



The Importance of Inequality for Natural Resource Governance: Evidence from Two Nicaraguan Territories

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Summary. — Natural resources constitute an important axis around which rural territorial dynamics revolve. Based on empirical registration of how applications for and denouncements of natural resource use are dealt with in two Nicaraguan rural territories, this paper examines the importance of inequality for the institutional practices through which district-level governance of natural resource use takes place. Notable differences are identified. The paper concludes that institutional practices which promote rule-based natural resource governance and gradually curb the veto possibilities of powerful actors are more likely to emerge in territories where political voice is not restricted to the economic elite.

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1. INTRODUCTION

Natural resources constitute an important axis around which rural territorial dynamics revolve (Berdegué, Bebbington, & Escobal, in this issue; Berdegué *et al.*, 2011). Not only do they provide a source of livelihood, income, and a sense of meaning and identity to rural populations; they also constitute a source of revenue and authority to national and district governments, a source of wealth to national economic and political elites, and the basis for the provision of ecosystem services of local, regional, and global importance (MEA, 2005). This makes the governance of natural resources a powerful lens (Larson & Ribot, 2004) for examining territorial dynamics, i.e., processes of social, economic, political, and institutional change in a given territory and their concomitant changes in development outcomes such as growth, distribution of assets and benefits, social inclusiveness and environmental sustainability.

Governance of natural resources such as water, land and forests, may be understood as the establishment, reaffirmation, or change of institutions (policies, procedures, practices and organizations) which regulate or resolve conflicts – overt or latent – between actors, both users as well as authorities, with respect to access to and the conditions for use of natural resources (e.g., Lemos & Agrawal, 2006; Paavola, 2007). Governance of natural resources takes place at many inter-connected levels ranging from the international level through multilateral environmental agreements such as the Convention on Biological Diversity, through the national level with its legislation and national agencies, to the territorial and local levels e.g., through district-level by-laws, administrative procedures and community-based arrangements e.g., for the use of fire and fire control. In this paper, we focus at the governance of natural resources as it takes place at the sub-national level.

In the aftermath of the Sandinista revolution in 1979 and the civil war during the 1980s, Nicaragua embarked upon a process of political decentralization which gradually – although at times somewhat reluctantly – also got translated into the assignation of specific legal and administrative powers

to the districts. The emergence of elected district governments coincided with a growing environmental concern, both internationally and locally. Combined with the central importance of natural resources to rural territorial dynamics, natural resource governance in many places came to constitute an important issue in district politics and administration. Although district governments and their administrations may be regarded as new institutions established in Nicaraguan districts in 1990 on a common legal basis, they were not created in a void but in different territories, each being characterized by specific social, economic, and political structures and thus by different levels and patterns of inequality.

Inspired by recent literature on inequality and natural resource governance from the perspective of new institutional economics (e.g., Boyce, 1994; Clement & Meunie, 2010; Li & Reuveny, 2006; Paavola, 2007), this paper is concerned with how different social, economic, and political structures shape district-level natural resource governance and in particular, how different levels and patterns of inequality influence the persistence and change of specific institutional practices. Based

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on Acemoglu, Johnson, and Robinson (2002) and Bebbington, Dani, de Haan, and Walton (2008), the *World Development Report 2006* argued that high levels of economic and political inequality tend to produce economic institutions and social arrangements that – legally or extra-legally – systematically favor the interests of those with more influence (World Bank, 2005). The report launched the concept of ‘inequality traps’ referring to situations where personal and property rights are enforced only selectively, where budgetary allocations benefit mainly the politically influential, and where the distribution of public services favors the wealthy, and thus, where both middle and poorer groups end up with unexploited talent. “These adverse effects of unequal opportunities and political power on development,” the report argues, “are all the more damaging because economic, political, and social inequalities tend to reproduce themselves over time and across generations.” (World Bank, 2005, p. 2). “These patterns of domination persist because economic and social differences are reinforced by the overt and covert use of power. Elites protect their interests in subtle ways, by exclusionary practices in marriage and kinship systems, for instance, and in ways that are less subtle, such as aggressive political manipulation or the explicit use of violence.” (World Bank, 2005, p. 2).

Robinson (2010) talks of this mutually constituting and reinforcing relationship between political and economic institutions as ‘institutional persistence’. Institutional persistence is produced and reproduced ‘when those with power in any given moment choose political institutions in the future and they naturally tend to choose those which reproduce their *de jure* power. This persistence is further strengthened when those with power in any given moment determine economic institutions which tend to distribute resources in their favor, thus reproducing their *de facto* power’ (Robinson, 2010, p. 9).

More recently, this focus on path-dependent, institutional inequality traps (Rao, 2006), has been complemented by a focus on gradual institutional change (Mahoney & Thelen, 2011). In their theory of gradual institutional change, Mahoney and Thelen (2011) examine the relationship between different modes of institutional change and the political and institutional context. In particular, they argue, two features characterizing the political and institutional context are associated with different modes of institutional change. The first of these two features is the extent to which the political context is associated with strong or weak veto possibilities. Veto possibilities, they explain, “can derive either from especially powerful veto players or from numerous institutional veto points” (Mahoney & Thelen, 2011, p. 18). “Veto possibilities are high where there exist actors who have access to institutional or extra-institutional means of blocking change” (Mahoney & Thelen, 2011, p. 19). The second feature is the extent to which a particular institution is characterized by a high or low level of discretion, i.e. the extent to which decisions are made according to the judgment of individual actors or according to pre-established rules which guide the interpretation and enforcement of legal and administrative rules. Combined these characteristics of the political and institutional context for a particular institution such as district-level environmental units produce different opportunities for potential change-agents such as district environmental officers and their constituencies for promoting gradual institutional change, in this case the institutional practices through which natural resources are governed. In turn, such emerging institutional practices may contribute to reshape and gradually change the political context.

This resonates with the findings reported by Andersson (2002, 2004) and Andersson and Ostrom (2008). In his

research on district-level forest governance in 32 districts in Bolivia, Andersson found considerable differences in their forest governance performance despite operating within a single legal framework. Andersson (2004) and Andersson and Ostrom (2008) propose that this varied performance to a large extent is explained by the face-to-face interactions – both horizontal and vertical – which district officers maintain. Vertical interactions are interactions between actors at different levels of government, such as between (groups of) users of forest resources and a district forest officer or between a district forest officer and a ministry delegate (Andersson, 2004). Vertical interactions are important to ensure upward as well as downward accountability from district authorities (see also Ribot, 2002, 2004). Horizontal interactions are interactions between actors at the same level, e.g., between forest officers working in different organizations for example in other districts or government agencies, NGOs, etc. Horizontal interactions are important for sharing insights and experiences on how to solve common problems, planning joined activities, etc. (Andersson, 2004). Based on theories on polycentric governance, i.e., the relationships among multiple authorities with overlapping mandates, Andersson and Ostrom propose that a governance system that manages to distribute capabilities and duties in such a way that perverse incentive and information problems at one level are offset to some extent by positive incentives and information capabilities for actors at other levels, will achieve better outcomes than either a highly centralized or fully decentralized system (Andersson & Ostrom, 2008, p. 73). In this way, they argue, multi-level or polycentric governance contributes to produce checks and balances and hence to limit the space for discretionary implementation and enforcement of the rules relating to the governance of natural resources.

