Understanding the new Nicaraguan Water Law: How rules and players interact and affect implementation?

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Abstract

This paper provides a diagnosis about the Nicaraguan Water Law, enacted in September 2007, by identifying the major factors that may impede or delay its future implementation and enforcement. Its empirical underpinning is provided by 41 in-depth interviews among a sample of representative policy actors and stakeholders. The analysis is approach from a social-ecological systems perspective, taking into account the patterns of interaction among water, institutions and the country-specific setting. The results show that the law's potential for solving water conflicts is yet to be seen in practice. For example, the institutional remapping grants new roles to old actors as well as old roles to new entities. In addition, sugarcane mills, rice, and coffee lobbies have presence in the legislative and block the appointment of managers in the newly created institutions. Interaction patterns related to deliberative processes, networking activities and conflicts of interest may explain to a large extent the delay in the law implementation. A disaggregate analysis reveals that stakeholders have different perceptions about what are the major barriers for an effective law application. This paper argues that at the root of the problems is the inconsistency of setting advanced water objectives which land on weak institutions. Although this study focused on the Nicaraguan case, the approach adopted in this study could yield useful results in other countries and challenge the setting of complex and imported water laws in countries with a great plurality in organizations, institutions, ecosystems and water management objectives.

Key words: water law; water reform; social-ecological systems; institutional analysis; Central America; Nicaragua

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1. INTRODUCTION

Water law reforms have traditionally been motivated by four major factors: (i) the need of improving water management in order to face an increasing demand of water, in particular, for agriculture and energy, (ii) the interest in fostering private inversion, decentralization and the use of economic mechanisms for water management, (iii) the economic factors, as increasing private investment may contribute to the reduction of water sector pressure over national budgets, and (iv) environmental and water agreements adopted both at international and regional scale.

In this context, the Nicaraguan Water Law, enacted in September 2007, is the first attempt to implement a new water law in the country. It incorporates the principles of integrated water resources management (IWRM) and sets up a new legal framework for putting the principles of sustainability, equity and conservation of water resources into practice. However, while all new water laws need time to be implemented, the progress in Nicaragua has so far been meager since March 2008, when the law was put into effect. The National Water Authority (ANA), which should have been created in September 2008, has been established in June 2010. However, actual regulatory, management, and control functions are still pending.

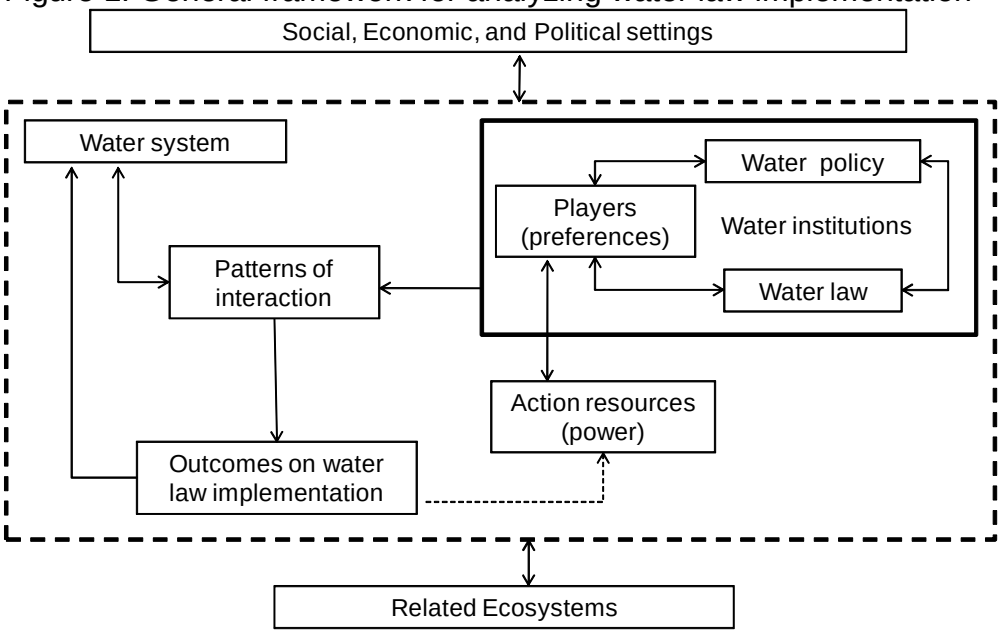
As shown in the Nicaraguan case, the enactment of a statutory water law does not automatically guarantee any change on the ground (Rogers, 2002; Burchi, 2005; Shah, 2007) since a variety of factors (e.g. structural, scale-related, socioeconomic) may constrain both law implementation and enforcement (Saleth and Dinar, 2004; Bruns et al., 2005a; Garduño, 2005, among others). Ostrom (2007a) suggests that sustainable resource management depends to a large extent on the efficiency, equity and applicability of resource distribution and ownership rules. Therefore, in order to understand the new water law in the Nicaraguan context we need to examine how rules and players interact and affect the incentives for water law implementation and enforcement. It requires recognizing the complexity of the system and, thereby, taking into account the physical, socioeconomic, political and institutional dimensions. For this purpose, we adapted the general framework developed by Ostrom (2007b, 2009) to analyze the sustainability of social-ecological systems and applied it to the analysis of the water law implementation in Nicaragua.

