al. 1993). The situation in the rural areas of Bolivia is especially serious. A 1997 government survey of rural poverty established that over 58 percent of the rural population suffers from some degree of malnourishment (Government of Bolivia 2000; Woodson 2000).

At the same time, Bolivia is blessed with a rich endowment of natural resources. The country's abundant forest resources are important as a source for both subsistence and industrial development. The majority of all Bolivians depend to some degree on the goods and services that the country's forests provide. The forest dependence is especially notable in rural areas, where people rely on the forest for a wide variety of household necessities such as firewood, construction materials, fodder, fruits, nuts, medicines, and in some cases wage labor (Pacheco 2001). Hence, Bolivia's forestry sector constitutes an important contribution in efforts to reduce poverty in Bolivia (FAO 2001a). A score of policy analysts along with Bolivia's government itself, recognize that while forestry does have a tremendous potential to reduce poverty levels in the country, the sector is far from reaching this potential (see for example Superintendencia Forestal 2000; Pacheco 2001; FAO 2001a). These observations beg a very legitimate question: What is preventing Bolivia from unlocking the potential contributions of forestry activities to be used in the country's fight against poverty?

This study approaches this question from an institutional perspective and proposes that forest resources in Bolivia in general, whether they happen to exist on public or private land, are plagued by ambiguous forest property rights. One of the main purposes of this chapter is to test this hypothesis. Empirical data from several independent sources confirm that insecure forest tenure remains an extensive problem in Bolivia's forestry sector (e.g., see Andersson 2001a; Urioste and Pacheco 2001; CIPEC 2001). The chapter concludes that government authorities, both at the national and local levels, can indeed play an important role in facilitating the creation of local institutional arrangements that are conducive for addressing the apparent lack of forest tenure security in Bolivia.

3. CONTEXTUAL FACTORS INFLUENCING FOREST GOVERNANCE IN BOLIVIA

The history of forestry-sector governance in Bolivia is characterized by political instability and a series of failed centralist and coercive policy interventions. As a result of the lack of formal governance structures at the local levels, Lowland settlers have relied primarily on local, informal institutional arrangements to solve problems associated with ambiguous property rights, poor infrastructure, and limited input of technical expertise on Lowland farming techniques. Many smallholder forest users in Bolivia perceive insecure forest tenure as a major constraint to forest use (Andersson 2001a). Several recent empirical studies conclude that the forestry sector in Bolivia is plagued by several *open-access common pool resource problems* (Urioste and Pacheco 2001; Andersson 2001; CIPEC 2002).

The traditional policy response to these problems in Bolivia's forestry sector has not been much different from the policies in many other developing countries: central government-led command and control instruments. This top-down regime, which characterized the governance of the forestry-sector policy arena until the 1996 Forestry law was passed, was unable to provide forest users with a robust forest property rights system in Bolivia. Despite the new law, which is an effort to introduce positive incentives to forest users for sustainable forest management via a combination of decentralization and privatization measures, insecure property rights prevail in Bolivia's forests. The discussion in this chapter argues that efforts to facilitate collective action among a variety of different actors are necessary to overcome the tenure insecurity problems. The context in which such efforts take place is shaped by several biophysical, socioeconomic, and institutional factors, which are described below.

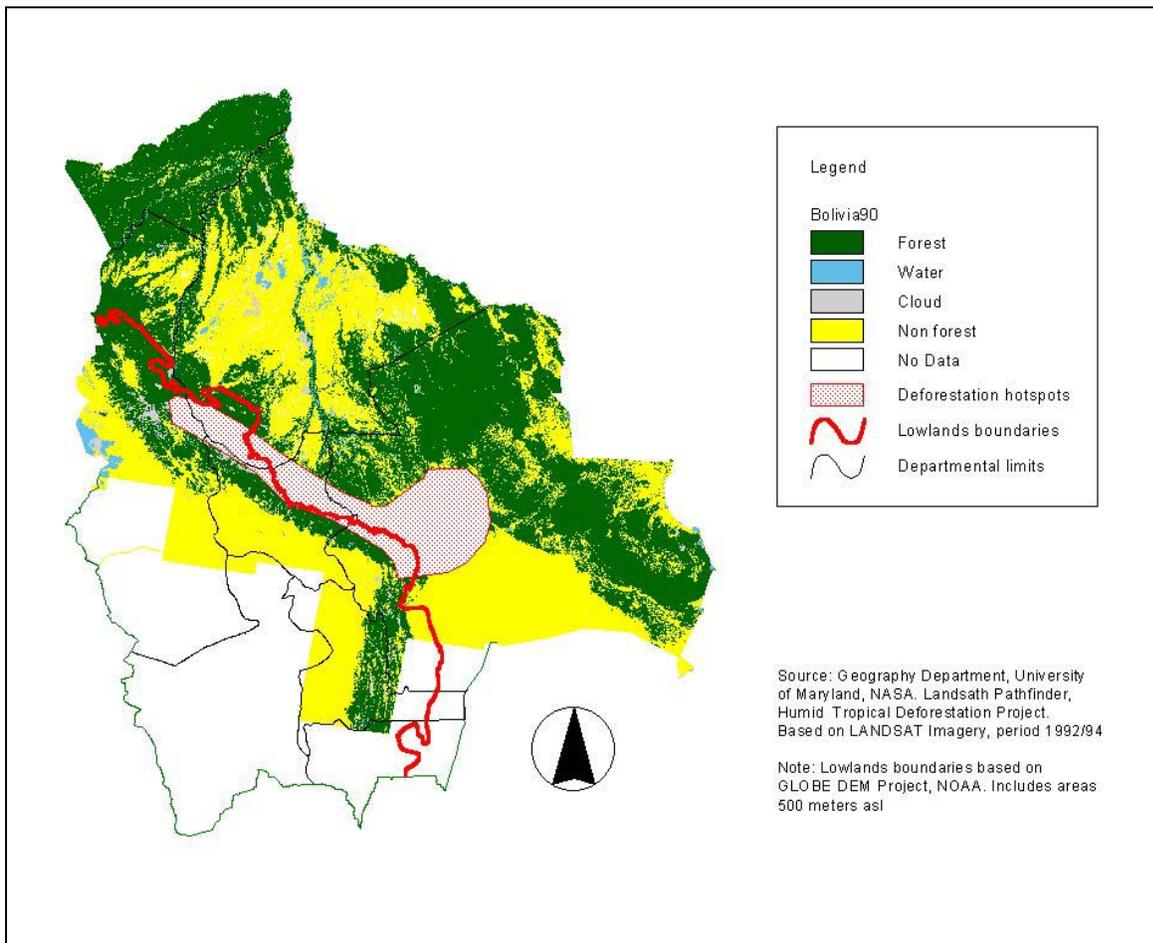
3.1 Biophysical Characteristics

Bolivia is often thought of as an Andean country, primarily characterized by its dry and arid highlands. While this is certainly one side of this highly diverse country, it is often forgotten that more than two-thirds of the country's area, or 763,000 km², is located in the tropical Lowlands. Roughly half of the country's surface is covered with different types of forests, amounting to approximately 530 000 km², a land area comparable to the size of France (FAO 2001b). Over 80 percent of the country's forests are located in the Lowlands (Montes de Oca 1989). The varied geography and heterogeneous ecological characteristics make Bolivia one of the most biologically diverse countries in the World (Birk 2000). In the Lowlands, seven distinct forest types with 2,700 of different tree and shrub species have been identified (FAO 2002). According to the 2000 FAO Forestry Resource Assessment, the annual deforestation rate for Bolivia currently amounts to about 1600 km² per year or about 0.3 percent of the total forest cover.¹ This rate is relatively low compared with other countries in the region.² Studies on the causes of deforestation identify a variety of variables, depending on the specific location and time period of the study. Currently at a national level, the expansion of agro-industries around the city of Santa Cruz explains most of the disappeared forest cover during the 1990s (Steininger, Tucker, Ernst et al. 2001; Superintendencia Forestal 2002). Other current causes include smallholders' shifting cultivation practices and large-scale cattle ranching (Pacheco 2001; Skole and Tucker 1993).

¹ Based on 1990–2000 forest cover change, using AVHRR satellite imagery products with 1 km spatial resolution (FAO 2001b).

² Compare with the regions average of 0.4 percent per year (FAO 2002b).

Just fifty years ago, prior to the government-led colonization campaign, the Lowlands' forests were virtually untouched. Back then an estimated 50,000–100,000 people lived in the Lowlands. But as a result of the Eastward migration of highland populations, spurred by the 1953 land reform and subsequent government incentive programs, about two and a half million people call the Lowlands their home today (INE 1993). Based on the country's latest census, about half of these are small scale farmers with origins from the highlands in Western Bolivia, 200 000 are members of different indigenous groups, and the rest represent a growing urban population mostly concentrated around the city of Santa Cruz (INE 2002). The colonization of the Lowlands has taken its toll on the forest, as an estimated 15 per cent or 4 million hectares of forest have been cleared since the first land reform in 1953 (Camacho et al. 2001; Steininger, Tucker, Townshend et al. 2001).



Map 1.1. Land Cover in the Bolivian Lowlands (1990s)

3.2 Forest User Attributes

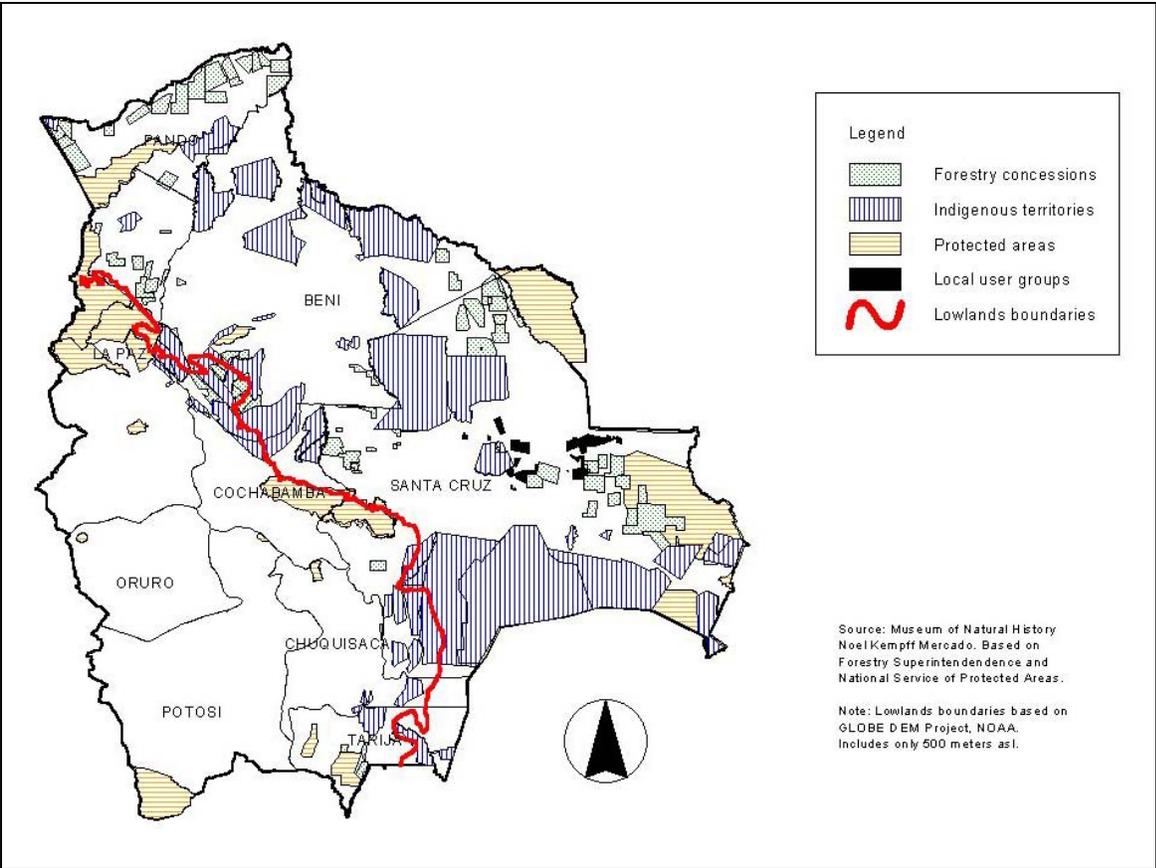
The Bolivian forestry sector is characterized by its great diversity of users. There are approximately 50 different indigenous groups in Bolivia. Most of these groups maintain their particular culture, traditions and languages that originate from pre-Columbian times. An increasing part of the indigenous population now lives in semi-urban settlements, even in the Lowlands.³ Nevertheless, according to Uberhuaga (1997), 90 percent of the Lowlands' indigenous territories are located in forested areas. Stocks (1999) estimates that there are 5–7 million hectares of commercially productive forests within the country's indigenous territories.⁴ As a result of a social mobilization, which culminated in a series of protests, manifestations and marches⁵ in the early 1990s, 47 indigenous groups have been officially recognized by the government and are currently in a process to acquire collective private property rights for a total land area of 22.4 million hectares, equivalent to 19 percent of the country's total land area (Martínez 2000). Map 1.2 shows the spatial distribution of these indigenous territories.

Land tenure in the Bolivian Lowlands is characterized by a sharp contrast in land distribution and diversity. In Santa Cruz and El Beni, the two largest Departments of the Lowlands, 87 percent of the land is concentrated in properties of 500 hectares and larger. These properties are in the hands of only 5.4 percent of the total number of landholders. On the other extreme of the spectrum, 84.6 percent of the total population of farmers are small landholders who occupy only 6.9 percent of the total land area (Urioste and Pacheco 2001). There are about 1.5 million smallholders, most of which have a plot of land of 10–50 hectares as a share of community property title issued after 1953. Most of the indigenous and smallholder settlers in the Lowlands live on or in close proximity to forested land. An overview of distribution of agricultural and forest lands to different categories of user groups is presented in Table 1.1.

³ The *Guarayo* people, for example, have two major settlements – *Asención de Guarayos* and *Urubichá*, with 12,000 and 3,000 inhabitants respectively.

⁴ See forest cover map overlaid with indigenous territory boundaries in Map 1.2.

⁵ There were basically two big indigenous marches that now constitute historical events since they managed to put the indigenous cause on the national political agenda. The first, called “The March for Territory and Dignity,” was held in 1991 and its followup five years later, just months before the Parliament passed the new land reform which granted the groups' legal rights to their ancestral lands.



Map 1.2. Bolivia: Indigenous Territories, Protected Areas, Forestry, and Mining

Table 1.1. Land Tenure and Forest Access Rights in the Lowlands

Land distribution by type	Area ('000 ha)	Observations
Total Lowland Area	76,300	
Forested Area	44,500	
Individual and Communal Properties		Additional areas have been illegally occupied, but reliable information is missing
- Commercial Farms ^a	22,853	
- Small Farmer Colonists ^b	3,192	
- Community Lands ^c	22,303	
- Titled	2,860	
- Immobilized lands ^d	11,762	
- New land claims	7,681	
Areas of Forest Use		The dramatic reduction (72%) of forest concession rights is attributed to the policy change to base concession fees on area rather than volume extracted, as laid out in the new Forestry Law (No. 1700) of 1996.
- Long-term concession contracts (until dic. 1996)	20,700	
- Forest concessions (after dic. 1996)	5,800	
- Forested area released under new regime	14,900	
- Concessions for Local Social Associations ^e	564	
Protected Areas		Refers to designated protected areas in the Lowlands that may or may not have management plans in place.
- Total Lowland area under protected status	12,800	
- Protected areas not legislatively defined	1,900	

^a Lands distributed by CNRA (1955–1993).

^b Lands distributed by INC (1961–1994); includes land with titles, and pending titles.

^c Conceded lands from 1990 to 1993 and those titled in April 1997.

^d Areas claimed by indigenous groups and immobilized by the state, titles pending.

^e Include only those areas allocated by the Ministry of Sustainable Development and Planning as municipal forest reserves until March 2000.

Sources: Author's adaptation of Pacheco (2001), INRA (1997), Mancilla (1994), MDSMA (1995), Superintendencia Forestal (2000), World Bank (1993)

The users presented in Table 1.1 depend to various degrees on different goods and services from the forests that surround them. In a recent study, the Food and Agricultural Organization of the United Nations (FAO) observes that forest products and services in Bolivia represent one of the most important resources for reducing poverty in the country (FAO 2001a). The specific characteristics of the different forest users' dependency are related to a series of attributes of not only the type of forest they use, but also of their socioeconomic needs, the users' capacity to access the resources, as well as any agreements they have made with other resource users about how to use and share the available resources. Table 1.2 summarizes each forest user group's main characteristics, the land area they control as well as the status of their formal property rights.

Table 1.2. Forest User Group Characteristics

Social Groups ^a	Location	Total Pop ^b	Land Area (ha)	Forest Property Rights ^c	Forest Resource Use ^d	Importance of Forest to Livelihoods ^d
1. Indigenous groups and subsistence farmers	Beni, Pando and Santa Cruz. Parts of north of La Paz and Cochabamba.	180,000 – 220,000	22,483 ^e	Rights over land not fully recognized. Slow titling process, 20 percent of the claimed land titled (2000)	Small-scale slash and burn agriculture with frequent rotation of fallow areas allowing the regeneration of secondary forest.	Highly dependent on forest resources to satisfy subsistence needs and for cash incomes to pay for consumption needs.
2. Family farms colonies of settlers in the Lowlands	Yungas, Alto Beni, Chapare and Northern Santa Cruz.	500,000 – 600,000	3 192 ^f	Small proportion of group has secure access rights to forest lands, even though most have formal land titles.	Slash and burn agriculture, diversified commercial crops; pasture conversion and occasional timber extraction, mostly illegally.	Agriculture and livestock are main income sources, but fuel wood and fodder, are important for household economies
3. Family farms with agro-extractive systems	Pando and provinces of Riberalta and Guayaramerin in Beni.	25,000 – 30,000	292	Extremely poor small-scale farmers without formal land titles. Limited market access, weak infrastructure, limited public service access	Slash and burn agriculture in combination with some temporal extractive activities, i.e., Brazil nuts and hearts of palm.	Highly dependent on non-timber forest products for household subsistence and cash income
4. Communal peasant farmers in temperate valleys	Valleys of Cochabamba, Tarija, Chuquisaca and west Santa Cruz	700,000–800,000	5,790	Most are poor but better off than 1), 2) and 3). Access to land is provided through old community titles, parcelled into smaller plots	Forest resources availability is very limited in some areas. Main uses are limited to fuel wood and charcoal, for domestic consumption.	Most important forest product is fuel wood, which constitutes a key energetic supplement in most households
5. Small-scale timber producers	Mainly practiced in north of La Paz, Southwest of Beni and Northeast of Santa Cruz.	500 ^g	800 ^h	Some are poor but better off than those in 1), 2) and 3). Better access to public services, but diverse degrees of access to individual titles for commercial extraction	Small logging operations often using chainsaws. Activities are constrained by high costs of management plans, extraction, chainsaw prohibition for processing and bureaucratic procedures	Logging is the main source of income, but because of low profitability many rely on alternative sources of income, mostly subsistence agriculture
6. Forestry-sector wage workers	Northern Santa Cruz, Beni and Pando, and northern La Paz.	5,600	N/A ⁱ	Very poor seasonal workers with extremely limited access to land and other assets.	Many engaged in timber extraction, transport and processing, some harvest Brazil nuts, hearts of palm	Forest represents main source of income

^a This typology is based on World Bank (1996) and Pacheco (1998)

^b Population is an estimate only, based on data from the national census, INE (1993), and the Employment National Survey, INE (1996), Diez and Riester (1996)

^c Based on UDAPSO et al. (1993), and World Bank (1996)

^d Based on Kraljevic (1996), Pacheco and Kaimowitz (1998), Roper (2000), Stoian (1999), and Stocks (1999)

^e Areas claimed by indigenous groups and immobilized by the state, titles pending

^f Lands distributed by INC (1961–1994); includes land with titles, and pending titles

^g Corresponds only to members of forest users associations

^h Refers to forest areas allocated to organized local forest users within municipal forest reserves

ⁱ Not available because these are not concentrated in any one specific region.

Source: Author's adaptation of Pacheco, 2001.

Considering the characteristics of the forest use in Table 1.2, it becomes evident that the main problems and opportunities for governance systems depend on the particular location and specific needs of each set of forest users. There is, nevertheless, one variable that cuts across all categories of users and forests and influences all users' relationship to forest resources, regardless of geographic location: forest property rights. The importance of property rights in the governance of forest resources is discussed below in the context of the broader institutional context of forest governance in the Bolivian Lowlands.

3.3 Institutional Aspects of Forest Use in the Bolivian Lowlands

The role of government is to facilitate the provision of collective goods, but in Bolivia's forestry sector many collective goods are underprovided, including monitoring of natural resource condition, protection of property rights, exclusion of non-legitimate users, and conflict resolution. Many of the collective goods in Bolivia's forestry sector can neither be provided by the users themselves, nor by the government by itself. This study argues that *jointly produced solutions* are necessary to solve the core problems facing the Bolivian forestry sector. This section starts with a historical overview of the effect that past government policy has had on forest users and their welfare. Particular attention is given to the impact that Bolivia's land reforms and forest legislation have had on forest resource property rights.

3.3.1 Centralist Government and Political Instability

The first post-revolution government in Bolivia, led by Paz Estenssoro in 1952, viewed the State's role as that of a central planner and coordinator of economic development. During this period, the mines and other large corporations were nationalized. According to historian Juan de la Mesa, the Paz Estenssoro government set the tone for government interventions in the Lowlands for the next three decades. They did so with its ambitious policy to be the "powerful, direct administrator of the productive sectors" (de Mesa 2001). By the 1970s, the central government administration had reached monstrous proportions as the central government's public sector now consisted of a total of 520 agencies (World Bank 2000).

The central government's colonization program consisted of an aggressive land titling program with the objective of relocating scores of landless people from the highlands to the sparsely populated Lowlands. Settlers received a conditional title of approximately 50 hectares on the agricultural frontier. The title was conditional because unless the settler cleared a significant part of the land for agricultural purposes, he ran the risk of losing the title if inspected (Urioste and Pacheco 2001). The centrally planned colonization effort was an expensive task, and as more

and more people migrated to settle in the Lowlands, less and less government services became available for settlers (World Bank 1993). By the late fifties, the titling program started showing signs of heavy strain as the backlog of untitled land grew quicker than the government agencies could inspect and issue new official titles (ibid.).

The government's capacity to respond to local settlers' demand for titles as well as requests for technical support and infrastructure development for agricultural production was severely hampered by the political instability that characterized Bolivian rule in the post revolution era. For instance, during the 18-year period between 1964 and 1982, Bolivia had a change of government, on average, every eleven months. Most of these changes were related to military coups. Of the twenty different governments in power during this period, only five were civilian governments. Despite obvious political differences between the series of generals and the civilian governments that led Bolivia during these years, they all shared the same centralist policy of government control over the productive sectors (de Mesa 2001). The political leaders' vision of central government as the crucial locus of power over the productive sectors would characterize government until the mid-1980s, when the economic crisis forced the country into a World Bank–designed structural adjustment program.

The limited capacity of central government, aggravated by the extreme political instability during the three decades following the 1952 revolution, led to little direct interactions between government and local settlers. As a consequence, the influence of government policy on local settlers' land-use decisions has been partial at best, and in some cases largely non-existent (Pacheco 1998; Contreras and Vargas 2001). In order to deal with the uncertainty that a lack of formal governance structure produced in their new environment, settlers turned to more informal institutional arrangements to address the problems they faced. Such informal arrangements are still prevalent strategies for Lowland populations to deal with tenure insecurity, variable climatic conditions, volatile markets and other sources of risk for the farmer (Becker and León 2000; Pacheco 1998). Lowland communities have learned from history that if you want public goods such as tenure security, market access and production infrastructure, you need to organize the community to provide these yourself, because it is unlikely that the government will do it for you. Given the high diversity of ecological conditions in the Lowlands and the wide variety of settler origins and characteristics, one can expect these informal institutional arrangements to vary greatly from one place to another.

3.3.2 *The Cultural Legacy of Agricultural Bias*

Fifty years of a government-led colonization campaign in the Lowlands was fueled by governmental policies with a strong bias towards agricultural production. Such policies have not

been conducive for sustainable forest management. The 1953 land reform viewed forestry as a less productive land use compared to agriculture. As a direct result of the reform, clearing of forest has become the most widely accepted way of demonstrating control over one's land, and in areas with large influxes of squatters, clearing land for agriculture is an important strategy to decrease the likelihood of squatters to invade your land. Although the new 1996 land reform⁶ recognizes forestry as a legitimate land use, to consider forest clearings a type of land improvement has become a deeply engrained cultural norm in the Lowlands and continues to be the way rural people demonstrate control over contested land areas (Hecht 2000).

Even though the recent reform package contains new provisions that address some of these problems, agriculture remains the implicit priority of Bolivian politics. This preference shines through in the government administration and the way that formal rules and regulations are interpreted and selectively implemented. Government incentives, such as subsidies, credit programs and tax breaks, in the agricultural sector clearly overpower those in forestry, making forestry an unlikely choice of land use for local users, not because of its unrecognized features of poverty reduction but rather because of the attractive short term returns in agriculture. Relatively few governmental efforts exist to correct these distortions and to promote forestry as an attractive land-use option for smallholder farmers. The old agricultural paradigm of the colonization era very much persists at the expense of forestry and the tension between agriculture and forestry as competing land uses (rather than complementary) remains largely unresolved because of inappropriate institutional arrangements at the national governance level.

3.3.3 The Collapse of Centralized, Coercive Governance

The political history of Bolivia speaks of the government's reliance on coercive governance as the principal method of inducing citizens to conform to public policy. Coercive governance by any level of government—central, regional, or municipal—is a very resource-intensive way of influencing user behavior. This is especially true if the existing cultural norms, which reflect the way people normally go about solving daily problems, are not congruent with the government's formal rules and policy. In such contexts, coercive governments must have a large number of representatives present where they wish to regulate activities or they are not able to monitor and enforce compliance. In addition, coercive governments must have a program for monitoring the monitors to ensure the proper behavior of the field-based agents. Apart from being economically very costly, the coercive governance approach also tends to be highly ineffective when the government is badly informed about the local conditions and the underlying causes of

⁶ The so-called INRA Law 1715. INRA is the National Agrarian Reform Institute, the central government agency in charge of implementing the law.

the production problems. The governance of Bolivia's forestry sector is to a large extent based on a coercive governance model, which, despite recent efforts to decentralize, continues to dominate the government's strategy to influence forest user behavior. The sector abounds with signs of the mismatch between formal regulations and local, informal institutions. The consequence is that although local users may comply with the norms and rules of local institutions, Bolivian law considers them illegal users of the forest resources on their land (Andersson 2001a).

3.3.4 *The Second-Generation Reforms*

In the mid-1980s, a government-led and donor-supported effort to transform the Bolivian central planning model to a modern market economy started. The structural adjustment program, which improved the financial stability of the country, was followed up by a second generation of reforms in the 1990s. Part of this reform package, which focused on reducing the central bureaucracy through decentralization of the public sector functions and privatized the government owned corporations, were the 1996 agrarian reform (Government of Bolivia 1996a) and the 1996 forestry law (Government of Bolivia 1996b). For the first time in Bolivian history, the country's formal legal framework recognized forest management as a legitimate land use for all property owners. Formal property rights with regards to forest resources according to the two integrated laws can be summarized in the following manner:

- The Bolivian State owns all forest resources in the country;
- Private ownership of forest resources are limited to forest plantations and harvested products that are accompanied by government permits⁷;
- The current private landholders' user rights with respect to the forest on their land include:
 - Household use of forest products and services on their land without any formal permits from the government;
 - Forest management activities, including commercial timber logging, if in accordance with the national standards of sustainable forest management⁸; and
 - First option to apply for commercial logging rights, but may pass on or sell these rights to third party users who do not hold formal titles to the land.

⁷ Forest plantations that have been verified and registered as such by the government authorities are considered private property. In 1999, there were only 40,000 hectares of registered planted forests in Bolivia, corresponding to about .01 percent of the total forest cover of Bolivia.

⁸ The forestry law requires all logging activities to be in conformance with the national standards for sustainable forest management. This means that previous to receiving the logging permits the applicant must develop a forest-management plan for a twenty-year rotation period. The management plan must be signed by a certified forestry engineer.

The implementation of the new formal property rights system has been a very complicated and slow process partly because the many contested land areas and partly because of the limited resources of the government agencies in charge of implementation. The agrarian reform agency's task to sort out the overlapping claims through an elaborate 'legal sanitation' process carries an impressive backlog. Five years after the new law was passed, less than 10 percent of Bolivia's land surface has gone through the legal sanitation process. As evidenced by the property right data summarized in Table 1.2, only a small fraction of all forest user groups in Bolivia have a secure land title. Even fewer have secure access to forest resources. Insecure land tenure adds to the uncertainties associated with forest users' access and user rights to forest resources.

Recent empirical evidence confirms the presence of forest tenure insecurity among smallholders in the Lowlands. Part of the fieldwork carried out for this study involved semi-structured, in-depth interviews with representatives of rural communities in 50 randomly selected municipalities.⁹ When asked about the most serious problems in the forestry sector that rural communities face, 84 % of the respondents felt that issues related to forest tenure were the most serious concern. Legal access to timber products was also mentioned as a particularly serious problem (CIPEC 2001).

The degree to which governmental organizations can address these problems in an effective and efficient manner through the creation and implementation of a mix of policy instruments, relies partly on a well-functioning judicial system. When the judicial system is limited in its capacity to provide consistent and predictable rulings on forest user rights through due process of the law, forest property rights become ambiguous for a large group of forest users. The World Bank notes in its 1999 Institutional and Governance Review of Bolivia that "the Bolivian judiciary's role in checking the actions of other government bodies have been minimal... because of a long history of political interventions in its operations" (World Bank 1999, vol 2, p53) and that "judicial practice as a whole often deviates from what the law appears to dictate" (ibid.). The Bolivian judicial system is not immune to the 'politicization' of public affairs that plague other Bolivian governmental bodies. Public officials whose charge is to protect the rights and liberties of its citizens, including their property rights, are often deeply involved in elaborate patronage networks. The institutional context of Bolivia's forestry sector, briefly described here, makes it difficult to not only to exclude exogenous users but also to *identify* who is considered exogenous by law. Under such circumstances, the forest resource systems take on

⁹ The results of these surveys are presented and analyzed in detail in chapters 4-6.

the characteristics of an open-access common-pool resource, even if these resources happen to be located on private land.

4. OPEN-ACCESS COMMON-POOL RESOURCE PROBLEMS IN FORESTRY

Knowledge about the existence and prevalence of different forest property right problems is an important first step towards formulating an appropriate policy response, but a more thorough understanding of the origin and particular characteristics of common pool resource problems is needed in order to construct concrete and viable policy options. The following generic example is an illustration of some of the dilemmas facing forest users in a CPR situation.

Five families live spread out around a small woodlot from which all of them harvest firewood on a regular basis. The woodlot is on public lands and the government owns all forest resources in the area, but since the government has never monitored forest use in the area, it is an open-access resource used by the community members. After a few years of harvesting, community members start to notice that less and less firewood is available. Users realize that they have overharvested wood without planting new trees. A concerned family proposes that each family should reduce harvesting and plant 10 seedlings every month for the next year to let the resource recover. The other users may agree to the proposal, but will be tempted to continue to harvest without paying the cost of planting seedlings every month—to free ride on the efforts of others. This temptation will be stronger if the users perceive that the risk of being identified as a free rider is small. The probability of being singled out, in turn, depends to a large extent on the ability of all users to agree on a set of rules that specifies the rights and duties of all users, including who will monitor compliance and what will happen if the rules are broken. But the organization of such a rule system is itself a collective-action dilemma with its own problems of trying to exclude free-riders.

Olson (1965) showed that there is no reason to expect individuals in such situations to provide the collective good, such as the effective exclusion of free-riders, *automatically*. Sandler (1992), after an extensive review of the collective-action literature, extended Olson's analysis and showed for a number of empirical cases that "individual rationality is not sufficient for collective rationality." Hardin (1968) argued that resources users in situations as the one described above, were caught in a social dilemma which always lead to a "tragedy of the commons" outcome. Historically, there have been two dominant policy responses to such CPR dilemmas: Central government coercion and privatization. The central government coercion approach that was employed in Bolivia until the mid-1990s failed decisively to address the sector's pervasive CPR dilemmas. The empirical evidence from Bolivia suggests that the traditional coercive approach

exacerbated rather than improved forest tenure insecurity (e.g., Urioste and Pacheco 2001; Contreras and Vargas 2001; Pacheco 2002).

In her analysis of a very large number of self-governed common pool resource systems, Ostrom (1990) addressed the collective-action dilemma of self-organization head on. In her study, Ostrom defined specifically what it takes for resource users to self-organize and succeed in coming to grips with a CPR dilemma. She established that groups of people who try to provide any collective good among themselves need to overcome not one, but three, inter-linked dilemmas of collective action. Applying the three-tiered collective-action dilemma to the example above, users need to (1) agree on a set of rules that addresses the future firewood shortage; (2) supply credible commitments and give each other assurances that they will all comply with those rules; and (3) invest in monitoring and sanctioning mechanisms that will control and correct violators of the rules. At each one of these levels, there is a collective good that needs to be provided and thus the nested collective-action problem.

Unless the dilemmas at all of the three levels are solved by the group, the effort to increase the future supply of firewood is not likely to succeed. If indeed users are successful in this endeavor, then the CPR resource can no longer be called an open-access CPR because in the process of providing for a mechanism to exclude the non-contributing beneficiaries, the users have created a type of common property that resembles private property because of its capacity to exclude outsiders and free-riders (McKean 2000). Are Bolivian user groups able to self-organize to provide such common property regimes?

If one were to rely on conventional economic theory to answer that question, the answer would be no. This school of thought predicts that users confronting an open access CPR problem are hopelessly trapped in a collective-action dilemma that can only be solved by direct governmental intervention. Such intervention can happen in two ways: State coercion or privatization. An increasing body of empirical evidence from both experimental economics and applied field research, however, contests this prediction and opens the door for a third possibility to resolve local CPR dilemmas: self-organization (Acheson 1989; Agrawal 1994; Arnold and Cambell 1986; Cardenas 2000; Fairhead and Leach 1996; Feeny et al. 1990; Gibson, McKean, and Ostrom, 2000; McKean 2000; Ostrom 1990, 2000; Thomson 1992; Varughese 1999; Wunsch and Olowu 1995).

Evidence from the common property literature shows that many of the most successful cases of sustainable natural resource management, which have survived many generations, have little to do with either state coercion or privatization reforms. This body of research demonstrates

how communities throughout history have been able to overcome the collective-action dilemmas to self-organize to provide a series of collective goods without any government intervention.

This research further shows how local institutions often filter and mediate the effects of national policies (Ostrom 1997; Gibson, McKean, and Ostrom, 2000). Consequently, a critical step in the analysis of the outcomes of the recent decentralization reforms in Bolivia's forestry sector would be to examine how forest user communities and their institutions respond to the recently introduced reforms.

4.1 What is the role of governmental authorities in solving CPR problems?

The findings of the common property literature have sometimes been used to make a case for the minimization of central governments and extensive devolution of all NRM responsibilities to the resource-user level (Gran 1983; Uphoff 1991). A closer read of the common property literature, however, suggests that this is a misinterpretation. In fact, one of the central empirical findings of this research is that successful self-governance of natural resources is associated with support from larger governmental systems. Ostrom (1990, 2000) points to several key functions for larger governmental regimes to encourage and support collective action of resource users. She suggests that governments can facilitate the likelihood of local collective action by

- providing accurate information about natural resource systems,
- providing arenas in which participants can engage in discovery and conflict resolution processes, and
- backing up local monitoring and sanctioning efforts.

As noted in the definition of collective action in the introduction to this chapter, it is important for policy makers and analysts to think about whether users are able to self-organize to provide the desired good without the government's intervention. A perhaps even more important question that policy analysts should ask is *what type of government interventions would serve to facilitate collective action among users*. This study examines the potential role of municipal governments in facilitating the solution to local collective-action problems related to forest property rights and tenure.

Users in an open-access CPR system tend to have short time horizons, try to maximize their short-term gains by "mining the resource," and are generally unwilling to make investments in resource improvements (Gibson, McKean, and Ostrom, 2000). It follows then that without effective exclusion mechanisms, no self-interested and rational users are likely to be motivated to use forests responsibly in Bolivia, which ultimately has negative consequences for poverty. The open-access regime must be fought if forestry is to have a significant impact on poverty in Bolivia.

4.2 Can Bolivian forest users self-regulate the open-access regime?

Several in-depth case studies in Bolivia's forestry sector conclude that many forest communities, and especially indigenous tribes, have enjoyed a well-functioning, self-governed system of forest management without any formal government interventions (Becker and Léon 2000; Uberhuaga 2001; Andersson 2001a). Some might go as far as saying it was *because* the central government did not intervene that these institutions worked so well. The argument of the latter is that if the government is corrupt it is likely that government officials are driven by interests to maximize personal rents rather than facilitating solutions to collective-action problems in the forestry sector. Nevertheless, considering the fundamental challenges that the property rights system in Bolivia poses for the forestry sector, many communities face difficulties in providing effective exclusion mechanisms in their forest activities (Andersson 2001a; Urioste and Pacheco 2001).

4.2.1 Forest Tenure Security As a Collective Good

In a systematic analysis of what basic elements are necessary to provide forest tenure security to smallholder forest users, Bruce (1998) mentions two key conditions. First, there must be a clear delineation of the resource recognized by the governmental management authority as well as the local smallholder community. Second, smallholders should be recognized to have the legal power to exclude and regulate use in the forest that they claim, either individually or as a group (p. 67). These two conditions imply that forest tenure security is not a good that a governmental authority can deliver by acting unilaterally. To create the two conditions that Bruce suggests are essential for tenure security, governmental authorities need to interact with local users to develop mutually recognized rules that control access to forests and regulate competition over them (Winter 1998). There are several issues that such rules need to address explicitly:

- Who has legitimate access rights to the forest?
- What harvesting activities are allowed?
- Who will monitor compliance with the rules? and
- What limitations of power does the local user group have to enforce these rules locally?

To agree on such rules is itself a social dilemma and some participants will be tempted to free ride on the organizational efforts of others (Ostrom 1990). Even if a formal agreement is reached, the enforcement of the rules will also require the active cooperation from both governmental authorities as well as local forest users. The active involvement of the local forest users seem particularly crucial for the monitoring and enforcement of rules as the governmental authorities usually do not have neither the resources nor the personnel to do so. Because of their closer geographical proximity to local forest users, and because of the past failures of central

governance, municipal governments are often considered to be in a better position than central agencies to engage in such co-provision activities (Litvack et al. 1999; Cohen and Peterson 1999; World Bank 1998; Wunsch and Olowu 1995; Olowu 2002).

However, it is doubtful whether the municipal governments in any country would have the authority to carry out such a dialogue directly with forest users. In Bolivia, municipal governments cannot carry out such a process unilaterally, but the mandate asks them to act as the go-between in the dialogue between local users and the central government forestry authorities. The 1996 forestry Law in Bolivia allows for such a cooperation process between the government and local forest users to take place. It even specifies the forestry policy instruments to implement the process.¹⁰ The role of municipal governments with regards to the application of these policy instruments, defined in the regulations included in the 1996 forestry law, is essentially to promote forestry-sector opportunities for smallholders and to facilitate the process through which smallholders gain legal access to forest resources. Bolivia's strategy to improve forest tenure security, then, requires the cooperation of at least three different actors at three different levels of governance: local forest users, central authorities, and municipal governments.

However, in order for a municipal governance system to be effective and provide the necessary support to local forest users, a series of difficult collective-action problems *within* the municipal governance system must first be resolved. Since the institutional changes called for by the 1996 forestry law effectively shifted the formal distribution of power over certain decision making processes in Bolivia's forestry sector, one can expect difficulties for the actors to reach agreements on how things should be done. The actors that benefited more from the old regime can be expected to resist implementing the new regime, and are likely to try to influence the decisions in the transition to the new regime. The individual interests of the different stakeholders are associated with different degrees of political power and these tend to complicate the decision making for joint provision of goods and services. Motivation problems as well as asymmetries of power and information are known to hamper effective governance of any collective good, and forest sector services are not an exception. The specific collective-action problems faced by municipal governance actors in Bolivia are analyzed in detail in chapters 3–5. Recognizing that the creation of forest tenure security is a complicated collective effort, this study is an effort to understand what local institutional conditions and factors influence the outcomes of a decentralized governance regime.

¹⁰ The forestry law and subsequent regulations mention two specific instruments directed to smallholders (a) community forestry concessions in municipal reserves (*Agrupaciones Sociales del Lugar*) and (b) community forest management on small private properties (<200). The details of these are discussed in chapter 6.

The collective-action literature suggests that municipal governments are in a good position to facilitate the effective provision and production of several public goods and services in the forestry sector. Table 1.3 summarizes what activities municipal governments could undertake in support for user groups' efforts to govern their forest resources and whether these are actually compatible with the current municipal mandate in the forestry sector.

Table 1.3. Supportive Tasks for Self-Governance Compared to the Municipalities' Official Mandate

Facilitation Tasks Supportive of Self-Governance	Official Mandate
Low-cost arenas for conflict resolution	Encouraged by Decreto Supremo No.23858 ^a , and Law of Municipalities article 144,1-2
Participatory planning	Required by the Law of Popular Participation, article 8, a, b, and the Law of Municipalities ^b , article 44-11
Assist user in bureaucratic affairs	Encouraged by the Law of Municipalities, articles 8-III-8 and 8-V-4
Monitoring rule compliance	Required by Forestry law, article 25,c-h
Supporting users' efforts to monitor their resources	Allowed as long as rules are not contradicting national law
Information about opportunities in improved legal access to forest products	Allowed as long as actions are not violating national law
Information about changing condition of forest resources in the area	Allowed as long as actions are not violating national law
Coordinate activities with external organizations, attract support	Required by the Law of Municipalities, articles 8-III-8 and 8-V-4
Broker contacts with external markets	Allowed as long as actions are not contradicting national law

^a Reglamento de las Organizaciones Territoriales de Bases, Decreto Supremo No. 23858. 1994

^b Ley de Municipalidades, Ley No. 2028, 1999

While many of the municipal functions that were derived from theory as supportive of collective action are not opposed by the law, only a few of them are explicitly mentioned as priority tasks for municipal governments. As we shall see in the next several chapters, the legal framework seems consistent with the goals of supporting locally based natural resource management. The main problems seem associated with the *motivation* of local governance actors and the *organization* of their action. Future chapters analyze these two constraints and in doing so, this study provides an empirically grounded explanation of why the observed results have been so variable from one municipality to another.

5. CONCLUSION

This chapter's overview of forest governance in Bolivia started out with the question why forestry is not playing a more important role in the fight against poverty in Bolivia. Evidence discussed in the chapter points to problems associated with forest tenure security and legal access to forest resources property rights. Forest tenure security is a fundamental condition for encouraging Bolivian farmers to invest in their forest resources. Only with forest tenure security would rural smallholders have an incentive to start diversifying their traditionally agriculture-biased production systems to include forest-related products.