On this basis, the paper sets out to examine the institutional practices through which district-level governance of natural resource use is performed in two Nicaraguan territories with different patterns of inequality, namely the Estelí area in northern part of Nicaragua, consisting of the districts of Estelí and Condega, and the Santo Tomás area, consisting of the districts of Santo Tomás, San Pedro de Lóvago and Villa Sandino in the Chontales department at the eastern shores of the Cocibolca Lake (Figure 1). In particular the paper focuses upon the character and frequency of horizontal and vertical interactions as a distinguishing feature of the institutional practices through which district-level governance of natural resource use takes place, which reflect but also hold the potential to gradually shape the political and institutional context through widening or narrowing the veto possibilities and the room for discretion in the governance of natural resource use that characterize the political and institutional context.

The paper is divided into six sections. The following section describes the methods employed and the data sets produced as part of the empirical work underlying the paper. Section three briefly introduces to two territories where empirical research has been undertaken, emphasizing their differences with respect to distribution of land and the continued presence of small-scale farmers, while the fourth section describes the role that district authorities play in the governance of natural resource use in Nicaragua. Section five presents the results of the empirical research conducted as the basis for this paper and, through this lens, examines the institutional practices through which the district-level governance of natural resource use takes place in the two areas. Finally the sixth and last section concludes and provides some final reflections.

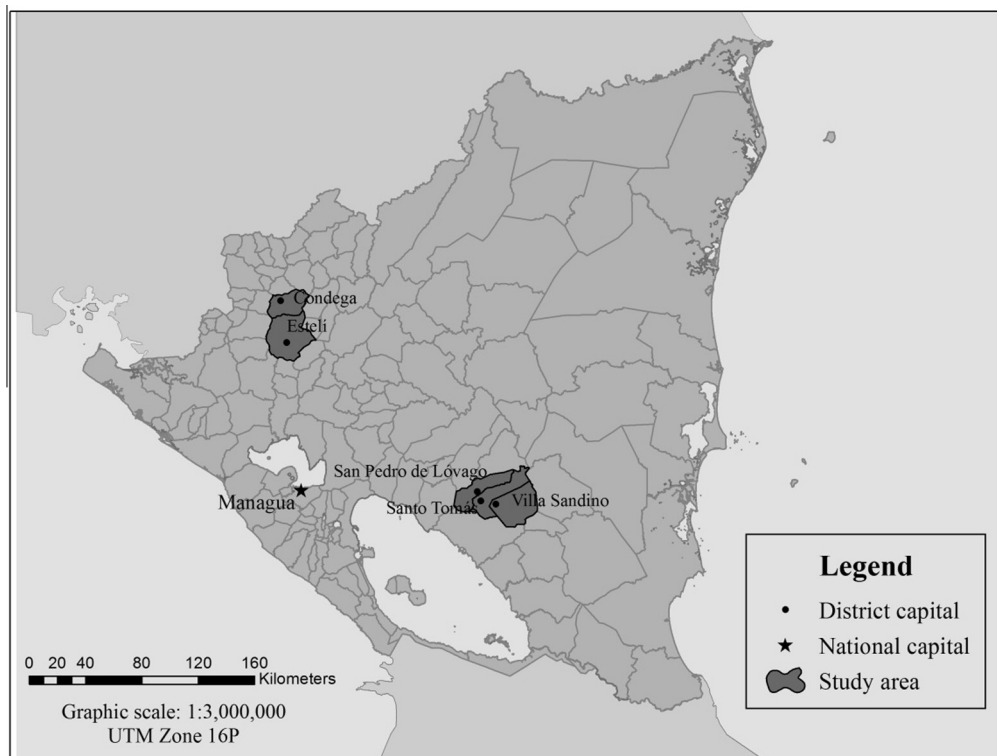


Figure 1. Nicaragua: Location of Santo Tomás and Estelí areas and districts.

2. METHODS AND DATA

Empirically, this paper examines the institutional practices through which district-level governance of natural resource use takes place through the lens of how (i) applications for natural resource permissions and (ii) denouncements, i.e., submission of formal accusations, of alleged natural resource use infractions presented to district authorities by citizens, are dealt with. The paper draws on two data sets. The first data set is based upon real-time registration of (i) applications for permission to use specific natural resources and of (ii) denouncements of allegedly illegal use of natural resources, both presented to district authorities by citizens during the period between April and August 2011¹ in four of the five districts² in the Estelí and Santo Tomás areas. The real-time registration was carried out by district environmental officers in the four districts, using pre-established formats for applications and denouncements, respectively, which had been developed in collaboration with a former district environmental officer.³ The formats solicited details about (i) the applicant and the type of use and the resource for which permission was applied, and (ii) the complainant and the issue denounced, respectively. In addition the formats solicited information about the actions taken vis-à-vis the application or denouncement and the institutions involved. A total of 134 applications and 57 denouncements were registered in the four districts. In Nicaragua, the period between April and August corresponds to the end of the dry season and the first half of the rainy season. Given the seasonality which characterizes the use – and alleged misuse – of natural resources, the data set, therefore, should not be interpreted to provide the complete picture of the types of natural resource use permissions solicited and issues denounced, nor of the yearly number of applications and denouncements presented to the district authorities.

The second data set focusses on the use of fire for land clearing and is a recording of (i) permissions issued for land clearing through the use of fire and (ii) denouncements of the poorly controlled use of fire to clear pastures before the rains, putting lives and properties at risk, presented to district authorities in the Santo Tomás area during 2003–09. The data set was recorded in 2010 through interviews with district officers and through the revision of district administrative records. The recording was made only for the Santo Tomás area. A total of 1,839 farmers received district authorization to use fire for land clearing, many of them through community-level applications, while a total of 75 denouncements of unauthorized or poorly controlled fires were identified through this reconstruction.

Each of these two data sets provides insights into the institutional practices through which district-level governance of natural resource takes place and may thus be expected to provide reflections of the political and institutional contexts where they take place, including the veto possibilities and the level of discretion in district-level natural resource governance. These insights are further contextualized on the basis of extensive research carried out in the districts over the past decade by the authors (Gómez, 2013; Gómez & Ravnborg, 2011, 2012; IICA, 2004; Ravnborg, 2002, 2003, 2006, 2008).

3. THE STUDY AREAS – TWO RURAL TERRITORIES WITH DIFFERENT PATTERNS OF INEQUALITY

Despite the Sandinista revolution in 1979, current distribution of productive assets such as land and water in Nicaragua testifies to a long history of land and water grabbing by the political elites – initially through coercive processes of colonization, later through economic and political means – and the

subsequent use of the legal system to turn grabbed resources into private property (Broegaard, 2009, 2013; de Janvry & Sadoulet, 2000; Deininger, Zegarra, & Lavadenz, 2003; Gómez & Ravnborg, 2012; Ravnborg, 2006, 2008; Ruben & Masset, 2003; Zimmerman & Carter, 2003).