Grounded in 41 interviews with different stakeholders involved in the water law process, this paper provides a diagnosis about the future implementation of the Nicaraguan water law. The objective of this study is twofold: on the one hand, to identify those factors and barriers explaining the delay and that may constrain future law implementation and enforcement from a country-stakeholder perspective; and, on the other, to offer prescriptive solutions to overcome them. Although our focus is the Nicaraguan context, we believe the same framework could be applied to analyze similar processes that are taking place in other Central American countries. In this sense, the approach of this study represents an effort toward integrating context-specific settings into water law analysis.

2. A SOCIAL-ECOLOGICAL APPROACH TO LAW IMPLEMENTION ANALYSIS

The analytical framework of this research is based on the multilevel and nested framework developed by Ostrom (2007b, 2009) for analyzing the sustainability of complex social-ecological systems (SESs). The focus of this study is on indentifying the relevant factors affecting the implementation of the new Nicaraguan Water Law. Figure 1 provides an overview of the broadest adapted framework, showing the relationship among water institutions, socioeconomic, environmental and political settings and related ecosystems. Due to the complexity of an entire national water system, interactions occur at different levels and among different variables. In the Nicaraguan institutional framework, water and sanitation rules and players are of particular importance. In this sense, water institutions, as well as the other system variables, might differ across spatial and temporal scales.

Figure 1. General framework for analyzing water law implementation



Source: Adapted from Ostrom (2007b, 2009) and Saleth and Dinar (2004)

Based on the Institutional Decomposition and Analysis (IDA) framework proposed by Saleth and Dinar (2004), water institutions are further decomposed. At the first level, water institutions can be unpacked into their institutional environment, defined by a set of formal rules, and institutional arrangements, referred to as governance structures (ibid.). At the second level, both formal rules and governance structures are decomposed into major subcomponents. Thereby, Water Law and water policy are the major institutional components that define formal rules in the water sector. With respect to governance structures, government, economic and social organizations are the key actors participating in the water sector. At the third level, the focus is on component-related institutional aspects, including key features and functions that characterize formal rules and water administration.

It should be noted that the institutional decomposition approach focuses on formal and macro institutions. Changes in informal institutions occur very slowly (North, 1990) and, therefore, are difficult to trace and usually disregarded in the institutional analysis literature (Helmke and Levitsky, 2004). However, especially in developing countries, informal institutions play an important role in structuring political life, and in

turn, in shaping economic outcomes. In this sense, special attention is given to both informal water players operating within the Nicaraguan water sector and informal politics determining to a large extent how the playing field is.

Water institutions and systems are embedded in a particular socioeconomic and political setting. Thus, changes in water institutions imply a reallocation of water rights, and very often a redistribution of economic power and political influence. Power balance among interest groups determines to a large extent the direction of institutional change and the economic opportunities and advantages of a reform (Bates, 2005; Bromley, 1989; Saleth and Dinar, 2004). Therefore, factors such as political institutions, government land policies, and economic development become relevant for understanding power distribution and the access of people to strategic resources and information.