Establishing the necessary stability and predictability of the rule of law and a well functioning cadastral system in the government administration will take time. Nevertheless, there are other things that public and private organizations can do to increase land and tree tenure in the meantime. Repeated interaction between governmental authorities and forest user groups with the purpose of supporting forest users to gain legal access to and protect their forest user rights is a first step to improve forest tenure security. The analysis in this chapter suggests that, in theory, decentralization can help this happen. However, this is by no means an automatic process.

The historical record of the central government's bleak performance in the forestry sector suggests that the traditional coercive approach to abate CPR problems does not work in Bolivia. Pure privatization of all forested land is not likely to work either, as it would threaten to render large groups of forest-dependent people without legal access to resources. The forestry-sector reforms in Bolivia, which decentralized some of the decision making in the forestry sector down to democratically elected municipal governments, present some important opportunities to deal with the widespread problem of insecure forest property rights. Municipal governments alone are not likely to be able to do much about improved forest tenure, as many of the obstacles to greater property rights security go beyond the jurisdiction, resources, and capacity of municipal governments. The analysis in this chapter shifts the focus from the activities of *governments* to those of *governance actors*. To provide more forest tenure security, governance actors at multiple levels need to cooperate. Tenure security is a public good that cannot be produced by any one actor unilaterally.

Although the new forestry law allows for such cooperation to take place, and even has instruments in place that invite cooperation, such efforts may be difficult to implement in practice as they are likely to be hampered by several collective-action problems, such as motivation problems and asymmetries of information and power. Many hurdles need to be overcome by municipal governance actors in order to organize themselves and their administrations for effective forest governance, providing the support necessary for users to gain access to, protect and manage their resources effectively. The next chapter will look at how the Bolivian set of reforms may have helped municipal governance actors to provide this kind of support.

CHAPTER 2

Is the municipal mandate in Bolivia's forestry regime conducive for local problem solving?

1. INTRODUCTION

While many other countries in Latin America have introduced decentralization reforms in the natural resource management sectors, no other country in the region has taken this process as far as Bolivia (FAO 1999). Through the decentralization reforms in the mid-1990s, municipal governments became a *tour de force* in Bolivian politics. Most of the current municipal governments did not even exist before 1994, and the ones that did, played only a symbolic role in the local political arena. In pre-reform Bolivia, municipal governments were essentially small, voluntary urban organizations without any significant political power, financial resources, or a clearly defined jurisdiction. Many of them had no formal obligations to either the central government or the citizens, apart from keeping the town square neat and tidy. That all changed with the reforms in 1994, when the central government began to transfer political decision making competence and financial resources to municipal governments.

Between 1994 and 1996, the government under President Sanchez de Lozada introduced a series of decentralization reforms that would radically change the country's political structure. The Law of Popular Participation (1994), the Law of Municipalities (1999) and the Law of Decentralized Administration (1995), established the municipal governments as major new political actors and provided them with the formal political competence and financial instruments to carry out their locally defined priorities and political programs. In post-reform Bolivia, popularly elected municipal governments are responsible for providing its citizenry with public services in a score of sectors; such as education, health, roads, water, sanitation, and natural resource management. In order to help finance the provision and production of these services, about 20 percent of the central government budget is transferred to the 314 municipal governments. In addition to the intra-governmental financial transfers, each municipality may levy taxes on motor vehicles as well as taxes on all urban property and large properties in rural areas.¹¹ Municipal governments may not levy their own taxes on operations in the forestry sector, and they are not allowed to ask for user fees when providing public services in the sector.

¹¹ In rural areas, private property farms smaller than 50 hectares are exempt from municipal property tax.

The Forestry Law (1996) lays out the broad mandate of the municipal governments in the forestry sector. Among their main duties, municipal governments are responsible for monitoring compliance with the formal user rules prescribed by the forestry law. In addition, they are to lead and coordinate the planning, implementation and monitoring of all public services related to the forestry sector in their respective territories. As long as municipalities comply with the overall formal mandate, they are free to adopt their own strategies of how to meet the exigencies of forest users in their jurisdictions, as long as these strategies do not conflict with the formal forestry regime.

The analysis in the previous chapter noted that the suboptimal utilization of forest resources is one of the main obstacles to poverty reduction in Bolivia. According to that analysis, one of the primary reasons for the forestry sector's limited contribution to the improvement of rural livelihoods, seem to be widespread insecurity of forest property rights among the rural poor. But what could municipal governments *realistically* do about that in Bolivia? This chapter presents the official municipal forestry-sector mandate and analyzes to what extent it can help improve the security of forest property rights for the rural poor.

It is improbable that, in the immediate future, Bolivia's political representatives would be able to create well-functioning governance institutions with a robust property rights system and a predictable and fair rule of law. Nevertheless, there are important functions that public organizations could undertake that would improve the incentives of the rural poor to invest in the development of forest resources. Governmental organizations in general, and municipal governments in particular, can improve forest property rights by providing several meaningful public services, for example (1) offering legal backup and help in monitoring to enforce locally defined user rules; (2) creating low-cost forums for planning and conflict resolution, and (3) disseminating information about changes in the condition of the forest resources in the territory as well as opportunities for users to improve legal access to forest resources.

In theory, a lower-level government, such as a municipal government, enjoys important advantages over any central agency to provide these services efficiently, because the former has access to better information about what mix of services would yield maximum utility to users (Ostrom et al. 1993; Hayek 1948). Would such service provision be consistent with the Bolivian forestry regime? If so, would municipal governments possess the necessary capacity to provide these services in an accountable, effective, and efficient manner? These are two of the core questions that guide the analysis in this chapter.

There are three main findings that emerge from the analysis of the Bolivian reform experiment in the forestry sector. First, the sector reform presents important opportunities for improved forest governance in general and for municipal government-led facilitation of collective action in particular. Second, the official mandate given to municipal governments through the decentralization reforms empowers them to engage in activities that have the potential to improve the security of forest property rights for the rural poor. Third, the effectiveness of the decentralized forestry regime will largely depend on the outcomes of the relationships between (1) the central and municipal governments, (2) actors within municipal governments, (3) individuals and user groups throughout the municipal territory, and (4) between forest users and municipal governments. The challenge to achieve effective and efficient municipal forest governance can thus be framed as a collective-action problem in each of these four action arenas.

This chapter presents the municipal mandate in Bolivia's forestry sector and discusses how it has changed the prospects for addressing property right problems in the forestry sector. It starts out with a review of what the forestry-sector governance used to look like before 1996. It then turns to the reform itself and explains what specific forestry-sector tasks and functions municipal governments have been asked to take care of. The chapter ends with an assessment of the decentralized mandate and the opportunities and constraints that it carries for addressing rural people's limited and uncertain access to and protection of forest resources.

2. BACKGROUND: MUNICIPAL GOVERNANCE OF CIVIC AFFAIRS

For most of Bolivia's municipal governments, everything changed in 1994 when the Law of Popular Participation was passed. Representing the lowest level of government in Bolivia, municipal governments had existed by law ever since Bolivia's first constitution was drafted in 1827, but it was not until 1994 that they gained significant political clout in national politics. The 1994 approval of the Popular Participation Law and other subsequent reforms meant a dramatic shift in the way political authority and financial resources were distributed, so also for the forestry sector.

In an effort to promote administrative transparency and political accountability of the public municipal administration, the decentralization reforms created a formal institution of social control that all municipal governments were obliged to create. A politically independent Municipal Oversight Committee,¹² consisting of elected representatives of local grass root

¹² *El Comité de Vigilancia* as prescribed by the Law of Popular Participation, No 1551, 1994.

organizations, is charged with the responsibility to perform a series of social control functions. The Municipal Oversight Committee, as the name suggests, monitors the municipal administration's adherence to central government regulations with regards to public expenditures in the municipal jurisdiction. In order for central government to disburse release funds to the municipalities, the Municipal Oversight Committee needs to approve the annual work plan of activities that the governmental transfers will be used towards. According to the Law of Popular Participation, two of the central criteria in the Municipal Oversight Committee's evaluation of the annual work plan, should be (1) the fair and reasonable distribution of allocations to rural and urban areas within the municipal jurisdiction, and (2) that no more than ten percent of the central government transfers should be spent on administrative costs.¹³ Should the Municipal Oversight Committee find that the municipal government does not manage the public resources in a satisfactory manner, they have the power to denounce the municipal council in front of the executive power of the government. The Senate is then obliged to intervene by first freezing all monetary transfers and then investigating the problem before ordering how to resolve the problem. Judging from the large increases in resources made available to municipal governments after the decentralization reform, the Municipal Oversight Committees have an extremely important function to perform.

In 1994, just after the Law of Popular Participation was passed, many municipal government's annual operating budget increased by as much as a few hundred percent, and many went from essentially zero to tens and thousands of dollars, practically overnight. For instance, consider the rural municipalities in the Department of Cochabamba, whose incomes from central government transfers for the 1993–1998 period are disclosed in Table 2.1 below. The total resources available from central government, which still represents the vast majority of funding for Bolivia's municipal governments, increased by a 1,310 percent from 1993 to 1994, and by 259 percent from 1994 to 1998.

¹³ Article 10, a and b, of the Law of Popular Participation, No. 1551, 1994.

Table 2.1. Fiscal Transfers to Rural Municipalities in the Cochabamba

Municipality	1993	1994	1993–1994 Change	1998	1994–1998 Change
Aiquile	1,496	164,780	10916%	615,841	274%
Pasorapa	37	36,146	98870%	136,363	277%
Omereque	0	38,813		146,406	277%
Ayopaya	0	224,244		845,553	277%
Morochata	0	204,581		771,510	277%
Tarata	3,904	66,848	1612%	248,773	272%
Anzaldo	0	79,177		290,341	267%
Arbieto	0	61,362		231,292	277%
Sacabamba	0	26,678		108,986	309%
Arani	11	103,387	914482%	389,598	277%
Vacas	0	79,828		301,097	277%
Arque	0	53,499		265,720	397%
Tacopaya	0	89,706		274,402	206%
Capinota	101,459	224,317	121%	465,507	108%
Santivañez	4	49,663	1359729%	187,324	277%
Sicaya	0	18,696		70,558	277%
Cliza	216	125,323	58014%	518,483	314%
Toko	0	50,036		188,745	277%
Tolata	0	41,449		106,853	158%
Sipe Sipe	50	158,471	316291%	566,569	258%
Tiquipaya	6,042	110,758	1733%	395,879	257%
Vinto	2,074	165,087	7862%	635,189	285%
Colcapirhua	209,347	277,615	33%	658,033	137%
Colomi	3	105,539	3193858%	458,632	335%
Villa Tunari	0	394,270		1425,177	261%
Tapacari	0	150,784		568,643	277%
Totora	48	110,750	228969%	414,367	274%
Pojo	0	44,056		527,934	1098%
Pocona	0	100,485		378,931	277%
Chimoré	0	51,147		253,189	395%
Puerto Villarroel	0	304,818		729,675	139%
Mizque	0	158,598		597,502	277%
Alalay	0	28,297		106,764	277%
Punata	2,099	183,624	8646%	804,250	338%
Villa Rivero	0	44,835		175,977	292%
San Benito	0	127,007		359,881	183%
Tacachi	0	3,262		12,233	275%
Cuchumuela	0	15,247		50,706	233%
Bolivar	0	55,543		209,516	277%
Tiraque	0	246,005		927,534	277%
TOTALS	\$326,789	\$4,607,405	1310%	\$16,543,199	259%

Source: Ministerio de Hacienda 2000. Servicio de Impuestos, Contaduría General del Estado

While the availability of funds at the local level represents opportunities for mitigating many urgent poverty-related problems, such dramatic increases in the flow of funds create their own set of problems. The lack of institutional mechanisms for financial accountability in combination with the inexperience of local government officials to organize an administration of this magnitude, presented a series of perverse incentives that made it difficult for municipal officials to manage the municipal finances in a responsible fashion. Ironically, despite the increased availability of funds, a score of the country's 314 municipalities find themselves in indebtedness and severe financial crisis, prohibiting them from fulfilling many of their mandated obligations (Pacheco 2000).

There is little doubt that bad financial management is a major cause of the paradoxical situation of municipal indebtedness. However, the problem may go deeper than that. Bad financial management can be seen as a symptom of a more systematic defect of the decentralization reform process: that the importance of institutional arrangements at the municipal level were not properly assessed by the decentralization reform and its proponents. Could it be that there is a mismatch between what is *expected* from municipal governments and what they can *realistically deliver* under the current circumstances? What factors determine the performance of municipal governments?

This study attempts to answer this question in the context of the forestry sector. The section that follows outlines and compares the official forestry policy before and after the decentralization reforms in Bolivia. It highlights the regime's expectations on municipal governments concerning their contributions to the promotion of "*sustainable use and the protection of the woods and forested areas to benefit current and future generations*" (Government of Bolivia 1996b).¹⁴

3. FOREST GOVERNANCE IN BOLIVIA: THE OLD AND NEW REGIMES

Forest governance in pre-reform Bolivia was a centralized affair. The 1974 Forestry law¹⁵ laid the ground rules for activities in the sector. Under the 1974 regime, one central agency, the *Centro de Desarrollo Forestal* (CDF) handled all administrative functions and enforced the formal rules in the sector. Contreras and Vargas (2001) characterize the old regime as a governance system in which "there was little political will to implement the formal rules and the widespread corruption at higher levels in the centralized hierarchy, which generated a general

¹⁴ Forestry Law No. 1700, article 1, 1, 1996.

¹⁵ Decreto Ley 11686 de 1974.

sense of apathy at lower levels” (p. 6). The formal rules of the old law, as shall be seen in this section, had little effect on private firms and other users in the sector. For a variety of reasons, which are described in more detail below, all forest users under the old regime were fairly unconstrained by the governmental authorities to maximize their individual short-term gains, at the expense of social welfare (Pacheco 1998). The de facto institutional arrangements under the old regime¹⁶ were not conducive to sustainable forest management as they generated several serious incentive problems for individuals within government agencies, commercial firms and forest user groups in general. The analysis below highlights the origins of some of the old regime’s perverse incentives.¹⁷

3.1 Short-Term Forest Concessions

Forest concessions rights were issued by the CDF to any individual or corporation for any forested area in the country, including forests on privately owned land. Even if the law provided for the possibility to acquire 20-year concession rights, the administrative procedure was so burdensome that for all practical reasons the length of the vast majority of logging concessions were limited to 1 to 5 years. The short length of induced concession holders to maximize short-term profits and not make any investments for resource improvements, as this would not benefit the present concession holder (Contreras and Vargas 2001).

3.2 Uncertain Property Rights

As highlighted in chapter 1, forest property rights during the pre-reform era were ambiguous and insecure for users who did not have an official concession right. The lack of clear and long-term forest access rights produced perverse incentives to “mine” the resources rather than considering the long-term effects of such usage. The perverse incentive to waste forest resources was reinforced by the old regime since it was easier to acquire formal *land* rights as compared to *forest access* rights. The established way to demonstrate land access rights was to clear the land from forest, regardless of the ecological consequences of doing so (Contreras 1999; Mahar and Schneider 1994).

3.3 Volume-Based Logging Fees

All individuals and corporations who extracted forest products commercially were obliged to pay a fee based on the volume of extracted species, regardless how large the areas of the concessions are. This tax policy was extremely difficult and expensive to monitor which made

¹⁶ The “old regime” in this chapter refers to the formal and informal institutional arrangements associated with the centralized, pre-reform administration of forest sector governance.

it easy for producers to cheat on their fee payments. The taxing system generated strong incentives for concession holders to maximize concession areas, as they did not pay more for this. The volume-based tax system drove concession holders to concentrate their extraction to a few of the most valuable species only, leading to overharvesting of Mahogany, Cedar, and Bolivian oak (Pacheco and Kaimowitz 1998).

3.4 Inequitable Distribution of Benefits

Partly because of the tax system, the old regime was characterized by few players who controlled vast amounts of the flow of benefits from the country's forestry sector. In 1995, the year before the reforms, about 50 firms controlled 186 concessions on a total area of 22 million hectares of forest, representing about 40 percent of the total forested area in the country (Pacheco and Kaimowitz 1998). The inequitable distribution of benefits led to widespread conflicts over resource access, especially in areas where concession boundaries overlapped with the community lands of farmers and indigenous people. (Urioste and Pacheco 2001). Under these circumstances, there were few incentives for rural people without access to logging concessions to invest in forest resource improvements (Contreras and Vargas 2001).

3.5 Weak Enforcement Mechanisms

Enforcement of the regime's formal rules for resource access and use was irregular in character as the CDF did not count with the necessary resources to monitor extraction activities. One of the few control mechanism was the road checkpoints, at which CDF personnel inspected the timber trucks. The volumes recorded and fees collected at these checkpoints, however, were so low that only opportunistic behavior on behalf of the CDF personnel could explain the missing numbers (Roper 2000). The corrupt system made it rational for concession holders to evade taxes even further, since they knew that fees paid to the government would not provide any public services that would be beneficial to them.

3.6 Weak Incentives for Sustainable Practices

The availability of high value species and lax rule enforcement made it economically unprofitable to invest in forest product processing. The old regime made it rational for commercial loggers to export raw materials rather than processed forest products with higher value added, because the latter required substantial investments. Contreras and Vargas (2001) observe that as a result of this situation, there were few incentives for entrepreneurs to develop a

¹⁷ The analysis of the old regime is based on the recent policy review by Contreras and Vargas (2001).

forest product industry in Bolivia. This lack of industrialization would later hamper the sector when the tougher regulatory conditions of the post-reform era hit in 1996.

3.7 Political Manipulation of Sector Decisions

Several forestry policy analysts have pointed to the influence of political interests in the decision-making apparatus of the CDF.¹⁸ The assigning of concession rights, for instance, was easily manipulable by political actors as this was a highly centralized function with little transparency (Andaluz 1995; Roper 2000).

It was in the wake of these institutional failures that the new forestry regime was launched in 1996. One of the principal features of the new regime was breaking up of the central and comprehensive mandate that the old regime placed on the CDF and the line ministry. In the new regime, six different organizations at different level of governance share the political, fiscal and administrative functions of forestry-sector governance. In contrast to the older regime, the 1996 law and regulations brought in lower level of governments, such as municipal administrations, into the picture and charged them with a series of key political responsibilities.

4. DECENTRALIZATION OF FORESTRY-SECTOR COMPETENCIES

The decentralization of the competencies in the forestry sector was partly enacted through the 1996 Forestry Law. The new forestry law was congruent with the other three decentralization reforms¹⁹ in the sense that it recognized the municipal governments' new role in local governance. It placed some of the previously centralized governance functions of the sector, such as monitoring and technical assistance, under the jurisdiction of the municipalities. Another major change from the previous law was that it recognized the country's indigenous people's exclusive right to extract forest products on their land, not only for subsistence but also for commercial purposes.

Perhaps the most significant change that the new, decentralized regime brought about was an attempt to introduce an institutional design with checks and balances between each of the six actors. This design was meant to hold each actor accountable to the public and each one of the other governance actors. To coordinate the overall governance system, the reform created the politically independent Forestry Superintendence in the center of the system. Table 2.2 provides an abbreviated comparison between the old and the new regimes' official policies.

¹⁸ See for example Roper 2000; Robbins et al. 1995; Andaluz 1995; and Contreras and Vargas 2001.

¹⁹ LPP 1994, LM 1955 and LDA 1955.

Table 2.2. Comparing Old and New Forestry Regimes at the Constitutional Level

Issues	Old Regime Policy	New Regime Policy	Implications
Logging Concessions	In theory a 20-year limit, but in practice it was a 4- to 5-year right. Allocation of concessionary rights were subject to political manipulation	Up to 40 year concession rights, allocated through publicly held, competitive bidding.	Weak incentive derived from short-term concessions in old regime better addressed by 40-year rule in new regime. More transparency in allocation of rights, at least in theory. Implementation of formal rules in new regime is still a problem
Forest Management	Formal rules required management plans, but these were not enforced effectively. Rotation period not defined for management plans.	More rigorous control mechanisms in place to ensure management plans are in place. Minimum 20-year rotation scheme.	Compliance is more expensive under new regime, because enforcement is stricter, but since the administrative processes are more transparent, monitoring is more effective and less susceptible to corruption. Rotation period limits maximum intervention to 5 % of the total concession area each year. Compliance with new regime makes certification come within reach.
Forestry Tax and Fees	Volume-based fees depending on species, but regardless of concession area	Area-based fees, \$1.00 per hectare, regardless of species.	New regime is easier to monitor, reduces incentives to maximize concession area and focus on single species without value added. Reduces concentration of sector benefit flows
Sector Administration	Sector administration is subject to political intervention and manipulation, as a result lack of resources, high turnover rates and low level of professional proficiency	Politically independent superintendence of forestry with long term mandate (6 years). Funded directly by concession fees,	Better professionals in new regime who stay longer on the posts But still problems with funding since the administration depends completely on the forestry firms ability to pay their fees. Currently the Superintendence is in deep financial crisis, which threatens the long-term prospects of effective sector governance.
Governance	Little transparency in administrative decisions centralized system of provision and production, highly inefficient	Decentralized model with checks and balances between the seven organizations that took over the mandate of the CDF	More transparent administration, less corruption, more built-in accountability mechanisms and public scrutiny in new regime.
Participation and Equity	virtually no formal access to timber or commercial extraction for the rural poor. Communities not able to defend user rights against concessions.	Land owners have exclusive user rights for forests on their land. Rural community access to concessions on public land through new provisions.	More participation and equity under new regime, but bureaucratic hurdles make legal access to concessions expensive and difficult. Expensive to get management plans elaborated because of formal controls. Preferential treatment in taxing of extraction by organized rural communities with legal management plans.
Protected Areas	Paper parks without meaning in practice, even open to logging	No logging allowed. Incentives for reforestation within.	Rural communities denied access and are rarely involved in park services and do not benefit substantially from protection.

Source: Contreras and Vargas (2001)

4.1 The New Regime Actors and Their Powers

The Forestry Superintendence (FS) is arguably the most important government actor in Bolivia's forestry sector. This central governmental agency was created by the 1996 Forestry Law in an effort to de-politicize the country's forestry policy. According to the 1996 law, the FS is a politically independent, technically competent regulator with the main responsibility of enforcing the forestry law. Practically, all regulatory competencies rest with either the Forestry Superintendence or the Ministry of Sustainable Development and Planning, which is the political lead institution for the forestry sector. Table 2.3 outlines how the governance functions in the decentralized regime are divided among the six main actors.

4.2 The Municipal Mandate

The 1996 forestry law recognizes the municipal government as a key actor in the nation's efforts to align national forestry policy and planning activities to sustainable forestry practices. The specific competencies and responsibilities assigned to municipal governments are primarily associated with technical advice, monitoring and administration. For these functions the municipalities enjoy a great deal of authority and decides independently who, when, where and how these functions are to be carried out. Nevertheless, the municipal government is ultimately accountable to the central government for the results of the delegated functions.²⁰ The formal competence and responsibilities with regard to the *regulatory* and most *judicial* functions remain centralized with the Forestry Superintendence and the Ministry of Sustainable Development. Table 2.3 outlines the specific functions assigned to municipal governments according to each area of competence.

4.3 Financial Means to Perform

All forest users who extract resources commercially are liable to pay some type of user fee or tax. These revenues finance the operations of the six organizations that share the political, financial, and administrative mandate of forest-sector governance. Table 2.4 shows how these revenues are distributed between the responsible organizations. These resources are in addition to the inter-governmental fiscal transfers that represent 20 percent of the national budget.

²⁰ Using Rondinelli's typology of decentralization, Bolivia's forestry sector reforms is a case of delegation rather than *deconcentration* or *devolution* (Rondinelli et al. 1989).

Table 2.3. Forest Governance Competences after the Decentralization Reforms

INSTITUTIONS	COMPETENCE FUNCTIONS
Ministry of Sustainable Development and Planning (MSDP)	<p>Formulate forest policies, strategies, plans and norms. Land classification and evaluation of forest potential. Delimitation of areas to be granted as concessions to timber companies and local groups Prices of timber and readjusting of forest fees Promote research, extension and education. Look for technical assistance and funding for plans, programs and projects.</p>
Forest Superintendence (FS)	<p>Supervise compliance of the forest regime Granting rights of forest use Approval of management plans and private sector agreements with indigenous territories (ITs) Enforcement of forest regulations and setting fines to illegal users Registration of concession, authorizations and logging permits. Inspect forest areas and activities, appropriate unauthorized timber and sell it through public bidding Require external forest audits in forest operations Collect fees and distribute them</p>
Prefectures	<p>Design and implement public investment projects at departmental level according to national policies, strategies and plans in the following fields: Forest development, research and extension, afforestation, reforestation, watershed conservation. Institutional strengthening of Municipalities in their forestry activities. Execute functions delegated by MSDP, MED and FS</p>
Municipalities	<p>Propose to MSDP the delimitation of Municipal Forest Reserves to be granted as community concessions to local user groups. Offer technical assistance to Local user groups and Indigenous Territories. Create Municipal Forestry Units (MFUs) Help users develop and adopt forest management plans and other instruments of sustainable forest management. Inspect forest activities and inform the forestry superintendent. Ask for external audits of any forest operations, including sawmills, carpentry shops, logging firms, cooperatives, etc.</p>
FONABOSQUE ^a	<p>Finance projects related to the sustainable management and protection of forest lands</p>
Ministry of Economic Development (MED)	<p>Promote forest investments, production and productivity of the forest industry. Promote the forest marketing and the introduction of lesser known species in national and international markets. Promote added value production in coordination with Prefectures and Municipalities.</p>

^a Not yet fully operational.

Source: Flores and Ridder (1999)

Table 2.4. Distribution of Government Revenues from Forest Management Activities

Organization	Concessions	Land clearings	Fines
Provincial governments	35%	25%	0
Municipal governments	25%	25%	0
FONABOSQUE	10%	50%	100%
Superintendence	30%	0	0
Total	100%	100%	100%

Source: Government of Bolivia (1996b)

The majority of the state's revenues from forestry activities come from the forest concessions. Each concession holder pays an annual fee of US\$1.00 per hectare. The second most important source of income for the state is a tax on commercial extraction on private lands and on a few volume-based concession contracts, which are leftover contracts from the old regime. Users with old-regime contracts pay 17 percent of the commercial values of the volume of particular species that they are authorized to harvest and sell. These two sources constitute about 95 percent of the total annual revenue for forestry governance of about US\$ 2.1 million in 2000 (Superintendencia Forestal 2001a).²¹

Municipalities, who cannot raise their own taxes in the forestry sector, are entitled to receive 25 percent of the government revenues from forestry-sector operations. The rest of the revenues are distributed according to the scheme in Table 2.5.

²¹ Non payment of concession fees has become a major constraint for the regime. The superintendence only collected about half of the calculated fees in 2000, leaving the entire regime severely under financed.

Table 2.5. Main Formal Competencies of Municipal Governments in the Forestry Sector

Competence	Task	Decision-Making Bodies
Judicial	Delimitation of municipal reserves to be assigned as community concessions for local user groups in up to 25% of the total forested land in the territory.	Ministry of Sustainable Development decides the fate of the application and asks municipal government to help the user group to develop a management plan. (FS) approves or rejects the management plan.
	Inspect and control all forestry activities within the territorial jurisdiction	Municipality
	Report violations of the forestry law and any other governmental regulations	FS decides how to react to the reported violation and what sanction to impose, if any.
Technical	Technical advice to LUGs and ITs for management plans ²²	Municipality decides what input to give but FS approves or rejects management plans.
	Set up a municipal data base with forest resources in the municipality	Municipality
Socioeconomic	Organize training for user groups	Municipality
	Facilitate, promote commercial undertakings and private sector participation in the area	Municipality ²³

Source: Government of Bolivia (1996a, 1996b)

In 1999, about a third of all municipal governments in the country (109 out of 314) shared a total of US\$ 1.2 million in sector revenues. The distribution of these resources, however, was rather skewed as over half the amount was given to only 13 municipalities. The top 30 municipalities received 84% of the collected fees (Pacheco 2000). As a result, the remaining 79 municipalities were left with an average annual core budget²⁴ of about \$2,430, which is insufficient to comply with the Forestry Superintendence's requirement to create, staff, equip and operate a Municipal Forestry Unit (MFU).²⁵ According to a recent evaluation commissioned by the Forestry Superintendence, only 13 municipalities would have sufficient funds to meet the

²² Indigenous Territories (ITs) is a free translation of the Bolivian denomination Tierras Comunitarias de Origen (TCOs).

²³ The state-sponsored project *Municipio Productivo* is a training package directed at all municipalities in the country and has as its primary objective to enable municipalities to attract private-sector partners to invest in their municipality.

²⁴ In addition to these incomes, municipalities that receive royalties are required to assign at least 10% of the funds they receive from the Popular Participation Law, regardless how little their income from forestry activities is. Since for most municipalities the PPL income is much larger than from forestry royalties, many municipalities end up having more liabilities than assets through their involvement in the forestry sector. In effect, this situation produces a perverse incentive to stay out of the sector completely, as the costs of active involvement exceed the benefits for most municipalities.

²⁵ According to the FS policy, each municipality that receives a share of forestry royalties must, within six months of the reception of these funds, create a Municipal Forestry Unit. Each unit should be headed by a professional forester, assisted by at least two field assistants, as well as being equipped with one 4x4

state directives for the MFU. However, none of the 109 municipal governments have fully fulfilled these requirements (Pacheco 2000, citing de Urioste 2000).

5. IS THE MUNICIPAL MANDATE CONDUCTIVE FOR COLLECTIVE-ACTION FACILITATION?

Although central government has retained considerable decision-making authority in most regulatory matters, it is the expressed intention of the Forestry Superintendence to successively delegate more competences to the Municipal Forestry Units (MFUs), as these mature and prove capable of handling more responsibilities. The delegation of formal regulatory powers is still experimental in nature and has not substantially changed the distribution of competencies shown in Table 2.3.

One of the potential advantages of relying on a decentralized governance structure for natural resource management is the possibility to introduce appropriate policy responses to local problems. Technically, there are currently no legal barriers that would prevent municipal governments from enforcing locally crafted rules on forest use, as long as such municipal ordinances were congruent with national policy and law. In fact, one example of the room given to municipal governments to create locally adapted rules, is their political mandate in the area of land-use planning. It is the explicit purposes of the Law of Municipalities to empower municipal governments to become the “land use planners and managers of the municipal territory” (Law of Municipalities 1999, article 5). Land-use planning at the municipal level implies by definition a process by which land-use rights are allocated. The allocated land-use rights are essentially rules that define who has the right to do what, when.

Likewise, the municipal government could engage users in the sector in a “forest use planning” exercise in which local forest users affected by common problems participate in a collective-choice forum to craft rules that may produce more productive outcomes for all. While there is nothing in the official forestry mandate to prevent that from occurring in all Bolivian municipalities, there may be other barriers that should make us wary of expecting municipal governments from undertaking such tasks automatically.

vehicle; one motorcycle; computer; GIS; GPS as well as a set of political, land-use and land-cover maps. FS 1999 estimates the annual operating costs of this unit to be about US\$ 39,000.

6. MUNICIPAL GOVERNMENTS' COMPETENCE RELATED TO PROPERTY RIGHTS

As this study is primarily concerned with the role of municipal governments in facilitating more secure forest property rights, it is important to consider how the specific legal mandate of municipal governments might affect this process. This section discusses of how the official tasks and functions, which are part of the formal regime's mandate to municipal governments, may affect the security of forest property rights for the rural poor. The relevance for municipal facilitation is highlighted for each of the mandate's formal functions is summarized in Table 2.6.

Table 2.6. Possible Contribution of Municipal Governance to Secure Forest Property Rights for Smallholders

Tasks and Functions	Source	Possible Effects on Forest Property Rights
<p>Lead the participatory planning process Annual work plan (POAS^a) and five-year strategic plan (PDM^b) must be developed with wide stakeholder participation in open forums organized and facilitated by the municipal government.</p>	LPP ^c , art 8 a, b, LM ^d , art 44-11	Collective choice level user rules, including land and forest use plans at the property level, may be created and recognized by the municipal administration to help users deal with operational-level problems. Provide forum for capturing new challenges to local forest users
<p>Conflict resolution Municipal governments may intervene in conflicts between citizens through arbitration and mediation</p>	DS,23858 ^e LM art 144,1-2	May provide accessible and low-cost forums to address the inevitable problems and friction between users of a changing property rights regime.
<p>Creation of municipal forest reserves Delimit 20 percent of fiscal forest land for community logging concessions.</p>	Forestry law ^f , article 25 a	Increased legal access to valuable forest products previously denied to the rural poor if the bureaucratic hurdles are cleared by the municipal administration.
<p>Assist groups in developing management plans Technical, administrative and legal advice to forest users to develop formal forest management plans.</p>	Forestry law, article 25 b	If advice is effective, it may improve access to legal extraction rights which in turn tend to improve long term profitability as it makes the certification of products with the FSC ^g possible.
<p>Inspect and monitor all forestry operations On private, public, communal and concessioned public land to control compliance with forestry law</p>	Forestry law, article 25, c-h	Potential strengthening of forest property rights of the rural poor through support to monitoring, as well as grassroots' support to monitoring of formal forestry regulations.
<p>Assist users to deal with bureaucracies To assist forest users getting legal permits for land clearings, forest management, commercial sale and transport from and central and regional agencies</p>	LM articles 8-III-8 and 8-V-4	If effective, such services may serve to lower the costs associated with legalizing forest use. Legal forest use will receive more government protection if violated. May also lead to more awareness among users about how to take advantage of opportunities within the realms of the regime for smallholders and their forest extraction.

Table 2.6 (cont'd)

Tasks and Functions	Source	Tasks and Functions
<p>Technical assessment reports of land clearing Performed by the municipal personnel has to accompany all permit applications. Some MFUs have been delegated decision making powers to authorize land clearings.</p>	Forestry Law, SIF directive #1 / 2000.	With good rapport with users and knowledge of agroforestry systems, the MFU officer may offer advice on where to clear land and where agroforestry may improve yields. This may decrease the need for continuous land clearings, and thus also reducing the number of land-use conflicts that accompany expansion of ag land.
<p>Urban and Rural Cadastre Municipal Administration is to create and maintain a cadastre of all properties in both urban and rural properties within the municipal territory.</p>	LM 44-17	If operative and legitimate, such a cadastre can be an invaluable legal instrument not only for collecting taxes but also for establishing more secure ownership rights to land and therefore also user rights to forests.
<p>Information management Municipal governments are asked to keep a register of all plantation forests, native forest and nurseries on private land in the territory. This information is needed to cross-check claims to tax breaks by private landholders.</p>	Forestry Law reg. art 68, VI and LM articles 8-I-6-7	Users could use information on a score of themes, such as the changing condition of the forest resources in the municipality, market opportunities, and new developments in the formal rules of forest governance, which may or may not help forest users to secure their forest property rights.

^a Plan Operativo Annual

^b Plan del Desarrollo Municipal

^c Ley de Participación Popular, Ley No. 1551, 1994

^d Ley de Municipalidades, Ley No. 2028, 1999

^e Reglamento de las Organizaciones Territoriales de Bases, Decreto Supremo No. 23858. 1994

^f Ley Forestal, Ley No. 1700, 1996

^g Forest Stewardship Council

Note: The Forest Stewardship Council certification program tends to improve high-end market access in Europe and North America, and, arguably increase the wholesale value added (Superintendencia Forestal 2000a; but see also evidence from Contreras and Vargas 2001).

6.1 The Possibilities of the Decentralization Reforms

Recall from the discussion of the collective-action literature in chapter 1 that there are several potential contributions from municipal governments towards the solution of local CPR problems. Recall also that many of these have to do with the provision of collective choice arenas to address operational-level problems. Comparing the list of potential contributions of municipal governments from chapter 1 with the formal mandate of municipal government described in this chapter, the considerable overlap becomes evident.

However, there are also several services that are *not* included in the formal forestry mandate that municipal governments would be free to undertake, if motivated to do so. This is because of the broad, political mandate given to municipal governments through legal instruments outside the Forestry Law. Both the Law of Popular Participation (1994) and the Law

of Municipalities (1999) recognize municipal governments as a primary governmental authority in planning and implementation of several public services, including land-use planning and natural resource management. This broad municipal mandate would imply that even if the facilitation of collective action related to improved forest property rights is not explicitly mentioned in the formal forestry mandate, municipal governments would have sufficient legal support of other decentralization instruments to perform such facilitative services.

The set of different laws encompassed by the decentralization reform as a whole, thus represents a possibility for municipal facilitation of local collective action in the forestry sector. Examples of facultative actions that municipal governments would be able to legally carry out include the organization and facilitation of participatory planning meetings, land-use and forest-use planning sessions, and forums for land-use conflicts. As long as the undertaken actions are not contradicting the formal mandate's limits, municipal governments are legitimate facilitators of local collective action. Below follows a discussion about what room exists for municipal governments within the limits of the law, to facilitate collective action.

6.1.1 Leading the Participatory Planning Process

According to the laws of Municipalities and Popular Participation, the municipal government is to define its annual work plan through a participatory planning process, in which the interests of all organized citizen groups should be represented (Government of Bolivia, 1994, Article 8a,b; Government of Bolivia, 1999, Article 44.11). Land-use planning is one of the specific areas of planning responsibility for the municipal governments. According to Article 44 of the LDM, municipalities should develop land-use plans for their entire territories, based on ecological zoning maps developed at the Departmental level (1:250000).

Although not explicitly stated in these provisions, the planning role of the municipality endows them with the ability to create collective choice forums for dealing with a wide range of problems. Forest property right problems, if expressed as a concern among participants, could therefore be addressed in this context by proposing specific collective choice rules (as long as these are in conformance with national policy). Given the broad municipal mandate for territorial planning, it is possible that municipal land-use plans are developed in which polygons are assigned specific land-use rights and responsibilities. Such a rigorous approach may help clarify the smallholders' forest property rights, but it can also become a tool for local elites to manipulate permitted land uses to their advantage. Access to and protection of forest property may be indirectly affected by placing such issues on the agenda of the collective choice arena meetings.

6.1.2 *Facilitating Conflict Resolution*

Municipal governments have a general mandate of conflict resolution when the dispute is between groups or individuals within their jurisdiction (Law of Municipalities, article 144,1–2). They may intervene through arbitration and mediation, a process that should strive to create consensus and respect local traditions of how to manage disputes (ibid.).

Conflicts are difficult to avoid when property rights are redefined or redistributed among forest sector actors. Conflicts over user rights are bound to occur as rural communities are empowered to have more formal access and defend their user rights more effectively, because other actors may lose some of their previous privileges. Such conflicts have the potential to be costly for all parties involved as it may reduce productivity of the forest management. It is therefore essential for an efficient property rights system to have access to a forum that is fair, unbiased towards the elites, low cost, and open to all forest users in the jurisdiction. It is not necessarily the municipal government who is best suited to carry out the mediation or even host the forum, but the municipal authority may bring the disputing parties together.

6.1.3 *Creating Municipal Forest Reserves*

According to article 25.a. of the 1996 forestry law, municipality should delimit up to 20 percent of fiscal forest land on its territory the purpose of community-controlled timber extraction. Each interested group that meet the formal criteria defined by the law may solicit a formal logging concession for which they must pay an annual fee of \$1.00 per year and hectare.

The establishment of municipal forest reserves opens up the possibility of increased legal access to valuable forest products previously denied to many rural poor through the legal channels. Major obstacles are the high costs of developing the required management instruments required by law, such as the 20-year forest management plan, and annual forest extraction plans. So far only half a dozen of municipalities count with municipal forest reserves with community concessions operating on them.

6.1.4 *Assisting User Groups with Management Plans*

According to Article 25.b. of the forestry law, municipal governments are asked to provide public support to all forest users who want to develop forest management plans. It is unclear what such support should consist of in detail, but may entail direction in the administrative and legal procedures, help applying for logging permits and assisting in the actual inventorying and land surveying, if such competence is available in the MFU. Depending on the level of expertise of the municipal forestry officials, such support may help overcome several

barriers associated with the requirement to develop a management plan for every commercial timber extraction activity:

- **Cost:** Having municipal staff helping out with tasks might reduce need to hire professional forester;
- **Bureaucracy:** Having the municipal staff handle the paper work may speed things up;
- **Access:** Well-informed municipal staff will know of alternative legal permits for timber extraction that are less costly than forest management plans.

6.1.5 Inspecting Forestry Operations

The forestry law empowers municipal governments to enter into all private, public, communal and concessioned public land to inspect forestry operations and control compliance with the forestry law, at any time without prior notice. Violations are reported to the Superintendence and only preventive expropriations can be made. They have no competence to sanction violators directly. If such inspections respond to the demands of the rural smallholders, however, they have the potential of strengthening the property rights of the rural poor. Since Municipal Oversight Committees are required to assist municipal governments in the monitoring of forestry operations on the territory, there is hope that such participation may lead to more effective monitoring of formal property rights and thus increased protection of local smallholders' property rights

6.1.6 Assisting Users to Deal with Bureaucracies

The Law of Municipalities, articles 8-III-8 and 8-V-4, ask municipal staff to assist citizens in their administrative affairs with central and regional agencies. Such support is especially important in the forestry sector since so many of the decisions concerning official permits and land property rights are under the jurisdiction for national government agencies. Counting on assistance from a municipal staff member that is well connected in the important central agencies, and especially in the forestry superintendence and the Ministry of Sustainable Development, may be of tremendous value to users who would like to legalize their forestry operations. If the officer is also well versed in the law, she will be able to advise users on how to best take advantage of the opportunities offered by the reforms, without breaking the law. Such opportunities do exist in the forestry law, especially when it comes to commercial timber extraction for local communities.

6.1.7 Carrying Out Technical Assessment for Land Clearings

In a recent agency directive, the Forestry Superintendence requires the municipal governments to carry out an in situ technical assessment report for each land clearing application

filed with the government. In some cases, the Superintendence has delegated the responsibility of evaluating user applications for land clearings and forest management to Municipal Forestry Units. The delegation takes place on a case-by-case basis as the superintendence feel confident that the municipality can handle the assessment responsibility in a responsible fashion. Land clearings are normally approved if they are on land classified as appropriate for agriculture according to the municipal land-use plan. The timber from land clearings can be sold, but must be declared and stamped by officials and a fee representing 17 percent of the commercial value of the species must be paid prior to receiving the stamp. If the municipal officer has good rapport with the farmers and possess knowledge of agroforestry systems, she may give them advice on where to clear land and where it may be better to combine forestry and agriculture for improved yields.

6.1.8 Creating and Maintaining Urban and Rural Property Cadastres

According to the law of municipalities, article 44-17, the municipal administration is to create and maintain a cadastre of all properties in both urban and rural properties within the municipal territory. Given that the uncertainty generated by the slow process of the central government's legal sanitation process of all properties in the country, a municipal cadastre that includes all locally recognized land ownership rights as well as user rights to other resources, such as forests, may serve to improve tenure security within the municipal territory. If operative and seen as legitimate by land owners, such a cadastre can be an invaluable legal instrument not only for collecting taxes but also for establishing more secure ownership rights to land and therefore also user rights to forests.

6.1.9 Disseminating Information

Both the 1996 forestry law and the 1999 law of municipalities stress the importance of municipal governments to manage sector relevant information in a systematic and reliable fashion. In the forestry sector, the municipalities are specifically asked to keep a register of all plantation forests, native forest, and nurseries on private land in the territory. This information is needed to cross check claims to tax breaks by private landholders.