After independence from the Spanish Crown in 1821, liberal ideas from Europe influenced local political discourse. However, political practice was adapted to fit the interests of the political elite in Nicaragua. With the booms in export crops around the middle of the nineteenth century, first for coffee and later cotton and sugarcane, land ownership became increasingly more important and contested. In 1862, the Nicaraguan government “decreed that land suitable for coffee might be expropriated ‘in the national interest’” (Dore, 2006, p. 71). The state promoted large-scale production through subsidies and taxation systems that favored large plantations (Dore, 2006, p. 71). Dore (2006) and Gould (1998) document this land grabbing by the political elite and how the political elite thereby succeeded in establishing itself also as the country’s economic elite. Dore concludes: “The triumph of private property in Nicaragua was achieved not through the workings of the market’s invisible hand, but through relentless state intervention to divest Indians of the common property rights they had enjoyed since the conquest.” (Dore, 2006, p. 72).

In the Santo Tomás area, the towns of Santo Tomás and San Pedro de Lóvago were founded during this period, namely in 1861 and 1864, respectively, when the government decided to relocate the Loviguisca indigenous community to these town areas. It is estimated that at the time of the relocation the Loviguisca community comprised 250 people (Espinoza, 2009; INIFOM, n.d.a). Villa Sandino developed much later around the Pueblo Viejo settlement that grew from a camp inhabited by the workers who were constructing the road connecting Chontales to El Rama and Muelle de los Bueyes. In 1892, the settlement only had three houses (Espinoza, 2009; INIFOM, n.d.a).

During this period from the mid to late 19th century the first settler families arrived to the Santo Tomás area. They established their haciendas on the *ejidos* (common land) and by claiming land that ‘belonged to no one’ at the mayor’s office and by paying one peso for between 100 and 150 *manzanas*⁴ (corresponding to 70–105 hectares) per year, they obtained usage rights. Those who were able, continued to pay the rent year after year, until eventually they could claim possession of the land and obtain private property rights.

Favored by the gently undulating landscape and the vast land extensions, extensive livestock farming soon became the major economic activity in the area. Families arriving later, e.g., up until the 1950s and 1960s tended to settle on land now belonging to the large estates, where the owners allowed them to plant crops, such as maize and beans, as tenant farmers. It is estimated⁵ that in 1963, the average farm size in the Santo Tomás area was 64 hectares and that approximately half of all rural households had no land but worked as agricultural laborers supplemented by growing food crops as tenant farmers. Often land owners allowed tenant farmers to grow food crops for a number of years in return for the tenant farmers opening up the land by cutting down and burning the forest. As a caretaker of a farm in Tierra Blanca, a community not far from Santo Tomás town told us: “That is how we made a living in the past: Cutting down the forest, setting fire and there came the harvest of all sorts of crops: maize, rice, beans, bananas.” (Personal communication, January 30, 2009; own translation).

The colonization of the Estelí area dates further back than that of the Santo Tomás area. Estelí was founded already in 1685 and was created as a department in 1829 (INIFOM,

n.d.b). Condega which used to be an important indigenous community was founded first as a small town, a *villa*, in 1856 and later, in 1962 as a town (*ciudad*) (INIFOM, n.d.b). Like in the Santo Tomás area, large estates were formed during the late 19th century and were further consolidated up through the 20th century. However, in difference with the Santo Tomás area, these estates were established upon a matrix of scattered but already existing small- and medium-sized farms. Thus, the estates were established partly through a process of claiming ‘virgin’ land, partly through a process of taking over smaller farms in cases where owners of these farms became indebted to the new estate owners (Octupan, 2004).

Initially, the large estates engaged in coffee production in the mountainous areas while cotton and also tobacco production expanded in the valley along the Estelí River. Livestock farming, which had been important all along, significantly expanded during the 1960s and into the 1970s, particularly in the foothills taking advantage of the growing demand for meat, primarily driven by the growing fast food market in the United States. In 1962, a slaughter house was established in Condega by a North American and two Nicaraguan investors (Octupan, 2004).

Despite the existence of large estates, in a few cases reaching up to 10,000 hectares (Octupan, 2004, p. 82), these have always co-existed with small- and medium-sized farms. According to the agricultural census made in 1963, the average farm size in the Estelí area was ‘only’ 34 hectares.

While the agricultural frontier had stabilized in the Estelí area, new land continued to be taken into possession in the Santo Tomás area. In the period during 1963–2001, the agricultural area grew by 28% in the Santo Tomás area, while in Estelí department the agricultural area contracted slightly (3%) in the same period. Moreover, despite the agrarian reforms of the 1980s and 1990s, the average property size increased in the Santo Tomás area from 64 hectares in 1963 to 67 hectares in 2001, while in the Estelí area, the average property size decreased from 34 to 23 hectares in the same period (INEC, 2002).

In part due to these different colonization trajectories, in part due to the fact that coffee cultivation remains an economic opportunity even to small-scale farmers as long as they can mobilize the necessary labor force, a considerable number of small-scale farms have continued to exist in the Estelí area while in the Santo Tomás area these have virtually disappeared due to economies of scale that are much more important in extensive livestock keeping (Ravnborg & Gomez, in this issue). More than two-thirds of the agricultural properties in the Estelí area are smaller than 14 hectares, while this is the case for only 18% of the properties in the Santo Tomás area, which is dominated by medium- and large-scale properties (INEC, 2001). A quarter of the agricultural properties in the Santo Tomás area are larger than 70 hectares and only a minority of the owners of these properties (22%) live on the property (INEC, 2001), either because they own several properties (Ravnborg & Gomez, in this issue) or because they live in town. In the Estelí area, only 7% of the agricultural properties are larger than 70 hectares and 42% of the owners of these properties live on the property (Ravnborg & Gomez, in this issue). Overall, more than half (56%) of the agricultural properties in the Santo Tomás area have absentee landowners while this is the case for 36% of the agricultural properties in the Estelí area (Ravnborg & Gomez, in this issue). Although small-scale farmers in the Estelí area⁶ only control around 15% of the agricultural area (Ravnborg & Gomez, in this issue), their presence and relative share of the rural population imply that rural communities in the Estelí area are dominated

by small- and medium-scale farmers living on their properties. In the Santo Tomás area, rural communities are characterized to a much larger extent by a mix of care-takers, casual laborers and tenant farmers, a few small-scale farmers and owners of medium- and large-scale farms of whom the majority reside elsewhere. As argued by e.g., [Bebbington \(1999\)](#) and [Lund \(2011a, 2011b\)](#), the importance of land rights and property extends beyond merely constituting a source livelihood, to also engender a sense and a claim of belonging to a place and to a political community. Owning property, however small, thus nurtures the sense of citizenship with the rights and obligations it entails rather than that of being a dependent subject (whether dependent of a patron for work or in-kind help or of a local or national government e.g., for cash transfers). According to many observers, the Estelí area has a long history of community organization. As a former mayor of Estelí explains:

Estelí has a history of organization which has its roots from the period prior to revolutionary victory. We organized ourselves into what was called 'neighborhood groups.' All neighborhoods were organized; we organized ourselves for the war, that was how we fought and that was how we did things.