In the Nicaraguan case, two key aspects should be highlighted. On the one hand, Nicaragua experienced three major political regimes: the Somoza dictatorship regime during 1937-1979, the Sandinista revolution in 1979 and the Chamorro and subsequent liberal governments from 1990 to 2006. On the other hand, the property rights distribution that arose as a result of the policy regimes, and that determines not only access to land but also access to water, has been mostly based on informal water rights appurtenant to land property.

Water players are influenced by their own preferences. Some preferences might follow the specific rule system (Di Gregorio et al. 2008) whereas others might result from certain economic or political interests. In addition to preferences, action resources enable actors to influence the process of institutional change. The capability of different actors to influence the decision-making process depends very much on the power relationships and, therefore, is also linked to the politics of scales, positions and places (Lebel et al., 2005). Since power is often linked to land and water property, water management issues are often a highly contested and politicized process (Lemos and Farias de Oliveira, 2004).

A key power and action resource is information, i.e. who posses or has access to what information, how and when in such a way that the most powerful actors have higher probability of carrying out their own will (Weber, 1947). Linked to information access and the capability for agency are the social, economic and political networks. In this respect, clientelism has traditionally been relevant in structuring political and economic outcomes in Latin American countries (Geddes, 1999; Kitschelt, 2000; Helmke and Levitsky, 2004, among others).

In addition to water institutions, water system variables (for example, the water scarcity level, storage capacity, temporal and spatial distribution) may influence both water management and institutions. For example, the institutional framework that structures access and entitlement to water resources may be associated with the level of competition for water resources. In addition, the lack of infrastructure or information systems may constrain the development of economic mechanisms. Therefore, the interactions of the water system with the other subcore systems may also influence implementation outcomes, as shown in Figure 1.

Interactions are therefore shaped by water players' bargaining power, water rules and water system features. Thereby, they determine the process of information sharing and deliberation, the lobbying and networking activities and the conflicts among uses and users. In this sense, the implementation of any water law in an uncertain environment is likely to take place if the opportunity costs of non-action exceed the transaction costs of implementation. This might explain why the 2007 water law implementation has been delayed.

3. EMPIRICAL STRATEGY

The analytical framework presented in section 2 is empirically applied to identify the major factors affecting the new water law implementation in Nicaragua. For this purpose, the empirical research draws on stakeholders' interviews and secondary data sources for analyzing water institutions and the key factors raised by the interviewees that affect interactions and determine the non-implementation outcome.

The research fieldwork consisted of 41 guided interviews carried out in Managua and Jinotega (Nicaragua) during June, July and November 2009 with representative policy actors and stakeholders involved in the water law drafting and future implementation process. Interviewees were divided into five main categories: 28 corresponded to public organizations, 5 to civil organizations, 5 to international organizations, 2 to academia and 1 to a farmers' union.

The main criterion for interviewee selection was that this person should be related to the water sector as a decision-maker, consultant or representative of an interest group. Subjects were chosen according to the responsibilities given by water and sector laws, and subsequently broadened from the original list based on subjects' suggestions. Because the sample includes all major players in the Nicaraguan water sector, it captures to a large extent the actual understanding and interpretation of the Water Law implementation. All interviews were carried out individually and coded, using the qualitative analysis software HyperResearch 2.8.3., based on the conceptual variables presented in Table 1. Conceptual variables are developed for each of the six variables defined in Figure 1.

The qualitative analysis allows for interpreting the factors underscored through the interviews as measures of the patterns of interaction and water law implementation outcome, which in turn provides a basis for policy recommendation and action. This empirical strategy also enables us to compare code frequencies across stakeholders, which are defined as the number of times a code is cited by a particular stakeholder. Since stakeholders might be interested or concerned about different aspects of the water sector reform, this cross-comparison might be particularly relevant for identifying the major convergences and divergences among players' and the possible bottlenecks that might stem from them.