Although not explicitly expressed as a featured function, there is nothing to prevent municipal governments from providing users with an additional information-related service. Users would benefit from receiving updated reports on the changing condition of the forest resources in particular parts of the municipality, about possible market opportunities as well as new developments in the formal rules of forest governance, which may or may not help forest users to secure their forest property rights.

7. CONCLUSIONS

Is the municipal mandate in Bolivia's forestry regime adequate for facilitating local collective action? The review of the formal mandate of municipal governments in Bolivia's decentralized forestry regime suggests that there are no formal legal or administrative barriers that would prohibit municipal governments from actively engaging in facilitation of local collective action. The regime is adequate in the sense that it provides ample room, and even legal support, for municipalities to provide a series of services that would improve the incentives of the rural poor to invest in the development of forest resources.

For instance, municipal governments can improve the security of forest property rights by (1) Recognizing locally devised user rules and help enforcing these; (2) Offering administrative and legal assistance in acquiring formal user rights to forest resources; (3) Offering technical assistance in developing management plans and other formally required legal instruments; (4) Creating low-cost forums for planning and conflict resolution (5) Creating and maintaining municipal cadastres of forest property rights even if these are not yet formally recognized by the central government, and (6) Disseminating information about changes in the condition of the forest resources in the territory as well as opportunities for users to improve legal access to forest resources.

Municipal provision of these services is not only consistent with the Bolivian forestry regime but it also has some legal support in the law of popular participation (1994) and the law of municipalities (1999). However, this legal empowerment does not mean that municipal governments will provide and produce such services automatically. There are other barriers municipal governments need to overcome in order to become a successful public service organization.

Municipal forest governance is a complex system in which multiple actors must be able to act collectively. For instance, municipal governments may be empowered by the central government to undertake actions that are conducive to improved forestry property rights for forest users in their territories but may find that doing so would be against their self-interest as their electorate or powerful interest groups may have other priorities, central governments may have no way of monitoring the true effort of the municipal government in complying with the center's instructions, or the municipal administration may not have the technical capacity to carry out the public services that the users demand. If any of these conditions hold, the mere legal empowerment is not likely to be sufficient to solve the collective dilemmas in municipal governance, but municipal officials will do what is beneficial to them personally rather than what is best for society.

The challenge to achieve effective and efficient municipal forest governance can thus be framed as a collective-action problem that is present in each of several relationships. Given the structure of the decentralized forestry regime in Bolivia, the most important of these relationships are considered to be between (1) the central and municipal governments; (2) actors within municipal governments, (3) individuals and user groups throughout the municipal territory, and (4) between forest users and municipal governments. These relationships each represent an action arena, which can be analyzed using the Institutional Analysis and Development (IAD) framework. The institutional analysis of municipal forest governance is next chapter's primary task.

CHAPTER 3

Under what conditions can municipal forest governance succeed?

1. INTRODUCTION

The municipal mandate may include several provisions that, if carried out, may improve the security of forest property rights for an array of rural forest users, but whether these provisions are sufficient or even the most effective responses to the situation at hand is a different question. This chapter examines this question as it carries out an institutional analysis of municipal forest governance. The institutional analysis identifies three conditions that are believed to be conducive for municipal government involvement in efforts to address problems related to forest tenure insecurity among smallholder farmers.

First, municipal governments need to be motivated to get involved in forest governance in the first place. Several potential sources of motivation are identified, among them: (1) central government coercion (2) potential financial gains from involvement; (3) interest group influence and (4) a majority of the constituents demand municipal government involvement.

Second, internal collective-action problems within the municipal government should be addressed effectively. Simply creating a public bureaucracy to address natural resource management problems does not automatically solve the initial problems and may even stimulate further problems (Miller 1992; Niskanen 1971). To be effective facilitators of cooperation between actors at different governance levels, municipal governments need to organize their administrations in ways that are conducive to deal with common collective-action problems in government hierarchies, such as principal-agent relationships, moral hazard, and adverse selection.

Third, municipal governments need to construct institutions for organizational learning. One of the main justifications for a decentralized governance structure is to be able to achieve a close match between public services and user preferences, which requires not only reliable information about such preferences but also forums where such preferences may be expressed to the municipal authorities. For instance, municipal governance actors need to learn about local forest user conditions and needs, the effects of current policy instruments, and what other actors are doing in the forestry sector. Such learning requires institutional innovations for sharing information at the local level and unless municipal governments establish such institutions as an

integral part of their provision and production functions, their operations are not likely to be effective.

The three conditions are closely associated with three distinct collective-action situations that can be further dissected and analyzed using the Institutional Analysis and Development (IAD) framework, which has been developed by colleagues at the Workshop in Political Theory and Policy Analysis at Indiana University. The collective-action problem of each of these three situations are analyzed in this chapter, and the main determinants of the three conditions mentioned above are identified using the IAD framework. One of the primary purposes of this institutional analysis is to produce a set of hypotheses that can be tested empirically in subsequent chapters.

The chapter starts out with a description of how the IAD framework will be used to structure the institutional analysis. The actual analysis starts out with the identification of ideal outcomes of the interactions between municipal governments and forest users, in particular poor, rural smallholders. Influential issues in three other action arenas are identified and related to the main action arena. The institutional analysis highlights the motivational and informational problems that may block desirable outcomes in all four action arenas, suggesting that unless these are addressed by the involved actors, successful collective-action outcomes will not result.

The core hypothesis of this study is that decentralization reform can motivate municipal governments to become facilitators of local collective-action problems in the forestry sector, but their success as facilitators depends on their ability to construct institutions to address motivational and informational problems, both in their internal organization as well as in the interactions with other forestry actors. The problem with this hypothesis is that it is too complex to be tested empirically with a single test, even with vast amounts of empirical data about municipal governments. To make empirical testing more tractable, it is necessary to break down the core hypothesis into distinct causal mechanisms.

The institutional analysis is used to develop three interdependent sub-hypotheses that include specific variables related to motivation and informational problems. The definition of the sub-hypothesis makes the empirical testing of the core hypothesis more tractable and logically consistent. The last section of the chapter presents the research design and the methods that were employed during field work and that will be used in the empirical analysis.

2. INSTITUTIONAL ANALYSIS OF MUNICIPAL FOREST GOVERNANCE

The relationship between municipal governments and local resource users can be viewed as a series of human interactions involving not only the municipal staff and users, but also actors who have a more indirect influence over their relationship, such as representatives from law enforcement, central government forestry officials, and buyers of forest products. The Institutional Analysis and Development (IAD) framework is particularly useful for analyzing such complex interactions as it provides the researcher with a systematic method to study how a wide variety of factors come into play and alter the outcomes of interactions (Kiser and Ostrom 1982; Ostrom 1999). Whether these interactions lead to collective-action outcomes that are beneficial to the involved parties depend on factors such as the kind of actors involved, the structure of their relationships and the general context in which they interact (Polski and Ostrom 1998).

2.1 Using the IAD Framework to Specify Hypotheses

This study employs the IAD framework to identify the main variables that seem to affect the ability of municipal governments to facilitate the establishment of a more secure forest property rights system for rural smallholders in Bolivia. This institutional analysis produces a suite of inter-linked institutional conditions that underpins the main hypothesis of the study. The analysis draws on collective-action theory and identifies what particular variables are likely to affect the validity of that hypothesis and uses these variables to formulate a suite of dependent sub-hypotheses.

In IAD language, the interactions between municipal staff and resource users represent the main *action arena* of this institutional analysis. As illustrated by Figure 3.1, the different interactions in this arena, the *action situations*, are influenced by the outcomes of decision making at three different levels of decision making: (1) operational, collective choice and constitutional levels. At the operational level, resource users interact with each other and the resource systems they depend on. The users' actions depend on the set of rules-in-use defined at the collective-choice levels. The rules that guide the decision making at the collective-choice level, in turn, are defined at the constitutional level. A user group engaging in actual harvesting activities is an example of an operational-level action situation. When municipal staff assist forest users to develop a forest management plan, however, it is a collective choice-level action situation, as the management plan will determine the actions at the operational level. The interactions that define the rules for how to carry out the municipal planning process in the forestry sector would be an example of constitutional-level interactions.

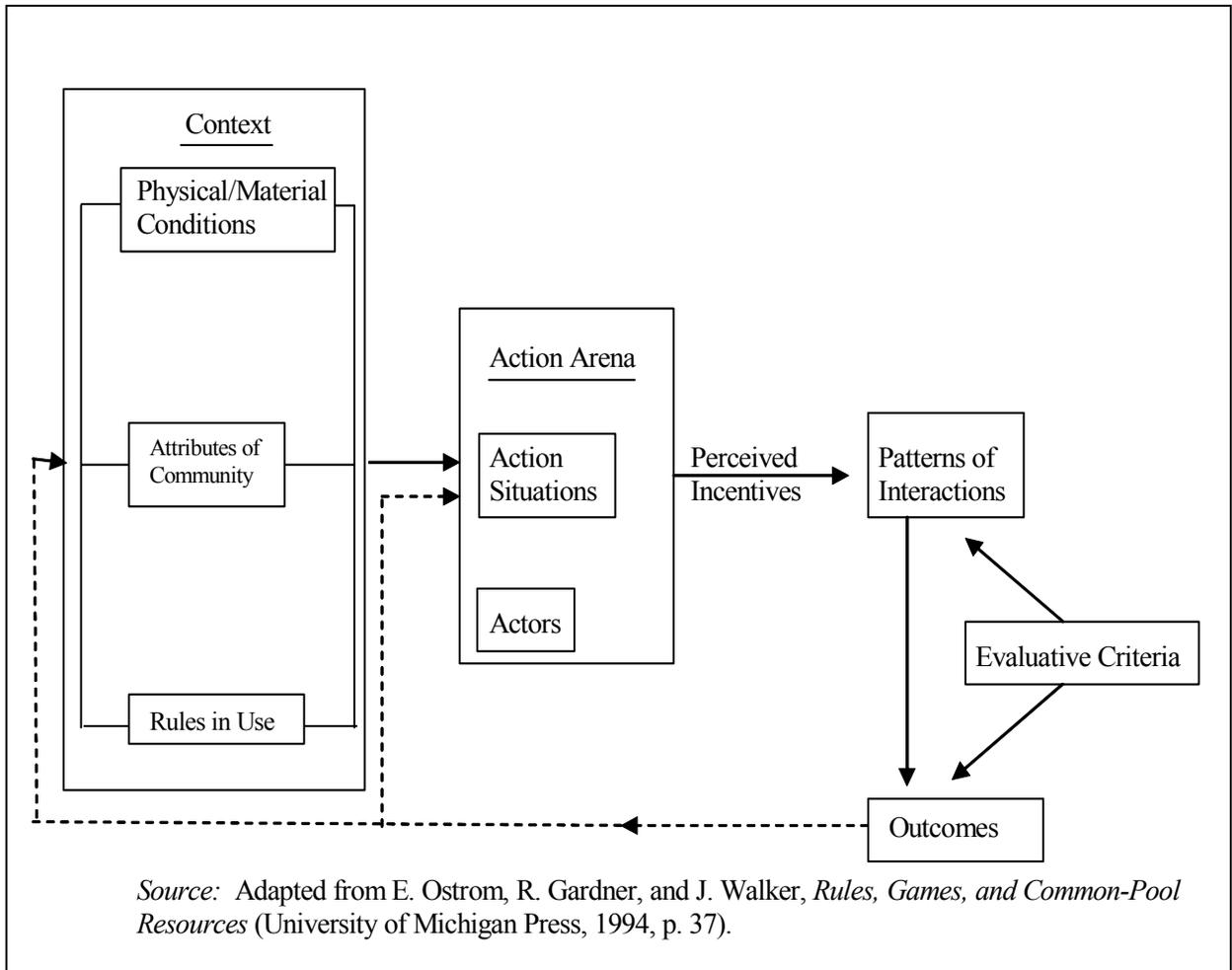


Figure 3.1. A Framework for Institutional Analysis

There are also different kinds of action arenas to consider at each level of decision making. The ability of municipal governments to be effective in their work with resource users will depend on the results of interactions in at least three other action arenas: (1) interactions between the central and municipal governments, (2) interactions between various actors *within* the municipal government, and (3) interaction between resource users. Consequently, the institutional analysis of municipal forest governance should consider at least four interlinked action arenas.²⁶ Figure 3.2 illustrates the issues of each arena and how these are connected.

²⁶ But note that interactions in each arena can operate at three different levels, depending on the nature of the decisions or agreements that result from the interactions.

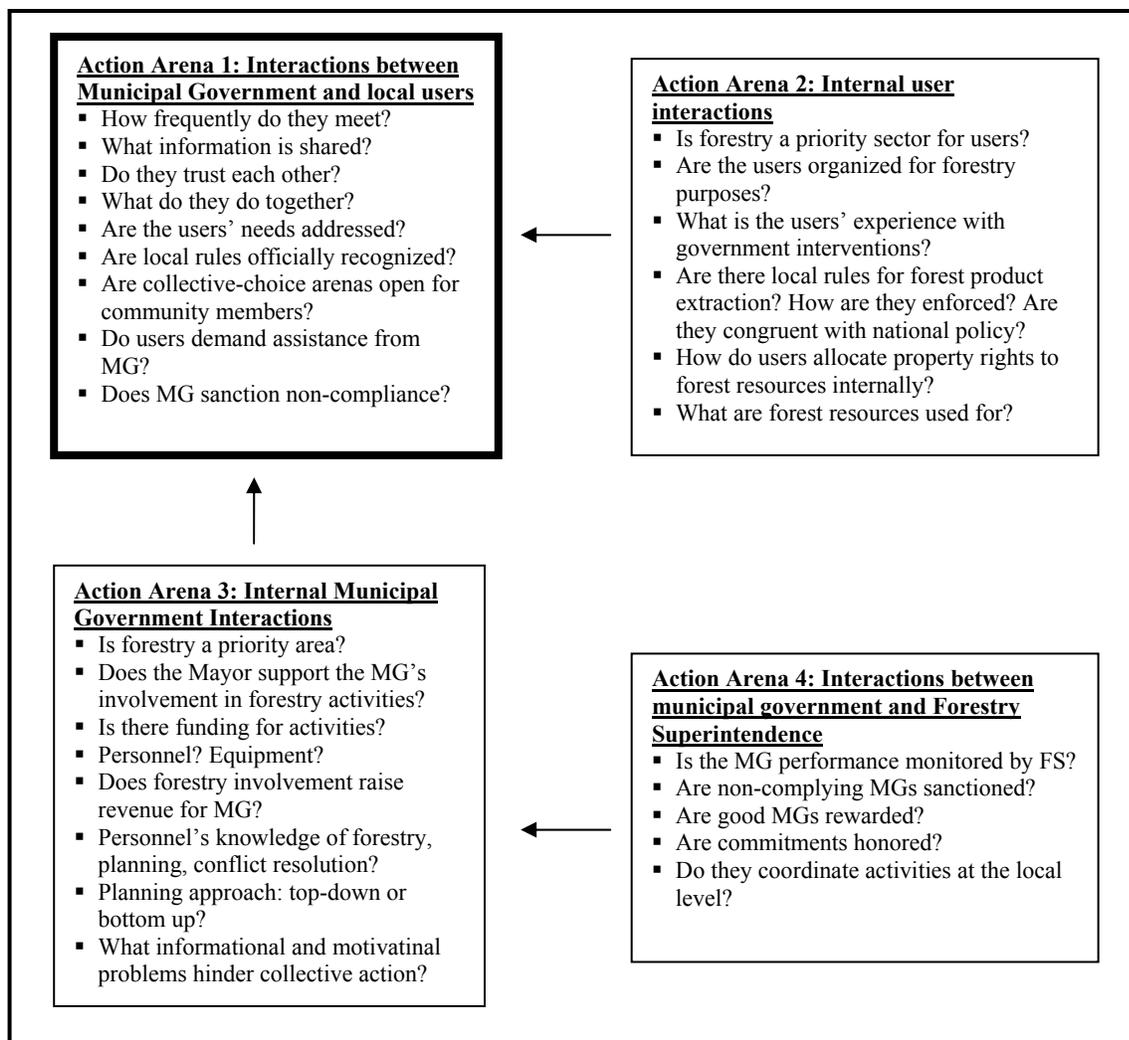


Figure 3.2. The Four Interrelated Action Arenas of Municipal Forest Governance

2.2 Defining the Desirable Outcomes

As its point of departure, the institutional analysis defines the desirable outcome of the main action arena (interactions between municipal governments and local forest users) and asks what needs to happen in all four action arenas' interactions in order to produce this outcome.

The ultimate outcome of interactions between municipal governments and forest resource users will depend on the compatibility of each of the four action arena outcomes. This means that even if local users demand municipal government interventions to solve local disputes, successful interventions by the municipal government in the area of conflict resolution is not likely to occur if municipal governments are not capable of providing the adequate services. Adequate services

in turn depend on decisions about resource allocation, contracting of personnel, and their terms of reference, among other factors. Consequently, a series of *critical decisions supportive of the desired outcome* can be defined for each action arena. The likelihood of these decisions being taken are, in turn, determined by the actors' incentives to put aside personal interest and act in the interest of the citizens.

Recall that the core problem in Bolivia's forestry sector was diagnosed in chapter 1 to be insecure forest property rights. Recall also the observation that municipal governments can potentially facilitate improved access to and protection of formal property rights. Through repeated interactions with users, municipal government staff can help users gain formally recognized property rights from the central agency, and provide collective-choice forums to regulate open-access forest CPRs. The strengthened formal property rights of forest resources for Bolivia's rural poor represent the desired outcome of the main action arena. The institutional analysis of municipal forest governance conducted below reveals that the likelihood of municipal governments achieving this outcome in their interactions with users, depend not only on municipal government actors' behavior but on the behavior of the collectivity of involved actors in the four action arenas. Consequently, in order for the interactions between municipal government and forest users to produce the desired outcome, these interactions must be underpinned by the action outcomes in the other three arenas as well.

The actors in all four action arenas are up against an array of collective-action problems that complicate any individual actors' efforts to improve forest tenure security. For instance, the municipal government's effort to organize its forestry-sector program so that it can address the most important problems of the sector requires a great deal of collective action within the municipal government. The Municipal Council, Mayor, staff, and Municipal Oversight Committee must agree on several decisions regarding the content of an effective work program, efficient resource allocations, who should implement the activities and who should oversee the implementation. In each of these decisions, the actors face several motivational and informational problems that threaten a productive collective outcome. These problems permeate the collective-action situations in all four action arenas. Even if the actors in all four arenas want outcomes that support stronger forest property rights for the rural poor, the mere existence of motivational and informational problems threaten the achievement of the overall desired outcome. Motivational and informational problems complicate collective action because they produce a tension between the individual self-interest and the collective good that is sought through cooperation. In such situations, actors face incentives to defect from cooperation and seek short-term personal benefits. Whether the desired outcomes in the action arenas are achieved or not depends on whether

involved actors are able to construct the necessary institutions to deal with these problems effectively.

2.3 Barriers to Desirable Outcomes: Motivational and Informational Problems

To construct effective institutions for collective action means altering the rules that comprise the institutional context. However, this is itself a collective-action dilemma as the actors would have to expend time and effort to meet, discuss and negotiate an agreement on the new rules. In this sense, a set of rules themselves is a collective good that is not likely to be provided automatically (Ostrom et al. 2002). As in most public good problems, some participants may be tempted to free ride on the efforts of others if they believe that the improved rules will come about without their contributions. Others participate but may do so to seek rents, that is, to propose rules that would benefit them personally rather than the group at large. Rent-seeking behavior and the creation of public goods are both associated with *motivational* problems, which complicate effective collective action.

Asymmetries of informational and power are at the core of all collective-action efforts, especially those that involve a large number of actors at multiple levels. The information problems stems from the fact that not all actors involved in the collective-action effort have access to the same information. A participant in a group undertaking will have a hard time knowing the true contribution of other group members, unless constantly observing their actions, which can be both difficult and costly to do. Williamson notes that whenever the individual contributions are costly or hard to measure, there are incentives for group members to behave opportunistically (Williamson 1975).

Individuals involved in a collective-action situation have access to different kinds of information. Hayek observes that “every individual has some advantage over all others in that he possesses unique information of which beneficial use can be made” (Hayek 1945, p. 521). Individuals can use information that only they hold to their personal advantage, possibly leading the group effort to unravel. The classic example of an information problem is that of a car salesman who may know the true quality of the car he is trying to sell, but may find that it is not in his best short-term interest to reveal this information to the potential buyer. An inexperienced buyer may not be able to determine the true quality of the car, and run the risk of being cheated.²⁷

²⁷ George Akerlof (1970) used the car salesman metaphor to illustrate information asymmetry problems in the absence of institutional arrangements. Since then, information asymmetries have been labeled Akerlof’s “lemon principle” as he argues that the information problem makes it difficult for buyers to separate a lemon (a bad buy) from a peach (a good buy). The problem is that the absence of institutional arrangements to help the buyer determining the true quality of the car prevents many productive

The asymmetries of information tempt participants to take advantage of their private information at the expense of the desired group outcome. Unless counteracting institutional arrangements have been devised by the group to deal with these information asymmetries, opportunistic behavior may result (Ostrom et al. 1993).

The prospects for successful outcomes in the four collective-action arenas turn on the issue whether the involved actors are motivated and capable of acquiring the necessary information to solve the collective-action dilemmas that are present in the four arenas. The analysis of municipal forest governance in this study focuses on how motivational and informational problems affect the interactions between forest users, municipal governments, and other important actors, such as non-governmental organizations and central government agencies.

3. DEALING WITH MOTIVATIONAL PROBLEMS IN MUNICIPAL FOREST GOVERNANCE

In the main action arena of analysis, both municipal government representatives and forest users face motivational problems that may prevent them from trying to alter the rules at the collective-choice level that have failed to secure local farmer's property rights to forest resources at the operational level. The motivational problems have many possible sources. The lack of motivation may be related to the perceived difficulty for these operational-level actors to do anything about the property right problem, arguing that property right problems are beyond their control and must be addressed at the constitutional-level arenas. If the actors' collective perception is that their actions can do little to affect the status of forest users' property rights, they are unlikely to expend any effort trying to do so.

Another motivational problem would occur if the rules of the forestry-sector regime do not allow municipal governments to create and enforce their own set of rules about forest use in their territory.²⁸ In this case, there are few institutional incentives to motivate sector stakeholders to self-organize and begin addressing these problems.

If the municipal government is viewed as an extended arm of the central government administration, what incentives could potentially motivate municipal governments and local forest users to address insecure property rights in the forest sector? The question is of central importance for the assessment of the conditions for municipal forest governance in Bolivia, and will be addressed both conceptually and empirically in this study. The conceptual discussion

transactions from taking place. Brand names on products and chain stores are institutional arrangements that can reduce the uncertainty in such situations (Ostrom et al. 1993).

starts with a look inside two different action arenas to trace the origins of the incentives for municipal government actors to provide public services in the forestry sector. Chapter 4 analyzes the empirical results on the relative strengths of these motivational factors. This study stipulates that at least one of the following incentives must exist in order for municipal governments to consider providing forestry-sector services:

1. There are potential financial gains for the municipal government from providing public services in the forestry sector;
2. The central government obliges municipal governments to provide certain forestry-sector services;
3. The constituents demand the services, or
4. Powerful interest groups demand forestry-sector services.

3.1 Potential Financial Gains

If municipal government actors see a possible monetary payoff as a direct result of providing certain public services to the forest users within their jurisdiction's boundaries, they will be motivated to pass collective-choice rules that enable the provision of such services. This incentive would emerge if the institutional context of the main action arena contains constitutional-level rules in use that give municipal governments a share of the public revenues from the sector. This is the case in Bolivia, where municipal governments can increase their revenue from the forestry sector by the establishment of logging concessions on the municipal territory. Twenty five percent of the annually collected logging fees goes back to the municipal government.

This pay-off rule generates an incentive for municipal governments to provide services that assist users to establish commercial logging concessions. Even though large commercial firms represent the largest potential income for municipalities, these are few in numbers and are currently struggling with profitability. Because of the current decrease of logging company concessions in Bolivia, the likelihood for municipal governments to raise revenue from these has become rather slim. The likelihood to raise revenue from community concessions would be relative higher, which would suggest that municipalities have an incentive to encourage communities to gain increased access to commercial timber concessions. However, the limited availability of public forest lands in combination with a tedious bureaucratic procedure, have reduced the potential amount of forestry-related income that municipal governments can raise (Contreras and Vargas 2001; Pacheco 2002).

²⁸ A similar situation occurs if neither the forest users nor municipal staff are allowed to participate in the constitutional levels of decision making. Local problems are not likely to be addressed if these groups are

Potential financial gains for the municipal government could motivate municipal governments to not only get involved in the forestry sector, but also to improve local farmers' legal access to commercial logging activities, as this, at least in theory, would increase the municipal government's financial resource base.

3.2 Central Government Pressure

Municipal governments are more likely to provide public services to facilitate improved forestry property rights if the central government obliges them to do so. The coercive strategy requires that the obligation is backed up by a credible threat from the center. There are several factors that influence the credibility of the threat and thus the overall effectiveness of the obligatory provision rule:

- The degree of measurability of performance
- The intensity of monitoring by central agents
- Likelihood of sanctions being imposed
- Relative strength of the punishment

3.3 Constituent Demands

Municipal governments are more likely to provide public services in the forestry sector if a major part of the Mayor's constituents demands it. For this incentive to have an effect several conditions must hold:

- There must be a mechanism through which such demands be communicated
- Constituents consider the services salient enough to take corrective action should the officials not respond to their demands.
- The costs for taking corrective action are not prohibitively high for the constituents, i.e., they depend on the officials for other services that may be jeopardized by taking corrective measures.

The quality of the service is not guaranteed with the mere existence of the incentive to provide the service unless constituents have access to instruments that hold officials accountable for the quality of the services. Such instruments may include a seat in a oversight committee, formal responsibility of monitoring service quality to superior levels of governance, and possibilities for constituents to co-produce the services with the municipal agents

excluded, which is likely to affect the motivation for collective action in a negative way.

3.4 Interest Groups

If interest groups whose support is important for the government in power demand that the municipal government provide public services in the forestry sector it is likely that such services will be provided. The strength of this incentive would tend to vary with

- The degree of the group's importance for the government representatives
- The potential political costs for not providing such a service
- The potential political cost of giving in to the pressures of the interest group should these be viewed as illegitimate or conflicting with the interests of other important interest groups for the government

The strength of the last three motivational factors is closely related to the *availability of reliable information*. For instance, the central government may require municipal governments to perform certain functions in the forestry sector, but in order for the center to enforce this it needs reliable information about the performance of the municipal government. Likewise, citizens and powerful interest groups may demand the municipal government to provide public services that improve the forest property rights of the rural poor, but without reliable information about the municipality's performance in the sector, it will be hard to assess their responsiveness.

In summary, the stronger at least one of these four incentives are, the more likely municipal governments are to take action in the forestry sector. When all of these incentives are weak, the conditions for municipal forestry action are not favorable, but this does not mean that such action is impossible, just improbable. A strong mayor with a deep conviction that forestry activities are important may not need a conducive institutional environment with favorable incentives to take action. Having such incentives present, however, is likely to increase the probability of action, regardless of the mayor's personal convictions.

Motivation is just one of the hurdles to achieve desirable governance outcomes. Once services are delivered, the effectiveness of these will depend on the municipal government actors' ability to solve several internal collective-action problems that are inherent in most public administrations.

4. CREATING ACCOUNTABILITY MECHANISMS TO ADDRESS MOTIVATIONAL PROBLEMS

Municipal administrations in Bolivia face few incentives to be efficient and effective providers of collective goods, because they essentially have monopoly on the provision of public goods in the local jurisdictions. Without competition in the provision of the public goods, there is

little incentive for the municipal administration to be efficient in its resource allocations. The lack of competition also weakens the incentives for municipal administrations to be innovative (Weimer and Vining 1989). Are there any mechanisms that could increase competition and thus strengthen the incentives for the municipal government to be effective and innovative? The advantage of a truly democratic society is that its competitive elections introduce competition among candidates and provides mechanisms for holding public officials accountable to their results while they are in office. In order for such *accountability* mechanisms to work in any society, however, there must be a sufficient degree of *transparency* of information about public affairs or concerned citizens will have a hard time assessing the performance of their elected municipal officials (Ribot 1999).

Holding elected municipal officials accountable to their electorate is probably the most important accountability mechanism for municipal forest governance, because it is the citizens' utility of the municipal officials' actions that ultimately determine how effective and efficient interventions have been. Nevertheless, there are other mechanisms of accountability that may also ameliorate the conditions for high performance by municipal governments. Having multiple mechanisms of accountability in place is likely to increase the well-functioning of municipal forest governance. When municipal governments respond to similar demands from both organized forest user groups and central government agents, they are likely to be more motivated to perform than when the demand comes from only one source.

According to Cohen and Peterson (1999), the dual accountability that results from plural delegation²⁹ is a good way of breaking up institutional monopolies. In contrast to institutional monopolies, a pluralistic set of organization with overlapping jurisdictions, are more effective and efficient precisely because their representatives are subject to competition which tends to make them more accountable to the actors that they depend on. The governance structure for the Bolivian forestry sector can be characterized as delegated forest governance since municipal governments are not completely controlled by the center, but are held accountable for a specifically defined area of competence.

The empirical evidence presented in chapter 1 indicated that the vast majority of forest users regarded insecure forest tenure the most pressing problem in the sector. Accountability to forest users has therefore the potential to motivate the municipal government to respond to such user concerns. Accountability will most certainly be strengthened if central government policy is supportive of municipal governments' efforts to address insecure forest tenure, or whatever problems or needs local forest users prioritize together with the local government and other users.

²⁹ That is, a governmental responsibility is split between central and lower levels of government.

Supportive central policy is important for plural accountability as it may give users an additional forum for expressing their concerns should they not be pleased with the way the municipal governments perform in the forestry sector. While institutional pluralism is good for accountability, and can thus address with some of the motivational problems of collective action, it does not guarantee an effective, or efficient provision of public services. Ultimately, the prospect for the accountability mechanisms to make a difference for improved forest property rights regimes depends on the how informational problems are solved. One of the central problems is the asymmetry of information and the difficulty to acquire reliable information about the true performance of agents. Informational problems pervade all efforts of collective action, but they are especially serious in public hierarchies.

5. DEALING WITH INFORMATIONAL PROBLEMS INSIDE MUNICIPAL GOVERNMENTS

Informational problems are at the core of all collective-action efforts, especially those that involve a large number of actors at various levels. They have the potential to block effective outcomes in all four action arenas. Nowhere is the potential problem greater than in the municipal government hierarchy, where the multiple tasks combined with large flows of money and little public transparency set the stage for opportunistic behavior among employees and executives.

In the hierarchy of the municipal government, the mayor, who is the head executive, will have difficulties in acquiring complete information about the effort that municipal government employees put into the tasks at hand. The employees face an incentive to take advantage of the information asymmetries and pursuing his or her private interest while being paid by the municipality. These asymmetries of information, commonly found in public agencies, are referred to as principal-agent problems.

Principal-agent problems exist in all hierarchies where employees (agents) know more about what they do than their superiors (principals). The information asymmetry is especially serious when the outputs are not closely related to the effort that an employee expends to carry out the specified task. For instance, a municipal forest officer who in a given month has failed to train the desired number of local community leaders in forest inventory techniques can blame this failure on a series of external factors beyond his control. Since the employee knows that it is too costly for the mayor to find out whether the employee really is efficient or not, the official has an incentive to blame the missed output target on factors such as the weak interest among community leaders, bad weather, or lack of transportation. In a different constellation of a similar principal-agent problem, the citizens are the principals who monitor the performance of the mayor, the agent. When regular citizens have limited access to reliable and timely information

that reveals the true effort of the mayor, it is easy for a cunning mayor to pursue private interests at the expense of the principal without the principal ever finding out.

Informational problems can significantly reduce the effect of the most innovative accountability mechanisms. The way the municipal government addresses its internal informational problems will therefore be an important determinant of both the organizational efficiency and effectiveness in achieving the desired outcome. What can municipal governments do to deal with such informational problems in a constructive way?

Studying informational problems in private firms, economist Bengt Holmstrom found that in a team work environment, because of information asymmetries and production externalities,³⁰ there will always be some member of the team with incentives to defect from cooperation, even if market incentives are present (Holmstrom 1982). Holmstrom's theorem explains why so many private firms are organized as vertical hierarchies that pay employees flat rates rather than performance-based salaries. Noting that both horizontally and vertically structured organizations have difficulties in inducing cooperation among employees, Gary Miller points to several initiatives in the private sector that have addressed such informational problems in a successful manner (Miller 1992). Because of their general potential contribution to the search for solutions to collective-action problems in the four action arenas of municipal forest governance, these initiatives deserve some attention.

The successful efforts reviewed by Miller have several things in common. First, Miller emphasizes the key role of management decisions in all of the efforts. As shown by the experiences of firms such as Volvo, Lincoln Electric and Hewlett and Packard, managers can inspire their employees to cooperate and sacrifice self-interest for the common purpose of the organization (*ibid.*). They can do so by setting an example, showing their employees that they are trustworthy partners who themselves are willing to sacrifice some of their self-interest for the betterment of their common goals. The credibility of management's commitment to cooperate will be assessed by employees over time, who will observe the actions by management in their repeated interactions.

Second, employees and management must ensure each other of its long term commitment to the common purpose. Mutual trust will have a chance to develop only if actors have a long time horizon and are actually given a chance to interact repeatedly.³¹ Third, Management can strengthen the credibility of its commitment to cooperation by creating forums for participatory

³⁰ The weak connection between individuals' efforts and team outputs.

³¹ The importance of repeated interactions to overcome social dilemmas has been studied by game theoretical models. For example, Axelrod (1984) found that group members are more likely to cooperate when the end of the game is unknown and there is a high probability of a long game.

decision making and sacrificing symbolic, executive perks. Such actions will reinforce their employees trust in them as partners worthy of their commitment to a long-term, mutually beneficial relationship.

Although this part of Miller's research deals with private firms, the findings provide some hope also for public hierarchies, at least in contexts where actors tend to have low discount rates. For Miller's managerial solution to informational problems to work in the municipal government setting in Bolivia, the mayor and his council must be able to demonstrate to both the public and its employees that it is first and foremost interested in the long term well-being of the citizens they serve. Given Bolivia's history of dominating elites and often corrupt politicians, it will be a challenge for any well-intentioned politician to break the public opinion's often stereotyped, negative expectation on their political leaders.³² To restore the public's trust in government would require a great deal of transparency of its bureaucracy and a sustained period of repeated, successful interactions with the public.

The considerable difficulties for the principals to acquire reliable and timely information from agents pose a real threat to the functioning of a decentralized governance structure. The information asymmetries, however, are frequently more complex than that. Sometimes, agents are operating at sub-optimal levels, not because of their lack of effort, but rather because they do not have access to all the information and knowledge they need in order to perform. The effective operation by agents is held up because they cannot get critical information from their principal or third party actors. This brings us to an assessment to one of the most cited justifications for a decentralized government structure in natural resource management: the advantage enjoyed by lower levels of governments to acquire reliable information about locally varying information of time and place (Hayek 1948; Johnson 1997). Such an advantage will not exist however if the principals and agents in the four arenas cannot acquire essential information about local variations in ecological, social and institutional conditions. Learning about and adapting to local context is thus a key challenge for the success of a decentralized governance regime.

5.1 Learning about Local Context

Action arena actors are fallible individuals with imperfect information about their environment and other actors' intentions and strategies. Effectiveness in this uncertain environment will depend largely on the ability of the concerned forest users and municipal staff

³² See for example, UNDP's annual human development report for Bolivia for 2000, which reveals general skepticism among many citizens toward political representatives (UNDP 2001). It should also be noted that in 2001, Transparency International ranked Bolivia, together with Haiti, as the most corrupt economy in Latin America (TI 2001).

to acquire reliable information about the changing conditions of forest resource use and how past actions have affected these.

Municipalities that provide mechanisms and incentives for employees to learn about local variations in the ecological, social and institutional contexts within the jurisdiction will therefore enjoy better conditions for achieving more efficient municipal governance, since efficiency is partially determined by how closely user preferences are matched with provided services. Specifically, what mechanisms for learning can municipal governments provide for their employees?

5.2 Conditions Conducive for Learning

The effective facilitation of collective action adapts activities to local needs and circumstances. Efficient municipal providers of public services produce services that have utility for the municipality's population at large. To be both effective and efficient facilitators of collective action in the forestry sector, municipal governments must enjoy certain basic conditions that allow them to gather valid information about local context. Successful municipal government facilitators of local collective action can be expected to enjoy at least some of the following favorable conditions:

1. Political support for such facilitation activities from the highest level municipal officials, such as the mayor and the municipal council;
2. Resource allocations for the contracting of staff with forestry knowledge and previous experience with collaborative problem solving with farmers in a field setting;
3. Resource allocations for the acquisition of transportation and essential field equipment;
4. Terms of reference for personnel that require staff to spend considerable time in the field;
5. Institutionalized a participatory planning approach for the development of the annual work plan that involves representatives from all forest user groups in the territory;
6. Career advancement criteria based on staff involvement in successful collaborative work with forest users;
7. Possibility of continuity of professional staff which allows for repeated interactions and creation of trusting relationships with both users and superior officials of the municipal government.

It would be difficult for municipal governments to be able to make a difference for the forest property rights of a large number of forest users in their jurisdictions without enjoying most of the conditions above. The question then becomes, whether municipal governments in Bolivia are likely to create these conditions. Although this question must be answered empirically—and

will be so in chapter 5—it should be recalled from the discussion in chapter 2 that there are no formal obstacles in Bolivian law that would prohibit municipal governments from taking on the role as an active local facilitator of collective action, which could lead to more secure forest property rights. In fact, several of the official functions that are prescribed to municipal governments by law; such as coordinating land-use planning, creating municipal forest reserves for community forestry activities and providing technical assistance to local forest user groups; represent key functions of such facilitation. On the other hand, simply complying with the official municipal government mandate is hardly enough for achieving effective facilitation of collective action. Table 3.1 summarizes municipal government functions of collective-action facilitation as suggested from the analysis in chapters 1 and 2, and assesses to what extent municipal government are mandated to carry out these functions.

Table 3.1. Supportive Tasks for Self-Governance Compared to the Municipalities’ Official Mandate

Facilitation Tasks Supportive of Self-Governance	Official Mandate
Low cost arenas for conflict resolution	Encouraged by Decreto Supremo No.23858 ^a , and Law of Municipalities article 144,1-2
Participatory planning	Required by the Law of Popular Participation, article 8, a, b, and the Law of Municipalities ^b , article 44-11
Assist user in bureaucratic dealings	Encouraged by the Law of Municipalities, articles 8-III-8 and 8-V-4
Monitoring rule compliance	Required by Forestry law, article 25,c-h
Supporting users’ efforts to monitor their resources	Allowed as long as rules are not contradicting national law
Information about opportunities in improved legal access to forest products	Allowed as long as actions are not violating national law
Information about changing condition of forest resources in the area	Allowed as long as actions are not violating national law
Coordinate activities with external organizations, attract support	Required by the Law of Municipalities, articles 8-III-8 and 8-V-4
Broker contacts with external markets	Allowed as long as actions are not contradicting national law

^a Reglamento de las Organizaciones Territoriales de Bases, Decreto Supremo No. 23858, 1994

^b Ley de Municipalidades, Ley No. 2028, 1999

Source: Author’s elaboration based on Government of Bolivia (1994, 1995, 1996a, 1996b,1999)

Table 3.1 suggests that the main barriers for municipal governments to become efficient providers of effective facilitation of collective action in the forestry sector are not external legal barriers but rather internal collective-action problems. The empirical analysis in chapters 4 and 5

will start to sort out what institutions are likely to be most successful in dealing with these problems.

6. DESIGNING THE EMPIRICAL INQUIRY

Municipal governments may be an important subject of this study, but they also are also important contributors to the research. One way of understanding the interactions between municipal governments and local forest users is to examine cases and experiments in natural settings. The empirical analysis carried out in the next three chapters compares the field observations of effectiveness of different municipal strategies for solving motivational and informational problems in collective-action situations. In order to make such an analysis at all meaningful, however, a set of hypotheses that link the variables that are believed to improve municipal facilitation of collective action must be developed. This section discusses the structure of the research design and how the overall hypothesis will be tested.

6.1 Research Design and Hypotheses

This research seeks to understand the mixed results of municipal forest governance. Why have some municipal governments failed to even begin to address governance issues in the forestry sector while others have not only provided a score of public services in the forestry sector, but some of these seem to have generated quite positive results. Considering the rather adverse institutional conditions for local government in Bolivia discussed in chapter 1, failures in municipal forest governance come as little surprise.³³ The many motivational and informational problems noted in the institutional analysis above, help to understand what might block the municipal actors from producing the desired outcomes in the forestry sector.

It is more puzzling why some municipal governments have challenged the adverse conditions and appear to have overcome some of the observed collective-action problems. Our current theoretical understanding of the underlying conditions of collective action would suggest that the prospects for effective municipal forest governance in today=s Bolivia are rather slim. Thus, the current successful experiences need to be explained.

In order to find out what seems to be driving these preliminary observations of success, a set of interdependent hypotheses was developed. The core hypothesis and its two sub-hypotheses define the range of variables of interest and at what levels these variables need to be measured.

³³Such as weak rule of law, inequitable distribution of wealth, high illiteracy rates, weak tradition of civil society participation in governance of natural resources, traditional centralized government administration and dominance of local elites in local politics.

After an overview of how the set of hypotheses are related, the section describes what methods will be used to gather and analyze the empirical data as to test the validity of the hypotheses.

6.2 Hypotheses

There is increasing concern among some policy analysts that decentralization reform has become a policy panacea, a widespread belief that decentralization is the solution to all governance problems associated with natural resource management (Ostrom 2000; Agrawal and Ostrom 1999). In view of the recent proliferation of decentralization policies in non-industrial countries, it is important to distinguish between naïve and nuanced hypotheses about the effects of decentralization reforms. A naïve hypothesis would simply state that “decentralization reforms make municipal governments effective facilitators of improved forest tenure security.” Such a hypothesis regards the decentralization process as an automatic process and fails to recognize the inherent collective-action problems that are likely to prevent effective institutions from emerging. A more balanced and nuanced hypothesis would reflect the importance of solving several collective-action dilemmas that are embedded into the various levels and stages of the decentralization process.

The core hypothesis of this study is: *Decentralization reform characteristics can motivate municipal governments to become effective facilitators of local collective-action problems in the forestry sector, but their success as facilitators depends on their ability to address motivational and informational problems, both in their internal organization as well as in the interactions with other forestry-sector actors.*

The causation in this hypothesis is rather complex and cannot be tested empirically with a single test, even with vast amounts of empirical data about municipal governments. The complexity has to do with the fact that the hypothesis encapsulates several different causal relationships between actors at different levels of society. There are at least three different sets of actors implicitly included in the hypothesis. First, there is the central government that is behind the decentralization reform. Second, there are the municipal governments that are somehow influenced by these reforms. Third, there are the forest users whose collective problem solving efforts might be somehow affected by the services provided by their municipal government. The effect of these collective choice-level efforts to solve operational-level problems related to insecure forest property rights may ultimately be visible in the changing condition of the forest resources in the immediate user environment.