[Former mayor of Estelí, personal communication, September 23, 2011, own translation]

More recently, small-scale farmers first in Estelí and later in Condega district have successfully advocated for the establishment of protected landscapes in an effort to also protect their economic livelihoods as small-scale farmers ([Ravnborg, 2008](#); [Ravnborg et al., 2010](#)). Conversely, in the Santo Tomás area, the structure of land ownership has tended to favor the formation of dependent clients and efforts to promote and citizen participation in district planning have largely failed ([Gómez & Ravnborg, 2012](#); [Ravnborg & Gomez, in this issue](#)).

Reflecting the lack of economic opportunities to the less resourceful households, the population of the Santo Tomás area has stagnated and even declined, particularly in the rural areas,⁷ whereas in the Estelí the population has grown by 19% overall and by 4% in the rural areas during the same period⁸ ([INEC, 1995](#), [INIDE, 2005](#)).

4. DECENTRALIZATION OF NATURAL RESOURCE GOVERNANCE

The first district government elections were held in all Nicaraguan districts outside the two autonomous regions in 1990 on the basis of the District Law⁹ which had been approved in 1988. Before 1990, the district administration had existed only as a local representation of the central government rather than as a democratically elected political space. The creation of this new political and administrative space coincided with an international wave of environmental attention based on the publication of the report of the Brundtland commission entitled *Our Common Future* and the UN Conference on Environment and Development in Río in 1992. This new international attention seriously questioned the 'colonization logic' which hitherto had characterized policies in many Latin American countries with respect to the governance of natural resources in general and land use in particular. Partly due to this temporal coincidence, partly due to the fact that in Nicaragua as well as in many other poor developing countries, the international development agencies played a central role in promoting political and administrative decentralization ([Larson, 2004](#)) as well as the environmental agenda, the district governments were born with considerable responsibilities with respect to the governance of natural resources.

In the case of Nicaragua, the District Law assigns authority to the district governments over all aspects that relate to socio-economic development and to the protection of the environment and the natural resources within their area of jurisdiction.¹⁰ Furthermore it mandates the district governments to develop, protect, and ensure the rational use of the environment and the natural resources as a basis for the development of the district and the country, to promote local initiatives to this end and, in coordination with the appropriate national agencies, to contribute to the monitoring, surveillance and control of the environment and the natural resource use.¹¹ In addition to these general responsibilities, also the Environment Law¹² from 1996 and other sectoral and resource specific laws such as the Forest Laws¹³ and the Water Law¹⁴ assign natural resource-related responsibilities and competences to the district governments.

The district governments are supposed to form district environmental commissions with the mandate to promote the environmentally sound use and protection of the districts natural resources and to prepare district-wide environmental initiatives such as district by-laws. In many districts, the district environmental commission serves as the institutional platform for coordination with the relevant ministries and agencies, with civil society and non-governmental organizations as well as with the communities through the participation of community representatives. As such, it holds the potential to facilitate both horizontal (e.g., between technical staff from different key ministries or between community representatives from different communities) and vertical interactions (e.g., between technical staff from key ministries, district level staff and community representatives). In addition, the district administrations are supposed to staff a district environmental unit responsible for carrying out the environmental tasks assigned to it by the district council and the district environmental commission.¹⁵

Despite the common legal and administrative framework for the governance of natural resources, the institutional practices through which the governance of natural resources is performed at the district level vary greatly among the five districts in the two areas. While the key ministries and government agencies such as the Ministry of Agriculture, Livestock and Forestry (MAGFOR), Ministry of Environment and Natural Resources (MARENA) and the National Forestry Institute (INAFOR) participate in the district environmental commission meetings in Estelí and Condega districts,¹⁶ this is not the case in the Santo Tomás area. Moreover, and perhaps as a consequence, the district environmental commission in San Pedro de Lóvago, one of the three districts constituting the Santo Tomás area, has not convened since 2009 while in another of the three districts, Villa Sandino, it only convenes every three months and generally without the participation of key ministries and agencies such as MAGFOR, MARENA, and INAFOR ([Gómez & Buitrago, 2012](#)).

In most Nicaraguan districts, the district environmental unit – if existing – consists of a single officer with only limited equipment and information at his or her disposal. This is also the case in the district administrations of the Santo Tomás and Estelí areas with the exception of Estelí district which has recently expanded its environmental unit to count three technical staff members. Thus, district environmental officers depend to a large extent on information from citizens as well as from staff members from other organizations working in the districts to detect environmental issues that require attention and at times institutional change. In this respect, denunciations of environmentally or otherwise harmful use of natural resources provide an important source of information and impetus

contributing to foster new institutional practices, as the following two cases illustrate.

In November 2005 the Condega District Council approved its first district by-law prohibiting the irrigation of tobacco and other crops during the dry months of March and April. The by-law had been under discussion in the district environmental commission for a number of years prior to its approval, but had been met with threats from the cigar factories of withdrawing from the district if the by-law was approved, which would leave a considerable number of people unemployed. However, repeated denouncements from citizens of the use of water for irrigation of tobacco during the dry season, particularly in the wake of the exceptionally dry season of 2004–05, led to the approval of the by-law (Gómez & Ravnborg, 2011). A revised and further tightened version of this by-law was approved late 2009. In addition to the preparation of these district by-laws regulating the use of water for dry season irrigation, the repeated denouncements and the debates they provoked in the district environmental commission, led to the institutionalization of the monitoring of tobacco growing in the district. Thus as part of his or her regular tasks, the district environmental officer should register tobacco fields in the district, their acreage, the capacity of the pumps used for irrigation, and the date of transplanting the tobacco. Based on this registry, the district environmental officer would be accompanied by a district police officer when during the dry season undertaking inspections along the tributaries to detect unauthorized withdrawals of water from the river for irrigation. On such an occasion, early March 2009, the district environmental officer encountered and confiscated 23 pumps taking water out of the Pire River.

In the Santo Tomás area repeated denouncements from rural and urban citizens alike of the fires set by farmers to clean their pastures before the onset of the rains, but escaping out of control and thus putting lives and properties at risk, similarly gave rise to a set of measures to regulate and restrict the use of fire for agricultural purposes. First in 2004, the district environmental commission prepared a district by-law to regulate solid waste disposals, but which in addition addressed the use of fire for land preparation and introduced a NIO 5,000 (approximately USD 300) fine for using fire for land clearing without having obtained prior permission from the district authorities. In this case, the district authorities would act on behalf of MAGFOR which holds the overall responsibility for regulating the use of fire for land clearing in Nicaragua. However, in cases of serious infractions which require the opening of a legal process, the district administration should pass the case to MAGFOR or to the environmental attorney. Subsequently in 2005, the Santo Tomás District Council approved a district by-law aimed at protecting water sources and detaining deforestation within the district. This by-law permits the use of controlled fire for land preparation

prior to sowing, but prohibits the use of fire for clearing of pastures. With the approval in November 2005 of the Law against Environmental Crimes,¹⁷ the district administrations were offered a second option for opening a legal process in case of environmental offenses, namely to denounce the case directly to the prosecutor which would then ask the police to undertake the necessary investigation of the case.