Table 1. Conceptual variables for analyzing water law implementation

Socioeconomic and political setting (S)

S1 Economic development. S2 Demographic trends. S3 Political stability S4 Government policies. S5 Market incentives	
Water policy (P)	Water law (L)
P1 Project selection criteria	L1 Legal treatment
P2 Pricing and cost recovery	L2 Water rights format
P3 Water markets and transfers	L3 Water planning and administration
P4 User and private participation	L4 Water distribution mechanisms
P5 Links law-policy	L5 Infrastructure development
P6 Links with other resource policies	L6 Pricing and financing
P7 Environmental aims	L7 Conflict resolution mechanisms
	L8 Environmental aims
Water system (W)	Players /actors (A)
W1 System clarity	A1 Governmental organizations
W2 System size	A2 Non-governmental organizations
W3 Infrastructure and productivity	A3 International organizations
W4 Scarcity: quantity and quality	A4 Network structures
W5 Water supply predictability	A5 Spatial organization
W6 Spatial and temporal distribution	A6 Functional capacity
Interations (I)	-> Outcomes (O)
I1 Water uses and users	O1 Institutional outcomes
I2 Information sharing	O1a Implementation
I3 Deliberative processes	O1b Enforcement and control
I4 Conflicts among uses and users	R2 Socioeconomic outcomes
I5 Lobbying activities	R3 Environmental outcomes
I6 Networking activities	R4 Externatilites
I7 Interest conflicts	
Related ecosystems (ECO)	
ECO1 Climate patterns. ECO2 Polution patterns. ECO3. In/out system flows	

Source: Adapted from Ostrom (2007b, 2009), Saleth and Dinar (2004) and Meinzen-Dick (2007)

4. OVERVIEW OF THE CONTEXT AND INSTITUTIONS

4.1. Social, economic and political setting

Nicaragua is classified as a lower-middle-income country. As an aid-dependent country, the net official development assistance received has traditionally represented more than 10 percent of GDP (World Bank 2010). Therein lies the importance of international and development agencies in triggering some of the major institutional and regulatory reforms undertaken in the country. The uneven distribution of population across regions and the rapid growth of urban population are remarkable. Thus, most population is concentrated in the water-scarcer Pacific region and urban and rural population account for 56 and 44 percent of the total population, respectively (World Bank 2010).

With respect to political stability, Nicaragua is well-known by the three major political regimes from the last decades: the Somoza dictatorship regime during 1937-1979, the Sandinista revolution in 1979 and the Chamorro and liberal governments from 1990 to 2006, when the Sandinista party took over again. In this sense, key water

sector and socioeconomic features are largely explained by the institutional processes that have taken place in the country.

During the Somoza period (1937-1979) the vertical control favored patron-client systems that resulted in a lack of access to basic services and opportunities for the large majority of the population, especially in rural areas (Deininger et al., 2003; Hawkesworth and García-Pérez, 2003; Donahue and McGuire, 1995). Market incentives linked to an export growth and an unequal land distribution encouraged both intensive and extensive environmental degradation (Gibson, 1996). The Sandinista Revolution of 1979 attempted to democratize the country by developing several social programs and enacting the 1981 Agrarian Reform Law. However, for a variety of reasons that are beyond the scope of this paper, by the end of 1989 the standard of living was well below the late seventies level (Brown, 1996; Gibson, 1996).

In the 1990s the Chamorro government redirected economic policies toward a neoliberal model, launching several agriculture, infrastructure, and services privatization phases (Estache and Trujillo, 2008). The subsequent Alemán's (1997-2002) and Bolaños' (2002-2007) administrations intensified both land and companies privatization. In that liberal reform context, grassroots groups supported by the Sandinista party emerged as a response against water privatization, which brought about Law 440 that stopped all privatization attempts until a water regulatory framework was enacted. Thus, the first government water law draft was presented in 2004 and followed by two other versions presented at the National Assembly by the National Consumers Defense Network (RNDC) and the Anti-privatization and Water Right Access Alliance (CODA).