The multilevel, causal chain can be viewed in Figure 3.3. Breaking down the core hypothesis into three distinct casual mechanisms will facilitate the empirical testing of the core

hypothesis. A sub-hypothesis is developed for each of the causal relationships in Figure 3.3. In order for the core hypothesis to be true, all three sub-hypotheses must hold.

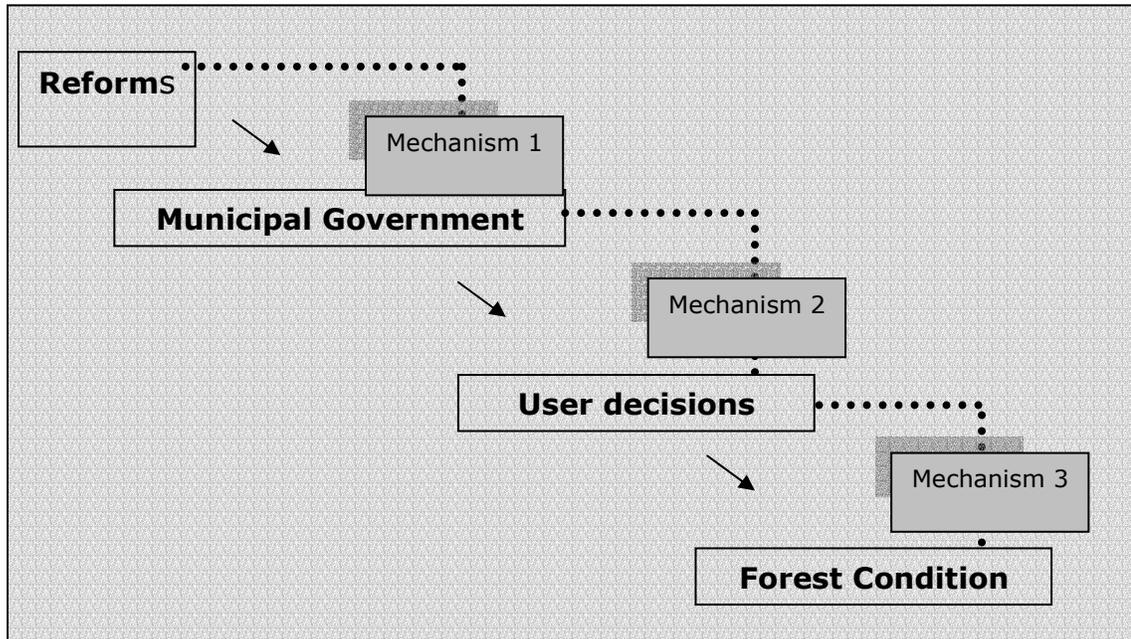


Figure 3.3. Casual Mechanisms of the Research Design

Sub-hypothesis 1: *The characteristics of decentralization reforms generate positive institutional incentives that motivate municipal governments to address forestry-sector issues.*

If the first sub-hypothesis is false, we can expect municipal governments to perform poorly in collective-action facilitation of local problems in the forestry sector, which would lead us to falsify the core hypothesis. If the sub-hypothesis is true, municipal governments may be motivated to solve collective-action problems, but it does not necessarily mean they will be successful in doing so. Successful facilitation of collective action will require municipal governments to address another set of problems related to collective action within the municipal government as well as in interactions with forest users.³⁴ The first sub-hypothesis is tested in chapter 4.

³⁴ Many of these problems are informational. Testing the municipalities' ability to deal with them is the topic of another inquiry by the author and will not be pursued in this dissertation.

***Sub-hypothesis 2:** Municipal governance systems that have developed institutions for information sharing between the main governance actors, deliver higher-quality forestry-sector services.*

The second sub-hypothesis helps explain why some municipal governments do better than others in facilitating collective action in the forestry sector. Municipal governments that are addressing internal information and motivation problems successfully may be able to do so for different reasons. One likely reason is that they have a perceivable incentive to address these problems. It is therefore assumed that if the second sub-hypothesis is true for any entity, it follows that the first sub-hypothesis is also true. The second sub-hypothesis is tested in chapter 5.

***Sub-hypothesis 3:** Forest users in municipal governance systems that have developed effective institutions for monitoring forest use, enjoy better forest conditions.*

The third sub-hypothesis helps testing whether collective-action facilitation can really make a significant contribution to improving forest property rights and forest conditions. To test this relationship empirically poses several methodological challenges. For instance, the fact that forest ecosystems are slow-changing systems would suggest that it may take several years of sustained collective efforts at the local level before the more sustainable user patterns start to pay off with regards to detectable improvements in resource conditions. Chapters 6 and 7 discuss this and other methodological challenges in more depth.

7. FIELD METHODS

The three hypotheses will be tested with information gathered from a variety of sources. First, personal interviews were carried out with three different actors involved in the municipal governance of forests resources in 50 randomly selected municipalities in the Lowlands of Bolivia. The three actors, interviewed between November 2000 and March 2001, were (1) the mayor who held office between 1996 and 1999,³⁵ (2) the municipal forestry officer, and (3) the president of the Municipal Oversight Committee.³⁶

As shall be demonstrated in chapter 4, the large sample is statistically significant, which makes it possible to make scientific inferences about the effect of the independent variables on

³⁵ The survey used in the interview with the mayor is almost identical to the survey developed by Gibson and Lehoucq for their research in Guatemala (see Gibson and Lehoucq 2003).

³⁶ *El Comité de Vigilancia*—an association of community-level organizations that is empowered by the 1994 Popular Participation Law to monitor the performance of the municipal government.

forestry-sector governance outcomes in Bolivian municipalities in general.³⁷ Statistical methods will be used to test the hypothesized relationships between variables.

To get a sense of the effect that municipal government facilitation has on local user incentive structures and operational decisions with regards to their forest resources, six in-depth case studies of municipal forest governance were carried out. The independent variables for sub-hypothesis one and two, measured by the municipal surveys in the 50 Lowland municipalities, were used to select the six cases. Because of the study's intention to attempt to explain the surprising success of some municipal governments, three out of six cases were selected in which conditions for successful facilitation were considered favorable and three in which conditions were much less so. In each municipal case study, the municipal government's forestry program was studied, paying close attention to the way activities were planned and implemented, how the internal organization of the municipality worked, how rule compliance in the forestry sector was monitored, and the frequency and characteristics of staff interactions with users.

To shed light on the user perspectives of their relationship with the municipal government forestry staff, user group representatives from all organized rural communities in each of the six selected municipalities were invited to a one-day workshop. In these workshops, the researchers conversed with users about how they perceived the main opportunities and constraints in the forestry sector, and to what extent the municipal government did or could do anything about any of these. In all of the workshops, users described the costs and benefits derived from both legal and illegal harvesting of forest resources. This information proved to invaluable for the analysis of how municipal governments affect forest users' incentives to self-organize to gain improved access and exclusion mechanisms to protect of their forest resources. Chapter 6 discusses this issue in more depth. These workshops also served to select a rural community in each municipality for an in-depth case study of rural community interactions with forest resources. The selection was done in consultation with broad participation of workshop participants to ensure that a outlier case was not selected for the in-depth community case studies. In each of the selected communities in the six municipalities, the research protocol of the International Forest Resources and Institutions (IFRI) research program was applied. The qualitative data gathered at the local level serve as a complement to the municipal-level survey data and helps to gain a more nuanced understanding of the processes underlying the three causal mechanisms that this research attempts to understand.

³⁷See next chapter for a statistical test of representativity.

8. CONCLUSION

The analysis in this chapter found that it is theoretically possible that the current municipal mandate can help improve forest property rights for rural smallholders in Bolivia. Few *legal* obstacles exist that would prevent effective and efficient municipal forest governance. In other words, the most serious bottleneck in Bolivia's decentralized forestry sector is not so much an inadequate or restricted formal mandate of municipal governments, but rather the institutional capacity of the municipal governance actors to co-provide and co-produce joint solutions to common collective problems. The extent to which municipal governments can capitalize on the mandate given to them and engage in facilitation of local collective action, depends to a large extent on their ability to create local institutional arrangements that foster stronger collaborative ties between different actors at different levels of governance authority. The next chapter is a first in a series of empirical chapters that will test the hypotheses developed in this chapter.

CHAPTER 4

What motivates municipal governments?

Uncovering the Institutional Incentives for Municipal Governance of Forest Resources

1. INTRODUCTION

This study analyzes how the recent decentralization reforms have affected the institutional conditions for successful forest governance in Bolivia. Successful municipal forest governance depends on many factors, and this chapter focuses on perhaps the most fundamental of them all: the factors that are believed to determine whether or not a municipal government decides to do something about forestry issues in the first place. Based on interviews with three different municipal governance actors in 50 randomly selected municipalities in the Bolivian Lowlands, the research compares how municipal administrations are fairing under the new, decentralized forestry regime. The study argues that the mixed outcomes of municipal forest governance depend to a great extent on the variable strength of political and financial incentives for municipal governments to get involved in the forestry sector.

The study shows that the decentralization reforms in Bolivia's forestry sector have the potential to generate several positive outcomes for natural resource management. Notably, the decentralized forestry regime opens up the possibility of improving the legal access to and formal tenure of forest resources among Bolivia's large population of rural smallholders. The achievement of this potential, however, is by no means automatic and should not be taken for granted. For one, it would require central government agencies, municipal governments and forest users to work together to construct effective institutional arrangements that provide less ambiguous forest property rights for forest users. The theoretical possibility that this would occur does not mean it *will* occur, or even that it is likely to occur. A positive outcome depends on a wide range of variables, and this chapter argues that the motivation of local politicians is one of the critical variables to be considered.

The analysis points to fundamental limitations for municipal forest governance in the non-industrial world because even if the legal and financial conditions are favorable in the decentralized forestry regime, there are several institutional and socioeconomic barriers to overcome. The relative strength of a combination of three institutional incentives appears to determine whether a municipal government is likely to begin to shoulder its responsibility to

organize the municipal provision of forest-related services. The study also finds that about half of Bolivia's Lowland municipal governments lack a sufficient level of institutional incentives to motivate them to provide a minimum of public services in the forestry sector.

2. BACKGROUND

Recall from chapter 2 that municipalities that receive forestry royalties must, within 6 months of the receipt of these funds, create a Municipal Forestry Unit (Government of Bolivia 1996). According to the regulatory framework associated with the 1996 Forestry Law, each municipal forestry unit should be headed by a professional forester, assisted by at least two field assistants, and equipped with one 4x4 vehicle, one motorcycle, a computer with a geographic information system, a hand-held global positioning system device, as well as a set of land-use and land-cover maps (Superintendencia Forestal 1997). Two recent evaluations of municipal government performance in the forestry sector conclude that out of the 109 municipal governments that receive some forestry royalties, about half provide some level of services but less than ten percent completely satisfies the requirements of the formal mandate (Pacheco 2001, citing *Superintendencia Forestal*, 2000) (see Table 4.1). The analysis in this study attempts to answer why some municipal governments choose to invest in forestry activities while others do not.

Several policy analysts have noted that forest resources are underutilized in the country's fight against poverty (Pacheco 2001; Superintendencia Forestal 1999; Andersson 2001; Contreras and Vargas 2001). There is an emerging consensus among Bolivian forestry-sector analysts that one of the primary reasons for the forestry sector's limited contribution to the improvement of rural livelihoods is the widespread insecurity of forest property rights among the rural poor (Pacheco 2001; Contreras and Vargas 2001). What can municipal governments do about that? Several of the main tasks that the decentralized regime asks of municipal governments relate directly to policy remedies for improved forest tenure security for smallholders. Apart from giving local forest users technical advice on how they can acquire formal property rights to forest resources on both private and communal land, municipal government officials are asked to monitor and enforce the rules of the formal forest property right system (Forestry Law, 1996, Article 25,c-h; Law of Municipalities, 1999, Articles 8-III-8 and 8-V-4).

Table 4.1. Formal Municipal Government Mandates in the Forestry Sector According to the 1996 Forestry Law and Subsequent Regulations

Mandate	Task	Decision-Making Bodies
Judicial	Demarcation of municipal reserves to be assigned as community concessions for local user groups ^a in up to 25% of the total forested land in the territory.	Ministry of Sustainable Development approves or rejects the application and, if approved, asks municipal government to assist the user group in developing a management plan. The <i>Superintendencia Forestal</i> (SF) approves or rejects the management plan.
	Inspect and control all forestry activities within the territorial jurisdiction	Municipal government
	Report violations of the forestry law and any other governmental regulations	SF decides how to react to the reported violation and what sanction to impose, if any.
Technical	Technical advice to local user groups and Indigenous Territories for management plans ^b	Municipal government decides what input to give but SF approves or rejects management plans.
	Set up a municipal data base with forest resources in the municipal government	Municipal government
Socioeconomic	Organize training for user groups	Municipal government
	Facilitate, promote commercial undertakings and private sector participation in the area	Municipal government ^c

^a Local user group is a free translation of the Bolivian denomination *Agrupaciones Sociales del Lugar* (ASLs).

^b Indigenous Territories is a free translation of the Bolivian denomination *Tierras Comunitarias de Origen* (TCOs).

^c The state-sponsored project *Municipio Productivo* is a training package directed at all municipalities in the country and has as its primary objective to enable municipalities to attract private sector partners to invest in their municipality.

Source: Author's elaboration based on the 1996 Forestry Law and the 1994 Popular Participation Law

Whether or not municipal governments will actually perform these functions in the best interest of the collectivity of local forest users, however, depends on at least two underlying questions. First, are municipal governments *motivated* to perform these functions, and second, are they able to do so in an accountable, efficient, and effective manner? For the remainder of this chapter, the focus will be on the first of these crucial questions. A quantitative, empirical analysis of motivational problems in municipal forest governance will be developed in light of a theoretical discussion on the relevance of such problems.

3. THE CONDITIONS FOR SUCCESSFUL MUNICIPAL GOVERNANCE OF FORESTS

A growing body of empirical literature is examining the underlying conditions for successful forestry-sector decentralization in non-industrialized nations (see for example Pacheco 2002; Silva et al. 2002; Ribot 1999, 2001, 2002; Larson 2002; Gibson and Lehoucq 2003; Andersson 2002; Agrawal and Ostrom 2001; Ostrom 2000; Pacheco and Kaimowitz 1998; Kaimowitz et al. 1998; Kaimowitz, Pacheco, et al. 1999; Kaimowitz et al. 2000; among others). Although the main emphasis in many of these analyses seems to be on how the *institutional capacity* of a local government influences governance outcomes, some recent studies speak explicitly to the importance of *motivation*.

In a series of articles and book chapters sponsored by the Center for International Forestry Research (CIFOR), researchers Pablo Pacheco and David Kaimowitz join a group of Bolivian scholars to review the origins and emerging results of the decentralization reforms in Bolivia's forestry sector (Pacheco and Kaimowitz 1998; Kaimowitz et al. 1998; Kaimowitz, Pacheco, et al. 1999; Kaimowitz et al. 2000). Drawing from field work carried out shortly after the passing of the reform in 1996, they analyze the new patterns of interactions between the most important actors at the central, regional, municipal, and grass-root levels. They compare the budding effects of the new legislation in nine municipalities, all of which provide some forest-related services. According to their very detailed account of the local Bolivian forest economies, the levels of motivation among local politicians to invest in forestry-sector activities vary a great deal. The authors' analysis reveals that although most municipal actors seem to have adopted a green discourse, far from all of them have translated the talk into actions (Pacheco and Kaimowitz 1998, p. 462; Kaimowitz et al. 2000, p. 31). The factors that might motivate municipal officials to intervene in the forestry sector are not explicitly addressed; they suggest that "municipalities are interested in forest issues but their capacity to address them remains limited" (Kaimowitz, Pacheco, et al. 1999, 1). The relative success of municipal governments is hypothesized to be related to the institutional capacity of the municipal administration, which is understood as the availability of financial resources and technically qualified human resources in the municipal administrations (Kaimowitz et al. 1998; Kaimowitz et al. 2000, p.19).

Pablo Pacheco (2000) systematically assesses the performance of municipal governments in Bolivia's decentralized forestry regime. Pacheco presents new evidence based on revisits to some of the same municipalities that were studied in 1996–1997, documented by Pacheco and Kaimowitz in 1998 (see above). He finds that the mixed performance of municipal forest

governance is principally related to variable conditions with regard to finances and institutional capacity. He concludes that the incentives for municipal officials to perform are rather weak since the funding, which comes exclusively from the central government, is paid regardless of a municipality's performance (Pacheco 2000, p. 52). Pacheco's discussion raises the inevitable question: If the financial payoffs for municipal governments are essentially the same, regardless of whether these provide services or not, why are some municipalities actually providing services in the forestry sector? Apart from financial incentives, what are the factors that motivate municipal governments to care about forestry?

Ann Larson (2002) examines the performance of 21 municipal governments in Nicaragua, which all offer some services in the forestry sector. She pays particular attention to the underlying conditions that allow some municipal governments to do better than others. She finds three key factors that help local governments become good resource managers: "capacity, incentive and interest" (p. 17). Using a comparative matrix design, she also finds that the *economic* incentives are the main drivers of municipal government decision making. Evidence of this is the fact that the three most successful municipalities (the ones that provide the most services in the sector) also happen to be the wealthiest of all, suggesting that forestry-sector activities can be difficult to carry out for those Nicaraguan municipalities with a predominately poor population.

In his synthesis of decentralization experiences in Africa, Jesse Ribot (2001) warns against conflating motivation and capacity in the analysis of local governments: "Local populations often do not carry out environmental management and other functions because these are not high in their priorities [but] this does not mean they cannot do it or lack the capacity." (p. 53).³⁸ To overcome such motivation problems, Ribot points to the importance of accountability mechanisms (see also Ribot 1999). If municipal government officials are held accountable by their electorate, and the electorate demands the municipal administration to provide forestry-related services, such demands—if perceived by the local politicians—constitute an incentive to take political action. In other words, if decentralization is to produce good governance, it needs to be accompanied by a great deal of democratization (Ribot 2002).

Also based on evidence from the Sahel region, Winter (1998), reviews the preconditions of decentralized natural resource management. This comprehensive study stipulates that in order for resource users to invest in organizing their resource use, the resource itself must hold sufficient value, making the organization effort worthwhile, and local organizations must be able

³⁸ Citing Engberg-Pedersen, 1995, p. 2.

to exercise authority over the resource use. By considering these factors, analysts may be able to predict whether a user group will make the effort to organize itself or not. However, local government officials are political actors whose incentive structures tend to be more complex than those attributed to resource users. Municipal officials respond to a wide mix of political and financial incentives that emerge from a variety of nested principal agent relationships with a large variety of actors in different contexts. This complexity of relationships, and the incentives these relationships generate, makes local political action difficult to predict (Andersson 2002). Yet, the very success of a decentralization reform that asks local governments to act in certain ways, relies on whether or not local government actors are sufficiently motivated to take action.

Gibson and Lehoucq (2003) interviewed the mayors in 100 randomly selected municipalities in Guatemala to learn about the factors that affect their attitudes and decision making regarding forest monitoring. In Guatemala, municipal governments are asked by the central government to monitor the compliance to the Forestry Law in their territories. The authors argue that “explaining the success or failure of [decentralized environmental] policies, demands an understanding of the incentives and constraints that local politicians face” (p. 4). Comparing the influence of a variety of explicatory variables, they find that two factors—central government funding and the presence of local organizations in the forestry sector—best explain the variations in the mayors’ priority ranking of forest monitoring activities.

All of these studies, except the one by Gibson and Lehoucq, focus on municipalities that already offer forestry-related services. The problem with such an approach is that by excluding municipalities that are **not** providing services, these studies are unable to shed light on the factors that motivate the municipal governments to offer or **not** to offer forestry services. This chapter argues that to explain the mixed success of municipal governance we need to understand not only the underlying incentive structures that motivate municipal officials to provide forestry services, but also the incentives that motivate officials to discard forestry activities altogether.

It is unlikely that successful municipal governance of forest resources will emerge unless the municipal government officials are motivated to provide high quality services. On the other hand, neither motivation nor capacity—no matter how strong they are—are likely to be sufficient to produce success in any collective effort to improve the municipal governance of forestry resources.

4. MOTIVATION PROBLEMS IN MUNICIPAL GOVERNANCE

Efforts to produce collective goods and services are often plagued by a combination of three different kinds of collective-action problems: motivation problems, information, and power asymmetries (Ostrom et al. 2002). If benefits can be obtained by an actor without a contribution, a temptation always exists to free ride on the efforts of others. The actor is not always motivated to contribute to the collective good. If municipal government officials notice that one of their principals, the *Superintendencia Forestal*, keeps sending them checks without monitoring the quality of the municipal forestry services, municipal officials have an incentive to shirk or even produce no effort at all.

The creation of a successful forest governance program in a municipal territory is a complex collective effort that involves many actors, including central government agencies and officials, municipal government politicians and staff, forest user groups, non-governmental organizations (NGOs); rural community groups, private landholders, forestry firms, and regular tax payers. Whether these actors are able to agree on what they should do about common problems in the sector, and then actually go ahead and act on those agreements, depends to a great extent on if and how the actors create the necessary institutions for monitoring and enforcement. Such institutions can mitigate, but not completely remove, the temptation to free ride (Ostrom et al. 2002).

The temptation for officials to defect from whatever commitments they might have to central government as well as constituents is likely to be particularly strong when a municipal government's resources are scarce and the personal well-being of the people in power is not associated with forestry service provision. Under such circumstances, one cannot take for granted that municipal governments will honor their commitments to care about forestry-sector activities.

Why would municipal governments be motivated to work in the forestry sector? In the next section, we will test the relevance of some of the incentives identified in earlier work for the context of the Bolivian Lowlands.

5. THE APPROACH OF THE EMPIRICAL INQUIRY

The effect of the proposed institutional incentives will be tested using different municipal government actors' perceptions about their relationships with each other and with other actors, such as central government agencies, forest user groups, NGOs, and private-sector actors operating within the forestry sector. To capture these perceptions, personal interviews were carried out with three different actors involved in the municipal governance of forests resources

in 50 randomly selected municipalities in the Lowlands of Bolivia: The three actors, interviewed between November 2000 and March 2001, were (1) the mayor who held office between 1996 and 1999,³⁹ (2) the municipal forestry officer, and (3) the president of the municipal oversight committee.⁴⁰

5.1 Is the random sample representative?

A difference-of-means test was carried out to assess whether the population in the random sample of 50 municipalities is representative of the total population of the 112 municipal governments located in the Bolivian Lowlands. The results, presented in Table 4.2, show that there are no statistically significant differences between the population of the random sample and the total Lowland population of municipal governments, for all of the socioeconomic and biophysical characteristics tested.⁴¹ Consequently, on the basis of this representative sample, it is possible to make inferences about the general situation of municipal forest governance in the Bolivian Lowlands.

Table 4.2. Differences of Means Tests for Lowland Municipalities in Bolivia

	Population Density	Annual Budget	Human Development Index	Health Sector Infrastructure
Population (n=112)				
Mean	10.13	2.59	0.48	8.31
Std. Dev.	28.03	2.66	0.07	13.29
Sample (n=50)				
Mean	11.4	2.91	0.48	9.9
Std. Dev.	16.32	2.9	0.07	10.77
95% Confidence Interval	No difference	No difference	No difference	No difference

Source: Ministry of Sustainable Development REDFAINDER database (1999)

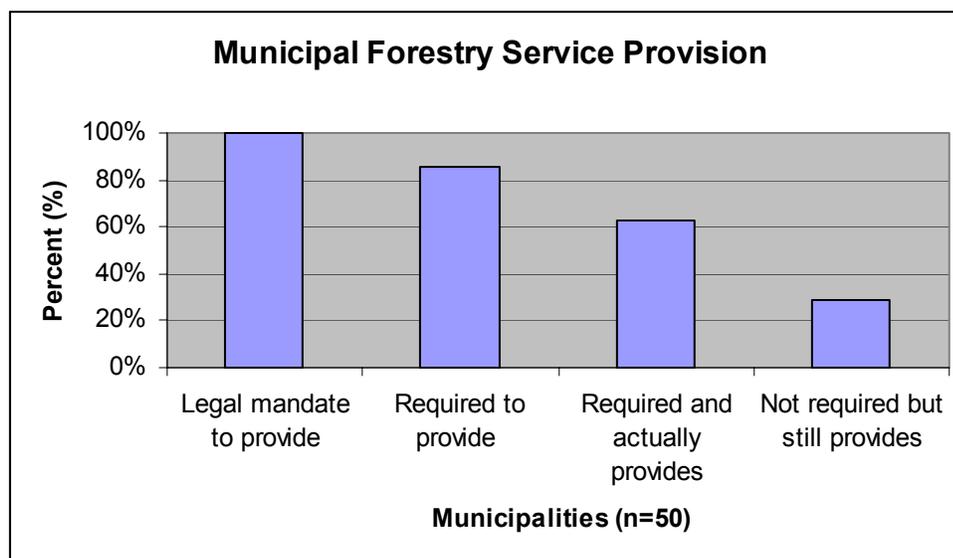
³⁹ The survey used in the interview with the mayor is almost identical to the survey developed by Gibson and Lehoucq for their research in Guatemala (see Gibson and Lehoucq 2003).

⁴⁰ *El Comité de Vigilancia*—an association of community-level organizations that is empowered by the 1994 Popular Participation Law to monitor the performance of the municipal government.

⁴¹ Out of a total of 314 municipalities in Bolivia, 112 are located in the tropical Lowlands.

5.2 The Dependent Variable

The dependent variable indicates whether a given municipal government provided any of the forestry-related services that their formal mandates ask them to do (see Table 4.1). This is a dichotomous variable, which specifies whether any of these services were carried out in 1999 (yes or no). The information on the status of forestry activities was obtained through the interview with the mayor (and cross-checked with information from the municipal staff responsible for forestry issues). Figure 4.1 presents some descriptive statistics from the survey results with regard to the distribution of municipalities. One hundred percent of Bolivian municipalities have a legal mandate to provide forestry services (column 1). Out of the Lowland municipalities, 86 percent have received money from the central government for forestry activities and are thus required by law to have a municipal forestry program (column 2) but only 63 percent of Lowland municipalities actually had established these in 2000 (column 3). Curiously, out of the Lowland municipalities that were *not* required by law to run a municipal forestry program, 27 percent (13) of them did so anyway (column 4 in Figure 4.1).



Source: Author's elaboration based on data from the Superintendencia Forestal (2000)

Figure 4.1. Forestry Service Provision in the Lowlands

5.3 The Independent Variables

Drawing on previous empirical work on the motivation of local government to get involved in the governance of natural resources, one can conclude that, in theory, any of the following sources of incentives could be sufficient to sway a Bolivian municipal administration to take action in the forestry sector.

Central government funding can serve as an important incentive for municipalities to intervene in the sector (Pacheco and Kaimowitz 1998; Kaimowitz et al. 2000; Gibson and Lehoucq 2003). This should be especially true in Bolivia since central government constitutes Bolivian municipalities' only source of legitimate funding for forestry activities. The strength of this incentive is measured as a three-level ordinal variable of the degree of a municipality's financial dependency on the funding for forestry activities from the central government (1= low, 2=moderate, and 3= high). The hypothesized effect is that the more financially dependent a municipality is on forestry sector-derived income, the more likely it is to offer forestry-sector services (and comply with central government instructions). The data for this variable come from the annual report of the Superintendencia Forestal (2000).

Central government monitoring can also give local government officials an incentive to act. Central government can use its coercive powers to oblige municipal governments to comply with their responsibilities in the forestry sector (Pacheco 2000; Andersson 2001). However, the direction of the causal flow between municipal government perception of central monitoring and municipal action is not straight forward. What if the central government only monitors municipalities that already provide services? To deal with this potential endogeneity problem, information was sought about central government monitoring strategies. In interviews with the *Superintendencia Forestal* staff it became clear that this central government agency does not limit monitoring activities to municipalities with forestry units already established but rather monitor the performance of all municipalities that host important forest resources, whether they provide services or not (Roca 2001; Urioste 2001; Guzman 2001).

The strength of the incentive generated by central government monitoring will be measured as an ordinal score (from 1 to 3) of the mayors' perceptions with regard to the frequency and intensity of central agency monitoring and enforcement activities regarding the municipal administration's compliance with their forestry mandate (see Table 4.1). The prediction is that the stricter the perceived control measures, the more credible the threat of withdrawal of benefits from central government and the more likely the municipal provision of forestry services.

Non-governmental organizations and externally funded development projects are playing important roles in supporting natural resource management initiatives in many rural communities in Bolivia, as well as in other parts of Latin America (Birk 2000; Muñoz Elsner 2000; Contreras and Vargas 2001; Gibson and Lehoucq 2003). As promoters of greater attention to the needs of the rural poor, NGOs may exert pressure on municipal governments to respond to the needs of rural communities by providing services to them. If the NGO or project is considered important by the municipal authorities, such pressure would supply an incentive to provide forestry-sector services. The incentive derived from the expressed demands from the NGOs and projects is measured in a two-step process: First, the number of external NGOs and externally funded development projects active in the forestry sector are added and, second, the frequency with which these organizations interact with municipal administrations is combined into one ordinal score (1–3).

The electorate within a municipal jurisdiction may also demand the popularly elected municipal decision makers to provide them with forestry-related services (Ribot 1999, 2001). The strength of the incentive originating from the electorate's pressure partly depends on the availability of accountability mechanisms through which constituents can make their voices heard. If such mechanisms exist, we can expect that the preferences for municipal intervention, as expressed by organized citizen groups, should not differ much from the priority areas as defined by the municipal governments. The strength of these incentives is measured as an ordinal variable (1–3). This proxy measure combines the interview responses from the mayors and the municipal oversight committee presidents with regard to the frequency of expressed demands for forestry-sector interventions by either community-based organizations, representatives from rural communities, or private landowners.

The relative economic wealth of municipalities may also, as suggested by Larson (2002), have an effect on the probability of municipal forestry interventions. The logic behind this reasoning is that municipal administrations that have a poor economic resource base are less likely to raise the critical amount needed for providing even a minimum of forestry services. One can expect, however, that this would be a less salient feature of the municipal incentive structures in the Bolivian context since municipalities here are not allowed to raise their own funds in the forestry sector.⁴²

⁴² The information for this variable comes from the Ministry of Sustainable Development and their REDFAINDER database, and the U.S. dollar per capita data is converted into a dichotomous variable. This was done to minimize the suspected correlation with other independent variables.

The availability and value of forest resources are perhaps the most intuitive drivers of municipal action in the forestry sector (Andersson 2002). If a municipality has lots of forested land, the population is likely to be more closely involved with the management of these resources than if such resources are less available. Consequently, all other things being equal, more forest land is likely to be associated with greater probability of municipal provision. Since this variable is likely to be correlated with just about all of the other hypothesized drivers of municipal provision, a dummy variable for forest cover is created.⁴³

The literacy rate for each municipality is added to these six hypothesized causes of municipal forestry involvement as a control variable. It is important to control for the influence of variable literacy rates since illiterate citizens may be constrained to interact with governmental authorities, NGOs, and other types of formal organizations. To make the variable compatible with the rest of the independent variables, an ordinal variable of literacy rates (1–3) was constructed.

5.4 Analytical Methods

The quantitative analysis is carried out in two steps. First, the current state of institutional incentives for forestry-sector service provision is assessed for the selected Lowland municipalities. This is done with descriptive statistics; for example, indicating what proportion of municipalities faces strong demands from the electorate to provide municipal services related to forestry. In the second step, I carry out a multivariate, ordered logit regression, which incorporates all independent variables and a control variable.

6. ARE MUNICIPALITIES MOTIVATED TO PROVIDE FORESTRY-RELATED SERVICES?

6.1 Central Government Funding

The survey results presented in Table 4.3 (variables 2-a and 2-b) show that most municipalities in the Lowlands do not have a high financial dependency on forestry resources. The most common response to the question of how important forestry-related incomes were to the municipalities was “least important,” and in 63 percent of all municipalities, forestry-related revenue represents less than 5 percent of their total budget.

⁴³ The concern that possible collinearity would bias the regression estimates was dismissed after running a non-parametric test of correlation between independent variables. All Kendall tau-b scores were found to be between -0.5 and 0.5, and only two relationships were greater than 0.4. The result indicates that collinearity is not a serious problem in the model.

Table 4.3. Survey Results from Lowland Municipalities. Survey responses were made according to the following five-point ordinal scale: 1 = most important/most frequently; 2 = quite important/quite frequently; 3 = not so important/rarely; 4 = unimportant/very rarely; 5 = least important/never. In the subsequent logit regression, the ordinal variables were collapsed into a three-level ordinal variable to improve tractability and facilitate interpretation.

Variable	Survey Questions	Activities	Mean	Median	Mode
1	Frequency of interaction on forestry between central and municipal government (N=50)	General contacts	3.41	3	3
		Training	3.45	3	2
		Technical assistance	3.59	4	4
		Central Monitoring	3.51	3	3
		Transferred resources	3.33	3	2
2-a	Financial dependency, ordinal (N=50)	Forestry Sector	3.42	4	5
2-b	Financial dependency, percentage (N=50)	Forestry sector	8.90%	1.04%	-
3-a	Number of NGOs (N=50)	NGOs	1.42	1	1
3-b	Frequency of NGOs' interactions with municipal governments about forestry issues (N=39)	General Meetings	2.33	2	2
		Formal meetings	3.36	3	3
		Council meetings	3.41	4	4
4	Frequency of constituents' demands on municipal governments according to sector (N=50)	Education	2.15	2	2
		Health	2.23	2	2
		Drinking water	2.33	2	2
		Roads	2.52	3	3
		Electrification	3.17	3	3
		Agricultural extension	3.25	3	3
		Forestry Sector	3.79	4	4
		Sewer pipes	3.92	4	4
		Garbage collection	4.37	5	5
5	Community-based organization's rank of priority activities for municipal governance (N=50)	Education	1.39	1	1
		Health	1.43	1	1
		Drinking water	1.61	1	1
		Roads	1.73	2	1
		Agricultural extension	2.41	2	2
		Electrification	2.47	2	2
		Sewer pipes	3.12	3	3
		Forestry Sector	3.69	4	3
		Garbage collection	3.84	4	5
6	Mayor's rank of municipal government's priority activities (N=50)	Education	1.39	1	1
		Health	1.49	1	1
		Drinking water	1.69	1	1
		Roads	2.14	2	2
		Agricultural extension	2.63	2	2
		Electrification	2.88	3	5
		Sewage pipes	3.06	1	1
		Forestry Sector	3.37	3	3
		Garbage collection	3.8	4	3

Source: Author's elaboration based on data from CIPEC (2001)

The Logit regression (Table 4.4) produced very strong results. The combined effect of the hypothesized independent and control variables explain 78 percent of the variance in municipal forest provision in Bolivia (Nagelkerke's $R^2 = 0.78$). However, the logit regression does **not** pick up on any significant effect of central government funding on municipal forestry provision. A likely explanation is that the distribution of these resources is severely skewed as the 13 most supported municipalities receive almost 85 percent of all disbursements (Pacheco 2000). Also, the fact that central government disburses funds without enforcing any of the formal conditions associated with these payments reduces the credibility of the law's threat to withdraw benefits in cases of non-compliance. As a result, many municipalities end up free riding on the efforts and funds of the central government.

Table 4.4. Logit Regression Results (n = 50, $r^2 = .78$)

Independent Variables	Coefficient	Std. Error	P
Central government funding (ord)	.699	.775	.367
Central government monitoring (ord)**	2.006	.936	.032
Demands from NGOs and projects (ord)**	2.755	1.245	.027
Demands from Electorate (ord)**	3.151	1.307	.016
Economic wealth of municipality (dummy)	-1.551	1.114	.164
Availability of forest resources (dummy)	-1.484	1.497	.322
Literacy rates (ord)	-.542	.391	.166
Constant***	-12.545	4.562	.006

** p < 0.05; *** p < 0.01

6.2 Central Government Coercion

The estimation of the strength of the institutional incentives derived from the degree of central government control and enforcement of municipal government obligations in the forestry sector, shows that although all municipal administrations in the sample are obliged by the central government to provide public services in the forestry sector, the perceived level of enforcement varies greatly from one mayor to the next. The central government's enforcement is generally slack, evidenced by the fact that 78 percent of the mayors were of the opinion that monitoring visits by the central government occurred "rarely," "very rarely," or "never." However, in the cases where municipal officials sense stronger central enforcement, municipal forestry becomes considerably more likely.

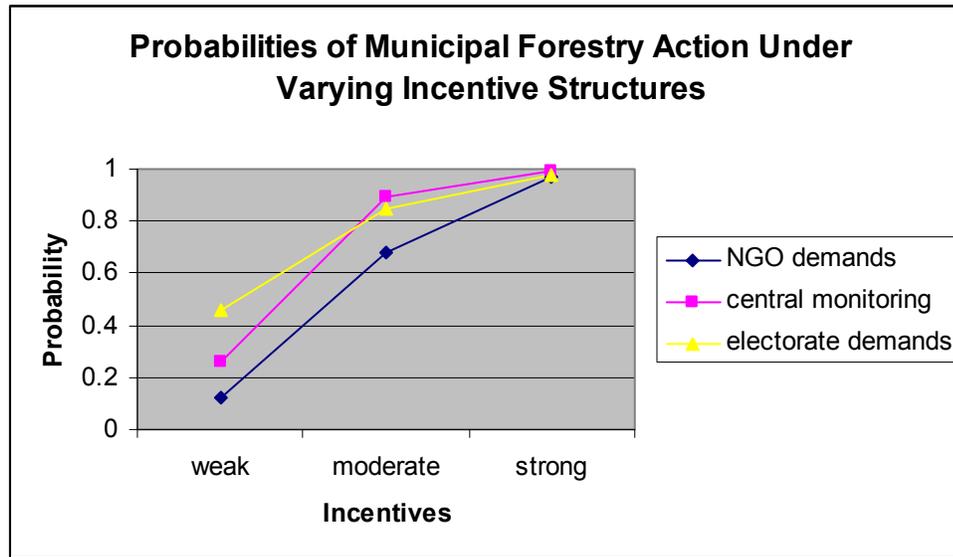


Figure 4.2. Probabilities of Municipal Provision of Forestry-Related Services under Different Incentive Structures

The positive effect that the perceived rigor of central government enforcement has on the likelihood of municipalities’ providing services in the forestry sector is strong and statistically significant at the 0.05 level. Figure 4.2 illustrates how the probability of provision increases with each increment in a mayor’s perception of central government monitoring.

6.3 Demands from NGOs and Externally Funded Projects

As shown in Table 4.3 (variables 3-a and 3-b), the majority of Lowland municipalities (78 percent) have one or more NGOs or projects working in the forestry sector within their jurisdictions. The numbers in Table 4.3 suggest that the NGOs generally do not interact frequently with municipal authorities. However, in the municipalities where NGOs do interact more frequently with municipal governments, forestry services are much more likely to exist. In fact, the probability of having forestry-related service provision in a municipality with a moderately perceived demand from NGOs and projects is about 50 percent higher than for a municipality where the mayor perceives this demand to be weak.

6.4 Demands from the Electorate

Variable 4 in Table 4.3 presents the mayors’ perceptions of the frequency of demands from representatives of rural communities, community-based organizations, and individual landowners with regard to a series of issues in the forestry sector. According to the mayors,

constituents demand municipal intervention in the forestry sector “very rarely” or “never” in 65 percent of the municipalities. The mayors’ assessments of constituents’ demands seem congruent with the community-based organizations’ prioritization of municipal interventions (variable 5). The mayors’ definition of municipal priority activities (variable 6) is no different from the order of constituencies’ priorities. In fact, a comparison of survey results on variables 5 and 6 shows that the community-based organizations assign even lower priority to forestry services than do the mayors. This finding would suggest that the generally low priority given to forestry-sector activities does not seem to be a problem of accountability but also that forestry activities are not a primary priority, neither for the municipal governments nor for the majority of people at the community level. As one would expect, in municipalities where constituents engage in more frequent interactions with the mayors about forestry issues, the higher the probability that municipal forestry services are provided.

According to the regression results, there are no statistically significant differences in the probability of municipal forestry service provision between the rich and poor municipalities, both in terms of their financial and forest resources. Literacy rates did not have a direct significant effect on the likelihood of municipal forestry provision.

7. CONCLUSION

The results of this study would suggest that it cannot be assumed that the Bolivian municipal governments will automatically begin to address pressing forestry issues just because they now have the funds and legal mandate to do so. At a minimum, municipal governments need to face sufficiently strong institutional incentives to be motivated to take on such issues. If a municipality faces one or more of the three institutional incentives that were shown here to improve the probability of provision, it may become motivated to take action in the forestry sector.

The fact that these incentives are largely absent from so many of the municipalities in the forest-rich Lowlands of Bolivia begs the question as to why this might be the case. Is forestry not a sufficiently valuable activity for the Lowland inhabitants? The argument that prevalent forest tenure insecurity has caused an undervaluation of forest resources provides one plausible explanation. If this is so, forest users will not feel urged to pressure their political representatives to protect their rights to forest resources until they feel that there is enough payoff in organizing such pressure. Future forestry policy studies should explore feasible ways out of such a tenure-induced motivation dilemma.

CHAPTER 5

Explaining the Mixed Success of Municipal Governance of Forest Resources: Overcoming Local Information Barriers

1. INTRODUCTION

The purpose of this chapter is to discern what factors might explain the mixed results of municipal forest governance. Why are some municipal governments performing well in their new mandates while others even fail to begin addressing forestry issues at all?

To explain the failures of municipal governments to invest in forestry-sector activities may not be so difficult, considering the rather adverse institutional conditions for local governance of forest resources in Bolivia.⁴⁴ It is more puzzling why some municipal governance actors have challenged the adverse conditions and appear to have overcome some of the observed collective-action problems. Our current theoretical understanding of the underlying conditions of collective action would suggest that the prospects for effective municipal forest governance in many non-industrial countries are rather slim. Therefore, the current successful experiences need to be explained.

This chapter argues that in order to be successful, the main actors of the municipal governance system need to be both *motivated* to provide public services in the forestry sector as well as *capable* of addressing a series of collective-action problems related to the effective provision and production of these services. If these conditions are only partially satisfied, there is little hope of decentralization having a positive effect on sustainable management of forest resources. The first question, why municipal governments would be at all interested in doing something about the many problems in the forestry sector; has been analyzed empirically for Guatemala's forestry sector by Gibson and Lehoucq (2000) and was done so also for Bolivia's forestry sector in the previous chapter. The second question, however crucial as it might be for understanding successful municipal governance, has not been studied empirically in great detail and rigor. This chapter takes on this task.

⁴⁴Such as ambiguous property rights, weak rule of law, inequitable distribution of wealth, high illiteracy rates, weak tradition of civil society participation in governance of natural resources, traditional centralized government administration, and dominance of local elites in local politics.

Drawing from the literature on institutional economics, adaptive management, and social learning, this chapter proposes that the *varying conditions for information sharing* between several key actors in the local governance system are strong determinants of the performance of municipal governments. This theoretical proposition is tested using empirical evidence from 50 randomly selected municipalities in Bolivia's forestry. The empirical analysis finds that the use of three distinct information-sharing mechanisms can dramatically change a municipality's prospects for achieving success as a public provider of forestry-sector services.