5. GOVERNANCE OF THE USE OF NATURAL RESOURCES IN THE SANTO TOMÁS AND ESTELÍ AREAS

During the period from April to August 2011, the district authorities in San Pedro de Lóvago and Villa Sandino districts in the Santo Tomás area and in Estelí and Condega districts in the Estelí area received a total of 134 applications for natural resource use permission and 57 denouncements of alleged natural resource use infractions divided among districts and resource use applied for/issues denounced as shown in Tables 1 and 2. As the registration was undertaken toward the end of the dry season and during the first half of the rainy season, the majority of the applications (91%) for natural resource use permission relate to the use of forest resources while the denouncements deal with issues relating to the use of fire for land clearing, forest resources and use of water for irrigation.

Table 3 provides a profile of the applicants for authorization of natural resource use from the district authorities. While in the Santo Tomás area the majority of the applicants are owners of farms larger than 35 hectares (67% in San Pedro de Lóvago district and 54% in Villa Sandino district), who in San Pedro de Lóvago furthermore tend not to live on the farm and thus in the area where the resource utilization will take place, the majority of the applicants in the Estelí area live in the community where the resource utilization will take place and are owners of farms smaller than seven hectares (80% in Estelí district and 89% in Condega district).

Probably reflecting the history of community organization, more than half of the denouncements presented to district authorities in the Estelí area between April and August 2011 were submitted by community organizations (Table 4). In addition to these denouncements, the district environmental commission in Condega district decided to ask the police to notify a total of 45 farmers who had been observed by members of the district environmental commission clearing their land through the use of fire without having received permission.

In the Santo Tomás area, the majority of the denouncements were presented by individuals (60% in San Pedro de Lóvago and all of the denouncements presented in Villa Sandino). Moreover, one-third of the denouncements made in San Pedro de Lóvago were filed by an official either from the district administration, from the police or from a

Table 1. Applications for natural resource use permission according to use and/or resource. Percent applications by resource use per district

	Estelí area		Santo Tomás area		All districts (N = 134)
	Estelí (n = 21)	Condega (n = 58)	San Pedro de Lóvago (n = 42)	Villa Sandino (n = 13)	
– Use of forest resources	71	95	93	100	91
– Extraction of gravel, stones, etc.	10	3	7	–	5
– Disposal of solid waste in soil	19	–	–	–	3
– Other	–	2	–	–	1
All issues/resources	100	100	100	100	100

Source: Registration of applications filed with the District Environmental Units.

Table 2. *Denouncements according to issue and/or resource. Percent denouncement by issue or resource use per district*

	Estelí area		Santo Tomás area		All districts (N = 57)
	Estelí (n = 20)	Condega (n = 10)	San Pedro de Lóvago (n = 20)	Villa Sandino (n = 7)	
– Timber, logging, fire wood	5	30	45	43	28
– Fires	70	30	10	57	40
– Water (contamination, use for irrigation, etc.)	25	30	35	–	26
– Extraction of gravel, stones, etc.	–	10	5	–	4
– Wild fauna	–	–	5	–	–
All issues/resources	100	100	100	100	100

Source: Registration of denouncements filed with the District Environmental Units.

Table 3. *Profile of natural resource use applicants. Percent applicants by farm size and place of living, by district*

	Estelí area		Santo Tomás area		All districts (N = 134)
	Estelí (n = 21)	Condega (n = 58)	San Pedro de Lóvago (n = 42)	Villa Sandino (n = 13)	
Estimated farm size of applicant ^{***}					
<0.7 ha	80	53	19	31	44
0.7–7 ha	–	36	2	–	17
8–35 ha	10	7	12	15	10
36–70 ha	10	2	29	23	14
>70 ha	–	2	38	31	16
Residence of applicant ^{***}					
– In community where resource use will take place	52	88	24	69	60
– In district capital	48	10	55	23	31
– Outside the district	–	2	21	8	8

Source: Registration of applications filed with the District Environmental Units.

^{***} $p < .001$; Pearson's chi-square test.

Table 4. *Profile of complainants of misuse of natural resources. Percent denouncements by type of complainant, by district*

	Estelí area		Santo Tomás area		All districts (N = 57)
	Estelí (n = 20)	Condega (n = 10)	San Pedro de Lóvago (n = 20)	Villa Sandino (n = 7)	
Community member	25	50	60	100	51
Community organization	75	50	10	–	39
Individual from outside the community	–	–	30	–	11
All	100	100	100	100	100

Source: Registration of denouncement filed with the District Environmental Units.

government agency rather than by the affected citizen(s). One of the explanations given for this procedure relates to the fact that people hesitate to denounce others due to fear of possible retaliation:

Practically we do not like to get involved with this kind of dangerous people; therefore it is the district office that is taking action on the matter ... because it makes me afraid. They always move around, armed with their machete; I don't carry anything, neither a gun, nor a machete. And anytime they are people capable of threatening me with their machete, even lynch me up. I prefer to avoid that and leave the responsibility to the police and the district office.

[Affected farmer, San Pedro de Lóvago, personal communication, October 4, 2011]

Tables 5 and 6 show the actions taken following the presentation of the application or the denouncement to the district authorities. In the vast majority of cases, *in situ* inspections were made, with the exception of the applications presented to district authorities in San Pedro de Lóvago where

inspections were made only with respect to a quarter of the applications (Table 5).

However, whereas the district environmental officers in the Santo Tomás area usually have to carry out these inspections alone, the district environmental officers in the Estelí area, and particularly in Condega district, tend to be accompanied by an officer or representative from at least one other institution. In Condega district, an average of 1.9 institutions (Table 5) and 2.8 institutions (Table 6) participate in *in situ* inspections in the case of applications and denouncements, respectively.

Finally, Tables 7 and 8 provide information on the decisions made with respect to the applications and denouncements presented to district authorities in the four districts. With respect to the applications for natural resource use permission the majority were approved whether on the basis of the *in-situ* inspections undertaken (69% of the applications), on the basis of community endorsement of the application (2%), or on the basis of the assessment of the district environmental officer

Table 5. Institutional participation in in-situ inspections related to applications for natural resource use, by district (N = 134). Percent applications per district

Inspections made and agency participating	Estelí area		Santo Tomás area		All districts (N = 134)
	Estelí (n = 21)	Condega (n = 58)	San Pedro de Lóvago (n = 42)	Villa Sandino (n = 13)	
In-situ inspection undertaken ^{***,a}	81	91	26	100	70
Average number of institutions ^b participating in the in-situ inspection ^{*,c}	1.3	1.9	0.3 ^d	1.2	1.7
Percent applications with participation in inspection of:					
– District environmental officer ^{***,a}	81	91	26	100	70
– District police	–	3	–	–	2
– MARENA ^{**,a}	24	14	–	–	10
– MAGFOR	–	5	–	–	2
– INAFOR ^{**,a}	24	72	–	15	37
Application has received pre-approval of community leader/organization ^{***,a}	81	81	–	15	49

Source: Registration of applications filed with the District Environmental Units.