4.2. Water System

Overall, Nicaragua is composed of 21 river basins, 13 draining to the Pacific and 8 to the Atlantic (INETER 2010a). Total renewable water resources per capita amount to 34,700 cubic meters per inhabitant per year (FAO 2010). However, water resources are characterized by an uneven distribution in both space and time. Thus, most freshwater resources are located in the less populated Atlantic region, whereas the more densely populated Pacific region is characterized by scarce freshwater resources and more abundant groundwater resources.

Precipitation might range from less than 800 millimeters in the North and Central dry areas to an annual rate of more than 5,000 millimeters in the Atlantic wet areas (INETER 2010b). Total freshwater water withdrawals amount to 1.3 cubic kilometers per year, of which agricultural, industrial, and domestic use account for 83, 2, and 15 percent, respectively (FAO 2010). The principal irrigated crops include cereals, mostly maize, vegetables, and sugar cane. Water is also used in the wet processing of coffee, which is one of the major export crops. So far, primary crops, essentially coffee, sugar, banana, tobacco, peanuts, and vegetables, contribute to nearly 40 percent of Nicaraguan exports (BCN 2010). In addition, agriculture value added accounts for nearly 20 percent of GDP (FAO 2010).
As many other data-poor countries, Nicaragua lacks a complete spatial and temporal water database. Therefore, it is certainly complicated to estimate the productivity of

the system as well as the predictability of the water supply. In addition, some of the water law and policy principles and mechanisms (for example, cost recovery, water markets, water tariffs) seem rather inapplicable without an information and control system supporting them.

4.3. Water Institutions

4.3.1. Water Policy and Water Law

The 1987 Constitution considers natural resources as public domain and, therefore, the government should regulate its allocation and uses. In addition, the 1904 Civil Code recognizes water as a public good but adds that its regulation depends on the regulatory framework of private property land (Barrios and Wheelock, 2005). Within this legislative framework the national water policy was enacted in 2001, but its principles have never been fully translated into actual water management practices. Nevertheless, it establishes a number of guiding principles that were taken up again in the water law and are summarized in Table 2.

Table 2. Nicaraguan water policy attributes

Policy attributes
1. Recognizes Dublin principles
2. Water is in the public domain and is owed by the state
3. Water is a strategic resource
4. Human consumption is the priority use
5. Adopts preservation and prevention criteria
6. Proposes the development of a water rights system
7. Uses polluter-pay and user-pay principles

Source: Authors' own elaboration.

The new water law regards water as public domain and proposes a decentralized model for water management. The National Water Authority (ANA) would be in charge of regulating, administrating, monitoring and controlling water resources. River basin organizations would operate under the umbrella of ANA. In addition, the National Water Resources Council (CNRH) would be responsible for supervising the ANA and updating the water policy.

With respect to water planning, ANA and river basin organizations should elaborate national and river basin plans, respectively. It is interesting to remark that, although national plan precedes the river basin plans, in the case of river basin 69, which includes Nicaragua and Managua lakes, Law 626 created the River Basin Sustainable Development Commission with the objective of elaborating an action plan for the management of natural resources within the basin.

In relation to water allocation, concessions and licenses should be granted by the ANA for large water and sanitation systems, as well as for hydroelectric and agricultural purposes. In the case of small systems or agricultural lands smaller than 3 ha, local governments would be responsible for granting the respective authorizations. It is worth noting that for agricultural lands between 3 and 20 ha, neither the water law nor its regulation states which agency is in charge of granting

water use permits. In addition, similarly to water laws all over the world, providing drinking water tops the list of priorities.

Water users are allowed to develop hydraulic infrastructures with both public and private participation. However, a number of environmental requirements set by the Environment and Natural Resources Ministry (MARENA) have to be met.

The water economic-financial system represents one of the most relevant and complex aspects of the new law. The National Assembly should pass a Water Tariff Law based on ANA's economic valuation of water resources. The funds would be used to support the National Water Fund (FNA) with the objective of financing water programs and activities related to both water policy and plans.

Since both the northern and southern borders of Nicaragua are rivers, the last institutional aspect to take into account is the management of transboundary water resources. The most recent example is the resolution by the International Court of Justice on the navigability of San Juan River in the Nicaragua and Costa Rica border.