The chapter starts out with a brief overview of the study's empirical research design, and specifies the theoretical propositions that will be tested empirically. A section follows in which the dependent, independent and control variables are presented and discussed. The quantitative methods to be used are then explained, followed by a presentation of the results of the empirical analysis. Finally, the implications of the results are discussed from both a research and policy perspective. Based on that discussion, future research needs are assessed.

2. BACKGROUND

Recall the institutional analysis of municipal forest governance in chapter 2 and 3, which pointed out that the governmental functions that collective-action theory recommends for larger governmental jurisdictions in support of self-governance of natural resources, are within the legal competence of the municipal mandate in Bolivia's forestry sector. Consequently, the possibility exists for municipal governments to play a significant role in supporting effective, self-governed institutions for forest management among local forest users in Bolivia. The possibility that municipal governments will actually perform these functions in the best interest of the collectivity of forest users and society at large, however, is a different question as it depends on at least two subsequent questions. In the previous chapter, the presence of varying levels of four different institutional incentives was shown to be associated with municipal government motivation to provide forestry-related public services. If municipal governments are motivated to provide forestry-related services, what factors would enable them to do so in an accountable, efficient and effective manner? For the remainder of this chapter, the focus will be on this crucial question. An exploration of the literature suggests that information problems of collective action might explain a great deal of the variation in decentralized governance outcomes. A quantitative empirical analysis of information problems in municipal forest governance will be developed in light of the theoretical discussion of the relevance of such problems covered in chapter 3.

The analysis in previous chapters suggests that the main barriers for municipal governments to become efficient providers of effective facilitation of collective action in the forestry sector are not necessarily legal barriers or lack of funding. In fact, the municipal mandate may include several provisions that, if carried out, may improve the security of forest property rights for an array of rural forest users. Whether these provisions are actually carried out, or whether they are the most effective responses to the situation at hand, is a different question. The prevailing problems, then, are likely to have a different source. Building on the analysis in the previous chapter along with the contribution of other studies, this chapter makes the argument that the underlying conditions for solving *collective-action* problems are key factors in achieving successful governance of natural resources, regardless of whether the structure happens to be centralized or decentralized (Ostrom 1990; Sandler 1992; Ostrom et al. 2002). Recall from chapter 3, that effective municipal governance requires cooperation and active contributions from at least three different governance actors: (1) forest users, (2) representatives from central government, and (3) representatives from municipal governments. The actual contribution of each actor, in their joint activities, will vary according to the level of *motivation* and the kind of *information* each actor possesses. The governance outcome, in turn, will vary with the degree to which information is actually shared between these actors. Informed decision making about how the municipal governance system should intervene in the sector requires each of the three actors identified above to learn about several aspects of forest governance. This chapter analyzes how the sharing of information between the actors within the system of municipal governance influences the performance of the municipal government administration.

3. INFORMATIONAL PROBLEMS

Informational problems are at the core of all collective-action efforts, especially those that involve a large number of actors at various levels. Municipal forest governance is no exception. In municipal government hierarchies; the multiple task agenda, large flows of money, and limited public transparency; information problems are rampant. This situation sets the stage for opportunistic behavior among employees and executives, undermining the potential for effective service delivery to citizens.

As we saw in the analysis in chapter 3, the mayor, who is the head executive of the municipal hierarchy, often has difficulties in acquiring complete information about the effort that municipal government employees put into the tasks at hand. The employees face an incentive to take advantage of such information asymmetries and pursue his or her private interests while

being paid by the municipality. These asymmetries of information are the fundamental causes of principal-agent problems, which are so common in public hierarchies.

Principal-agent problems are liable to exist in all hierarchies where agents have private information about their performance, information that their principals do not have access to. Information asymmetries are especially serious when the outputs are not closely related to the effort that an agent expends to carry out the specified task. For instance, citizens may not have access to information about the true performance of the municipal government officials. In addition, the central government forestry service (the entity that is ultimately responsible for the performance of all municipal governments' performance in Bolivia's forestry sector) may have difficulties in monitoring the effort of the municipal actors in the sector. Also, the mayor may not always have access to reliable information about the performance of his technical staff responsible for carrying out the municipal work plan in the field. The absence of information for any of the three principals produces perverse incentives to shirk for all three agents. These situations bode for sub-optimal outputs. What can municipal governments do then, to deal with such informational problems in a constructive way?

This chapter argues that the degrees to which municipal governments are successful in providing adequate public services efficiently, depends upon the way the municipal administration deals with local information problems. There are three specific information problems that are believed to be crucial in explaining the quality of municipal governance, which are discussed below.

3.1 Information about the Performance of Public Officials

Agrawal and Ostrom (2001) argue that good decentralization policy is fundamentally connected to democratization “or the desire that humans should have a say in their own affairs (ibid., p. 487).” If decentralization is to lead to better natural resource management, theory suggests that it will be through greater accountability of decision makers to their constituents (Ribot 1999). The failure to establish the necessary mechanisms for citizens to hold government officials accountable at any level of governance can “block the development of local democracy and its benefits” (ibid., p. 1)

Accountability mechanisms represent a way to address some of the principal-agent problems that hamper municipal governance of forest resources. An example of an accountability mechanism that can help overcome some of the local information barriers is having regular review meetings where resource users, municipal officials, and forestry service officials discuss the progress of the municipal forestry program. If such review meetings generate useful

information about the performance of the actors involved, they may help to strengthen the incentives for municipal staff to perform at a higher level. Resource users' interactions with both municipal government and central government officials, therefore, constitute a prerequisite for such accountability mechanisms.

3.2 Information about the Local Circumstances

The agents in principal-agent relationships within public hierarchies face several constraints that makes sub-optimal levels of performance difficult to achieve. Suboptimal performance does not always occur because of the agents' lack of effort, but often because they do not have access to all the information and knowledge that they would need to perform better. One of the most cited justifications for a decentralized government structure in natural resource management is the potential advantage enjoyed by lower levels of governments to acquire reliable information about varied local information of time and place (Hayek 1948; Johnson 2000). Such an advantage will not exist, however, if the municipal governance actors cannot acquire essential information about local variations of ecological, social, and institutional conditions. Thus, a key challenge for the success of a decentralized governance regime is learning about and adapting strategies and actions to the local context.

At least two basic conditions must hold if essential learning about local circumstances is to occur. First, municipal staff must stay on their jobs for long enough to be able to benefit from the lessons learned in the past, and second, municipal staff must be able to spend part of their time in the field to be able to appreciate the local reality.

3.3 Information about What Other Organizations Are Doing and Learning

When more than one organization is carrying out similar activities in the forestry sector, inter-organizational coordination of efforts can provide economies of scale and other efficiency gains. But more importantly, such meetings can also lead participants to share experiences from their past work and thus stimulate horizontal learning to take place (Lee 1993). By meeting regularly with other organizations to share information about the problems in the forestry sector; how they have been addressed in the past, what results have been achieved, and how they should be addressed; municipal governments may learn what others are doing and what they could do better in the future. Decisions to collaborate in the governance process can avoid duplication and economize resources.

In the eyes of the population at large, municipal governments who coordinate well with others may get credit for efforts they may not even have initiated, much less paid for.

Coordination and sharing of information between sector actors seems especially sound for rural Bolivia, whose resources are often scarce and the sector's needs are many. The extent to which these three conditions explain the mixed results of municipal governance of forest resources in Bolivia will be analyzed in the next section.

4. EMPIRICAL ANALYSIS

Contrary to theoretical expectations, some municipal governments have successfully provided high-quality services in Bolivia's forestry sector. This study proposes that *municipal governments with viable information-sharing mechanisms are able to provide higher-quality forestry-sector service*. This hypothesis will be tested empirically in the following section.

4.1 Dependent Variable

The dependent variable, municipal government performance in the forestry sector, will be estimated using variable scores of user satisfaction with the municipal provision of such services. The user ratings have been converted to a dichotomous variable, indicating whether the quality of forestry services provided by the municipal government during the 1999–2000 term were regarded as either “responding **well** to the rural population's needs in the forestry sector” or “responding **poorly** to the rural population's need in the forestry sector.” The variable was measured in interviews with the presidents of the Municipal Oversight Committees (*Comités de Vigilancia*⁴⁵) at the municipal level in the 33 municipal governments that provided forestry services in 1999. The grassroot representatives in 17 municipalities were of the opinion that municipal services in the forestry sector responded well to rural communities' needs, while the remaining 16 thought these services responded badly to rural people's needs.

4.2 Independent Variables

The merits of a decentralized governance structure depends largely on the capacity of the municipal government officials to (1) be accountable to citizens (Agrawal and Ostrom 2001; Ribot 1999, 2002); (2) adapt interventions to local conditions and needs (O'Riordan 2001; Light, Serafin, et al. 2002; Hayek 1948) , and (3) coordinate with and learn from other governance actors (Litvack et al. 1998; Lee 1993; Johnson 2000). These are the three sets of independent variables that are believed to affect municipal governments' capacity to provide adequate

⁴⁵ Municipal Oversight Committees.

municipal services in the forestry sector. The composition and measurement of each one of the three independent variables are discussed below.

4.2.1 *Conditions for Downward Accountability*

Downward accountability allows forest users to hold municipal officials accountable for their performance in the sector and making certain the municipal government responds to the users' preferences. Regardless of the level of influence that grassroots organization representatives actually exercise over municipal decision making, they will have very limited possibilities to influence municipal decisions unless they interact with the decision-making bodies to let them know their demands. For this study, conditions for the establishment of downward accountability mechanisms were estimated by combining the number of monthly, forestry-related direct interactions between representatives of rural community based organizations (*Organizaciones Territoriales de Base*) and (1) mayor; (2) municipal council; (3) technical municipal staff; and (4) central government Forestry Superintendence, which is the formal entity ultimately responsible for ensuring satisfactory performance of the municipal forestry units. The number of monthly interactions with the different actors were then added to form an aggregate index, that was subsequently converted to a five-point ordinal variable indicating whether the conditions for downward accountability in the municipality were either: "1=very poor," "2=poor," "3=average," "4=good," or "5=very good."⁴⁶ As such, this independent variable is not a direct measure of transparency or accountability, but rather a proxy variable for the underlying conditions that allow for rural resource users to hold municipal officials accountable.

4.2.2 *Conditions for Municipal Staff to Learn about Local Conditions*

This is crucial information for the municipal government's planning of future interventions and the prospects of creating enduring and trusting relationships between municipal staff and users. These relationships have the potential to increase the effectiveness of services through efforts of joint production. Favorable conditions for learning about local circumstances can also be expected to increase the likelihood that the municipal government provides services that are socially optimal. That is, services that generate an optimal level of social welfare for society as a whole. How does one measure such conditions? This study considers the circumstances within municipal governments that allow its representatives to engage in repeated interactions with resource users. The aggregate of three different variables are considered: (1) the permanence of municipal forestry staff, (2) the number of days per week that forestry staff spends

⁴⁶ The categorization of the aggregate measure was carried out with SPSS automatic categorization function.

in the field, and (3) whether the forestry unit has any mode of transportation to get to the rural areas of the municipality. The aggregate scores of the three variables are then combined into one five-point ordinal variable that describes the degrees of more or less favorable conditions for municipal learning. The following five degrees exist: “1=very poor”; “2=poor”; “3=average”; “4=good”; or “5=very good” conditions.⁴⁷ The theoretical expectation is municipalities enjoyed most favored conditions for learning About local conditions in the forestry sector, and also enjoying higher user ratings of their involvement in the sector.

4.2.3 *The Conditions for Coordination and Horizontal Learning*

This five-point ordinal variable indicates the degree to which the municipal government coordinates the provision of forestry activities with other organizations, such as the forestry superintendence, NGOs and other forestry-sector actors. The five-point ordinal variable consists of the relative frequency of meeting measurements between the municipal government and (1) the forestry superintendence; (2) the land reform agency (INRA); (3) associations with other municipal governments (mancomunidades); and (4) non-governmental organizations. The variable reflects the conditions for the exchange of important information for forestry-sector planning and implementation. More information that is essential is likely to be shared if the different actors meet physically on a regular basis. The theoretical prediction of the influence of this variable is that for any given municipality, the more inter-institutional coordination and information sharing that takes place, the better the quality of municipal services in the forestry sector.

Information about these variables was collected through personal interviews with three different actors related to municipal government administration: (1) the mayor, (2) the municipal forestry officer, and (3) the president of the Municipal Oversight Committee. These three actors were interviewed according to a structured survey format in 50 municipalities in the Bolivian Lowlands, where forest resources are abundant. Since the sub-hypothesis deals with the quality of services that are actually delivered by municipal governments, the analysis considers only those municipalities that provide some services in the forestry sector. Out of the 50 Lowland municipalities in the random sample, 33 reported that they carried out some activities in the sector during the 1999–2000 term.

⁴⁷ The categorization of the aggregate measure was carried out with SPSS automatic categorization function.

5. EMPIRICAL METHODS

The effect of the conditions for information problem solving by municipal governments on the user-perceived performance of the municipal services in the forestry sector will be analyzed using quantitative methods. The empirical analysis examines and compares the association between three different aspects of information problem solving conditions and the likelihood of achieving successful municipal forest sector governance. An ordered logit model is used to regress the three ordinal independent variables on the dichotomous dependent variable. The advantage of the *logit regression* in comparison to more elementary methods of quantitative analysis, such as cross tab analysis, is that it allows the researcher to control for other variables that may also influence the variance in the dependent variable. The logit regression method thus enables the researcher to isolate the effect of an independent variable.

The logit model used in this chapter incorporates three control variables that could potentially influence the quality of perceived user ratings of forestry services:

1. The ratio of municipal government budget per capita. A municipal government with a high proportion of resources per capita could provide services more easily without necessarily being more effective in doing so;
2. The population density of the municipality. A densely populated municipality can reach a larger number of users more easily than sparsely populated municipalities); and
3. The average literacy rate in the municipality. Municipalities that have a more literate population are likely to achieve better results not necessarily because of their superior performance, but because cooperation with literate users is likely to be easier since such users are able to function in a formal system of governance, based largely on written communications.

The theoretical prediction of the analysis is that the more favorable conditions that a given municipal government enjoys—in terms of inter-organizational coordination, learning about local circumstances, and downward accountability mechanisms—the better the perceived quality of the delivered services. The econometric analysis provides a statistical test of this study's hypothesis that the three specified conditions for information problem are important drivers of successful delivery of municipal services in the forestry sector.

6. EMPIRICAL FINDINGS: EXPLAINING SUCCESSFUL MUNICIPAL GOVERNANCE

This chapter argues that the varying conditions for establishing information-sharing mechanisms both within the municipal governments as well as with other actors in the forestry sector, help explain why some municipal governments succeed while others fail. The results of the econometric analysis with regards to how the performance of forestry-related municipal services is affected by downward accountability, staff learning, and inter-organizational coordination, are shown in tables 2 and 3 below. The three independent variables' coefficients are statistically significant and have a positive sign.

Table 5.1 The Effect of Information Sharing by Municipal Governments on Resource Users' Ratings of Municipal Forestry-Sector Services (N=33)

Independent Variables	Coefficients	Std. Error	Probability
Municipal coordination**	1.1712	0.4730	0.0130
Learning conditions**	0.9482	0.4527	0.0360
Accountability*	0.7432	0.3836	0.0530
per capita municipal resources	-0.0003	0.0003	0.4420
Literacy rates	-0.0392	0.0438	0.3710
Population density	-0.0403	0.0968	0.6780

** p< 0.05; * p< 0.1

6.1 The Conditions for Holding Municipal Officials Accountable

The conditions for accountability seem to be positively associated with the quality of the municipal services in the forestry sector, as rated by the grassroot representatives in the municipality. Controlling for the influence of literacy rates, municipal budget per capita, and population density; the results in table 5.1 would indicate that the better the conditions for accountability, the higher the probability of successful service delivery. The graph in Figure 5.1 reveals that municipal governments with “very poor” conditions for accountability (very little contact between government actors and users) have only about an 18 percent probability of being rated as a successful municipal government in the forestry sector. On the other hand, municipalities whose conditions for downward accountability are “very good” have an 80 percent probability of success. A one-category improvement in the conditions for downward accountability corresponds to a 16 percent average increase in the likelihood of receiving a positive user rating.



Figure 5.1. Probabilities for Achieving Successful Municipal Governance

6.2 The Conditions for Learning about Local Circumstances

The learning conditions for municipal staff are believed to be affected by the continuity of staff, the amount of time staff spends in the field, and their mobility. The learning conditions seem strongly and positively correlated with the quality of municipal services in the forestry sector. In fact, according to the results presented in Table 5.1, statistically significant results indicate that the better the conditions for learning, the higher the probability for successful municipal governance. A municipal government interested in improving its performance in the eyes of its rural population, may find it worthwhile to pay more attention to the continuity and field presence of its forestry personnel. Holding all other variables constant, a municipality with average learning conditions can increase the probability of a positive rating by an average of 18.5 percent by making sure that its forestry personnel stay on their jobs for about 6 months longer and spend one more day per week in the field. If a municipality were really serious about improving its user ratings, it could increase its chances for success to 88 percent by having staff stay for more than two years on their jobs, spend a minimum of 3 days per week in the field, and acquiring a motor vehicle for the municipal forestry unit. Out of the 12 municipalities that enjoy “good” or “very good” learning conditions, only one municipality does not have regular access to a motor vehicle. That same municipality somehow manages to coordinate its transportation needs with other actors, because it still spends an average of 3.5 days per week in the field.

While the lack of staff continuity certainly seems to be a serious bottleneck for municipal staff trying to learn about local circumstances, the relationship between continuity and staff performance is not linear. In many bureaucracies in the industrial world, the problem is often the exact opposite to the situation in Bolivia: career bureaucrats tend to stay *too* long in the same

post. Because of rigid labor laws, it can be difficult for managers to move or fire inefficient staff. In an environment where one's individual performance as an employee is not directly connected to one's monetary rewards or career promotions, the tangible incentives to perform are weak. Studies have shown that in such situations, non-monetary rewards become more important for employee performance (Ostrom et al. 2002). Non-monetary rewards include encouragement from management, recognition of quality work and good effort, as well as the threat of coercive measures. Employees on a guaranteed, lifetime position who have limited non-monetary incentives to perform, can be expected to become less motivated to produce high-quality work the longer the individual stays in the same job.

Continuity may be a favorable and even necessary pre-condition for effective learning, but other factors also shape the incentives for engaging in such learning over time. Ideally, job security can be coupled with performance-based remuneration so as strengthen the incentives for municipal staff to learn from and work together with the citizenry. Industrial countries' experimentation in this field, however, indicates that there is no such thing as a perfect blueprint for optimal employment contracts.⁴⁸ Nevertheless, as far as Bolivia goes, anything that can prolong the current professional life expectancy of a municipal forestry officer, which is currently about 11 months, will most certainly benefit on-the-job performance.

6.3 The Conditions for Inter-Organizational Coordination

Of all the factors considered in this study, the conditions for inter-organizational coordination and information sharing seem to have the strongest influence on successful municipal governance. Controlling for other possible influences, the coordination variable is not only statistically significant at the 0.05 level, but the coefficient is also quite strong. The probability to achieve success goes from less than 10 percent for a municipality that has "very poor" conditions, to more than 90 percent for a municipality with "very good" conditions. A closer look at the data reveals that it is the number of monthly meetings with the central government's Forestry Superintendence that has the biggest influence on approval ratings. Other factors remaining constant, a municipality can increase its probabilities for achieving success by meeting with the superintendence more frequently. Why might this be so? A plausible qualitative explanation would be that the Forestry Superintendence is quite proactive in specific forest-rich areas of the Lowlands. According to the Superintendence staff, they always try to coordinate

⁴⁸ Gary Miller (1992) argues that both hierarchical and market-based contracts have their own advantages and problems. Miller's analysis concludes that hierarchies can do better by fostering a more productive environment in which "good, cooperative behavior" is encouraged by management. In order for this strategy to work, management must prove itself trustworthy and committed to the long-term well-being of

activities with the municipal technical staff when they carry out activities directly with communities. As a result, the municipal governments are likely to get some of the credit for the organization of these coordination meetings, even if the initiative often did not come from them.

7. DISCUSSION OF FINDINGS

Surprisingly many municipal administrations in the Bolivian Lowlands receive positive approval ratings from grassroot representatives with regards to their forestry-related services. Out of the 33 municipal governments that provide services in the sector, 17 (52 percent) are considered to provide services that “respond **well** to the rural population’s needs in the forestry sector.” Based on an econometric analysis, the study offers an explanation as to why these municipal governments are able to achieve the unexpected success.

The results confirm the hypothesis that municipal governments with viable information-sharing mechanisms are more likely to be successful providers of public services in the forestry sector. The probabilities for achieving successful municipal governance in the forestry sector depend on the varying conditions for downward accountability, learning about local circumstances, and inter-organizational coordination. It is noteworthy that financial resources seem to play less of a role in determining the quality of the services significantly. One should be wary, however, to suggest that municipalities have all the necessary resources to be effective in their mandate. Even to introduce the three information-sharing mechanisms studied here would require a fair amount of resources. Offering long-term contracts and acquiring motor vehicles for municipal staff require a financial commitment by the municipal governments that few are willing to accept under the present difficult times for public finance in Bolivia.

The good news for Bolivia’s municipal governments, as suggested by these results, is that they have an opportunity to improve their performance ratings and popularity among their constituents. They can do so by opening up their decision making process, inviting more representatives from organized citizen groups to participate in the planning and implementation of municipal service delivery, and by hiring technical staff that not only stay on their jobs longer but also spend a considerable share of their time in the field. A most dramatic improvement in approval ratings can happen if the municipal officers take the initiative to link up with and share information with other actors that operate within their jurisdictions. In the forestry sector, the municipalities would do well to *liaise* more with the central government’s Forestry Superintendence, which have proven to be a beneficial partner for many municipal governments.

their employees. They can do this by “practicing what they preach,” by setting an example for what good, cooperative behavior entails in practice.

The empirical analysis also provides some useful insights for national governments, non-governmental organizations as well as bilateral and multilateral development organizations that wish to support municipal government capacity to provide and produce high-quality public goods. Based on the results above, it would make sense for these actors to make sure that their support does not upset the creation of any of the essential information-sharing mechanisms. Granting support directly to municipal government administrations may not be the most effective way of supporting municipal governance, as this may boost the incentives for some actors to seek rents. In a rent-seeking environment, actors tend to try to control private information to have an edge against their competing rent seekers. It may be more effective to support the forums and activities where information sharing takes place.

One of the limitations of the quantitative analysis in this chapter is that it does not inform as to *why* some municipalities have been able to create relatively favorable conditions for information sharing. What are the underlying reasons to the apparent success, and what motivates the municipal decision making? A more qualitative research method, such as an in-depth case study of selected successful municipal governments, may be more appropriate to address that question. The next two chapters, will take on this task.

Finally, while the analysis in this chapter points to some of the underlying conditions for successful municipal governance, this does not imply that municipal governments, which appear as successful according to user ratings, are doing all the right things. High approval ratings do not necessarily mean that the most pressing problems in the sector are being addressed. It may be that the municipal services were so poor in the past that any activity on behalf of the municipality is seen as an improvement. It would therefore be useful to try to acquire a dataset that allows the analyst to replace the dependent variable (currently the user ratings) with a more objective indicator of the effects of municipal government provision of services in the forestry sector. Such dependent variables could include the amount of land incorporated in approved forest management plans for poor farmers, as well as the rates of uncontrolled deforestation on ecologically fragile soils. Are the municipal governments able to facilitate improved access to and protection of formal forest property rights for Bolivia's rural population? Replacing the current dependent variable of success with a more objective indicator of the effects of municipal governance will make empirical testing even more informative. There are, in other words, plenty of tasks for future research.

8. CONCLUSION

Despite many obstacles to good municipal governance in Bolivia's forestry sector, quite a few municipal governments are able to deliver high-quality public goods to forest users. In fact, about half of the municipal governments in the Lowlands receive positive reviews from grassroots representatives. This chapter shows that municipal governments' success as providers of forestry-related services tend to depend on the way the municipal administration engages in information-sharing activities with forest users and other actors in the sector. The prevailing conditions for three particular mechanisms of information sharing seem to be particularly important in explaining the success of municipal governance of forest resources: (1) downward accountability, (2) staff learning about local reality, and (3) coordination with other sector actors.

There is reason to be optimistic about the prospects for improved governance of forest resources in Bolivia. The decentralization process has opened up doors of opportunities for local governments to make a difference in the forestry sector. A sound formal institutional framework exists with the basic mechanisms for increased downward accountability and transparency, allowing local governments to assume local political leadership in many areas of public affairs, including community-based forest management.

One should nevertheless be cautious about expecting too much, too soon from municipal governments in Bolivia. Many organizations, including some of the Bolivian government agencies, have realized that a successful decentralization process of the forestry-sector competencies involves more than simply changing the formal structure of governance. Contrary to the current funding trends in support of municipal governance of forest resources, the Bolivian experience suggests that more equipment and trained personnel may not be the best way to support the governance capacity of municipal governments. The conditions for how essential information is shared between the main actors of municipal forest governance seem to be a crucial factor for the success of municipal governance, at least in Bolivia. The country's municipalities that are interested in improving their approval ratings with forest users can increase their chances of achieving this by investing more in trying to overcome the local information barriers.

CHAPTER 6

Can the new regime of formal property rights make forest management a more attractive land-use option for rural smallholders?⁴⁹

1. INTRODUCTION

Insecure tenure arrangements for forest resources, primarily caused by the inability of institutions to enforce assigned forest property rights, tend to produce an undervaluation of forest products relative to other land uses. If the forest products do not have a value that is competitive with the values of alternative land-use products, chances are that the forests will be cleared for other land uses, even if this implies high social costs for society at large (less carbon sequestration, loss of biological diversity, more downstream sedimentation, etc.). Further, the economic distortion of the economic value of forest management may lead to sub-optimal on-farm incomes as it will shift investments away from the otherwise more profitable forestry activities. In this sense, insecure forest property rights not only weaken the incentives for the smallholder farmers to invest scarce resources in forest management activities, but such rights also prevent forest management from realizing its potential contribution towards the reduction of rural poverty.

Without the distortions introduced by tenure insecurity, it may make more economic sense for rural smallholder farmers⁵⁰ to *manage* forested land, even in the short term. Consequently, in theory, rural people could increase their overall incomes of their land uses if they had more secure forest property rights. Does such a possibility exist for rural smallholders in Bolivia? Have the decentralization reform package and the new mandate of municipal government in the forestry sector, led to any real improvements with respect to the security of

⁴⁹ Several individuals helped in the collection, processing and analysis of the data used in this chapter. Robin Humphrey at the Center for the Study of Institutions, Population, and Environmental Change (CIPEC) helped me process case study results and made sure the quality standards of the IFRI research protocol were met. Carlos Pinto at the René Moreno University at Santa Cruz, Bolivia, helped me dig up national-level time series data on formal forest property rights in Bolivia. I am most indebted, however, to the community members of the six rural communities who let me and my colleagues work with them to document their land-use decision making and their relationship with forest resources. Any errors in this chapter have nothing to do with the contributions of these individuals, but are entirely my own responsibility.

⁵⁰ Hereafter referred to as “smallholders.” In this chapter, there is no distinction made between whether such smallholders are of indigenous or *mestizo* descent.

smallholders' forest property rights? These are two of the central questions that are addressed empirically in this chapter.

The purpose of this chapter is to examine how changes in the formal property rights regime may affect the land-use decisions of local smallholders, who previous to the reform had very limited formal access rights to forests. The chapter uses the tools of institutional analysis to study how the incentive structures of local forest users are changing in the face of recent policy reforms. The main argument in the chapter is that the incentives of local forest users is a key determinant of policy outcomes, and should therefore be considered as an essential component of national monitoring programs of policy reform.

While previous chapters have focused to a large extent on the role of municipal governments as the main actor in the municipal governance system, the study now shifts its focus to another crucial municipal governance actor: the local forest users. This may very well be the most important level of analysis for municipal governance as it is at this level that the user decisions and the actual forest use take place. It is also at this level that the operational outcomes of policy reform are directly observable.

Before Bolivia's forestry-sector reforms were passed, rural smallholders' de jure rights to forest resources were practically nonexistent as the pre-reform State did not recognize formal forest user rights for hardly any non-industrial forest users. The analysis in this chapter suggests that the conditions for acquiring formally recognized property rights for rural smallholders in the Bolivian Lowlands have improved considerably as a result of the reform, but that the vast majority of Lowland settlers not only lack de jure property rights to forest resources, but also lack a regularized land title (Superintendencia Forestal 2001a; Hernaiz and Pacheco 2001). Being increasingly aware of some of the shortcomings of the new regime, the implementing governmental organizations have taken steps to make de jure forest user rights more accessible to the poorer segments of Bolivia's large rural population. Whether these adjustments will be enough to induce a significant share of Bolivia's forest users to formalize their forestry activities remains to be seen.

The analysis also shows that the changes in the de jure situation are not sufficient to improve the de facto forest property rights. The de facto rights, and consequently tenure security, depend to a large extent on the implementing institutions and their capacity to mediate and facilitate the access to and protection of formal rights. Municipal governments, through the new mandate vested in them, have the potential to act as a mediating institution, although, as the analysis in previous chapters have pointed out, this is far from an automatic process. In fact, the analysis indicates further suggests that municipal governments play a key role in promoting

smallholder access to formal forest management rights. Municipal governments that have been able to address some of the critical motivation and information problems associated with the municipal governance of forest resources, seem to be outperforming other municipalities in securing an increasing proportion of their territories' forests for smallholder use. It remains an open question, however, whether the apparent improvements in formal property rights have effectively altered the forest users' incentive structures and actual behavior with regards to sustainable forest management practices. The second part of the empirical analysis tries to answer precisely that question.

The empirical analysis examines this particular question by comparing forest dwellers' decision making in six different Lowland communities. It focuses on how the forest users' incentive structures for sustainable forest management have changed after the introduction of the decentralized forestry regime and its new property rights regime. The empirical analysis concludes that while property rights related to commercial forest management are virtually nonexistent among the vast majority of Lowland forest users, in the places where forest users do enjoy such rights, the farming system is more diversified and household incomes are substantially higher.

1.1 Structure of the Chapter

The chapter starts with a brief background presentation of the nature of formal and informal forest property rights for rural smallholder farmers in Bolivia. Empirical evidence about rural community representative's perceptions regarding forest tenure issues are presented followed by the description of a theoretical framework that is useful for analyzing such property rights. Subsequently, the question is raised whether the modified formal property rights have actually modified the forest users' incentive structures so as to be more likely to undertake responsible forest management practices today than they were before the forestry reforms. After developing a theoretical argument about how the acquisition of formal property rights to forest resources can lead to improved tenure security and increased household incomes, a benefit-cost calculation of local forest user decision making is carried out using data from six case studies from different Lowland municipalities. The results of the empirical analysis are presented and discussed in light of municipal governance and the role of municipal governments and other local and national-level actors in facilitating more secure forest tenure for rural settlers.

1.2. Definitions

For the purposes of this study, *formalized forest management* refers to a situation in which the forest users have acquired all necessary formal permits and are authorized by government to extract forest resources for commercial purposes as long as that extraction complies with the legal prescriptions for forest management. Table 6.3 specifies what the different formal government rules are for each particular permit.

2. BACKGROUND

The tropical Lowlands of Bolivia is a vast geographical area with diverse ecological, ethnic and socioeconomic characteristics. Despite this diversity, Lowland smallholder farmers share many of the predominant realities of small-scale, subsistence agriculture in the tropics.

Following the 1953 agrarian reform, farmers from the land-scarce highlands migrated to settle in the tropical Lowlands, taking advantage of the reform government's offer to own a considerable piece of agricultural land on the frontier. Newly arrived settlers acquired formal land titles by joining farmer unions that were given official community titles by the central government's land reform agency. The farmers' unions, in turn, parceled out the community land into individual titles which were then registered as individual property with the governmental authorities. Each individual title holder was assigned a maximum of 50 ha. Before receiving the individual title, the claimant had to prove that he or she was making "productive use" of the land to which title was sought. Since forestry was not considered productive use, the old property rights regime created strong incentives for smallholders to convert existing forests to agriculture and pasture. In that day and age, all trees and forests were considered the property of the State and only individuals or firms with forest concession from the government held the legal right to extract forest resources for any kind of use, commercial or subsistence.

The bias towards agriculture and the complete State ownership of all forests were two of the main issues addressed by the 1996 forestry law and land reform.⁵¹ The reforms affirm that forestry is a legitimate land use and should be considered a productive use of the land, alongside of agriculture and cattle raising. However, the traditional strategy of using land clearing to secure land tenure had become deeply engrained in rural areas of Bolivia, and a simple adjustment in the legal texts is probably insufficient to do away with the de facto bias against forestry in Bolivia (Contreras and Vargas 2001).

⁵¹ These are two different laws that were both passed in 1996: The Forestry Law No. 1700, and the INRA Law No. 1725.

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). The typical smallholder farmer practices slash and burn agriculture to produce mainly maize, rice and *yuca* and also clears forests for pastures to graze cattle on. A common livelihood strategy for small scale farmers is to produce enough crops to satisfy two primary objectives: First, to produce enough food crops to feed their families, and second produce enough excess crops to sell these for a profit, which is then used to the family's non-food needs, such as school fees and health care items (Thiele 1995). Once the basic livelihood objectives are met, households will invest any remaining residuals in alternative activities that yield the highest possible return to their scarcest resources, which is often cash and family labor (Davies et al. 2000). Cattle has proven to be the most popular investment object, regarded by many as a comparatively low-risk placement option for excess resources in the Lowlands (ibid.). Despite the 1996 reforms, forestry has not been able to stir up much of an interest as a prospective area of investment for risk-averse, smallholder farmers, even in the forest rich tropical Lowlands.

Lowland farmers who practice slash and burn agriculture often keep a large proportion of their land under forest cover, as they only clear small areas of forest each time they rotate their crops. Because forest clearing is very labor intensive and family labor is a scarce resource for many smallholders, it is common practice to rotate the crops every two years between three and four different fields rather than clearing new forest areas every year. Over a 20 year period, the average Lowland farmer uses about ten hectares for agricultural production (Maxwell and Pozo 1981). The remaining land is usually used for a combination of housing, pastures and forest.

For many rural communities in Bolivia, forests are useful for providing essential subsistence needs as well as generating cash income through the sale of forest products. Products for subsistence purposes; such as fuel wood, fruits, nuts, fibers, and wood for construction; are available in abundance throughout most of the Lowlands and the new, formal property rights regime gives land owners the right to extract these products on their land without the special government permits that are required for commercial extraction of forest resources. Nevertheless, it is precisely the commercial extraction of timber resources that often represent the most significant benefit for smallholders because of its potential to generate cash income. In an increasingly specialized economy, cash is needed to acquire many essential household items, such as food, farming equipment, health care, and school fees. Commercial extraction of timber resources, however, requires special logging permits from the government.

The problem for many smallholder farmers in the Bolivian Lowlands, is that it can be both costly and complicated to obtain such permits. As a result, even the smallholder

communities that have vast forest resources on their lands tend to view forest management as an uncertain and costly land-use activity. Several independent sources empirical evidence speak to the persistence of problems associated with gaining access to secure forest property rights and protecting forested land from outsiders' illegitimate use.

2.1 Empirical Evidence of Forest Tenure Insecurity

During fieldwork carried out for this study, the elected presidents of the Municipal Oversight Committees⁵² in 50 randomly selected municipalities in the Lowlands were asked about what they felt were the most pressing problems in the forestry sector. A summary of their responses are presented in Table 6.1 below.

Table 6.1. Results on Grassroots Perceptions on Most Serious Obstacles to Better Forestry Practices

Problem	Mean	Mode
1. Forest Tenure Security	1.16	1
2. Access to timber	1.75	1
3. Forest Management Plans	1.91	2
4. Financial Assistance	2.05	2
5. Technical Assistance	2.55	3
6. Access to NTFPs	2.59	3
7. Commercialization	2.70	3

The grassroots' representatives were presented with a long list of plausible problems and were then asked to rank these in order of their importance to the members of the organizations they represent. Out of the 46 who ventured a response, 37 (84.1 percent) were of the opinion that compared to other problems in the sector, *forest tenure problems* are the most serious.⁵³ Legal

⁵² *Comités de Vigilancia (CV)*, or Municipal Oversight Committees, which represents the interests of all communities within the municipal boundaries, are charged with the responsibility to monitor the performance of the municipal governments. The CV must approve the annual work plan and budget before central government disburses the respective allocations from the central government organizations.

⁵³ The other 11 did not contradict this, but assigned a slightly lesser weight to the tenure problem, saying that it is "more important than other problems" rather than saying that it is "much more important than other problems" which was the response of the 37.

access to timber products was also mentioned as a particularly serious problem. The results of the survey, presented in part in figure 1, provides strong empirical support for the notion that insecure and ambiguous forest property rights are perceived as a major constraint by Bolivian forest users.

Another way of determining whether the hypothesis that forest property-rights issues represent a real problem for rural user groups is to study the degree and sources of conflicts between user groups in the forestry sector. In a recent study of the land and forest tenure situation in the Lowlands, Urioste and D. Pacheco (2001) report that in the Lowland departments of El Beni, Pando and Santa Cruz, a very large group of user groups perceive conflicts associated with access to land and forest resources (*ibid.*). Their research, which was based on a stratified random sample according to different land-use groups, ethnic groups and geographical location, reports that in El Beni, 44.19 percent said that conflicts with other users constrained their access to land and forests, and 86 percent of these conflicts were said to be associated with disputed boundaries and third party land invasions. In Santa Cruz 28.6 percent of the indigenous communities that were surveyed reported access-constraining conflicts. Ninety (90) percent of the forestry firms in Santa Cruz said that conflicts with other users complicate their extraction activities. In Pando, finally, only 15.8 percent of settlers have a formal property title. (*ibid.*).

These results are confirmed by CIPEC's surveys of Municipal Forestry personnel in 50 randomly selected Lowland municipalities. The results with regards to the prevalence, degree and sources of forest user conflicts reveal that some degree of social conflict between forest users are present in most Lowland municipalities. Out of the 46 municipal forestry officers who answered this question, 27 (59 percent) said that conflicts exist between users to some degree within their jurisdictions. They attributed these conflicts to unclear property rights and boundaries (41 percent), slow and bureaucratic land titling system (33 percent), contested legitimacy of other users (18 percent), and other reasons (7 percent).⁵⁴

The rest of this chapter discusses different aspects of how to deal with these problem locally. After a brief theoretical review of an analytical framework for studying property rights, Bolivia's new forest property regime is outlined. In the empirical analysis, particular attention is paid to the potential and actual effects that the new formal regime has on smallholders' relationship with trees and forests in their immediate surroundings.

⁵⁴ CIPEC 2001.

3. PROPERTY RIGHTS AND INCENTIVES FOR FOREST MANAGEMENT

What does Bolivia's reformed forest property rights regime entail and what difference might it make for the rural smallholders and their land-use decision making? In this section, a theoretical framework that was developed to analyze natural resource property right regimes is used to distinguish between the fundamental features of Bolivia's new regime of forest property rights.⁵⁵

Property rights represent the authority to undertake a particular action related to a specific domain. (Commons 1934). In exercising a particular property right, there are rules that govern the actions of both property right holders and the individuals who the property right holders interact with (Schlager and Ostrom 1992). This means that when an individual holds a property right, other individuals have the duty to recognize and respect that right (ibid.). The effectiveness of property rights in terms of providing *tenure security* can thus be conceived of as the degree to which the rules that are associated with the rights are actually followed by society at large. When the rules are generally agreed upon and enforced, they are *rules-in-use*, rather than *rules-in-form*, which is when the rules exist only on paper.

When considering de facto rule compliance with regards to formal property right system rules, it becomes important to distinguish between different *levels* of rules and rule making. When individuals interact to conduct their everyday business, their activities are constrained by *operational* rules. Operational-level rules serve as way to organize and reduce the uncertainty of everyday interactions. In forestry, for example, forest users may agree to follow operational rules about who can harvest what species, where and when. In order to change such rules, *collective-choice* actions are necessary. Collective-choice rules determine who can participate and the conditions under which collective-choice actions may be carried out. Taking the forestry example, users may decide to modify the list of harvestable species because of observed changes in species availability. Such a collective-choice action would have to be in conformance with the user group's collective-choice rules. In this context, collective-choice rules are synonymous with the user group's policy for operational rule changes. Collective choice rules, in turn, are anchored in the core principles of the human organization in question. Such principles are reflected in

⁵⁵ Using the basic conceptual building blocks of the Institutional Analysis and Development (IAD) framework, developed by scholars at the Workshop in Political Theory and Policy Analysis at Indiana University, Ostrom and Schlager (1992) refines the IAD framework further to analyze bundles of property rights associated specifically with natural resource management. For a thorough discussion of the IAD framework and its applicability to the study of natural resource management see Kiser and Ostrom 1982; McGinnis and Ostrom 1992; Ostrom 1999a; Varughese 1999; Schweik 1998; Agrawal and Ostrom 2001; Thomson 1992; Gibson, McKean, and Ostrom 2000; Ostrom et al. 2002.

constitutional rules of the group. *Constitutional rules*, in turn, govern the process of modifying collective-choice rules in a particular action arena. Returning to the forestry example, a constitutional rule could define who would participate in the collective choice decisions to modify the operational rules associated with harvestable species.

At the operational level, rules basically govern two different kinds of property rights: *access* and *withdrawal*. If a group of forest users holds rights of *access* they have the authority to enter the forest where the resources are located. The group may not harvest those resources, however, unless they hold rights of *withdrawal*. In Bolivia, the formal rule system gives forest access rights only to those individuals who are private owners of the land where forest grows, or have received a concession to manage forests on government owned land. To those who are land owners, the 1996 forestry law gives first option to acquire commercial withdrawal, management, exclusion and alienation rights by obtaining logging or land clearing permits from the government.⁵⁶ Holding such rights, however, does not guarantee any *tenure security* per se, as tenure security would require that the property rights have a set of rules-in-use that effectively govern the actions undertaken by property holders and the society at large. It is possible to have an internally consistent and robust formal property right system which has little effect on de facto tenure security if the rules that govern the formal property regime are not effectively enforced. Consequently, the degree to which the forestry sector's formal property rights system provides tenure security depends on the government agents' collective capacity to enforce the rules associated with the formal rights.

Individuals with property rights at the collective-choice level have the authority to participate in the definition of future rights with regards to *management*, *exclusion*, and *alienation*. Forest users with management rights can regulate the operational level use at it relates to withdrawal activities of specific forest products, such as timber and firewood. Forest users with exclusion rights are authorized to devise operational-level rights of access, while users with alienation rights possess the authority to transfer a part or all of its collective choice rights to another individual or group. The five different types of property rights form a hierarchy of property rights that can be used to classify different categories of property right holders. Table 6.2 defines the bundles of rights associated with each category of natural resource user.

⁵⁶ If use takes place on the user's private property and it is for domestic purposes, no government user permit is necessary. Only forest usage on state land and commercial activities in general require government permits.