^a Pearson's chi-square test.

^b The participation of institutions include the following eight institutions: (i) the district environmental officer; (ii) the mayor or vice mayor; (iii) the police; (iv) the military; (v) MARENA; (vi) MAGFOR; (vii) INAFOR; and (viii) the district environmental commission.

^c The average number of institutions participating in the in-situ inspections is significantly higher in Condega than in the remaining three districts, and significantly higher in the Estelí area than in the Santo Tomás area; ($p < .05$; one-way analysis of variance, Scheffe test).

^d If only applications where in-situ inspections are included ($n = 11$), an average of 1.0 institutions participated in in-situ inspections in San Pedro de Lóvago.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 6. Institutional participation in in-situ inspections related to denouncements, by district (N = 57)

Inspections made and agency participating	Estelí area		Santo Tomás area		All districts (N = 57)
	Estelí (n = 20)	Condega (n = 10)	San Pedro de Lóvago (n = 20)	Villa Sandino (n = 7)	
In-situ inspection undertaken ^{*,a}	100	100	75	100	91
Average number of institutions ^b participating in the in-situ inspection ^{*,c}	1.8	2.8	1.3 ^d	1.4	1.7
Percent denouncements with participation in inspection of:					
– District environmental officer ^{*,a}	75	90	100	100	89
– District police ^{**,a}	–	50	40	29	25
– MARENA ^{*,a}	50	20	20	–	29
– MAGFOR ^{*,a}	10	30	–	–	10
– INAFOR ^{*,a}	–	30	–	14	8

Source: Registration of denouncement filed with the District Environmental Units.

*** $p < .001$.

^a Pearson's chi-square test.

^b The participation of institutions include the following eight institutions: (i) the district environmental officer; (ii) the mayor or vice mayor; (iii) the police; (iv) the military; (v) MARENA; (vi) MAGFOR; (vii) INAFOR; and (viii) the district environmental commission.

^c The average number of institutions participating in the in-situ inspections is significantly higher in Condega than in the remaining three districts, and significantly higher in the Estelí area than in the Santo Tomás area ($p < .05$; one-way analysis of variance, Scheffe test).

^d If only denouncements where in-situ inspections are included ($n = 15$), an average of 1.7 institutions participated in in-situ inspections in San Pedro de Lóvago, which statistically is comparable to that of Estelí district.

* $p < .05$.

** $p < .01$.

(19%), the being most common in San Pedro de Lóvago. Only, 2% of the applications were rejected (all in Condega district) and 9% of the applications were left undecided (all in San Pedro de Lóvago district) (Table 7).

With respect to the denouncements, 10% of the cases – all in the Santo Tomás area, namely 20% of the denouncements presented in San Pedro de Lóvago and 72% of the denouncements presented in Villa Sandino – were dropped because they were found to lack sufficient evidence (Table 8). Unfortunately, we do not have information to assess whether this reflects that the denouncement was used as part of a conflict not directly related to the issue of the denouncement itself or whether

other factors – or actors – resulted in the decision to drop the case. In close to half of the denouncements, the denounced person was notified (29%), warned not to repeat the infraction (10%) or an agreement was reached between the parties (8%). However, in slightly more than 40% of the denouncements a sanction was applied directly (14%) or the case was passed to the police (29%).

Turning to the second data set, which focuses on the efforts to regulate the use of fire for land clearing in the Santo Tomás area during the period from 2003 to 2009, Table 9 shows that between 190 and 490 farmers per year received district authorization to use fire for land clearing of an average of

Table 7. Decision made with respect to natural resource use application by district*** (N = 57). Percent applications per district by decision made

	Estelí area		Santo Tomás area		All districts (N = 134)
	Estelí (n = 21)	Condega (n = 58)	San Pedro de Lóvago (n = 42)	Villa Sandino (n = 13)	
Approval or conditional approval based on <i>in-situ</i> inspection	81	88	26	100	69
Rejection based on <i>in-situ</i> inspection	–	3	–	–	2
Approval or conditional approval based on community endorsement only	–	3	–	–	2
Approval or conditional approval by district environmental officer without <i>in-situ</i> inspection or community endorsement	19	5	45	–	19
No decision made	–	–	29	–	9
All decisions	100	100	100	100	100

Source: Registration of applications filed with the District Environmental Units.

*** $p < 0.001$; Pearson's chi-square test.

Table 8. Decision made on denouncements by district (N = 57). Percent denouncements per district by decision made

	Estelí area		Santo Tomás area		All districts (N = 57)
	Estelí (n = 20)	Condega (n = 10)	San Pedro de Lóvago (n = 20)	Villa Sandino (n = 7)	
– Case was dropped due to lack of evidence	–	–	20	72	10
– Notification of denounced person	30	80	5	14	29
– Agreement among the parties	–	10	10	–	8
– Call of attention	5	–	20	–	10
– Sanction applied	–	–	35	–	14
– Case passed to the police	65	10	10	14	29
All decisions	100	100	100	100	100

Source: Registration of denouncement filed with the District Environmental Units.

Table 9. Authorizations issued for burning crop residues before planting in the Santo Tomás area, 2003–09. Number of farmers authorized, total and average area per farmer (ha) allowed to be cleared through burning by year

Year	Number of farmers ^a authorized	Total area authorized to be cleared through burning (ha)	Average area per farmer authorized to be clearing through burning (ha)
2003	190	200	1.0
2004	190	266	1.4
2005	250	350	1.4
2006	250	350	1.4
2007	490	686	1.4
2008	240	252	1.0
2009	229	160	0.7
All years	1,839	2,264	1.2

Source: Reconstruction of permissions issued by District Environmental Units.

^aPlease note that these are not unique farmers as one farmer may have received authorization during more than one year.

1.2 hectare per farmer during this period. Many of the farmers received their authorization on the basis of joint applications submitted by a community leader on behalf of several, usually small-scale farmers wanting to clear their fields before planting maize and beans.

During the same period a total of 75 denouncements of unauthorized or poorly controlled fires were registered with the district authorities in the Santo Tomás area (Table 10).

These denounced fires on average affected an average of 39 hectares, ranging from less than one to 500 hectares and with a median of 11 hectares.

The majority of the denouncements of unauthorized or poorly controlled fires registered during 2003–09 in the Santo Tomás area (57%, data is not tabulated) involved owners of farms larger than 140 hectares, while only 4% of the cases implied owners of farms smaller than 70 hectares. In the majority of the cases, the denounced fires were related to clearing of pastures.