Overall, the new Nicaraguan Water Law is a standard and modern water law. However, implementing its guidelines and enforcing its rules in the Nicaraguan context is a significant challenge for better water management.

4.3.2. Water sector players: Key Features and Institutional Mapping

When considering the Nicaraguan water players, two aspects should be highlighted. First, the current dispersion in the water-sector administration and, second, the water and sanitation bias reflected in the number of actors devoted to managing and financing this subsector. This might be to a large extent explained by the socioeconomic and political setting since none of the governments included water for purposes other than drinking water as a major policy concern. In addition, the 1990s' neoliberal reforms focused mainly on the energy and water and sanitation sector. As a result, partly pushed by grassroots movements (Barrios and Wheelock 2005), most efforts were devoted to regulate both water subsectors.

The current water institutional setup results from the legal reforms adopted between 1998 and 2007 (World Bank 2008). Overall, four main public institutions are in charge of the water and sanitation sector: the National Commission on Water and Sanitation (CONAPAS) as the policy design body, the Nicaraguan Institute for Water and Sanitation (INAA) with regulatory functions, the National Water and Sanitation Company ENACAL with the main objective of providing potable water and sanitation services in urban areas, and the Social Emergency Investment Fund (FISE) with responsibility in the rural sector. However, when considering the water sector jointly, more than 10 public institutions take part in the water-sector management. Nevertheless, under the present system irrigation water is mostly managed as an open resource, with water rights typically rooted in land rights.

Figure 3 highlights the complexity and fragmentation of the sector, with multiple institutions connected to different spatial and use dimensions of water resources. In Figure 4, the new water sector framework is represented according to the roles and

functions defined in the 2007 water law. As shown in Figure 3, the government's main roles are to regulate, plan and manage water resources. Thus, at the national level, ministries and institutes are the major actors, whereas at the local level regional governments play a more relevant role. Law 40 and law 28 grant municipal and regional autonomy for regulating and managing water resources within the municipal and regional borders, respectively. In the new institutional framework, as shown in Figure 4, local and regional governments take part in both basin agencies and basin committees. However, it is not totally clear what role they will play in basin agencies and committees, in particular concerning water regulation and management competencies within their political borders.

It is also important to distinguish between rural and urban spaces since different public organizations and stakeholders take part in water resources planning and management. Thus, in rural areas the water sector, especially drinking water and sanitation, is mostly supported and funded by international organizations, aid agencies, NGOs and FISE and operated by Water and Sanitation Committees (CAPS). CAPS are informal water user organizations created by the local population to provide water services in rural communities. However, under the new organizational framework, ENACAL is also responsible for the rural water sector and, therefore, an important issue to consider is whether the transfer of planning and management responsibilities will also be accompanied by a transfer of funds and, in that case, how water funders will be framed within the new institutional map. Nevertheless, for the time being the rural water sector is operating under the business-as-usual framework, that is, CAPS, FISE, NGOs, and international and development organizations.