Table 6.2. Bundles of Rights Associated with Different Types of Property Rights Holders

Rights	Owner	Proprietor	Claimant	Authorized User
Access	✓	✓	✓	✓
Withdrawal	✓	✓	✓	✓
Management	✓	✓	✓	
Exclusion	✓	✓		
Alienation	✓			

Source: Classification adopted from Schlager and Ostrom (1992)

4. BOLIVIA'S FORMAL FOREST PROPERTY RIGHTS REGIME

The categorization of property right holders in Bolivia's forestry sector is far from clear cut. This section attempts to sort out the Bolivian formal property rights regime and clarify what it means for smallholder communities in the Lowlands.

In the Bolivian forestry legislation there is a clear distinction made between forest use of *household* and *commercial* nature. Another distinction is made between forest *management* and forest *clearing* for agricultural purposes. Using the language of the property rights framework developed by Schlager and Ostrom (1992), an individual, or a group of individuals, who has private ownership of a piece of land with forest on it, can be considered a *conditional proprietor* of that forest. The conditionality of the proprietorship is related to the prohibition to clear forest areas for agricultural purposes, including smallholder subsistence agriculture. In order to get authorization for forest conversion to agriculture, land owners must acquire a special land clearing permit from the government. Permits, in turn, may require a specially developed land-use plan signed by an authorized agronomist that the land is apt for agriculture as well as an advance payment of a flat administrative fee.⁵⁷ For all other *household* uses of the forest, including extraction of timber, firewood, fruits and plants, the proprietor has the authority to define rules of access, withdrawal, management and exclusion rules with respect to the forest. However, as proprietors they do not hold the *alienation* rights that would authorize them to sell some of the

⁵⁷ Land areas inferior to three hectares are exempt from a land-use plan, and fee, but must still obtain an official permit from the municipal government and the Agrarian Superintendence. This exemption rule was the result of a social movement led by the federation of organized indigenous groups across the country in April of 2000.

forest products that they harvest from the resource. In order to acquire alienation rights, proprietors need a special government permit. In order to obtain such a permit, applicants need to provide a land title or proof of a government concession right, a management plan, and an advance payment of a tax representing 17 percent of the commercial value of the products that will be harvested and sold. An individual or a group who acquires the government permit can be considered a *conditional owner* of the resource since such individuals are authorized to make collective-choice decisions with regard to rules of access, withdrawal, management, exclusion and alienation, as long as these rules do not break the forestry law and the regulations of the forest management plan.

There are four ways for Bolivian smallholders to get alienation rights to forest resources. Each of these alternatives requires that the individual or group receives a special government permit. Table 6.3 describes the most important features of each one of these permits along with their main opportunities and constraints for smallholder forest management.

Five years after its approval, the formal regime has undergone several modifications, especially as it concerns smallholder and indigenous groups. Social mobilizations and protests by these grassroots have led to changes in some of the regime's specific rules. The modifications were intended to make it substantially less costly and simpler for smallholder farmers to attain formal forest property rights. The most famous of these modifications is the rule that gives smallholder farmers and indigenous groups the right to clear up to 3 ha of forested land for agricultural purposes without paying any fees and without the need to carry out a land-use plan (Superintendencia Forestal 2000). Another, less publicized, exempt mechanism is a resolution that authorizes rural communities to exploit timber commercially without a formal management plan, as long as the total annual harvesting area does not exceed 200 hectares and the forest is located on two or more privately registered land properties (Superintendencia Forestal 2001a).⁵⁸ These and other modalities available to smallholders who wish to access formal property rights to commercial forest management are listed in Table 6.3.

It remains to be seen whether the new formal regime will effectively lead to any real improvements in forest tenure security for smallholders. A potential stumble block for the government's policy strategy is the fact that forest tenure security hinges on more than just the introduction of formal property rights. Unless there is effective enforcement of these formal rights, behavior is likely to default back to the old de facto regime. Further, if enforcement of the

⁵⁸ An informal forest management plan is required, which is to be developed in collaboration with the Municipal forestry unit officials.

formal rules is spotty, and if the formal judicial institutions in charge of property regime governance are not predictable in their rulings, tenure *insecurity* is bound to prevail. Moreover, even if the formal regime is implemented perfectly, the relatively high up-front costs associated with a land owner's acquisition of alienation rights will detract from the perceived benefits of a de jure regime.

The introduction of a formal property rights system that recognizes the rights of rural smallholders may be a necessary policy reform for improving forest tenure security for smallholders, but it is hardly sufficient. The degree, to which a new formal regime is actually able to deliver forest tenure security, is partially related to the performance of the formal implementing organizations. The formal institutions that are charged with the implementation of the formal regimes, may or may not have the resources, information or motivation to carry out their mandate effectively. Who are these organizations and what are their mandates?

Table 6.3. Typology of de jure Forestry Rights for Rural Smallholders

Type of de jure User Right	Total Area ^a	Rights and Responsibilities	Opportunities	Current Constraints
Individual logging permits on private lands	221.539 3.5 % of managed forests	<ul style="list-style-type: none"> Individual must have: A forest management plan signed by a certified forester and approved by the Forestry Superintendence, and A regularized land title certified by the Land Reform Institute (INRA) A transportation certificate for selling and transporting the logs outside the place of harvest (from SIF) 	<ul style="list-style-type: none"> Better forest tenure security Better prices for legal wood products Better conditions for sustainable management if permits are enforced 	<ul style="list-style-type: none"> Bureaucratic obstacles – four different certificates from three different government agencies needed. Long waiting period adds to uncertainty and transaction costs. High administrative fees for the four permits. High cost of developing forest management plan^b 17 % tax on sold wood
Individual land clearing permits	N/A	<ul style="list-style-type: none"> Individual must have: A land-use plan certified by the Agrarian Superintendence and All requisites applying to individual logging permits, less a forest management plan 	<ul style="list-style-type: none"> Better access to credit markets Better access to technical assistance 	<ul style="list-style-type: none"> Only 10–20% of the Lowland settlers have regularized land titles Use of chainsaw for sawing logs prohibited by law – clashes with the customary techniques used by many smallholders
Community logging concessions on public lands (ASL)	257.123 4.5 % of managed forests	<ul style="list-style-type: none"> To qualify, a group must have: Minimum of 5 years of local residence, 20 or more members, be a formal, legal entity; A forested area on public land assigned to them by the municipal government and certified by the land reform agency, and A management plan to be signed by a certified forester and approved by the central government A transportation certificate for selling and transporting to outside property (from SIF) 	<ul style="list-style-type: none"> Increased property value Better chance to get formal land title 	<ul style="list-style-type: none"> Few smallholders are aware of the formal rights and their rules, very low rate of compliance.
Community logging permits on private lands ^c	241.169 ^d 4.0 % of managed forests	<ul style="list-style-type: none"> To qualify, a group must have: Proven local residence, and be registered as a legal entity; Valid land titles to the forested land area belonging to the community member applicants; For areas smaller than 200 ha, a simplified management plan may be developed with the municipal forestry staff, otherwise need for formal plan, as indicated above. A transportation certificate for selling and transporting the products outside the place of harvest (from SIF) 	<p>Same as above, and in addition, the considerably lower costs for forest management plans.</p>	<p>Lower costs in general, but very limited awareness among smallholders about the potential opportunities associated with this modality.</p>

^a Numbers correspond to total areas in '000s ha, for the entire country, approved by the Superintendencia Forestal (SIF) from 1997 to 2000. Raw data provided by SIF in February of 2002.

^b For properties larger than 200 ha, as high as several thousands of dollars, an astronomical amount for most smallholder farmers

^c Including Indigenous Territories (TCOs). For smallholders with forest resources on their land plots, a simplified forest management scheme introduced as a pilot program in Santa Cruz in 2000 enables private landholders to get permits collectively. The municipal government helps the community to develop the plan replacing the formal need of a certified forester's signature. This program has reduced the costs of forest management considerably for smallholder communities. SIF extended the program to other departments during 2001.

^d Includes indigenous territories.

4.1 The Main Actors of the New Forest Property Rights Regime

There are several governmental organizations that are responsible for the enforcement of the new regime's forest property rights in Bolivia. If the new regime is to achieve its objective of making forestry a more economically viable activity for Bolivia's rural population, its effective implementation is crucial. Table 6.4 provides a summary of the official mandate of each of the key governmental authorities and identifies the main issues that each one is facing in the implementation of the new regime.

Table 6.4. The New Forest Property Rights Regime's Main Actors, Mandates, and Main Challenges

Organization	Mandate	Current issues
Ministry of Sustainable Development	<ul style="list-style-type: none"> • Highest regulatory decision-making entity; coordinates implementation of the government's policy decisions with regards to forestry and natural resource management. • Assigns forestry concessions on public lands 	<ul style="list-style-type: none"> • Extremely long waiting periods for community forestry concession approvals • Lack of coordination with Ministry of Agriculture, leads to continued bias in favor of agriculture in policy implementation.
National Land Reform Institute (INRA)	<ul style="list-style-type: none"> • Implements 1996 land reform, including the regularization of all old land titles and the issuing of new ones, determining the spatial extent of the country's indigenous territories, private and state lands. 	<ul style="list-style-type: none"> • Slow process of land regularization, expensive and slow to get title regularized. Only 10–15% of smallholders and indigenous populations have regularized titles.
Forestry Superintendence (SIF)	<ul style="list-style-type: none"> • Implements the Forestry Law • Formulates the detail regulations that govern the local implementation of the forestry law. • Approves logging permits, forest management plans, land clearing permits and transportation certificates, as well as collects forestry taxes and fees. • Monitors and enforces formal property rights system with the assistance of municipal governments. 	<ul style="list-style-type: none"> • Financial crisis have led to downsizing of staff, especially in the field as well as the cancellation of a contract with Inspectorate, an independent monitoring company, which had achieved a high degree of control of illegal logging. • Limited legitimacy with local forest users who often see SIF representatives and the new forestry law as threats to their traditional forest use.
Municipal Governments	<ul style="list-style-type: none"> • Monitor forest rights and together with Superintendence's local offices enforce the forestry law regulations. • Delimit state forest land for community forestry activities. • Assist forest users to formalize their user rights and acquiring logging permits. • Inform local forest-dwelling communities of the opportunities offered to them by the new regime • Assist forest users develop management plans 	<ul style="list-style-type: none"> • Forestry is not a priority area • Technically weak staff with high turnover rates • Weak institutions for downward accountability enable local elites control municipal interventions to their favor • Low awareness of opportunities in the new regime for smallholders or unable to provide the necessary support to forest users • Lack of financial resources

Source: Author's elaboration based on data from Government of Bolivia (1996a, 1996b)

Where forest resources are abundant and users have not acquired formal alienation rights, forests often take on the characteristics of an open-access resource. In such situations, trees and forests are largely frequently as nuisances and obstacles to agriculture and pasture. In some of these areas, land properties with forest cover still sell for considerably less than land with comparable soil quality, but which has been cleared for agriculture. A recent study in the Department of Pando, for example, found that the price of one hectare of forested land to be about US\$4–20 compared to about \$200–300 for land that had been cleared for agriculture or pasture (TCA 1997). The indifference towards forest resources is liable to change only if it can be shown, in a conclusive and convincing manner, that smallholders can increase their on-farm net incomes by engaging in responsible forest management activities. The empirical analysis below explores if the introduction of formal property rights influences the profitability of forest management.

Despite the efforts of the four organizations in Table 6.4 to promote the significant opportunities for smallholders to engage in forest management on their lands, forestry still has not caught on among a majority of Lowland farmers (Contreras and Vargas 2001). According to the 2001 Annual Report of the Forestry Superintendence, only a fraction of Bolivia's smallholder farmers in the Lowlands take advantage of the new regime's opportunities for forest management.⁵⁹ Why is forest management not catching on among rural smallholders? The question is very relevant because the forest users' perceptions of the new forest property rights are decisive not only for the forestry sector's potential contribution to poverty alleviation but also for the long-term condition of Bolivia's forests.

Part of the explanation has to do with the delays in the implementation of the 1996 land reform. The national government agency in charge of its implementation struggles with a constrained budget and extremely complex and burdensome bureaucratic procedures. Five years after the land reform, most smallholders still lack a regularized individual *de jure* title to their land. In 2001, only about 10–20% of the Lowlands had been regularized (Hérnaiz and Pacheco 2001). Without a regularized title it is often difficult to get forest management plan and land clearing permit approved by the government.⁶⁰ But even for settlers who have regularized titles, the perceived high cost of obtaining the corresponding government permits has made many smallholders disinterested in even applying for land clearing and logging permits (Cordero 2001).

⁵⁹ In 2000, an estimated 8.8 % of the managed Lowland forests were legally managed by individuals or groups of rural smallholders, including indigenous groups. Yet, smallholders and indigenous populations have legal claims to more than 70 % of the total forested land area in the Lowlands (author's estimation based on data provided by the *Superintendencia Forestal*).

The result is that the vast majority of forest users in the Lowlands hold no de jure rights to commercial forest exploitation, even to the forest resources situated on the land where they have lived for several years.

In sum, there are serious limitations in the new implementation of the new regime. These constraints notwithstanding, several empirical studies agree that the new regime provides an improved legal foundation for supporting increased forest tenure security in Bolivia (Pacheco 2001; Contreras and Vargas 2001; Andersson 2001a). In fact, most of the limitations cited above have little to do with the regime itself, but rather the inadequate implementation of it. The Bolivian institutional framework is evolving and there are two particular occurrences that would indicate that improvements with regards to the effectiveness of the new regime may be under way in the foreseeable future.

First, as the land regularization process advances, albeit very slowly, formal alienation rights to forest resources will become more accessible to smallholders, as they receive regularized land titles (one of the formal prerequisites for obtaining alienation rights). Second, if the formal sector organizations are able to continue the simplification of the formal requirements for rural smallholder communities to acquire such rights, we may see real improvements in the conditions for increased forest tenure security. If this is the case, there is at least a theoretical justification for being somewhat optimistic about the prospects of the new regime contributing to increased forest tenure security for smallholders. The next section further explores the possibility of this actually occurring.

5. INCENTIVES, TENURE SECURITY, AND PROPERTY RIGHTS

The bundles of forest property rights affect the incentives that individuals face when making land-use decisions. The incentive to invest in the improvement and protection of natural resources, including forests, have been shown to be closely related to the tenure security of the resources (Schlager and Ostrom 1992). Forestry is a long term activity and therefore requires long term tenure security. Insecure forest property rights has a negative effect on the probability of being able to capture a future flow of benefits from forest management investments, but a forest property rights system that allocates and enforces rights in an efficient, effective, equitable and accountable fashion, can improve the long term security of forest tenure. The fruits of such a

⁶⁰ But not impossible. If an individual can show that he or she is the only claimant to a piece of uncontested land, a logging or land clearing permit may be assigned.

regime include improved economic incentives for rural forest users to carry out sustainable forest management.

The formal property rights system is a feature of public policy that can strengthen the incentives for forest management and thus increasing its viability as a land-use option for Bolivian farmers. However, to obtain formal alienation rights to forest products is far from free, and for many smallholders the costs can be quite substantial. As was revealed by the comparison in Table 6.3; taxes, administrative fees, and forestry consultant fees; all detract from the perceived benefits of formalized forest management as a land-use option. From a forest users' perspective, the decision whether to formalize forestry activities or not, is not likely to be relevant unless the individual user feels that forestry activities represent a reasonably profitable land-use option in the first place. The decision to dedicate a piece of one's land to formal forest management activities, with all the necessary government permits, boils down to weighing the likely costs against the projected net income from future forest product sales along with the estimated value of potential non-monetary benefits (Davies et al. 2000).

The decision to engage in legal forest management activities is further influenced by how the forest user values the future. If a forest user and land owner have high discount rates and value short term income much more than long-term returns to investments, getting formal forest property rights may not do much to strengthen the incentives for forest management, even if the implementation of such rights should provide effective forest tenure security. As a matter of fact, recent studies have shown that when users have very high discount rates, the secure forest tenure may lead to *increased* mining of the resource and not long term forest management (Kaimowitz and Angelsen 1998; Mendelsohn 1994; Southgate 1990). Do Lowland settlers have high discount rates?

Since discount rates are generally related to the level of uncertainty that people perceive with regards to meeting basic subsistence needs, individuals who have difficulties in satisfying their own and their families' basic needs, can be expected to have high discount rates. In the Bolivian Lowlands, where an estimated 80 percent of the rural population lives below the poverty line, one can expect that discount rates are generally high, although it would be virtually impossible to be more precise than that (Government of Bolivia 2000b; FAO 2001a).⁶¹ As a

⁶¹ Poverty estimations based on family income obtained from a survey carried out in 1997 found that about 51% of Bolivia's urban population was poor and 21% lived in conditions of extreme poverty. Rural poverty, however, is much more prevalent; 80% of the population in the countryside lives below the poverty line, with 58% receiving incomes below the value of a food basket (Bolivian Government 2000). One way to estimate a discount rate for the Lowlands would be to compare it to rates used in other societies. In benefit-cost analyses for industrialized countries, it is generally accepted to use a discount rate

consequence, a policy that completely devolves collective-choice decisions to the user level (in essence privatizing forest property rights), under such circumstances, may very well lead to increased short-term forest exploitation.

Another factor that can potentially detract from the expected benefits of a formal property right system is the difficulty in devising local institutions capable of governing users' collective-action efforts. Since some of the formal forest property rights are given to a community of users, rather than to an individual, the group of users need to work out ways of solving collective problems associated with forest management, or the common benefits of the formal regime is not likely to be achieved. If local users do not expect that the *benefits* they will receive as a result of organizing themselves will exceed the total *costs* of forest management, users are not likely to invest in improving their local institutions (Gibson, McKean, and Ostrom, 2000; Ostrom 1990).

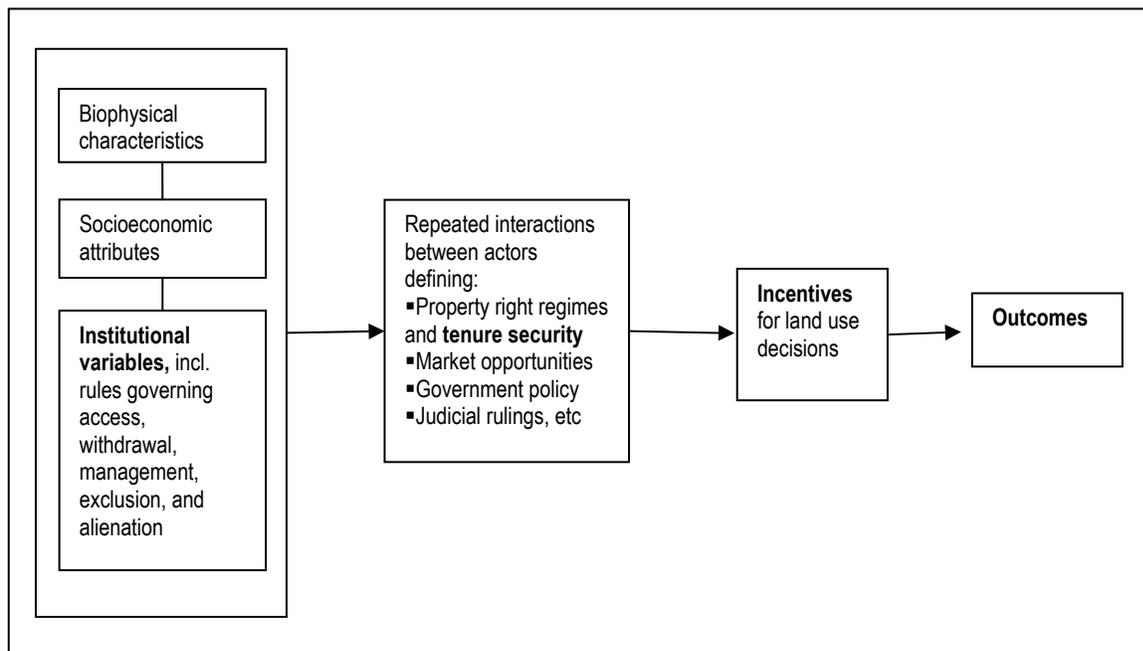
Despite the observed limitations concerning the expected benefits of developing formal property rights in the forestry sector, the benefits of obtaining formal forestry rights are substantial for a potentially large group of farmers. For individuals who have forest on their lands and have relatively low discount rates, acquiring de jure rights *could* be decisive in the land-use decision making, as it may provide the necessary economic incentives to engage in forest management activities rather than other land-use options. The empirical analysis assesses the effect of de jure alienation rights on the economic incentives associated with different land-use options.

The comparative analysis developed in this chapter assumes that incentives for specific land-use decisions are formed on the basis of the economic costs and benefits of the yields for different land-use alternatives. For smallholders in the tropical Lowlands of Bolivia, two basic, alternative uses of forest resources are considered. Farmers either manage the forest resources that cover large tracts of land, or they convert the forests into agricultural or pasture lands. Further, it is assumed that public policies, including formal property regimes, land reform initiatives, agricultural subsidy programs, and trade policies, shape the incentive structures for these land-use decisions. For instance, a subsidy to farmers to increase the on-farm prices of corn strengthens the farmer's incentive to plant corn rather than dedicate the land for the production of otherwise equally profitable crops. In the past, there has been a strong bias in favor of agricultural practices at the cost of forestry in Bolivia. Public policies, including land reforms that define forest tenure, have individually and collectively contributed to make agricultural activities artificially more profitable than investments in forest management even in places where

of 10%. For developing countries, such as Bolivia, the norm has become to use a variety of discount rates, ranging from 15% to 25%, to see how outcomes vary under different conditions.

agriculture is not an ecologically sustainable land use (Stewart and Gibson 1995; Solorzana 1994).

Such slants in public policy may help explain why forest management has had such a hard time to catch on among Lowland smallholders. This study argues that a common denominator to all of the potential explanations is the relatively low profitability of forest management compared to competing land uses. A hypothetical causal flow, illustrated in Figure 6.1 below, links individual and groups of users and their rules to, property rights, forest tenure security, economic incentives and outcomes.



Source: Adopted from the Institutional Analysis and Development (IAD) framework, developed by scholars at the Workshop in Political Theory and Policy Analysis (See for example Kiser and Ostrom 1982, Ostrom et al. 1993, Ostrom 1999b, Ostrom et al. 2002).

Figure 6.1. Simplified Causal Flow for Rules, Rights, Incentives, and Outcomes

Considering the causal flow above, can the implementation of the new formal property right system in contribute to make forest management a more commercially viable land-use alternative in Bolivia? The answer to this question depends a great deal on economic incentives for forest management that the formal property regime generates among users. With this in mind, the following hypothesis has been developed: Forest users who have acquired de jure alienation rights have diversified their production and increased their net on-farm income compared to when they did not have such rights.

6. THE EMPIRICAL INQUIRY

The empirical research aims at explaining local land-use decision making with respect to forest management, and in particular how the introduction of de jure alienation rights affects the probability of a typical smallholder farmer to opt for forest management as a viable land-use alternative. The municipal-level survey data, which was used for the analysis in chapters 4 and 5, would be insufficient to test the hypothesis, which concerns forest use at a lower level of aggregation. Instead, case studies of forest user communities were carried out to study the factors that influence the formation of forest user incentive structures in the Bolivian Lowlands. The municipal survey data was nevertheless useful for selecting the sites in which community-level case studies were carried out. A total of six cases were selected, according to a three-step selection procedure.

6.1 Selection of Case Study Sites

First, on the basis of survey results, three municipalities were identified in which the municipal governments had worked actively to promote the new formal forest property regime and another three municipalities in which such efforts had not materialized. In addition to the property rights criterion, in order to ensure comparability between biophysical characteristics a criterion of forest resource availability was applied.⁶² Second, each of the selected municipalities was visited and a workshop was held with representatives of all its rural communities that have “considerable” forest resources within their community boundaries.⁶³ During the workshop, the costs and benefits of forest management were discussed for forest users in the municipality in general. At the end of the workshop, participants were asked to identify a community that represented, for the municipality, typical characteristics with regards to forest management activities, and in which the research team would be able to conduct an in-depth, community case study. On the basis of the participants’ suggestions, the research team selected a community where the predominant land uses included forestry, agriculture and cattle raising. Although this approach by no means guarantees that a truly representative community is chosen in each municipality, the approach does help researchers avoid selecting extreme outliers. The main characteristics of each of the selected communities are summarized in Table 6.5. Having followed this procedure in the visited municipalities, the land-use decision making was studied in the following six communities:

⁶² In addition to the property rights criteria, to qualify, the selected municipalities had to have an existing percentage of forest cover above 50 percent, and a predominantly rural population.

⁶³ We let the municipal forestry officers determine what they viewed as “considerable.”

Almodovar is located in the Municipality of Filadelfia in the Department of Pando.

It is a nut gathering community with no formal rights to timber resources, but with a livelihood based on the sale of non-timber forest products and subsistence agriculture. The better-off families invest their cash incomes in cattle, which are managed individually.

La Embocada in the Municipality of San Borja and the Department of El Beni is a settlement that was formed in the 1950s following the agrarian reform. It features predominantly individualized agricultural production, after the community abandoned the cooperative organization which promoted mechanized production in the 1980s. Currently, there are some self-organized efforts in the areas of pasture management, and illegal forestry activities. There is very little organized activity related to forestry on private lands, because, according to community members, most of the valuable species are scarce.

Lagunillas in the Municipality of El Torno, Santa Cruz consists of highland migrants from Cochabamba who arrived about 10 years ago. Community members live off charcoal extraction and subsistence agriculture. The community has acquired formal permits from the Superintendencia Forestal, but their extraction is not closely monitored. The municipal government has been active in brokering contacts between community and central government bureaucracies, which has enabled the community to acquire alienation rights. This has somewhat improved their tenure security.

San Juancito, in the Municipality of San Ignacio, Santa Cruz is a community which was formed by settlers in the early 1960s. The community has a self-organized cattle cooperative, certified ecological coffee production for export, and more recently a community forest management plan with logging rights. Despite its relative young age, the community is well organized and has a long-term plan for forest management. Thanks to their effective organization, the community has been able to lay claims on large tracts of forest land with commercially valuable tree species on them.

San Lorenzoma in the Municipality of San Rafael, Santa Cruz, is a small settlement (13 families) who was recently declared an indigenous community although its members settled the area in the late 1960s like any other Lowland settlement. This identity switch from *colono* to indigenous was a pragmatic move as the community felt that as an indigenous group they would receive more attention and support from external organizations, especially when it comes to land claims. In 2000, the community asked the municipality of San Rafael for help in acquiring formal user rights through the development of a community forestry management plan to be implemented on the community land. Thanks to the plan, in 2001 the community harvested 165 cubic meter of 6 different timber species on 39 hectares of community land. The community's

first legal logging activity raised over US \$ 5,000 for the community which was distributed equally among the 13 families.

Villa Aquiles in the Municipality of Buena Vista, Santa Cruz, is located right next to the National Park of *Amboró*, constituting a part of the park’s buffer zone. The community has developed an ecotourism center with trails and a picnic area for visitors. A couple of community members have been trained by an external NGO to guide tourists in the forest, but due stiff competition from urban agencies and a lack of active promotion, visitors relatively few and the ecotourism project still has not generated any substantial cash income to community members. In fact community participation in the maintenance of the facilities is dwindling. No formal forest management activities take place in the community and members live off individualized subsistence agriculture and raising cattle.

Table 6.5. Main Characteristics of Selected Case Study Sites

Community	Main Income	Land Uses^a	Forest property rights^b
Almodovar, Filadelfia, Pando	Nuts	Forestry (NTFPs), agriculture, and cattle	Informal de facto rights, conditional proprietors
La Embocada, San Borja, Beni	Maize, yuca, cattle	Agriculture, cattle, and forestry	Informal de facto rights, conditional proprietors
Lagunillas, El Torno, Santa Cruz	Charcoal, maize	Forestry, agriculture, and cattle	Formal harvesting rights, conditional owners
San Juancito San Ignacio, Santa Cruz	Cattle	Pasture, forestry, coffee, and agriculture	Formal harvesting rights, conditional owners
San Lorenzoma San Rafael, Santa Cruz	Maize	Agriculture, cattle, and forestry	Formal harvesting rights, conditional owners
Villa Aquiles Buena Vista, Santa Cruz	Rice, maize	Agriculture, cattle, and forestry	Informal de facto rights, conditional proprietors

^a In order of the size of land share proportions. For instance in Villa Aquiles, approximately 50% of the land is dedicated to Agriculture, 30 % to cattle pastures and the remaining 20 % is forest.

^b Users who are considered claimants have some collective choice authority when it comes to access, management and exclusion decisions with regards to the forest resources on their land, but unlike users with de jure alienation rights (owners) they cannot sell any products.

6.2 Case Study Methods

In each of the visited municipalities, two different case studies were carried out—one that focused on the municipal government’s relationship with forest users and a second that studied land-use decision making from the perspective of rural smallholder communities. At the municipal level, the case study provided a qualitative assessment of the municipal government’s involvement in the forestry sector, how it carries out its mandate and specific functions, especially with regards to forest-dwelling communities and rural smallholders in general. Several

sources of primary information were tapped to seek answers to these questions. In-depth interviews were carried out with municipal government authorities and technical personnel, representatives of organized forest user groups, NGO's, governmental agencies, municipal oversight committee, civic committee, and the representatives of all forest-dwelling communities in the municipality.⁶⁴

In the community-level case study, the research protocol of the International Forest Resources and Institutions (IFRI) Research Program was employed. The IFRI research protocol is a powerful tool of institutional analysis that focuses on forest users' interactions with forest resources. The protocol, which relies primarily on participatory rural appraisal methods and in-depth interviews with key informants for information gathering, contains a set of key questions in ten different subject areas, increasing the viability of cross-site comparisons.⁶⁵ Moreover, the community-level case studies also provided an opportunity to validate the information obtained in the municipal workshops with community leaders.

The two different levels of case studies provided complementary information about the influence of municipal government on local land-use decisions. While the workshop focused principally on the costs and benefits of forest management as well as the role of the Municipal Forestry Unit in the promotion of forest management as a land-use alternative, the community case studies provided a more detailed account of community members' decision making and organization with regards to forest use.

The answers to two specific questions are sought throughout the empirical analysis:

1. Does the introduction of de jure alienation rights make forest management more profitable? And if so, is the increased profitability sufficient to make forest management a more likely land-use option for Lowland smallholders?
2. What is the significance of municipal government actions in smallholders' land-use decision making?

⁶⁴ A meeting was organized in each municipality to which one community leader from each forest-dwelling community was invited by the research team and the Municipal Forestry Unit. Participation varied from 12 community participants in Filadelfia, Pando, to over 80 in San Borja, El Beni.

⁶⁵ These questions guide the researchers in the discovery of the relationships between human institutions and the surrounding natural environment. The IFRI protocol explores these relationships in the following 10 subject areas: (1) community background and history; (2) the nature of the natural resource; (3) the quantitative definition of the condition of the natural resource; (4) characteristics of the physical realities of the human settlements of the study area; (5) definition of and description of the characteristics of the different resource user groups; (6) characteristics and influence of formal user group associations; (7) inter-user group relations; (8) locally extracted natural resource products and their importance for users; (9) the influence of non-harvesting organizations, such as municipal governments; and (10) inter-organizational relations.

To answer the first question, the analysis draws on information from the community case studies. This analysis compares the effect of formal forest ownership rights on land-use decision in forest-dwelling communities. The main analytical method for this exercise is gross margin analysis, a simplified benefit-cost analysis tool. The benefits and costs of forest management are compared in two different sets of communities. The first set includes three communities in which formal property rights authorize logging activities by community members (conditional *owners*) according to an approved forest management plan. The second set consists of three communities in which forest logging is also prominent, but primarily without formal logging permits (conditional *proprietors*). The analysis seeks to understand how the introduction of formal *alienation* rights affects the smallholders land-use decision making, and under what conditions a de jure regime might reduce the uncertainty of forest management so as to boost smallholder investments in forestry.

To address the second question, municipal case studies in combination with secondary data on forest property rights are called upon. This part of the analysis compares the conditions for sustainable forest management under two different situations: One in which municipal governments have played an active role in forest sector governance and another in which they have not been able to do so. The percentage of forest land under smallholder control that has been authorized de jure logging rights.

Despite the careful selection of both municipalities and communities for the case studies; so as to minimize the risk of biased inferences; one should be aware of the limitations associated with qualitative case studies of this sort. Each municipality and community has its unique characteristics, not only in terms of its biophysical, socioeconomic and cultural attributes but also the way it is organized to solve everyday problems. Even though the sites were selected with the intention to minimize the contextual differences between the sites and the fact many of the subtle differences were captured by the IFRI research protocol, it is impossible to control for all of these in the comparison between sites. It is arguably one of the most difficult challenges of qualitative research to isolate the effect of the independent variable, especially when the number of cases is so small.

6.3 Results

6.3.1 Does the introduction of de jure alienation rights make forest management more profitable?

This was the main question posed to forest users in the six municipalities. Smallholder community representatives were first asked about the differences in existing market prices of

timber harvested with and without the required logging permits. In areas where there are markets for both legal and illegal timber, the difference in prices for illegal products varied between 45% and 72% of legal product prices, even for relatively abundant species. It was found that the stricter the control against illegal logging the larger the differences between prices between legal and illegal products.⁶⁶ Users were then asked to specify what some of the most important non-monetary benefits of acquiring formal property rights to forest products are. Farmers generally agreed that having de jure logging rights could increase the market value of the property where the timber extraction takes place; speed up the title regularization process; increase institutional support for forest management from municipal government, NGOs and forestry superintendence. Although such benefits are not trivial, farmers who had formalized their forest management activities said such benefits had not been important in their decision because so far most of these benefits were hearsay that had not been validated by experience. There was consensus among the interviewed smallholders that the most important consideration of whether to apply for logging permits or not was the prospects for increasing economic profitability.

Table 6.6 displays the comparison of the economic costs and benefits between formal and informal forest management activities shows that users with formalized forest management rights generally receive considerably higher economic returns than users without such rights. However, this result requires some further discussion. It is important to note that the costs of formalized forest management in this comparison are based on a policy instrument introduced by the Forestry Superintendence in 2001 with the intention to make the acquisition of de jure forest property rights more accessible for rural communities with forest resources on their lands.⁶⁷ The introduction of this new instrument has cut the initial cash expense for smallholders by almost 80 percent compared to what they would have had to pay before 2001. Had the costs of the old instruments been applied, the returns to cash in Table 6.6 had become negative.

⁶⁶ This control is carried out by a combination of organizations at the local level, among them the municipal government, the forestry superintendence's local and regional offices, the regional government's representatives as well as INSPECTORATE, a private contractor that operates several roadside control points.

⁶⁷ One of the unique features of this policy instrument is that in order to receive the logging permits it is not necessary to carry out an all-out, 20-year forest management plan, developed by teams of expensive, certified forester contractors. Rather, for community logging permits it is sufficient for the community members to present a relatively simple extraction plan for a forested area of a maximum area of 200 hectares, which describes which trees should be harvested and which should be kept as seed trees until the

Table 6.6. Returns for Forest Management *with* and *without* Formal Logging Permits

Forest Management <i>with</i> Logging Permits^a	Average Annual US\$/ha	Forest Management <i>without</i> Logging Permits	Range Average Annual US\$/ha
Benefits^b		Benefits	
Timber sales (at farm gate)		Timber sales (at farm gate) ^c	
- hardwoods per hectare	43.64	- hardwoods per hectare	18.54–28.80
- softwoods per hectare	94.55	- softwoods per hectare	31.23–52.27
		- 10% risk of losing timber through inspections ^d	-6.91
Total benefits	138.18	Total benefits	42.86–74.16
Costs		Costs^e	
- planning	21.82		
- logging (incl. hired labor)	18.18	- logging (incl. hired labor)	21.99
- training, taxes, depreciation of equipment	13.45	- depreciation of equipment	9.00
Total costs	53.45	Total costs	30.99
Family labor average 15 days per year/ha		N/A	
Net income/year/family/ha	84.73	Net income/year/family/ha	11.67–43.17
Returns to cash	1.59	Returns to cash	0.38–1.39

^a Costs and benefits for legal and illegal logging activities are calculated averages from the six selected municipalities and communities respectively.

^b Benefits do not take into consideration non-monetary items such as increased property values, higher probability of acquiring regularized land titles, or lower management costs because of the legal backup and assistance from the municipal authorities.

^c Illegal timber sales vary greatly from one area of the country to another, depending on a combination of factors such as local demand for wood products and the rigor of law enforcement agencies.

^d The 10 percent risk is based on the analysis of Stocks (1999) who estimates that the SIF is able to confiscate about ten percent of all illegally extracted wood in Bolivia.

^e These costs do not take into account the lost non-monetary benefits derived from de jure rights, such as increased property value, access to credit markets and institutional support, technical assistance, and lower management costs among others.

In addition, since legal and illegal logging activities follow fundamentally different strategies, a comparison of their respective costs and benefits per hectare is complicated to do. While legal logging activities take place in a specific area according to the approved management plan, such area specificity does not apply to many illegal logging activities. Organized illegal logging often take place on de facto open-access lands outside community boundaries, which makes a per hectare comparison of net benefits skewed in favor of formalized management.

next rotation. If need be, the Municipal Forestry Unit personnel is available for technical advice. The municipal personnel approve the plan and then present it for final approval to the Superintendence.

Another extremely important factor that was not held completely constant in the comparison was the availability of valuable timber species. At the individual farm level, the potential net gains derived from formalizing forest management activities are liable to vary with the values of available species. Nevertheless, the comparison does give a powerful testimony about the *potential* economic benefits from acquiring de jure forest property rights.

If the economic benefits are so substantial, why do not more smallholders apply for formal forest user rights? The municipal case studies point to two hypothetical explanations. First, smallholders in the three municipalities with poor institutional arrangements for municipal forest governance were of the impression that forest management was not intended for rural communities, because of the high costs associated with the development of a forest management plan, the government permits, taxes and fees. None of the interviewed forest users in these municipalities had ever heard of the possibility to avoid these costs with the assistance of the municipal staff. What is even more surprising was the fact that only staff in the three municipal governments with favorable institutional conditions were aware of the existing opportunities for rural communities to acquire formal logging permits with simplified management plans on privately owned land.

The second hypothetical explanation as to why so few smallholders have applied for formal property rights has to do with the relatively superior benefits that flow from alternative, and more traditional land uses, such as agriculture and cattle raising. Even if formalizing forest management can increase the net benefits from forestry, this increase may not be enough to motivate smallholders to shift their investments from the activities that have proven to be secure, albeit low-yielding investments overtime. The analysis in Table 6.7 shows that formalized management has the potential to become an increasingly attractive alternative land use. However, this calculation does not take into account all possible costs and benefits that are of importance to farmers. In order for risk-averse farmers to decide to change their present investment strategies, they are likely to want to see a proven, successful track record of formalized forest management, because such a change would involve considerable costs for the farmer. To start a forest management operation would not only require substantial financial investments in terms of new production hardware, but would also entail dedicating a great deal of time and effort to learn effective forest management techniques, develop market contacts, and if management is not individual, to create institutional arrangements that allow for effective collaboration with fellow community member forest managers. Interviewed smallholder farmers who were skeptical to starting forest management activities mentioned the high opportunity costs as a major constraint together with a general lack of trust towards governmental authorities.

These results would indicate that the performance of municipal governments could have something to do with the accessibility of formal forest property rights in the Lowlands. The next section takes a closer look at this possibility.

6.3.2 *The Significance of Municipal Governance in Smallholders' Land-Use Decision Making*

Recall from earlier chapters that the performance of the municipal provisioning of forest sector services was found to be quite mixed, and that the varying local institutional arrangements can explain a great deal of the mixed performance. The analysis in this chapter examines the influence of these variables on the proportion of forested land that has been granted de jure alienation rights. The analysis consists of two steps: First, it compares the percentage of forest land that have been assigned to smallholder logging activities in municipalities that provide their own forestry-related services with the corresponding percentage area in municipalities that do not provide their own services in the forestry sector. The first part of Table 6.7 presents the results of this comparison.

Table 6.7. Percentage of Forest Areas under Formal Forest Management Plans for Different Types of Municipalities in the Department of Santa Cruz (n=28)

Type of Municipality	Mean	Median	Std. Deviation
M. with municipal forestry services	0.78%	0	1.54
M. without municipal forestry services	0.00%	0	N/A
Student t-score		1.81	
Difference for the 95 % C.I.		Not significant	
Type of Municipality	Mean	Median	Std. Deviation
M. with <i>favorable</i> conditions for sector involvement	1.02%	1.10	0.99
M. with <i>unfavorable</i> conditions for sector involvement	0.24%	0	0.71
Student t-score		2.91	
Difference for the 95 % C.I.		Significant	

The second step of the analysis compares the same proportions of forested land in municipalities with different institutional conditions for effective service provisioning. The second part of Table 6.7 displays the results of that analysis.

The results indicate that the percentage of forest land under smallholder forest management plans is zero percent in municipalities that do not provide forestry services, and an average of 0.78 percent in municipalities that are providing services. The 95 percent confidence

interval for the mean difference includes zero, which means that there is no significant difference between the two sets of municipalities. If one extends the analysis to compare the situation in municipalities that are motivated and have a more appropriate institutional arrangement for forestry-sector governance (the independent variables in chapter 4 and 5) with the situation in the municipalities where such conditions do not exist, the difference in the percentage of land under formal management plans becomes slightly more noticeable. Although the percentage of forested lands under management plan barely reaches 1% of the total forest areas in the municipalities that enjoy favorable institutional conditions, the difference compared to municipalities that do not enjoy favorable conditions is statistically significant at the 0.05 level.

The results of this quantitative analysis suggests that municipal governments can, indeed, make a difference in facilitating improved access to formal forest user rights. The results do not inform us, however, what specific municipal government actions seem most effective in prompting improved access to de jure forest property rights and more importantly whether the introduction of formal forestry rights can actually achieve improved forest tenure security for rural smallholders. We turn to the six case studies at the municipal and community levels for an in-depth look at what influence municipal governments have on forest tenure security.

The municipal case studies provided valuable information about what the actual and potential roles of municipal governments are with respect to forestry-sector governance. The qualitative comparison clearly shows, when the institutional conditions are favorable, municipal governments can play a significant role in encouraging smallholders' to engage in forest management. The experiences from the three municipalities that enjoy favorable institutional conditions for effective forestry-sector governance, suggest that municipal governments influence, directly or indirectly, smallholders' forest tenure security by (1) informing communities about opportunities for low-cost forest management, (2) reducing the costs associated with acquiring formal logging rights, and (3) actively monitor the compliance of de jure rights and responsibilities within the municipal jurisdiction. All of these characteristics were found in the three municipalities where favorable institutional conditions for effective municipal forest governance prevail: San Ignacio, San Rafael, and El Torno.

6.4 Qualitative Hypothesis Testing

On the basis of these findings one can venture a tentative assessment of the validity of the main hypothesis in this chapter: “forest users who have acquired de jure forest property rights have diversified their production and increased their total on-farm incomes compared to when they did not have de jure rights.”