As shown in Table 11, there is a tendency that the offender immediately accepted to pay the fine in cases where the area affected by the fire was very large (average area affected by the denounced fires where denounced offender immediately accepted to pay the fine was 134 hectares). In the cases where the affected area was not so large (on average 16 hectares), the offender tended to receive a notification only, whereas in the cases where the area affected by the fire was larger (on average 42 hectares), the offender was fined, but the fine was not paid and the case was passed on to MAGFOR or the prosecutor.

As the data presented above show, district authorities both in the Santo Tomás and the Estelí area have become spaces that many citizens utilize to seek authorization for specific uses of natural resources, or to denounce allegedly harmful or illegal use of natural resources by others. However, the data also show that there are significant differences in the institutional practices that have developed among district authorities in the two areas in order to respond to the concerns and requests of citizens and to ensure sustainable natural resources use.

As a departmental capital, the city of Estelí enjoys the presence of most ministries and government agencies. Particularly with respect to applications for permission to use natural

Table 10. *Denouncements of unauthorized use of fire for land clearing in the Santo Tomás area, 2003–09. Number of denouncements and total and average area affected (ha)*

Year	Number of denouncements	Area affected (ha)	Average area affected per case denounced (ha)
2003	6	161	26.8
2004	5	393	78.5
2005	10	453	45.3
2006	10	406	40.6
2007	21	487	23.2
2008	17	912	53.7
2009	6	88	14.6
All years	75	2,899	38.7

Source: Reconstruction of denouncements filed with District Environmental Units.

Table 11. *Decision made on denouncements of unauthorized fires and average area affected in the Santo Tomás area, 2003–09** (N = 75). Percent denouncements by decision made*

	% Denouncements	Average area affected (ha)
Notified and warned by district authorities	41	15.7
Notified and fined by district authorities; fine paid ^a	8	133.6
Notified and fined by district authorities; fine not paid; case passed on to MAGFOR and/or prosecutor with no decision	51	42.4
All decisions	75	38.7

Source: Reconstruction of denouncements filed with the District Environmental Units.

^a The average area affected per case denounced is significantly for cases where the offender was notified and paid the fine than for the remaining categories of cases ($p < .05$; one-way analysis of variance, Scheffe test).

** $p < 0.01$; One-way analysis of variance.

resources, this reduces the call upon the district environmental unit. However, even in Estelí people prefer to file their denouncements with district authorities rather than with other authorities,¹⁸ in part because filing a denouncement with the district authorities does not directly open a legal process – something which many citizens hesitate to do.

None of the remaining districts count on permanent representation from national authorities with natural resource-related mandates. Despite this shared feature, significantly different practices have developed in the districts for ensuring coordination among institutions involved in the governance of use of natural resources. Particularly Condega district has had a well-functioning district environmental commission which has met regularly every month over more than five years, whereas neither San Pedro de Lóvago or Villa Sandino count on such regular fora for district-level coordination. Moreover, in Condega MAGFOR, INAFOR and depending on the agenda also MARENA participate in the district environmental commission meetings whereas these institutions rarely participate in the Santo Tomás area. In addition to serving to facilitate inter-institutional coordination, the Condega district environmental commission also serves as an opportunity for the population, e.g., community representatives, to present natural resource-related issues. Due to the fact that Estelí district has four protected areas (partly) within its jurisdiction, the district counts on several protected area-related platforms for inter-institutional interaction in addition to that which is offered by the district inter-institutional platform.

Although district environmental officers play an important role to the functioning of such platforms, their establishment and permanency in time require, and thus reflect political leadership and support beyond what can be provided by district environmental officers.

The existence of such platforms obviously facilitates both horizontal interactions e.g., between natural resource professionals (agricultural, environmental, or forestry professionals)

who work with the different agencies and NGOs, and vertical interactions e.g., between ministry representatives, district staff, and community representatives. This difference in the institutional practices which have developed in the Estelí and the Santo Tomás area is further corroborated by the finding that environmental officers in the Estelí area tend to be accompanied by representatives from other institutions when realizing *in-situ* inspections in relation to applications or denouncements, while this is only rarely the case for their colleagues in the Santo Tomás area. As expressed by the environmental officer from Condega (personal communication, April 17, 2011), this practice of joint inspections helps to ensure ‘uniformity’ in the way decisions are made due to the fact that more professionals participate in the assessment of a given situation and the interpretation of how the situation compares to the legal and administrative framework. Thus, our results suggest that this higher frequency of professional face-to-face interactions contributes to limit the space for individual discretion and interpretation in decision making (Mahoney & Thelen, 2011). Although we do not have data to assess the environmental impacts of natural resource governance as it is performed in the two areas, our data suggest that a higher proportion of the contacts from citizens (applications and denouncements) are responded to in the Estelí area and that the responses are more likely to be supported by empirical technical evidence produced in interactions between actors from different institutions than is the case in the Santo Tomás area. In this way, these results echo the findings of Andersson (2004) and Andersson and Ostrom (2008) from Bolivia of positive correlation between the frequency of horizontal and vertical interactions maintained by district forest authorities and the quality of forest governance.

Despite these differences in the institutional practices that have developed in the Santo Tomás and Estelí areas, district environmental officers both areas share the frustration of having very limited possibilities for acting in cases of

environmental offenses beyond notifying and warning offenders of not repeating their offense. Opportunities for issuing sanctions such as fines are limited – both due to limited political will to provide for environmental fines as part of the district environmental by-laws and due to the limited legal as well as human resource capacity to ensure compliance with the sanction. In case of non-compliance, the district authorities have to pass the case to competent authorities such as ministry delegations or the prosecutor. As our data show, the cases very often end there unresolved. This contributes to undermine the authority of district environmental officers and limits the effectiveness of the district-level governance of natural resource use. The efforts to regulate the use of fire for land clearing in the Santo Tomás area is a case in point. In fear of being issued a fine of NIO 5,000, which to a tenant farmer earning a considerable part of his or her income through day-laboring corresponds to more than two months of salary, the majority of small-scale farmers who wished to use fire for clearing one or two hectares before planting maize or beans made sure to apply for permission (Table 9 above):

In general it is the small-scale farmers who are more careful, because to them it is more difficult to pay [the fine]. They take more precaution and are more careful to obtain a permit.

[Former District Environmental Officer, Santo Tomás area, personal communication, January 2010]

However, to a livestock farmer planning to clear his or her 15–20 hectare pasture before the onset of the rain, a NIO 5,000 fine breaks even with the cost of hiring day-laborers to cut back the vegetation. Knowing that most livestock farmers have farms that are larger than 20 hectares and adding the fact that many livestock farmers claim to have difficulties finding ‘trustworthy’ and ‘hard working’ day-laborers, make the risk of having to pay a NIO 5,000 fine seem even less threatening:

There is a man [*un señor*] who sets fire every year [. . .] He doesn't invest in clearing; his only expense is a match. He has around 10 farms. INAFOR issued a fine but I don't know how big it was. This year he also set fire, but not as strong. He likes to use fire; it's cheaper. He doesn't want to pay laborers and when you burn a pasture, it germinates faster and grows faster with the onset of the rain.