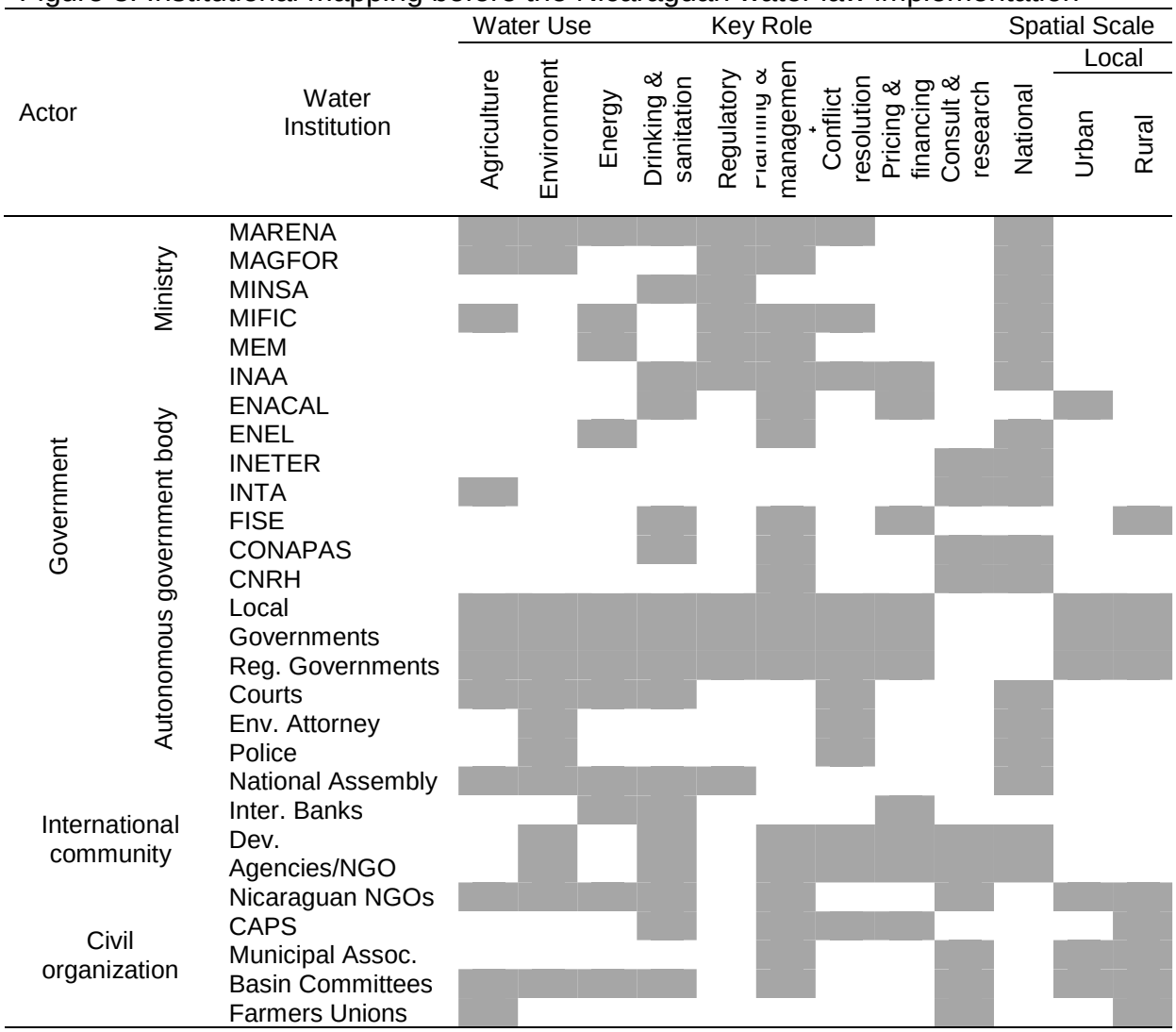
In addition to the new responsibilities granted to ENACAL, there is an underlying competence conflict between ENACAL and INAA. Whereas Law 275 granted regulatory functions to INAA, the new water law does not clearly state whether INAA or ENACAL will be the regulatory organization for the water and sanitation subsector. It is worth noting that the former ENACAL director was appointed a member of ANA's board while being ENACAL's director. However, since April 2010 the former vice-minister of finances has been in charge of ENACAL. Whether this new appointment will also take over the position in ANA's board is still unknown.

Because most water conflicts occur at local level, both local governments and ministry and environmental attorney delegations are the major actors involved in conflict resolution, as shown in Figure 4. The new water law grants conflict mediation functions to the ANA. But, to what extent this conflict-resolution responsibility will be developed it is still under scrutiny.

With respect to water pricing and financing, international donors, such as the World Bank and development agencies, are responsible for the lion's share of water funding. Jointly with government and civil organizations, international organizations form the Water and Sanitation Board, whose objective is to coordinate financial cooperation and investments in the water sector. However, the new institutional set up does not reflect, at least explicitly, the position of these major water funders. The new institutional mapping brings along water financing and pricing for agriculture. So far, water for agriculture is not priced and is open access and free.