In the three communities where a majority of the members enjoy alienation rights to forest resources, the hypothesis is confirmed, although the evidence is less conclusive for the community of Lagunillas. During first year of forest management activities in San Lorenzoma, household incomes increased by an average of US\$ 320 for all of the 13 families that constitute the community members. Only one of these families had incomes related to forestry activities previous to obtaining the community logging permits. In San Juancito, aggregate gross incomes from forest management were slightly higher than in San Lorenzoma, reaching almost US \$6,000, but this amount was divided between 48 families, providing a forest management-related household income US\$ 125. Previous to acquiring alienation rights, forestry activities were not part of the community-organized production activities, but were carried out by a group of six individuals. These individuals estimated their annual net incomes from these to about US\$ 400 per person without the official permits. In San Juancito, getting formal logging permits have produced a more equitable distribution of the benefits from forest management activities and has increased average household incomes and a diversified production for a majority of community members. Finally, in Lagunillas, where formal alienation rights were given to community members authorizing them to produce and sell charcoal from hardwoods, household incomes have increased somewhat after formal permits were, but production has not diversified noticeably. The same number of households engage in forest management as before when the activity was considered illegal.

These results may not suggest a definite and indisputable corroboration of the hypothesis, but the results do indicate a noticeable positive effect of the introduction of formal forestry alienation rights on smallholders' incentive structures. Acquiring formal ownership rights to forest resources, although conditional in nature, has increased average household incomes compared to previous levels of incomes, and smallholder communities in which formal forest property rights exist, land use-based production is more diversified compared to communities that do not possess government permits to commercial forest management.

Table 6.8. Comparing Economic Incentives for Smallholders' Land-Use Decision Making

Formalized Forest Management	Average	Manual Agriculture	Average	Cattle raising	Average
Benefits^a	US\$/ha/year	Benefits^b	US\$/ha/year	Benefits	US\$/ha/year
Timber sales (at farm gate)		Sale of excess production of		Sale of excess production of	
- hardwoods per hectare	43.64	- maize	54.55	- Milk and Cattle	240.00
- softwoods per hectare	94.55	- other crops	330.55		
Total benefits	138.18	Total benefits	385.10	Total benefits	240.00
Costs		Costs		Costs	
- planning (inventories, management plans, bureaucratic relations, etc.)	21.82	- Inputs (seeds, herbicide, insecticide, fertilizer, transport, etc.)	54.55	- Inputs (seeds, fence, vaccination, medicine, salt blocks)	104.62
- logging (incl. hired labor)	18.18	- hired labor (land clearing, weeding, harvesting, etc)	92.73	- hired labor (fencing, pasture improvements, maintenance)	24.66
- training, taxes, depreciation	13.45				
Total costs	53.45	Total cost	147.27	Total cost	129.28
Family labor average 15 days/year/ha		Family labor average 35 days/year/ha		Family labor average 20 days per year/ha ^c	
Gross margin/ha	84.73	Gross margin/ha	237.81	Gross margin/ha	110.72
Gross margin/cash^d	1.59	Gross margin/cash	1.61	Gross margin/cash	0.86

^a These benefits do not take into consideration non-monetary items such as increased property values, higher probability of acquiring regularized land titles, or lower management costs because of the legal backup and assistance from the municipal authorities.

^b These benefits do not include the contribution of these crops to subsistence needs and the value of food security.

^c The areas taken into account are limited to the improved pastures from year to year and not total areas of pastures.

^d Figure represents investment returns to cash, because cash is one of the scarcest resources in smallholder communities in the Lowlands.

7. CONCLUSIONS

This chapter has examined whether Bolivia's new forest property rights regime has managed to make sustainable forest management a more attractive land-use option for rural smallholders in the country's Lowlands. Specifically, the study examined whether the new regime has had any noticeable effect on the forest tenure security for rural communities and if the introduction of *de jure* alienation rights has altered the incentive structures of rural settlers to engage in sustainable forest management.

The hypothesis of the study was that if owners were authorized to engage in forest use beyond subsistence forestry activities and were authorized to sell forest products (by acquiring *de jure* alienation rights) forest management might become a more attractive land-use option, also for smallholders. The empirical evidence from six selected municipalities suggests that that acquisition of *de jure* alienation rights can indeed make a significant difference in terms of the forest users' incentives to engage in sustainable forest management.

The empirical results confirm earlier research findings that forest management in the tropics can be economically viable, although the traditional policy bias towards agricultural activities, tends to distort farmers' decision making at the cost of forestry investments. Based on data from Costa Rica, Stewart estimated that without distortions, well managed tropical forests can yield yearly incomes of US\$270–450 per year and per hectare (Stewart 1994). Most competing agricultural crops yield much less. In Ecuador, for instance, Southgate et al. (1994) estimated agricultural income of no more than US\$20 per year and hectare. Income from cattle ranching can be as low as \$2.50 to \$3.00 per year and hectare (Stewart 1994). Profits for all agricultural crops for all three countries were less than a US\$ 100 per year and hectare, except for potato in Bolivia (CAO 1992; Stewart and Gibson 1995).

The results of the economic importance of forest management in this study are less dramatic, but they nevertheless show that forest management can, under some circumstances, compete with agriculture and cattle raising, even with a policy that favors these traditional land uses. The returns to cash for formalized forest management are only slightly lower than agriculture and actually higher than cattle raising. The most remarkable finding from the comparison of gross margin returns to cash is the notable difference that exists between the net incomes from forest management under different constellations of property rights. Formalized forest management, which operates with alienation rights, generate from 15 to 300 percent higher returns per dollar invested, compared to informal forest management.

Despite these encouraging empirical results, the new forest property rights regime that was introduced in Bolivia in 1996, has had a hard time catching on among the nation's forest users. The reform has not succeeded in converting any significant numbers of rural smallholder farmers into forest managers. Judging from national statistics on the distribution of formal logging permits, smallholder farmers are heavily underrepresented, constituting only a fraction of total permits granted. The study discusses several hypothetical explanations as to why the new regime has not been received with enthusiasm by rural settlers, and smallholders in particular. Interviewed smallholder community members offered a mix of responses, including the lack of information about the opportunities of the new regime; perceived high transaction costs associated with the application process; widespread insecurity with regards to the eventual benefits of formal forest management rights; more support and credits for agriculture, as well as a general lack of institutional support.

The benefit-cost analysis showed that the profitability of forest management increases considerably if users are able to acquire *de jure* alienation rights. However, existing farming knowledge, skewed policy interpretation in favor of agriculture and cattle raising as well as more advantageous subsidies and technical assistance for such land uses, may potentially weaken the perceived viability of commercial forest management, even if *de jure* alienation rights are attained.

All of these factors are important reasons why rural people are not lining up to apply for logging permits. Nevertheless, despite the initial skepticism among many rural settlers in Bolivia to the new forest property rights regime, more and more farmers seem to be discovering the opportunities that the regime has brought to smallholder forest management. The evidence in this study affirms that a formal property rights regime can help make forest tenure more secure and forest management more profitable. For the rural communities studied, communities that had acquired *de jure* alienation rights for timber resources had also been able to diversify their on-farm production systems and increased their overall net household incomes.

This is not to say, however, that it would make economic sense for all rural smallholders to apply for *de jure* alienation rights. Acquiring such rights is often both complicated and costly relative to their likely benefits. The qualitative cases studies indicate that the benefits of getting *de jure* alienation rights to timber products are associated with the presence of a market for local timber products, uncontested land titles, a tradition of collective action among community members, and the availability of external institutional support. As a matter of fact, in no case had community members acquired logging permits without the external technical support of some sort. The role of the municipal forestry unit seemed particularly critical for making *de jure*

alienation rights more accessible to rural settlers. The incentives for municipal governments to engage in such mediation activities may be questioned, however, as their potential financial gain from facilitating de jure rights are minimal, especially for the relatively small forest areas that are normally associated with smallholder forest management. This lack of institutional incentives for municipal governments may be a contributing factor to the fact that in more than 60 percent of all Lowland municipalities, no de jure alienation rights were issued to any smallholders during the 1997–2000 period (Superintendencia Forestal 2002). It is indicative that all three of the municipal governments that had actively promoted formal forest property rights among its forest-dwelling communities, had received some type of external support to do so.

The results of the analysis in this chapter would suggest that the strategy to assign more formal logging rights to smallholder farmers in the Lowlands may help save Bolivia's forests. This may seem counterintuitive, but under the current circumstances in the Lowlands, forest resources will continue to be undervalued if users are limited to subsistence usage and are prohibited from engaging in commercial forest management. The cross-site comparison in this study showed that, under some circumstances, assigning de jure alienation rights to forest resources can help strengthen forest user incentives to manage forests as perennial cash crops rather than clearing them for agriculture and cattle. The question whether such improvements in user incentives actually leads to less forest clearings all together remains unanswered by this study.

Are the physical impacts of the new forest property regime even detectable? If so, would it be possible to link such changes in the forest condition to the institutional variables identified in this and previous chapters? This is impossible to answer at this stage since no existing program is systematically monitoring landscape changes in Bolivia with an eye to public policy. The next chapter takes on this challenge as it develops a spatial specific approach to assess how Bolivia's forestry-sector reform is affecting the condition of the country's forests. The chapter will bring us one step closer to answering the question: Can decentralization save Bolivia's forests?

CHAPTER 7

Can decentralization save Bolivia's forests? Putting Municipal Forest Governance into a Spatially Explicit Perspective

1. INTRODUCTION

The success and failure of the decentralized forestry regime in Bolivia rests to a great extent on the performance of the municipal governance system. Previous chapters' analyses have pointed to various factors that influence this performance. The analysis in chapter 4 suggested that the presence of four particular institutional incentives motivate local politicians to provide forestry-related services to users, and that such incentives are often weak in the Bolivian Lowlands. Among the municipalities that do provide their own public services, the ones that have developed institutional mechanisms for information sharing seem to be able to solve several collective-action problems more effectively and are also receiving higher user ratings relative to municipalities whose information-sharing mechanisms are less developed. In addition, the high performing municipalities also seem to be more effective in facilitating better forest tenure security.

However, if the users' discount rates are high, which is the case in many parts of the Lowlands, better forest tenure security may not produce more sustainable forest management practices. Even if a municipal government is effective at facilitating better access for forest users to de jure rights to forest resources, the net effect of these interventions will not necessarily be improved forest conditions but may in some cases even spur increased forest degradation. This possibility raises a serious concern about the potentially negative environmental impact of the decentralization reforms. Five years after the introduction of the reforms, it seems important to begin to take stock of the environmental impact of the reforms in the forestry sector. Have the reforms had any discernable impact on the patterns of land-cover change in the tropical Lowlands? Is it possible to link the performance of municipal forest governance to biophysical changes in the landscape? By addressing these questions, this chapter seeks to put municipal governance of forest resources into a more spatially explicit perspective; a perspective from which one can gain a more realistic appreciation of the current impact of municipal governments on forest users' decisions in the Bolivian Lowlands.

While previous chapters have been focused largely on demonstrating the possibilities of the decentralization reforms—how municipal governance actors can become successful facilitators of improving the conditions for responsible forest management—this chapter takes a critical look at what one can realistically expect from the municipal governance system. It attempts to assess the actual contribution of municipal forest governance to sustainable forest management in the Lowlands.

Up until the late 1980s, deforestation rates in Bolivia were among the lowest in Latin America (Kaimowitz 1997). However, two recent national inventories of forest resources in Bolivia conclude that deforestation increased dramatically during the 1990s (Steininger, Tucker, Ernst et al. 2001; Camacho et al. 2001). Several studies have looked at these broader deforestation trends and conclude that, so far, municipal governments have been largely ineffective in preventing increased deforestation in the Lowlands (Hecht 2001; Kaimowitz, Graham, et al. 1999; Camacho et al. 2001; Davies et al. 2000; Contreras and Vargas 2001). These studies argue, more or less explicitly, that the increasing deforestation rates in Bolivia as a whole are indicative of the general weakness of government in the forestry sector. They also, more or less unanimously, suggest that if municipal governments had only been stronger, especially in terms of trained personnel and financial resources, they might have been able to exert more influence on forest users so that the deteriorating forest trends could be reversed. However, only Camacho et al. (2001) bases its arguments on empirical deforestation data at the municipal level. None of them relate municipal governance variables to the observed deforestation trends. In spite of the methodological difficulties involved in such an exercise, this study is an attempt to analyze such a relationship.

Municipal governance actors who strive to contain the current deforestation rates are up against an enormous challenge. While the formal legal framework for natural resource management, redefined by the decentralization reforms in the mid-1990s, allows municipal governments to define and implement their own land-use policy for the municipal territory, the institutional incentives that they face often prevent them from actually taking any real measures to invest time and effort in forestry-sector governance. On balance, municipal governments have stronger incentives to support agricultural development as they benefit more from that activity than from forestry. Moreover, the incentives that do exist for municipal governments to get involved in forestry-sector governance are not related to conservation but rather to the extraction of forest resources. Municipalities do not make any money from encouraging users to conserve forest resources, but they do get 25 percent of all fees from legal timber extractions. Since municipalities are authorized to tax only in the agricultural sector and not the forestry sector, it

may be argued that the decentralization process has produced incentives within the municipal governments to support agricultural companies to deforest, as this is one of the few ways in which the mayors can increase their tax base.

Another factor that makes it difficult for municipal governance actors to promote conservation and sustainable management of forest resources is the fact that large agricultural industry owners, who have been identified as the main agents of deforestation in the Lowlands (Steininger, Tucker, Ernst, et al. 2001; Hecht 2001), often belong to local elites with important political contacts in the central government. Should the need arise, the large and well-connected property owners can exercise a great deal of influence over local politicians. Considering these institutional structures, it seems unlikely that municipal governments would even try to prevent agro industries from converting forests to agricultural land, especially since they are not breaking any law in doing so. As long as the land that landowners wish to clear is located in an area which is determined as appropriate for agriculture by the land zoning maps and owners pay for their permits, agro industries are free to continue their conversion of forests to agricultural lands. In fact, during the last decade, most of the massive conversion of forests to agricultural land in the Lowlands has taken place in areas which were considered by the government as appropriate for conversion to agriculture (Camacho et al. 2001).

Out of the 50 municipal governments surveyed in this study, none had taken issue with the agro-industries or protested against their forest clearing. On the other hand, there was no evidence that municipalities explicitly encouraged the agro-industries to deforest either. These observations would suggest that the influence of municipal government actions on forest cover change, if any, is limited to the deforestation carried out by smallholder farmers and the third party forest clearing on open-access forest land. The forest area cleared by these users represents less than a fifth of the total deforested land area between 1986 and 1998 (Steininger, Tucker, Ernst, et al. 2001).

There are, in other words, several important reasons why one should *not* expect that the decentralization process per se would be able to reverse the current trend of rapid forest conversions in the Bolivian Lowlands. But there are equally important reasons why one should try to find out to what extent municipal governance actors *are* able to have an impact on current land-use patterns. If this link can be established, it will be possible to evaluate the institutional and environmental impacts of the decentralization reforms in the Bolivian forestry sector.

1.1. Structure of the Chapter

After clarifying a couple of central concepts for the subsequent discussion, the chapter starts with a review of the costs, causes and possible benefits of deforestation in general, and in Bolivia in particular. The argument is made that deforestation studies would benefit from considering measures of *unauthorized* deforestation rates rather than *crude* deforestation rates, as the former represent a better indicator of sustainable forest governance. The influence of municipal governance on local land-use decisions is then tested by performing a statistical analysis of the relationship between institutional arrangements in the municipal governance system and the changing forest conditions within the municipal territory. One of the main findings of the chapter is that municipalities with relatively well-developed institutions for co-provision and co-production of forestry-sector services at the municipal level, enjoy considerably lower deforestation rates compared to municipalities with less developed institutions.

1.2. Definitions

Deforestation is defined as “the conversion of forest to another land-use class or the long-term reduction of the tree cover below the minimum 10 percent threshold” (FAO 1996). Whereas the term *afforestation* excludes any natural re-generation of forest cover, deforestation does not distinguish natural loss of forest from that caused by human action (FAO 2002). This definition of deforestation also implies that any type of forest degradation that does not reduce the forest’s canopy cover below the ten percent limit, is not considered deforestation. In practical terms, this definition of deforestation effectively limits the deforestation activities to conversion of forests to agriculture and cattle grazing only.

2. BACKGROUND

The World’s tropical rainforests provide a series of environmental services that are essential for the sustained wellbeing of life on Earth. The Amazon basin is a particularly important life support system as it contains almost half of the World’s remaining tropical rainforests and it holds a richer biological diversity than any other region in the world (Hemming 1985). In addition, it is one of the planet’s most important terrestrial carbon sinks, as the Amazon Basin’s rain forest stores more than ten percent of the planet’s total terrestrial carbon, (FAO 2001a).

During the past several decades, vast forested land areas in the Amazon Basin have been forced to give way to other land uses such as agriculture, ranching, and urban areas. The negative

impacts of forest cover loss are well known, and these costs tend to be especially high in the Amazon basin. In many places of the basin, soils are relatively poor in nutrients because of the nearly closed nutrient cycle in its forests (Sioli 1985). Deforestation also threatens the stability of the climatic conditions at the regional level as half of the Amazon rainfall originates from the forest itself (Lovejoy 1985).⁶⁸ When large forest areas are cleared, the transpiration process can destabilize, which may lead to reduced and wildly oscillating total rainfalls (ibid.). Further, the forest canopy also serves to intercept some 19 % of the water that falls on it (ibid.). Removing the forest cover, consequently, leads to increased surface runoff from the now exposed forest soils.

In summary, the removal of forest cover causes various degrees of:

- Net release of carbon dioxide into the atmosphere;
- Loss of biological diversity;
- Nutrient losses through leaching and soil erosion;
- Reduced volumes of annual rainfall;
- More concentrated, seasonal rainfalls;
- Increased surface runoff through canopy removal;
- Increased river sedimentation and increased risk of inundations, and
- Soil compactation.

A common problem for policy makers who are preoccupied with trying to conserve forest resources is the skewed distribution of the costs and benefits that characterize both deforestation and conservation. Most of the benefits derived from forest resource conservation, such as the continued environmental services described in the introduction, share the characteristics of a global common pool resource. The costs of *not* cutting down trees, however, often have to be borne locally. Local populations who have settled in the Amazon have subsistence needs that often make it necessary for them to clear forest areas in order to cultivate subsistence food crops, such as maize, rice, *yuca*, and beans. The food security of forest dwellers is one of the most important examples of *local* benefits of deforestation. The very nature of forest resources makes it difficult to internalize all the costs and benefits of conservation and deforestation in the individual decision making of local land users. In order for the true costs and benefits to be considered in local land-use decisions, institutions need to be developed. Without institutions that are capable of generating local benefits for local forest conservation, local populations with short time horizons, are not likely to refrain from deforestation even though the long term costs of

⁶⁸ The other half comes from the Atlantic Ocean (Lovejoy 1985).

deforestation are likely to be the highest for the local people who depend on the continued productivity of the land.

Table 7.1. Forest Clearing in Santa Cruz, Bolivia

Dept.	Total Area	Forest Cover			Deforestation (ha)	
		1986 (ha)	1993 (ha)	2000 (ha)	1986–1992	1993–2000
Santa Cruz	35,643,850	34,465,013	33,890,513	32,431,848	574,500	1,458,665

Source: Based on data from Camacho et al. (2001) and Steininger, Tucker, Townshend, et al. (2001)

A recent forest resource assessment in Bolivia estimates that more than 3 million hectares of Lowland forests have now been cleared (Camacho et al. 2000). 1.4 million hectares, or 45 percent of that total, was deforested in the Department of Santa Cruz during the seven years between 1993 and 2000 (ibid.). Table 7.1 presents the deforestation rates for the time periods 1986–1992, and 1993–2000 for the Department of Santa Cruz. At the regional scale, the increase in deforestation in the Lowlands coincides with an increase in population density. It is tempting to jump to the conclusion that population growth has caused the observed decline in forest cover. As we shall see in the following section, however, such an argument does not hold at the local scale.

Another hypothetical cause of deforestation in Bolivia is the structural reform program that the country's national government has been implementing over the past ten to fifteen years. A comparison of the deforestation rates shown in Table 7.1 shows that the deforestation rate has quadrupled in the time period after the decentralization reform program was introduced in 1994. It would again be tempting to conclude that it was this set of reforms that caused this increase. However, to determine the actual causes of deforestation is more complex than that.

3. DIRECT AND UNDERLYING DRIVERS OF DEFORESTATION IN BOLIVIA

When discussing the causes of deforestation, it is important to distinguish between its direct and indirect determinants. When local forest users, such as commercial loggers, industrial farmers and smallholders, exploit forest resources in an unsustainable manner, the factors that motivate such land-use decisions are the direct causes of deforestation. Such factors may include the search for tenure security, economic profits, or simply subsistence livelihoods. However, the incidence and specific characteristics of these factors are determined by deeper processes in society, which may be called the underlying drivers of deforestation (Contreras 1999). The underlying drivers of deforestation have to do with how society is structured, i.e., how people are

organized; how power, authority, and political representation are assigned; and how resources and property rights are distributed among different members of society. Specific government policies, which may not explicitly be intended to address forestry issues, may in fact influence decisions associated with forest use. Other underlying factors that may indirectly influence forest user decisions include demographic characteristics, dysfunctional markets, as well as religious and cultural values.

3.1 Direct Drivers in Bolivia

The environmental impact of different forest uses tend to vary depending on a long and complex chain of different factors. The forest users' temporal intensity and spatial extent of use define forest conditions, but these characteristics in turn depend on factors, such as access to technology, physical capital, and local institutions.

When trying to determine what the direct drivers of deforestation are, it is useful to start out by identifying who the main groups of forest users are and how they use the forest. Knowing how different actors use the forest will provide hints with regards to who is responsible for the rapid deforestation rates in Bolivia. Commercial loggers are often blamed for deforestation, but various factors make clear-cutting an economically inefficient forest use in Bolivia. Only a few selected species are profitable, which means that logging tends to be very selective. Indirectly though, once the logging companies have taken out the most valuable species they leave behind logging roads and a degraded resource, which combine to make forest conversion to agriculture more attractive to both subsistence and industrial farmers (Contreras 1999).

Forest clearing by smallholder farmers represent another frequently cited cause of deforestation. According to the 2001 population census in Bolivia, the rural population in the Lowlands has grown by over 28 percent since 1992 (INE 2002). Although Lowland smallholders often clear forests to plant their subsistence crops, they seldom clear more than 4–5 hectares during a decade (Maxwell and Pozo 1981). It is therefore unlikely that smallholders constitute the most important agent of deforestation in the Lowlands. A recent forest resource assessment, based on high resolution satellite imagery, confirms this notion as it shows that most of the forest clearings during the 1990s in Santa Cruz were associated with large industrial, soybean plantations (Steininger, Tucker, Townshend, et al. 2001). As a matter of fact, during the 12-year period between 1986 and 1998, 87 percent of the forest clearings in Santa Cruz were carried out by about 3,000 industrial farmers, including the Mennonite colonies, while the almost 100,000 small scale farmers accounted for only 13 percent (Hecht 2001). Table 7.2 presents the spatial extent of forest clearings in Santa Cruz and its principal agents.

Table 7.2. Annual Areas of Forest Clearing by Type of Agriculture, 1986–1998 (hectares)

Agriculture	1986	1988	1990	1992	1994	1996	1998	Total	Share
Smallholders	9,282	11,095	16,184	17,772	23,120	21,419	31,566	130,438	13.24%
Mennonite	6,956	11,573	14,424	13,669	23,717	22,824	11,791	104,954	10.66%
Industrial	22,501	24,649	52,060	89,954	147,914	223,965	188,485	749,528	76.10%
Total	38,739	47,317	82,668	121,395	194,751	268,208	231,842	984,920	100.00%

Source: Steininger, Tucker, Ernst et al. (2001), Hecht (2001)

3.2 Underlying Drivers in Bolivia

Population growth is an often cited cause of deforestation (Gibson, McKean, and Ostrom, 2000, citing Rudel 1994 and Burgess 1992). The case of deforestation in Bolivia, however, clearly shows that this causal relationship does not always exist. Despite the strong mathematical correlation between the two occurrences at the regional and national levels, a spatially explicit analysis reveals that most deforestation is not taking place in the rapidly growing colonization areas. Rather, most of the deforestation during the past decade in Bolivia was associated with the actions of a small number of industrial actors. Deforestation is not primarily driven by the large numbers of smallholder farmers, although it should not be denied that subsistence farming also takes its toll on the forest. These findings on the dynamics of Bolivian forest cover confirm earlier research efforts that have found that the relationship between deforestation and population growth is often ambiguous and depends on the scale at which one analyzes forest cover changes (Gibson, Ostrom, and Ahn 2000; Varughese 2000; Hecht 2001).

If the soy bean plantation owners are the main agents responsible for the increased deforestation rates in the Bolivian Lowlands, what has motivated these actors to deforest where they did and at this particular point in time? Answering these questions moves us into a discussion of the underlying, political drivers of deforestation.

The location and timing of the soybean expansion are not coincidental. The Bolivian national government has actively supported extensive, industrial agriculture by offering the agro-industry owners a variety of incentive packages. The structural adjustment policies that were introduced in the late 1980s, included economic instruments that removed price controls on soybeans, devalued Bolivian currency, and introduced tax breaks and fiscal incentives for soy bean exporters and involved government investments in physical infrastructure, such as roads and telecommunication networks (Kaimowitz 1997). These policy instruments explain the particular timing of forest conversions, while the location is best explained by the particular biophysical characteristics in the Lowlands. The Department of Santa Cruz in the Amazon Lowlands enjoys

very favorable biophysical conditions for extensive agriculture as soils are relatively rich in nutrients and the topography is very flat. Under these conditions, large-scale forest clearings, as well as the subsequent cultivation, carry a relatively low economic cost (Hecht 2001).

If industrial agriculture is the main driver of deforestation in the Lowlands and the decentralized regime actors, municipal governments in particular, have only limited real influence over such activities, one might argue that because of the decentralized governance structure, there is less resistance for agro-industries to convert forest to soy bean plantations. Is it possible that the decentralization reforms have contributed to increased deforestation and should therefore be considered an underlying driver of deforestation?

3.3 Public Policy As an Underlying Driver to Deforestation

Even if the negative impact of decentralization on forest cover can be established empirically, it does not necessarily mean that the decentralization reform is a policy failure, because only if all deforestation is considered undesirable by all public policy instruments could one imply that high deforestation rates would be a policy failure. In Bolivia, public policy is quite tolerant, if not supportive, of many types of deforestation. In fact, several public policy instruments in the agriculture sector indirectly promote the conversion from forest to agricultural land use (Repetto and Gillis 1998; Kaimowitz 1997). Although few municipal governance systems have been able to contain increasing deforestation rates, the numbers on deforestation do not inform us of the effectiveness of the reforms and the institutional arrangements at the municipal level. In fact, one of Bolivia's few measurable public policy objectives with regards to rural development, which was introduced in the late 1980s, was to create favorable conditions for agro-industrial exports (Pacheco 1998). The introduction of such public policy measures was a conscious effort by the central government to support the creation of one million hectares of soy bean plantations before the year 2000 (Urioste and Pacheco 2001). The extensive deforestation that resulted from the implementation of this policy was not an unexpected side effect, but would be more accurately described as a calculated cost that had been taken into account when the policy instruments were designed. For example, in the Government's land-use plan for the Department of Santa Cruz (PLUS), in which the appropriate land use is defined for each relatively homogenous polygon according to the prevailing biophysical, social and economic conditions, the area where the soy bean plantations are located is determined as appropriate for extensive agriculture (Government of Bolivia 1995c). It can be argued that the almost complete removal of forest cover in this part of the Lowlands was a public policy *success* rather than a *failure*.

Both agricultural and forestry policies in Bolivia allow for deforestation to take place in certain areas and under certain circumstances. National natural resource policies are consistent in recognizing that unauthorized deforestation is not compatible with sustainable land use. For Bolivian public policy, it is not deforestation per se that is the enemy, but rather the *unauthorized* deforestation—the deforestation that takes place against the intentions of the national government.

Considering that from a standpoint of social welfare, not all deforestation is bad and that agriculture may be socially more beneficial than forest use under some circumstances, a straight forward deforestation measure is a poor indicator of sustainable land use. It is also a poor indicator of the performance of government organizations and the effect of public policy. A more appropriate measure would be unauthorized deforestation rates, that is, the *rate at which forests that are not considered apt for other land uses, disappear*. Such information would be more useful for assessing the performance of the decentralized forestry regime. Such an analysis would also provide valuable feedback to those policy makers who are concerned with the effectiveness of the existing public policy instruments associated with the promotion of sustainable land-use practices.

3.4 Public Policy As a Solution to Unauthorized Deforestation Problems

One of the central objectives of the decentralization reforms was to address unauthorized deforestation and enforce a new set of rules and property regime that would induce and support forest users to engage in commercial forest management. Through the reform, municipal governments were charged with many of the key competencies associated with forest sector governance and land-use planning in general. According to their mandate in land-use planning, which was introduced through the regulations of the 1994 Law of Popular Participation, municipal governments are to develop and enforce *a municipal land-use plan* that should identify the current and optimal land uses for all property polygons in the municipal territory, considering the varying economic, ecological and social costs and benefits of alternative uses. Once the plan is approved, the national and regional governments officially recognize the plan and municipal government become the primary authority for the enforcement of the plan.

Through the reforms in the forestry sector in 1996, municipal governments were given the responsibility to promote community forestry among smallholders through community concessions on public lands, technical assistance to get formal user rights, control illegal extraction, and inspect concessions, among others. The analyses in previous chapters showed that

the municipal mandate, if carried out, has the potential to have a considerable positive impact on sustainable forest management in Bolivia, especially with regards to the smallholders' forest tenure security. It was shown that municipalities that have been able to create municipal governance institutions, which include both forest users and central government agents, are able to better solve several collective-action problems that often block effective forest governance. Citizens, who live in municipal territories where the institutions for collective action within the forestry sector are more developed, tend to have better access to formal forest property rights. These citizens are therefore more likely to engage in forest conservation and management activities relative to other land uses.⁶⁹ One would therefore also expect that *municipalities where the local actors have developed relatively effective institutions for forest governance would also have lower unauthorized deforestation rates*. The challenge is to develop a viable method to test such a hypothesis empirically.

4. METHODS

The hypothesis will be tested quantitatively with empirical survey data collected through interviews with three different forestry-sector actors at the municipal level, as well as independently collected information about unauthorized deforestation rates in a representative sample of 25 municipalities in the Lowland Department of Santa Cruz. The hypothesized relationship between the independent and dependent variables, will be examined using *ordinary least squares* (OLS) regression techniques.

4.1 Dependent Variable

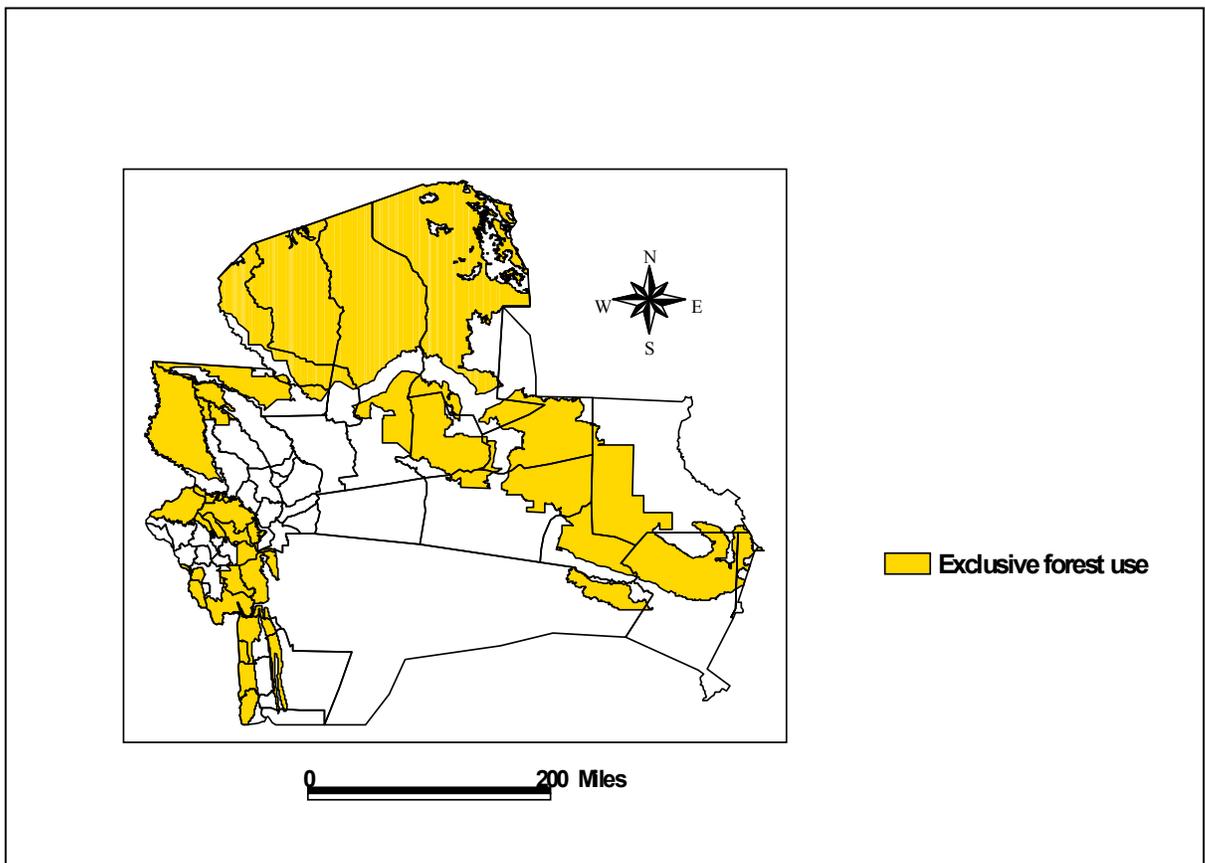
Unauthorized deforestation rates will be used as the dependent variable. Although, this is not a perfect measure of forest conditions in a municipality, it does provide a more nuanced measure of sustainable forest governance than a crude deforestation rate. The next section describes how an index of unauthorized deforestation was created for the Bolivian Lowlands.

4.1.1 Unauthorized Deforestation Index

Creating an index of unauthorized deforestation may seem like a rather cumbersome and complicated process, but thanks to the recently improved availability of ecological zoning and land-use products, it is not as difficult of a task as it used to be. In Bolivia, a national land-use

⁶⁹ See chapter 6 for a more thorough discussion of this point.

plan (PLUS) developed by the central government defines recommended land uses for specific land areas for the entire country.⁷⁰ As such, the PLUS maps represent the national government's vision for how the country's territory should be utilized to generate sustainable development. The map in figure 7.1 shows the land areas that the PLUS has designated as the most appropriate for forest management. Areas outside the highlighted marked polygons must not be converted to agriculture.



Source: Elaboration by author based on CORDECRUZ (1995) and Superintendencia Forestal (1999)

Figure 7.1. Designated Land Areas for Exclusive Forest Use According to the Land-Use Plan for Santa Cruz, Bolivia

⁷⁰ Since the TFPS was developed on the basis of PLUS data, the two products are coherent in their definitions of land inappropriate for conversion of forest to agricultural use. However, PLUS is the more complete of the two since it not only considers the areas that are designated to exclusive forest management use, but in addition also considers what areas are most suitable particular alternative land uses.

The PLUS maps are important policy instruments for the authorization of forest management plans, and especially forest clearings. Permits must not be issued if the proposed land use is in conflict with the land use that the PLUS has determined for the area in question.⁷¹ Therefore, forest areas that have been cleared, even though they are defined by PLUS as areas most appropriate for forest management, represent *unauthorized deforestation*. In order to be able to calculate the exact area of unauthorized deforestation, one must first determine the exact location and extent of each deforested area in a given region and then cross this information with the land-use maps. This calculation is facilitated by using a computer-based geographic information system (GIS). The PLUS has been available since 1995, but it is not until early 2002, that fine-resolution deforestation maps of the Bolivian Lowlands have become available to the public. Thanks to the publication of the Forestry Superintendence deforestation maps, which portray the location and extent of forest cover change for parts of the Lowlands during the 1993–2000 period, an index of unauthorized deforestation can be calculated for a specific region, municipality, or even a community.

In ArcView, the name of the GIS software used, the maps for recommended land uses (PLUS) and deforestation were overlaid, one on top of the other. A spatial analysis was carried out, using the “tabulate areas” command. This automated operation calculated the areas that correspond to deforestation on land areas with different recommended land uses, i.e., deforestation on land areas considered by PLUS as most apt to be used for “timber production,” “protected watershed,” “extensive agriculture,” or “intensive agriculture.” If deforestation took place on land that had been assigned for non-forest use, such as agricultural use, the deforestation was classified as “planned,” although it may or may not have been consciously planned according to the formal rules of land-use planning in Bolivia. If the deforestation took place on land that had been designated by PLUS for forest or protection purposes, it was classified as “unauthorized.”

For the purposes of this study, a digital map with municipal boundaries was then overlaid with the map of unauthorized deforestation. The overlay allowed for the calculation of the area of unauthorized deforestation per municipality, which is the primary unit of analysis in this study. The results of the GIS analysis are presented in table form in table 7.3 and in map form in Figure 7.2.

⁷¹ Municipal governments do not have the authority to issue such permits unilaterally, but they are required to inspect the applicant’s property to verify the information on the permit applications. The permit is issued by the *Superintendencia Forestal*.

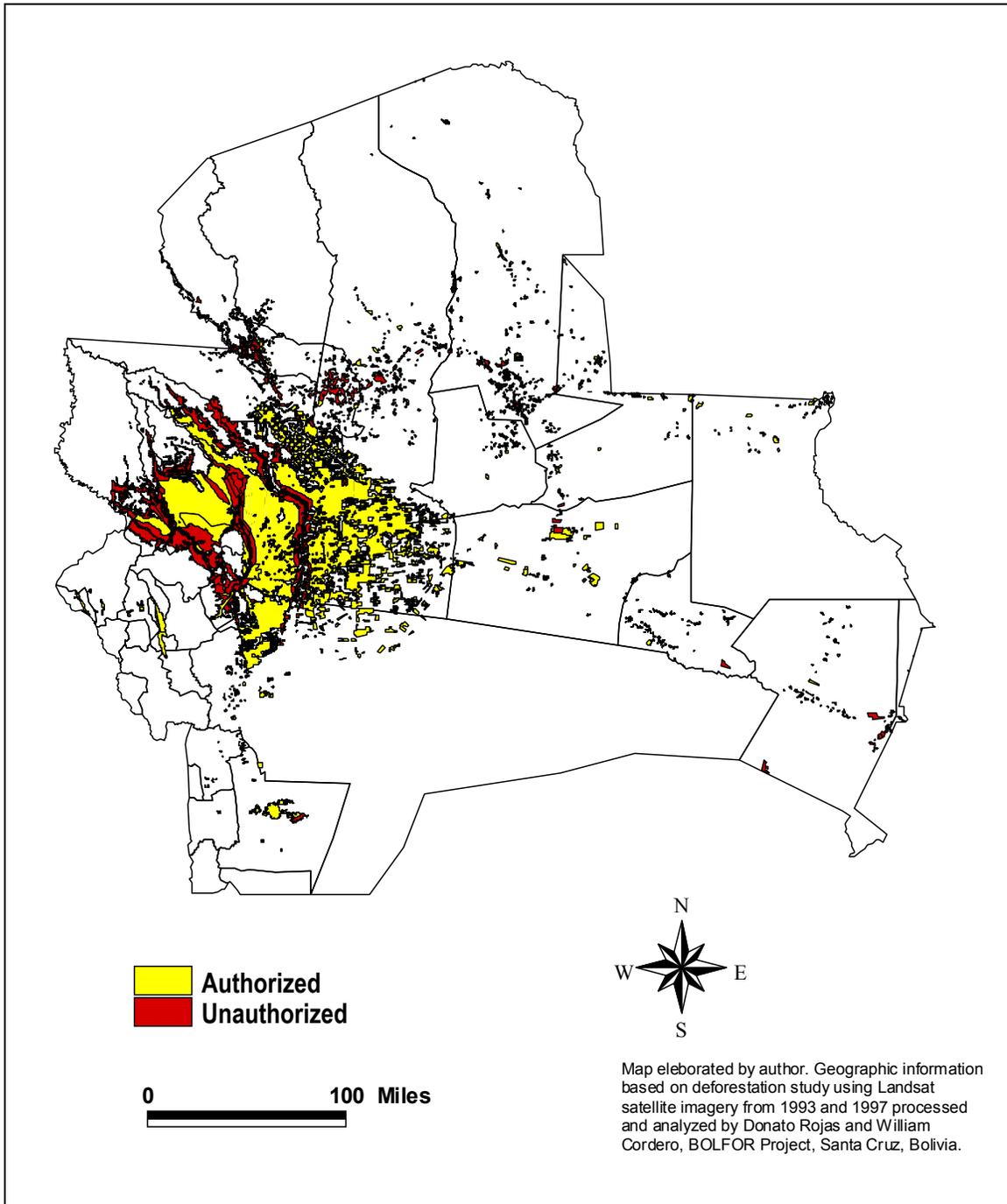


Figure 7.2. Authorized and Unauthorized Deforestation in Santa Cruz, Bolivia, 1993–2000

Table 7.3 Unauthorized Deforestation for 25 Municipalities in Santa Cruz, 1993–2000

Municipality	Forest Cover 1993 (ha)	Deforestation (ha)	Defor. 2000 (ha)	Unauth. Defor. (ha)	Unauth. Defor.	Proportion Unauthor.
Ascencion de Guarayos	878,439	26,911	57,623	19,295	2.18%	71.70%
Ayacucho	48,967	2,870	46,121	2,522	4.69%	87.88%
Buena Vista	185,921	4,389	84,565	3,677	1.86%	83.78%
Cabezas	6,763,245	112,284	211,773	8,020	0.12%	7.14%
Camiri	196,669	536	536	0	0.00%	0.00%
Capital	6,690	300	78,033	42	0.05%	16.42%
Charagua	806,740	19,909	30,762	4,977	0.61%	25.00%
El Puente	746,976	49,141	69,279	22,932	3.05%	46.67%
El Torno	63,264	2,536	31,563	1,836	0.26%	72.41%
Gutierrez	225,983	2,632	3,257	0	0.00%	0.00%
La Guardia	57,192	3,174	41,297	1,630	2.62%	51.35%
Mairana	57,631	256	8,616	0	0.00%	0.00%
Mineros	364,895	123,489	261,439	65,638	17.95%	53.15%
Montero	0	0	27,648	0	0.00%	0.00%
Pampa Grande	98,648	261	4,197	0	0.00%	0.00%
Postrer Valle	104,927	256	1,855	0	0.00%	0.00%
Puerto Suarez	2,200,578	25,797	25,795	15,048	0.64%	58.33%
San Carlos	123,792	25,898	178,687	8,470	6.79%	32.70%
San Ignacio	4,184,058	55,189	55,189	36,793	0.88%	66.67%
San Javier	214,497	52,746	53,037	41,025	1.90%	77.78%
San Jose de Chiquitos	2,202,272	51,616	61,271	5,060	0.22%	9.80%
San Julian	464,041	205,853	413,175	40,477	8.71%	19.66%
San Rafael	1,544,895	27,133	27,133	6,030	0.39%	22.22%
Santa Rosa del Sara	209,703	24,074	185,885	11,111	5.24%	46.15%
Urubicha	1,592,526	1,758	9,231	195	0.01%	11.11%

Source: Author's adaptation of data from Camacho et al. (2001)

4.2 Independent Variables

The hypothesis will be tested using a composite independent variable called municipal forest governance. The independent variable is a dummy variable that considers the level of institutional development of the municipal actors' forestry-sector governance system. The same variables that were employed as independent variables for the analysis in chapters 4 and 5 are

used here to determine whether each municipality's forestry-sector governance system has "high performing" or "low-performing" institutions. A municipality is considered to have "high-performing institutions" if its aggregate scores on motivation (chapter 4) *and* institutions for information transfer (chapter 5) are above the national median, considering the survey results in the random sample of 50 Lowland municipalities. In the Department of Santa Cruz, 11 of the 25 municipalities are considered to have high-performing institutions and the remaining 14 were considered low performing. The theoretical prediction is that municipal forest governance systems in municipalities that have well-developed institutions for collective action are more likely to regulate its citizens' land use and would therefore enjoy lower rates of unauthorized deforestation rates.