[District Environmental Officer, Santo Tomás area; personal communication, October, 2011]

Thus despite being illegal, the size of the fine still makes the use of fire for the clearing of pastures, an economically attractive option particularly to the larger scale livestock keepers. When adding that paying the fine may be easily avoided, particularly by those who have contacts with district-level as well as higher level institutions, the end result becomes ineffective regulation of the use of fire and loss of credibility of – and thus frustration among – district environmental officers toward those farmers who have made the effort to apply for permission. As a consequence, efforts to regulate the use of fire for land clearing are now suspended in the Santo Tomás area.

Having discontinued the efforts to regulate the use of fire for land preparation in the Santo Tomás area, today it is mainly large-scale, absentee land owners who solicit authorization to use natural resources from district authorities, particularly in San Pedro de Lóvago (Table 3 above). With only limited political support and aware that any *in-situ* inspections will have to be performed unaccompanied, the district environmental officers may perceive that they are left with little choice but to approve the application without *in situ* inspection and yield to the strong veto possibilities which these large-scale farmers enjoy. Despite the attempts made, the institutional practices for district-level governance of natural resource use which had developed in the Santo Tomás area did not succeed

in gaining sufficient strength, e.g., through fostering inter-institutional interactions with professionals in other agencies, to curb the veto power of the local political and economic elite.

6. CONCLUSIONS

The empirical evidence provided by this paper from two Nicaraguan territories corroborates the proposition that the sub-national political and institutional context shapes the institutional practices that develop within an otherwise common legal and administrative context. Since the establishment of district environmental units, efforts have been made both in the Santo Tomás area and in the Estelí area to develop institutional practices for the governance of natural resource use in general and for dealing with what have been perceived as important environmental problems, such as deforestation, the use of fire for the clearing of pastures, and the use of water for irrigation in particular. Nonetheless, the institutional practices which have developed in the two territories examined differ markedly in at least two respects, namely in the extent to which they facilitate, on the one hand, downward accountability, and, on the other hand, vertical and horizontal interactions between officers from different levels of government. As the paper demonstrates, the degree to which the prescribed district environmental commissions have been established as functioning and regular spaces for setting the agenda and monitoring the progress with respect to district-level natural resource governance, and institutional practices that have developed for dealing with applications for natural resource use permissions and denouncements of alleged natural resource use infractions are cases in point.

The paper suggests that the pattern of inequality is an important factor, shaping the political and institutional context and thus the opportunities for institutional change. In the Santo Tomás area, considerable efforts have been made by the district environmental authorities to develop institutional practices to regulate the use of fire for the clearing of pastures, including the formulation of by-laws, the development of a permit system, attempts to coordinate efforts with important line ministries, *etc.* The first to suffer the consequences of fires slipping out of control are the small- and medium-scale farmers who live in the area and whose houses and crops are put at risk. However, since the late 1990s small- and medium-scale farmers have gradually been squeezed out of production by large-scale livestock farmers and have thereby gradually lost their strength as a social actor capable of holding district authorities to account. Thus, the political support for the efforts made by the district environmental units to regulate the use of fire for clearing pastures has gradually weakened, and powerful livestock keepers have effectively succeeded in undermining the institutional practices that had been developed to the extent that they have now been suspended.

In the Estelí area, on the other hand, a considerable part of the rural population still make their living as small- and medium-scale farmers with a demonstrated ability to exert their agency, at times as part of broader social coalitions counting also parts of the urban population. Institutional practices have developed and been sustained which facilitate vertical interactions between district authorities and their rural constituents. Examples include the establishment of protected areas and the ensuing institutional practices, and the institutional responses to the concerns with dry-season irrigation of tobacco. In both cases, the ability to invoke central government agencies through the regular vertical and horizontal interactions maintained with and among between officers from

different government agencies e.g., under the auspices of the regular Condega district environmental commission and through joint inspections, has been crucial to reduce the degree to which decisions depend upon individual discretion and interpretation and thus strengthen the legitimacy of decisions made. Albeit not eliminating the veto possibilities of powerful individuals, this combination of vertical and horizontal interactions has also been instrumental in strengthening the downward accountability of the district environmental authorities and in curbing these veto possibilities and the space for discretionary natural resource governance. Thereby, the development of new institutional practices in response to

new policy domains such as natural resource governance, may promote not only a process of gradual institutional change but also of gradual political change. In this way, our empirical results support the proposition made authors such as Boyce (1994), Clement and Meunie (2010) and Li and Reuveny (2006) and reiterated in the 2011 *Human Development Report* (UNDP, 2011) that when those who perceive environmental problems (e.g., lack of water, risk of having fences and houses affected by wild fires, etc.) have more effective representation – the likelihood of which increases with decreasing levels of inequality – authorities are more likely to address these environmental problems.

NOTES

1. The registration of applications and denouncements was supervised by Rolando Buitrago, former research assistant with Nitalpan, Universidad Centroamericana (UCA), Managua. In Condega district, the registration covers the period from January to August 2011. However, only applications submitted between April and August 2011 are included in the tables presented in this paper.
2. Permission for undertaking the registration of applications and denouncements was not granted by the mayor of Santo Tomás district.
3. Luis Enrique Sevilla Fajardo, who served as the district environmental officer in Condega district during 2006–10, i.e., prior to the onset of field work reported in this paper.
4. 1 *manzana* = 0.7 hectare.
5. On the basis of INEC (1963, 2001).
6. Owners of properties smaller than 14 hectares.
7. Overall, the population of the Santo Tomás area declined from 37,263 inhabitants in 1995 to 37,206 inhabitants in 2005. During the same period, the rural population declined from 18,042 inhabitants to 15,166 inhabitants, corresponding to a decline of 16%.
8. The population of the Estelí area grew from 118,143 inhabitants in 1995 to 140,565 inhabitants in 2005. During the same period, the rural population grew from 38,737 to 40,377 inhabitants.
9. Ley de Municipios (leyes 40 and 261).
10. Ley de Municipios, Ley No. 40, Article 6.
11. Ley de Municipios, Ley No. 40, Article 7.
12. Ley 217.
13. Leyes 462 and 585.
14. Ley 620.
15. In an effort to assess and compare the performance of Nicaraguan district authorities, the national institute for district development (INI-FOM) has developed a set of district performance indicators. In the 2007 assessment Condega and Santo Tomás were ranked fifth and sixth within their category, whereas San Pedro de Lóvago and Villa Sandino were ranked 12th and 31st, respectively within the same category. About Villa Sandino, observers of *Ética y Transparencia* stated that the district does not count on e.g., written procedures for contracting staff at the district administration and that there is widespread distrust and civic apathy among the population toward the district authorities (*Ética y Transparencia*, 2010; here quoted from Gómez & Buitrago, 2012).
16. In Condega district, the district environmental commission meets regularly the last Wednesday every month. In Estelí district which is the departmental capital, the inter-institutional environmental platform has during the past two years undertaken the functions of the district environmental commission and convenes the first Thursday every month.
17. Ley 559.
18. In addition to being reflected in our registration of applications and denouncements, this was also explained by one of the Estelí district environmental officers in a meeting held in Estelí, April 17, 2012.

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