4.3 Control Variables

One of the most difficult tasks in linking institutional and socioeconomic process to changes in biophysical resources, is to isolate the effect of the hypothesized independent variables. It is therefore important to employ analytical methods that allow for the introduction of control variables—variables that are believed to also have an effect on the variance of the dependent variable. One of the advantages of using regression techniques is the possibility of incorporating control variables in the equation and thus effectively holding the influence of these variables constant in the analysis.

For the particular hypothesis examined in this chapter, there are several variables that can potentially influence the land-use pattern in each municipality. These include the migration pressure on forested lands, the availability of land with agricultural potential, and level of road infrastructure development. These variables are but a few among a long list of potentially influential variables, but because of limited data availability, the analysis could not include other important factors such as agricultural subsidies, central government performance, soil types, and forest species composition. These methodological limitations should be taken into account in the interpretation of data.

- ***Migration pressure on forested areas*** (persons/ha) is a continuous variable that is composed of the number of new settlers that entered the municipality during the 1992–2001 period (the dates of the national censuses) divided by the number of hectares of forested land (1993 forest cover) in the municipalities that must not be converted to non-forest use according to the department's land-use plan. Municipalities with high migration pressure on its forests can be expected to have, *ceteris paribus*, higher rates of unauthorized deforestation.

- **Density of roads** (kilometers/km²) is a dichotomous variable that indicates whether the road infrastructure in each municipal territory is high (1) or low (0). The variable was calculated in ArcView, using geographic information from the Bolivian Institute of Statistics (INE 1999). The theoretical expectation is that if a municipality has a low level of road infrastructure it is more difficult for settlers to move the agriculture frontier, which should result in relatively less deforestation in the territory.
- **Availability of forest resources** (km²/ km²) is the proportion of forested lands that the PLUS has determined to be most apt for forest production in relation to the total municipal territory. The variable is considered to be a proxy for both the potential commercial value of timber resources as well as the scarcity of agricultural land in the municipality. If the potential commercial value of forest resources in the municipality is high it may induce land users to engage in forest management rather than cattle ranching or agricultural activities. On the other hand if agricultural land is scarce, pressure on forests will be greater, increasing the probability for higher rates of unauthorized deforestation.

5. RESULTS

The empirical analysis of the relationship between municipal forest governance performance and land-cover change is limited to the situation in the Department of Santa Cruz, an area that represents about half of all forest resources in the Bolivian Lowlands. A representative sample of 25 municipal governments in the Department was included in this analysis. As deforestation and land-use data become available for the rest of the country, future analyses will include the remaining 25 Lowland municipalities that were surveyed in this study.⁷²

The Bolivian mandate of municipal governments in the forestry sector is designed primarily to provide support to rural smallholders. Municipal governments are asked to create municipal forest reserves on forested public lands for exclusive local community use and provide a series of technical assistance services related to forest management. Although they also have a general responsibility to inspect and enforce the law, their common lack of real political power in relation to large landholders and concession holders makes it hard for some municipal-level authorities to be effective law enforcers.

⁷² The remaining 25 municipalities are located in the departments of Cochabamba (6), Pando (8), Beni (7), and La Paz (4).

Despite the noted limitations, the analyses in chapters 4–6 showed that municipal governments can play a positive role in facilitating effective problem solving in some areas of the forestry sector. If municipal governments are motivated and capable of fulfilling their formal mandate and in addition have local decision making institutions in place that make their implementation of actions in the sector effective, it is entirely possible that their actions contribute to better forest tenure security among smallholders, and perhaps even to the improved condition of the territory’s forest resources. This chapter attempts to establish whether municipal governance systems have had a noticeable effect on forest conditions in the selected municipal territories.

Given the results in chapter 6, one would expect that the same municipalities that have been relatively successful in developing institutions that improve forest users’ access to de jure property rights to forest resources would exhibit lower rates of unauthorized deforestation, because users with firmer property rights have stronger incentives to manage the forest rather than converting it to other uses, such as agriculture and ranching. Well, do they really?

Table 7.4. The Relationship between Municipal Forest Governance Performance and Unauthorized Deforestation Rates (N = 25)

Regression Statistics	Coefficients	Std. Error	P-value
Intercept*	10541.00	5723.05	.08
Population pressure on restricted-land use areas (1992–2001)	-23.94	16.52	0.16
Municipal Forest Governance* (1996–2000)	-13963.53	8150.05	0.10
Density of roads (1999) **	16800.03	7435.29	0.04
Availability of forest resources (1993)	0.00184	0.004	0.62

* p < 0.10

** p < 0.05

Note: r² = 0.27

An Ordinary Least Squares (OLS) regression was carried out to establish the relationship between municipal governance performance and the rates of unauthorized deforestation rates in the Bolivian Lowlands. The analysis, which is limited to the situation of 25 municipalities in the department of Santa Cruz, regressed unauthorized deforestation rates on the independent and three control variables.

The regression results, which are presented in Table 7.4, suggest that the independent variables included in the model explain 27 percent of the variance of unauthorized deforestation. High-performing municipalities show significantly different land-use patterns in comparison with low performing municipalities. Although both exhibit high rates of unauthorized deforestation,

municipalities that have more motivated local politicians and that have developed better governance institutions for solving collective-action problems seem to have been able to somewhat contain unauthorized deforestation in their territories. The high-performing municipalities experienced, on average, almost 14000 hectares less unauthorized deforestation during the 1993–2000 period than municipalities with governance systems that are not as well developed institutionally. The significant difference disappears completely when the control variables—density of roads, availability of forests and migration pressure—are removed.

The dummy variable for road infrastructure also seems to affect the level of unauthorized deforestation rates, suggesting that the more roads that a municipality has the more difficult it is for institutions to enforce the rules for appropriate land use. Neither the variables for availability of forest resources nor the migration pressure variable turned out to be statistically significant at the $p=0.10$ level, but both are important control variables that should be included in the analysis.

How does one explain these results? Why would municipalities that enjoy superior conditions for solving collective-action problems have lower levels of unauthorized deforestation?

6. DISCUSSION OF RESULTS

One of the possible explanations of the results of the regression analysis has already been alluded to in the introduction: Municipalities that have developed effective institutions for dealing with collective-action problems are more likely to contribute to solutions of the most serious problems in the forestry sector. Recall that according to the vast majority of grass root organization representatives in the Lowlands, as documented in chapter 1, forest tenure insecurity and lack of access to forest property rights are perceived as the main problems in the sector. As was shown in chapter 6, municipal governance systems can help users to improve their access to and protection of forest property rights. Forest users who have firmer forest property rights are more likely to engage in forest management activities and are less likely to convert forest to agricultural and ranching lands. Moreover a strong and motivated municipal government with good governance institutions in place may be able to enforce the rules of sustainable forest management in their territory more effectively. Such enforcement could have an effect on controlling illegal forest clearings. This would also increase the probability of having healthy forest resources. This explanation is consistent with the results in both chapter 6 and this chapter.

But there are alternative explanations that could also explain why these particular municipalities have lower deforestation rates. For instance, the theoretical possibility exists that

some municipalities have lower rates of unauthorized deforestation because the central government agencies, such as the *Superintendencia Forestal*, have targeted these for a more intense enforcement of forest user rules. If this is the case, the lower deforestation rate is associated primarily with the performance of the central government agencies and not the local-level actors at the municipal level. Only an analysis that incorporates variables on central government actions along with municipal governments could determine which factor is really responsible for the variance in unauthorized deforestation rates.

Another related, alternative explanation has to do with the influence of non-governmental organizations. It is conceivable that their activities are the main causes of the variance in unauthorized deforestation. Or perhaps deforestation rates vary as a function of the level of self-organization in local forest-dwelling communities. This last explanation would certainly be consistent with a growing body of literature on the relationship between forest user institutions and forest resources (See for example Gibson, McKean, and Ostrom 2000; Varughese 1999). Local self-organization is not contrary to more effective municipal-level governance, if the latter encourages local organization.

The most plausible alternative explanation, however, is likely to be a mix of all of the above. In fact, the variable in the analysis, municipal forest governance, does not just refer to the characteristics of municipal governments, but the *governance system* embodying representatives from forest user groups, central government, NGOs, municipal governments and other actors with a stake in the creation of local-level institutions to regulate forest use. As such, the municipal forest governance variable reflects the governance system's institutions for co-provision and co-production among the various forest governance actors.

While the results may seem quite encouraging in the sense that municipal governance systems seem to be capable of having a positive impact on the sustainability of land uses in the Lowlands, one should not exaggerate this positive effect. Unauthorized deforestation rates in Santa Cruz are still very high in absolute terms. Among the 25 surveyed municipalities, 21 experienced some degree of deforestation during the 1993–2000 period. On average, about 40 percent of the deforestation that took place in these municipalities was unauthorized. The sheer magnitude of uncontrolled deforestation in the Lowlands should be a concern for policy makers and analysts who are preoccupied with the sustainability of current land-use practices in the Lowlands. It is doubtful that the current level of performance among the majority of municipal governance regimes is sufficient to ensure sustainable use of the Lowlands' natural resources.

Despite the relatively strong empirical results, when interpreting these results one should be aware of several methodological limitations. The most obvious of these is the low number of

observations in this analysis. Despite that the Department of Santa Cruz is the largest of the five departments in the Lowlands, the land-use patterns in Santa Cruz are quite different compared to the rest of the Lowlands (Pacheco and Kaimowitz 1998).⁷³ The low number of observations make the analysis especially prone to be skewed by extreme outliers. In fact, when outlier cases, such as Montero (that did not have any forest left in 1993) and Cabezas (which is a huge and sparsely populated territory with little commercial forest resources) are dropped the estimated coefficient for municipal forest governance the statistical significance is weakened somewhat. It is important to interpret these results as preliminary and aim at increasing the number of observations for future studies.

Another methodological weakness is associated with the discrepancy between the dates of the formal introduction of the political reforms and the actual implementation of these. Formally, the introduction of the decentralization reforms in Bolivia took place in 1994, when the law of popular participation was passed. After this date, municipal governments had the formal mandate to intervene in land-use planning on their territories. While the rules related to the land-use plan for the Department of Santa Cruz entered into force in 1994, it was not until 1996 that municipalities were given a formal mandate to carry out specific functions related to forest property rights. Most of the municipalities did not begin to assume these responsibilities, however, until several months later (de Urioste 2000). Consequently, the deforestation that took place before 1996 should not be considered as unauthorized as the distinction between planned and unauthorized deforestation was not introduced in most municipalities until the PLUS maps became available in late 1995 (Government of Bolivia 1995c). Future research in this area would benefit from addressing these limitations, possibly by increasing the number of municipalities included in the sample, and by amplifying the deforestation time series data set and acquiring images for the dates when most municipalities with a currently functional forestry program started operating, that is around 1997.

7. CONCLUSION: CAN DECENTRALIZATION SAVE BOLIVIA'S FORESTS?

Five years after the decentralization reforms transferred substantial responsibilities to municipal governments; one can begin to take stock of the actual effects of the reforms. Has the

⁷³ The 25 municipalities in the analysis constitute a sub-sample of a random sample of 50 Lowland municipalities and may not be completely representative of the general situation in the Lowlands at large, but is highly representative of the situation in Santa Cruz, which represents about two-thirds of the total forested land area in Bolivia. Data processing is underway, which will allow for a future analysis of the 50 Lowland municipalities.

decentralization reform improved the prospects for saving Bolivia's forests? Perhaps not the decentralization reforms per se (after all, they are mere pieces of paper) but the analysis in this and previous chapters suggests that the reforms have produced important opportunities for improving the governance of forest resources in Bolivia.

As a result of the reforms, the local forest users of Bolivia have strengthened their positions in the forestry sector, as their access to decision making forums in the sector and to formal forest property rights are now supported by law. However, this improved legal environment is often not sufficient for improving forest governance. This study has shown that the performance of the decentralized forest governance regime depends to a great extent on how local-level actors are able to organize their decision making institutions in the forestry sector. Without strong municipal governance institutions, the reforms are not likely to have any effect on current land-use pattern in the Lowlands.

The municipalities in which local forest users, municipal and central government representatives as well as NGOs have not only come to an agreement on how to cooperate with regards to the planning, implementation, monitoring and enforcement activities in the sector, but also to make sure that each of the co-responsible actors comply with their commitments, municipal forest governance have a positive impact on the sustainability of land-use patterns. The findings in this chapter supports the discussion in earlier chapters on the *possibility* of decentralization, as the empirical results show that municipalities in which forest users and other forest governance actors enjoy superior conditions for cooperating in the sector, unauthorized deforestation rates are significantly lower than in municipalities with less adequate conditions for collective action. Hence, the chapter's hypothesis is supported by the empirical analysis.

This chapter has reinforced the central argument of this study, that local-level institutions are one of the keys to the success of environmental policy. While these local-level institutions have been given increased authority in the new decentralized forestry regime in Bolivia, many of them, if not most of them, are rather weak and fail to play a major role in forest-sector governance. Even if the results of this study could be interpreted as a supportive of Bolivia's policy of decentralized forest governance, one should not overestimate the benefits of this policy. A spatially explicit analysis of the influence of municipal forest governance on land-use patterns helps put the benefits of decentralized forest governance into perspective. The analysis shows that even the high performing municipalities have very high rates of uncontrolled deforestation and that the main actors responsible for this phenomenon, the agro-industries, are often beyond the municipal authorities' sphere of influence.

In order to come to grips with the unsustainable land-use patterns in the Lowlands, Bolivian society needs to develop the institutions that can respond to the forces that drive the uncontrolled deforestation in the Lowlands. Although forestry-sector actors at the municipal level have had some success in detaining uncontrolled deforestation, the efforts of local politicians and local forest users are not always enough for achieving sustainable land-use patterns in the Lowlands. In order to be effective, their efforts need to be complemented by supportive institutional arrangements and policy at superior levels of governance.

CHAPTER 8

Conclusions

Shifting some of the governance responsibilities for a specific sector from a heavily centralized organization to a more decentralized and polycentric system in which the governance responsibility is distributed among several different political actors at a lower level of aggregation, is a transformation process that implies both potential advantages and constraints for public policy. Theoretically, the shift in the roles of the political actors in the national natural resource management policy arena implies that the political decision making process is brought closer to the natural resource users, and that the local organizations in charge of governing activities in the sector, are in a better position to consider local knowledge of time and place when addressing problems associated with the use of natural resources (Johnsson 2000; Arya et al. 2002; Barnett et al. 1998). Also, some of the inefficiencies resulting from the application of national, blueprint solutions are avoided (Ostrom et al. 1993).

Other theoretical justifications for decentralized governance of natural resources include a more (1) efficient administrative structure, as the resources required for centralized processing of local information tend to increase exponentially with the number of subsystems (Hayek 1948; Johnson 2000, citing Hogg and Huberman 1993); (2) effective arrangement for conflict resolution, as a local government authority is a more accessible mediator or arbitrator for local natural resource users involved in inter- and intra-communal conflicts (V. Ostrom 1967; E. Ostrom 1990; Lam 1996); (3) more appropriate for learning, by allowing local actors to experiment and exchange information about the consequences (Lee 1996; Light et al. 2002; O'Riordan 2001), and more (4) robust governance system as the risk of governance failure is spread over many actors (McGinnis 1999; Oakerson 1999). The redundancy of functions among many actors at the local level, i.e., municipal government systems, makes no single municipal government essential for performance of the overall governance system (Wunsch 1991; McGinnis 1999).

On the other hand, a decentralized, polycentric system can also produce sub-optimal results. For instance, information asymmetries in the principal-agent relationship between central and local government systems complicate the monitoring of local government performance producing perverse incentives for agents to slack (Ostrom et al. 1993). Another potential drawback with a decentralized structure is the possible strengthened position of local political

elites who may direct the increased resources available in local governments to their personal benefit (Crook and Manor 1998; Ribot 2002; Pacheco and Kaimowitz 1998). Also, in a decentralized system, coordination between local governments is necessary for solving some problems that cross the municipal boundaries, and such coordination can be costly (Oakerson 1999; Wunsch 1991). In countries where the central governments are decentralizing selected governance functions to lower levels of government, the challenge is to create institutional arrangements that will maximize the benefits while avoiding the disadvantages.

This study raises concerns about decentralization as a panacea and how it obscures a realistic assessment of municipal governments' role in decentralized natural resource management. The central argument of the study is that successful decentralized forest governance is a complex collective process that requires much more than just a legal reform and transfer of resources. The empirical analysis, based on field research in Bolivia's forestry sector, finds that even if the legal conditions for decentralized governance of the forest sector are favorable, there are several institutional and socioeconomic factors that help determine its effectiveness. The study examines whether Bolivian municipal governments are motivated to engage in forestry-sector problem solving and whether they have the local institutions in place to do so effectively. The decentralized regime's impacts on forest property rights and land-cover/use patterns are assessed empirically with survey and community-level data from 50 randomly selected municipalities in the Bolivian Amazon Lowlands.

The decentralization reforms in Bolivia's forestry sector redistributed power and duties from central government agencies and distributed them to seven different actors with different competencies at regional and municipal government levels. At the local level, municipal governments were given the responsibility to promote forest management among rural communities, which traditionally did not have formal forest user rights. They were also given a broad mandate to plan, implement and enforce locally defined priority actions in the sector. All forestry activities in the municipal territory are under the partial jurisdiction of the municipal government as the municipal government has a mandate to control and monitor forest users compliance with the law and local rules, but does not have the authority to unilaterally intervene, fine and tax forestry activities on their territory.

The study shows that the prospects for this new decentralized governance arrangement to support conditions that are conducive for sustainable forest management, depends to a great extent on how the local-level governance actors are able to associate themselves with forest users to construct and enforce differential and viable institutions that can regulate forest use in an effective, efficient and equitable manner. The local institutions for co-provision and co-

production of forest-sector services are the cornerstones of successful decentralized forest governance because many of the main constraints faced by forest users in Bolivia cannot be addressed effectively by any one actor unilaterally. Forest tenure insecurity, which is today's most serious problem for rural smallholders in Bolivia's forestry sector, requires a broad, collective problem-solving effort among a score of different political actors at different levels of authority.

Bolivia may have become known as one of the countries that has carried its forestry-sector decentralization reforms farther than most countries (UNDP 1998; FAO 1999), but Bolivia is certainly not the only country that has decentralized the governance of their natural resources. Today, at least 60 countries are decentralizing some aspects of their natural resource management systems (Ribot 2002, citing Agrawal 2002). Although the empirical analysis in this study is concerned with the context of the Bolivian Lowlands, the findings are relevant for public policy beyond the national boundaries of Bolivia. While one should be careful as to not extrapolate specific findings from Bolivia, there are general lessons that are pertinent for other nations that are decentralizing forest governance. One of the main lessons is that decentralization will not automatically produce better governance outcomes, but if local governance actors are able to devise institutions that effectively address motivation problems as well as asymmetries of information and power, decentralization may indeed lead to better governance of natural resources. The analysis shows that the institutions that foster cooperative links between actors at different levels of governance explain why some municipalities have been more successful than others in the new decentralized regime. Finally, the particular variables that are likely to affect the likelihood of success for different multilevel institutional arrangements will certainly differ from one national context to another, but the tools of institutional analysis used in this study can be of help to research elsewhere as well.

1. SUMMARY OF MAIN FINDINGS

The study starts out by showing that forest tenure insecurity constitutes a major constraint for rural smallholders with an interest in forest resources. In order to come to grips with forest tenure insecurity, collective action at multiple levels between a large numbers of governance actors are needed. In theory, municipal governance systems could do a great deal to facilitate collective action locally and back up rural communities' self-governance efforts in the forestry sector. Such action could help strengthen forest tenure security. Chapter 2 presents the legal mandate of municipal governments in Bolivia and concluded that their mandate is consistent with what collective-action theory defines as essential functions for governmental authorities in

facilitating collective action. In other words, Bolivian municipal governments are legally empowered to become facilitators of the collective processes needed to improve forest tenure security.

However, whether municipal governments are able to fulfill their role as collective-action facilitators depends on how the local public economy is organized to deal with a series of collective-action dilemmas. The institutional analysis carried out in chapter 3 shows that the creation of the institutional arrangements that underpin successful municipal governance of forests is a collective-action process that resembles the creation of a public good. As such, the institutional development process faces several collective-action problems, which are not always easily solved. The analysis pays particular attention to how municipal governance systems have organized themselves to solve motivation and information problems of collective action. According to the IAD-guided analysis presented in chapter 3, there are four questions that help determine the outcomes of the decentralization reforms in Bolivia's forestry sector. The questions, which are addressed empirically in chapters 4–7, are:

1. What motivates municipal governments to take action in the forestry sector?
2. What makes municipal forest governance effective?
3. Can the decentralized regime make forest management a more attractive land-use option? and
4. Can good municipal governance produce improved forest conditions?

1.1. What motivates municipal governments to take forestry action?

The theoretical expectation is that four particular institutional incentives motivate municipalities in the Bolivian Lowlands to take action in the forestry sector:

- Central government forces them to provide these services;
- Financial importance of forestry sector for municipal budget;
- Important interest groups demand services, and
- Important share of the electorate demands services in the forestry sector.

The quantitative analysis—which controlled for the influence of availability of forest resources in the municipality, its economic endowments, literacy rates, and population densities—suggested that only three of the four have a significant effect on municipal action in the forestry sector. Surprisingly, the financial importance of the forestry sector does not seem to affect the probability of a municipality to provide municipal forestry services. The probable explanation of this finding is that the central government generally hands over funding regardless of the municipalities' past performance.

The presence of these three incentives explain 79 per cent of the variance in the municipal service delivery in the forestry sector, but the institutional incentives were found to be either weak or entirely missing in most municipalities. These results would suggest that it should not be assumed that municipal governments will automatically begin to address pressing environmental issues just because they now have the legal mandate and resources to do so. At a minimum, municipal governments need to face sufficiently strong institutional incentives in order to be motivated to take on such issues. As such, the findings provide a theoretical explanation to the observation that so few municipal governments comply with the formal requirements for municipal provision of forestry-related services: they are not sufficiently motivated to do so.

Even if these critical incentives are strengthened in the future, there is no guarantee that this will lead to more effective municipal forest governance. The decentralized forestry regime may motivate some municipal governments to get involved in the forestry sector, but it does not automatically lead to improved governance performance. Once motivated, municipal governments face the challenge of trying to provide and arrange for the timely production of the most efficient and adequate type of municipal services. This requires an organization that fosters a learning environment. Learning, in turn, relies on information sharing between governance actors. The creation of institutions for information sharing becomes a second-level collective-action dilemma for municipal forest governance.

1.2. What makes municipal forest governance effective?

Several empirical studies find municipal government performance to be rather mixed when it comes to providing public goods and services in Bolivia. The purpose of the analysis in chapter 5 was to discern what factors might explain the mixed results of municipal forest governance. Why have some municipal governments failed to even begin to address governance issues in the forestry sector, while others have not only provided a score of public services in the forestry sector, but have even achieved quite positive results?

Considering the rather adverse institutional conditions for local governance of forest resources in Bolivia, failures in municipal forest governance are of little surprise. It is more puzzling why some municipal governments have challenged the adverse conditions and appear to have overcome some of the observed collective-action problems. Our current theoretical understanding of the underlying conditions for collective action would suggest that the prospects for effective municipal forest governance in many non-industrial countries are rather slim. The current successful experiences need to be explained.

Surprisingly many municipal administrations in the Bolivian Lowlands receive positive approval ratings from grassroots representatives with regards to their forestry-related services. Out of the 50 municipal governments surveyed, 33 (66 percent) provide services in the sector, and 17 of these (52 percent) are considered to provide services that “respond well to the rural population’s needs in the forestry sector.” Based on an econometric analysis, chapter 5 offers an explanation as to why these municipal governments are able to achieve this, rather unexpected, success.

The results confirm the hypothesis that municipal governments with stronger institutions for information sharing are more likely to be successful providers of public services in the forestry sector. The probabilities for achieving successful municipal governance in the forestry sector depend on the varying conditions for downward accountability, learning about local circumstances, and inter-organizational coordination. It is noteworthy that financial resources seem to play less of a role in determining the quality of the services significantly. One should be wary, however, to suggest that municipalities have all the necessary resources to be effective in their mandate.

The good news for Bolivia’s municipal governments, as suggested by these results, is that they have an opportunity to improve their performance ratings and popularity among their constituents. They can do so by opening up their decision-making process, inviting more representatives from organized citizen groups to participate in the planning and implementation of municipal service delivery, and by hiring technical staff that not only stay on their jobs longer but also spend a considerable share of their time in the field. A most dramatic improvement in approval ratings can happen if the municipal officers take the initiative to link up with and share information with other actors that operate within their jurisdictions. In the forestry sector, the municipalities would do well to liaise more with the central government’s Forestry Superintendence, which have proven to be a most valuable partner for many municipal governments.

The empirical analysis also provides some useful insights for national governments, non-governmental organizations as well as bilateral and multilateral development organizations who wish to support municipal government capacity to provide and produce high-quality public goods. Based on the results above, it would make sense for these actors to make sure that their support does not upset the creation of any of the essential information-sharing mechanisms. Granting support directly to municipal government administrations may not be the most effective way of supporting municipal governance, as this may boost the incentives for some actors to seek rents. In a rent-seeking environment, actors tend to try to control private information to have an

edge against their competing rent seekers. It may be more effective, then, to support the forums and activities where information sharing takes place.

While this analysis points to some of the underlying conditions for successful municipal governance, it does not imply that municipal governments, which appear as successful according to user ratings, are doing all the right things. High approval ratings do not necessarily mean that the most pressing problems in the sector are being addressed. It may be that the municipal services were so poor in the past that any activity on behalf of the municipality is seen as an improvement. It would therefore be useful to extend the analysis in chapter 5 to consider the impacts of the varying levels of municipal governance performance on more objective measures of sustainable forest management. The subsequent empirical analyses in the study attempt to assess the impacts of municipal forest governance on forest tenure security (chapter 6) and forest conditions (chapter 7). These analyses serve to gain a more realistic appreciation of what can be expected from decentralization in Bolivia's forestry sector.

1.3. Can the decentralized regime make forest management more attractive?

Insecure tenure arrangements for forest resources, primarily caused by the inability of institutions to enforce assigned forest property rights, tend to produce an undervaluation of forest products relative to other land uses. If the forest products do not have a value that is competitive with the values of alternative land-use products, chances are that the forests will be cleared for other land uses, even if this implies high social costs for society at large (less carbon sequestration, loss of biological diversity, more downstream sedimentation, etc.). Further, the economic distortion of the economic value of forest management may lead to sub-optimal on-farm incomes as it will shift investments away from the otherwise more profitable forestry activities. In this sense, insecure forest property rights not only weaken the incentives for the smallholder farmers to invest scarce resources in forest management activities, but the weak and ambiguous rights also prevent forest management from realizing its potential contribution towards the reduction of rural poverty.

Without the distortions introduced by tenure insecurity, it may make more economic sense for rural smallholder farmers to manage forested land, even in the short term. Consequently, in theory, rural people could increase their overall incomes of their land uses if they had more secure forest property rights. Does such a possibility exist for rural smallholders in Bolivia?

The empirical analysis in chapter 6 examines how changes in the formal property rights regime may affect the land-use decisions of local smallholders, who previous to the reform had

very limited formal access rights to forests. The conditions for acquiring formally recognized property rights for rural smallholders in the Bolivian Lowlands improved considerably as a result of the reform, but the vast majority of Lowland settlers still lack *de jure* property rights to forest resources, and many also lack a regularized land title (SIF 2001; Hernaiz and Pacheco 2001). Being increasingly aware of some of the shortcomings of the new regime, the implementing governmental organizations have taken steps to make *de jure* forest user rights more accessible to the poorer segments of Bolivia's large rural population. Whether these adjustments will be enough to induce a significant share of Bolivia's forest users to formalize their forestry activities remains to be seen.

The analysis also shows that the changes in the *de jure* situation are not sufficient to improve the *de facto* forest property rights. The *de facto* rights, and consequently tenure security, depend to a large extent on the implementing institutions and their capacity to mediate and facilitate the access to formal rights and then to protect them effectively. Municipal governments, through the new mandate vested in them, have the potential to act as a mediating institution, although, as the analysis in previous chapters have pointed out, this is far from an automatic process. The results in chapter 6 reiterate that municipal government systems can play a key role in promoting smallholder access to formal forest management rights. Municipal governments that have been able to address some of the critical motivation and information problems associated with the municipal governance of forest resources, seem to be outperforming other municipalities in securing an increasing proportion of their territories' forests for smallholder use. It remains an open question, however, whether the apparent improvements in formal property rights have effectively altered the forest users' incentive structures and actual behavior with regards to sustainable forest management practices.

The empirical analysis examines this particular question by comparing forest dwellers' decision making in six different Lowland communities. It focuses on how the forest users' incentive structures for sustainable forest management have changed after the introduction of the decentralized forestry regime and its new property rights regime. The empirical analysis concludes that while property rights related to commercial forest management are virtually nonexistent among the vast majority of Lowland forest users, in the places where forest users do enjoy such rights, the smallholder production system is more diversified and household incomes are substantially higher.

The results of the analysis in this chapter would suggest that the strategy to assign more formal logging rights to smallholder farmers in the Lowlands may help save Bolivia's forests. This may seem counterintuitive, but under the current circumstances in the Lowlands, forest

resources will continue to be undervalued if users are limited to subsistence usage and are prohibited from engaging in commercial forest management. The cross-site comparison in this study showed that, under some circumstances, assigning de jure alienation rights to forest resources can help strengthen forest user incentives to manage forests rather than clearing them for agriculture and cattle ranching. The question whether such improvements in user incentives actually leads to less forest clearings all together remains unanswered by this part of study.

Are the physical impacts of the new forest property regime even detectable? If so, would it be possible to link such changes in the forest condition to the institutional variables identified in this and previous chapters? This is impossible to answer at this stage since no existing program is systematically monitoring landscape changes in Bolivia with an eye to public policy. Chapter 7, the last empirical chapter in this study, takes on this challenge as it develops a spatially explicit approach to assess how Bolivia's forestry-sector reform is affecting the condition of the country's forests.

1.4. Can good municipal governance produce improved forest conditions?

Chapter 7, the last empirical chapter in this study, attempts to establish whether municipal governance systems have had a noticeable effect on forest conditions in the selected municipal territories. The analysis of the relationship between municipal forest governance performance and land-cover change is based on the situation in the Department of Santa Cruz, a land area that hosts about half of all forest resources in the Bolivian Lowlands. A representative sample of 25 municipal governments in the Department was included in this analysis. The empirical analysis used a Geographic Information System to generate an index of uncontrolled forest cover change for each of the selected municipalities.

From a social welfare perspective, not all deforestation is bad and, under some circumstances, agriculture may be socially more beneficial than forest use. Consequently, a straight forward deforestation measure is not always a good indicator of sustainable land use. It is also not a very good indicator of the performance of government organizations and the effects of public policy on forest resources. A more appropriate measure would be the uncontrolled deforestation rate for a given area, that is, the rate at which forests that are not considered apt for other land uses, disappear. Such information is more useful for assessing the performance of the decentralized forestry regime.

Given the results in chapter 6, one would expect that the same municipalities that have been relatively successful in developing institutions that improve forest users' access to de jure property rights to forest resources would exhibit lower rates of uncontrolled deforestation,

because users with firmer property rights have stronger incentives to manage the forest rather than converting it to other uses, such as agriculture and ranching. The results of the empirical analysis suggest that municipalities with more developed governance institutions to solve motivational and informational problems of collective action show significantly different land-use patterns in comparison with institutionally underdeveloped municipalities. Although both types of municipalities exhibit high rates of uncontrolled deforestation, municipalities that have more motivated local politicians and that have also developed better governance institutions for solving collective-action problems seem to have been able to reduce uncontrolled deforestation in their territories. The high-performing municipalities experienced, on average, 14000 hectares less uncontrolled deforestation during the 1993–2000 period than municipalities with governance systems that were not as well developed institutionally.

One of the possible explanations to these results is that municipalities that have developed effective institutions for dealing with collective-action problems are more likely to respond effectively to the most serious problems in the forestry sector. Recall that according to the vast majority of grass root organization representatives in the Lowlands, as documented in chapter 1, forest tenure insecurity and lack of access to forest property rights are perceived as the main problems in the sector. As was shown in chapter 6, municipal governance systems can help users to improve their access to and protection of forest property rights, because forest users who have firmer forest property rights are more likely to engage in forest management activities and are less likely to convert forest to agricultural and ranching lands. Moreover, a strong and motivated municipal government with good governance institutions in place may be able to enforce the forestry law, including rules on sustainable forest management, more effectively. Such enforcement could have an effect on controlling illegal forest clearings.

While the above explanations are consistent with the results in previous chapters in the study, it is important to note that these findings do not suggest that it is municipal governments per se that make the biggest difference in terms of decentralization outcomes at the local level. In fact, the variable in the analysis, municipal forest governance, does not just refer to the characteristics of municipal governments, but the governance system embodying representatives from forest user groups, central government, NGOs, municipal governments and other actors with a stake in the creation of local-level institutions to regulate forest use. As such, municipal forest governance performance reflects the local governance system's institutional capacity for co-provision and co-production among the various forest governance actors. Undoubtedly, the representatives of municipal government constitute an important local actor, but the analysis shows that its performance depends on its ability to cooperate with other local-level actors.

Although the results may seem quite encouraging in the sense that municipal governance systems seem to be capable of having a positive impact on the sustainability of land uses in the Lowlands, one should not exaggerate this positive effect. Uncontrolled deforestation rates in Santa Cruz are still very high in absolute terms. Among the 25 surveyed municipalities, 21 experienced some degree of deforestation during the 1993–2000 period. On average, about 40 percent of the deforestation that took place in these municipalities was uncontrolled. It is doubtful that the current level of performance among the majority of municipal governance regimes is sufficient to ensure sustainable use of the Lowlands' natural resources.

2. IMPLICATIONS OF THE STUDY

This study shows that the effects of the decentralization reforms in Bolivia's forestry sector depend to a great extent on the prevailing conditions for local people to solve a series of collective-action dilemmas. By employing the tools and methods of institutional analysis and drawing from the findings of collective-action theory, the study has been able to identify what particular institutional factors seem to determine whether the conditions for successful decentralized governance of forest resources exist or not for a given municipality. While the theoretical puzzle of what factors might influence the probability of achieving a successful decentralized governance system is far from being completely solved, the study does frame this puzzle in a way that makes the empirical testing of hypothetical causes more tractable.

The theoretical analysis frames the problem of successful municipal governance of forests as a two-level collective-action dilemma. In order to produce successful governance outcomes, at the municipal level, the first collective-action dilemma that the actors must overcome is a motivation problem. Why should these local actors decide to get involved in the forestry sector in the first place? Even if actors are successful in overcoming this first dilemma, it does not mean that successful forest governance will evolve automatically: A second collective-action dilemma, related to several information asymmetries in the local governance system, also stands in the way of good municipal governance. Once motivated, actors must be able to construct the necessary institutions to share essential information for the effective planning, implementation, monitoring and enforcement of activities and rules.

By considering the institutions that are needed to overcome the two collective-action dilemmas, one can understand why some municipal governance systems do better than others in terms of public service performance in the forestry sector. Moreover, the study suggests that the

performance of the institutions for co-provision and co-production of municipal goods and services are key for explaining success and failures of decentralization reforms.

2.1. Implications for Municipal Governance Actors

The institutional analysis of municipal forest governance offers reasons for careful optimism with regards to the potential for improved forestry-sector governance under the new regime in Bolivia. However, the study also points to some fundamental institutional barriers that currently prevent governance actors from capitalizing more fully on the opportunities presented by the new regime. For instance, the Superintendencia Forestal keeps transferring increasingly scarce resources to municipal governments even if they have not used past disbursement in a responsible fashion (i.e., not providing any public services related to forestry). Given the result that central government support seems to be more important than funding for motivating municipal forestry action, it would make more sense to disburse a portion of the resources based on past performance. By applying a performance criteria as a basis for funding municipal officials would be encouraged to give more serious attention to forestry issues in their territory.

Another way of developing stronger incentives for municipal government officials to get involved in forestry activities would be to incrementally devolve more decision-making powers to them. One of the major constraints in the current regime is that municipal governments have very little to gain from investing in forestry-sector activities. Forestry activities, such as technical assistance to users and monitoring of forestry practices, are often perceived as costly activities with a very low—and uncertain—marginal returns. The incentive for municipal officials to invest in forestry-sector activities could be strengthened, however, if municipalities were allowed to charge user fees, collect taxes, and charge fines for infractions. Letting go of such fiscal powers might make some decision makers in the central government nervous about opportunistic behavior and corruption at the local level. Yet, if the devolution is done incrementally to those municipalities that want to assume the responsibility and have demonstrated their ability to do so, it is unlikely that this process would cause more opportunistic behavior than what the currently centralized fiscal system generates.

Municipal governments that are motivated to take action in the forestry sector, but lack either technical know-how to support users or the capacity to organize effective programs, may learn from other municipalities or organizations that have demonstrated their capacity in these areas. Opportunities for horizontal learning between municipalities and other local-level organizations working in the sector have the potential to strengthen the effectiveness of municipal forest governance. To stimulate such information exchange and organizational learning, central

government, with the support from international donors and NGOs, should work to improve the networking opportunities for municipalities with an interest in forest governance.

Forest users' lack of information about their possibilities to gain formal property rights to forest resources may be the most serious obstacles to the success of the Bolivian regime. Unless more smallholder users are able to access such rights, forest tenure insecurity is likely to prevail for these groups and under such circumstances, forestry will continue to play a minor role in reducing rural poverty in Bolivia. The fieldwork carried out for this study documented several misconceptions about the new regime. The majority of smallholder forest users interviewed for this project were not aware of their rights or the conditions under which they could access formal property rights. Such lack of information may partially explain why less than one percent of the forested area certified for sustainable forest management in Bolivia is managed by smallholder forest users (Bolivian Council for Voluntary Forest Certification 2001). The municipal governments have a big role to play in informing local forest users of the opportunities in the forestry available to them.

Once users are aware of the opportunities to gain access to firmer forest management rights, their incentives to invest in forestry will also be strengthened. Their incipient forest management activities are likely to need the periodic input from technical expertise not only in forest management but also in product processing, business administration and marketing. Forest users may increase the chances of receiving such assistance if they manage to organize themselves in secondary local organizations and even national associations. The newly created National Association of Community Forestry Concession Groups⁷⁴ (ASLs) has been able to organize pressure on officials to speed up the review process of concession application. Since the national association was created, the area of granted community concessions within municipal reserves has increased substantially (Superintendencia Forestal 2002b).

2.2. Implications for National Forestry Policy

From a public policy standpoint, the study provides important elements for assessing possible causes of observed policy outcomes. The impact of the decentralization reforms, both in terms of smallholders' forest tenure security and uncontrolled deforestation rates, are shown to be associated with the institutional performance at multiple levels of the municipal governance system.

The analysis in chapters 6 and 7 demonstrate that successful municipal governance systems can facilitate the establishment of improved forest tenure security as well as lowering

⁷⁴ *Agrupaciones Sociales del Lugar* (ASLs).

uncontrolled deforestation rates. Since both forest tenure security and uncontrolled deforestation represent relevant impact indicators of Bolivia's forestry policy, the study's research design provides a structured method that may be useful for those who want to monitor and evaluate the effects of forestry-related policies in Bolivia.

The information from a monitoring program that is able to link policy processes and local-level governance with biophysical outcomes is a potentially powerful policy making tool, but the potential contribution of this tool to better public policies depends largely on the incentives that policy makers face to actually take this information to heart. Regardless of how good the quality of the information from the monitoring and evaluation system is, and no matter how timely its delivery is, if the institutions for accountability do not function effectively it is unlikely that the information will be used to modify existing policy instruments in the sector (Gordillo and Andersson 2002). In that sense, the effective use of monitoring and evaluation systems in political decision making presents its own set of collective-action problems.

2.3. Implications for Future Research

One of the main lessons learned from this study is that massive changes in formal law and financial resource transfers alone are unlikely to lead to any major changes in behavior. The changes in the law and financial distribution may very well be necessary components in the creation of an enabling environment for decentralized governance, but they are not sufficient. This study has shown that the institutional arrangements for cooperation at the municipal level are powerful determinants of governance outcomes.

However, this analysis is inconclusive in some of its results regarding what the Bolivian reforms have meant for forestry-sector decision making and its effects on the condition of the country's forests. Future research could supplement this study by expanding the institutional analysis of municipal forest governance initiated here. One approach that would add to the efforts in this study would be the incorporation of information about forest users' decision making prior to the decentralization reforms in the mid-1990s. During the course of this study, several such data sets were identified, mostly at the community level. Among earlier research efforts, the IFRI research program carried out eight different community case studies from 1993 to 1995. Returning to these sites almost ten years after, would provide a unique opportunity to test the hypotheses formulated in this study in a context with more temporal depth. Such a study could look at whether the conditions for these community members' access formal property rights have changed, and if such changes have affected the local people's perceived forest tenure security

To get a firmer grip on the biophysical impacts of the reforms and the activities carried out by municipal governance actors, future research could expand the analysis of forest cover change to the entire country, and going further back in time. It would be particularly useful to get a forest-cover time-series dataset that includes the periods just before and after the passing of the 1996 forestry law. Since changes in governance patterns often take time to manifest themselves in the conditions of natural resources, it would be important for analysts to carry out periodic national assessments of the changes in the forests' spatial extent and condition (including uncontrolled deforestation).

As a complement to the national-level studies, remote sensing technology can also be used in studies at the local level, linking community case studies (i.e., using IFRI research protocols) with changes in the local biophysical environment. If carefully selected, such microlevel studies could test the hypothesized relationships between macropolicies, user decisions, and outcomes in terms of forest condition at the local level.

Finally, future research efforts should harness the power of comparative analysis. The Bolivian case should be compared with other countries' experiences with forestry-sector governance. It would be particularly interesting to compare Bolivia to other countries in Latin America, some which have undertaken decentralization reforms in their forestry sectors around the same time as Bolivia (e.g., Guatemala, Honduras or Colombia) and others which have not carried out such reforms (e.g., Peru or Venezuela). Such a research project would be able to construct empirically grounded theory to further explain how and why local political actors respond to decentralized forestry policy, and what impacts such policy might have on the natural resource base.

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