Based on the comparison of institutional maps, it is clear that the new law has simplified and clarified the distribution of competencies and roles among the government branches. However, as we discuss below, the fact that the new agencies, including the most important one (ANA), have not actually been put in place, the interim standing of the government roles reinforces the barriers to change and provides time for lobbies' strategic actions.

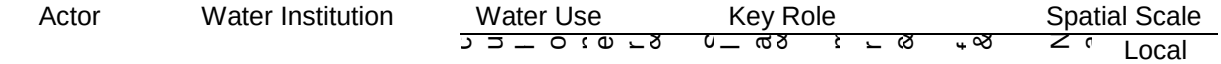
Figure 3. Institutional mapping before the Nicaraguan water law implementation

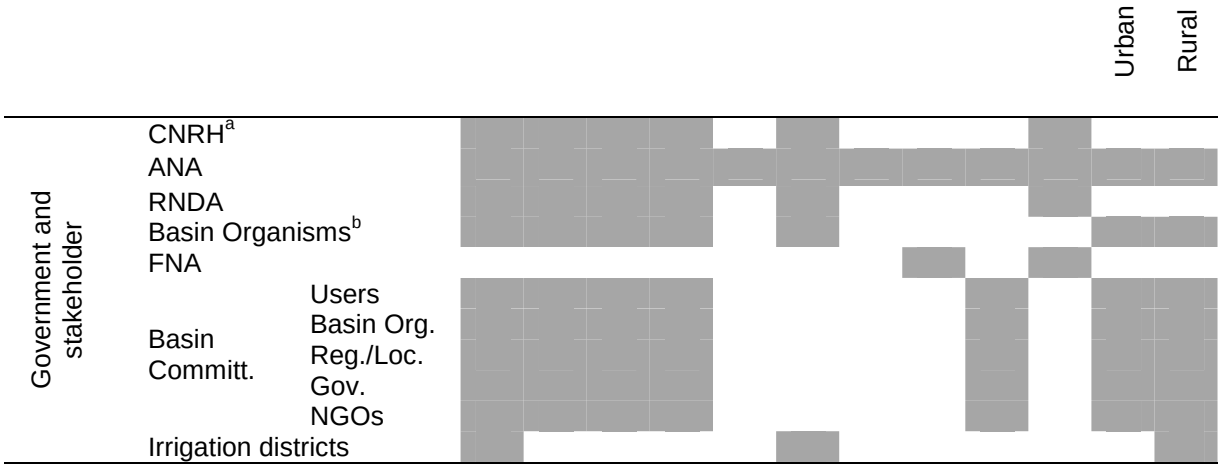


Note: MARENA = Environment and Natural Resources Ministry; MAGFOR = Agriculture and Forestry Ministry; MINSA = Health Ministry; MIFIC = Infrastructure and Trade Ministry; MEM = Energy and Mines Ministry; INAA = Nicaraguan Institute for Water and Sanitation; ENACAL = National Water Supply and Sanitation Company; ENEL = Nicaraguan Electricity Company; INETER = Institute Territorial Studies; INTA = Institute of Agricultural Technology; FISE = Social Investment Fund; CONAPAS = Commission on Water and Sanitation; CNRH = National Water Resources Commission; Reg. Governments = regional governments; Env. Attorney = environmental attorney; Inter. Banks = international banks; Dev. Agencies = development agencies; CAPS = water and sanitation committees; Municipal Assoc. = municipal associations.

Source: Authors' own elaboration.

Figure 4. Institutional mapping after Nicaraguan water law implementation





Note: CNRH = National Water Resources Council; ANA = National Water Authority; RNDA = Water Rights Registry Office; FNA = National Water Fund; Basin Committ. = basin committees; Basin Org. = Basin organisms; Reg./Loc. Gov. = regional/local governments.

[a]CNRH is composed of representatives from Environment and Natural Resources Ministry (MARENA), Agriculture and Forestry Ministry (MAGFOR), Health Ministry (MINSA), Infrastructure and Trade Ministry, Institute Territorial Studies (INETER), Nicaraguan Institute for Water and Sanitation, Energy Administration (INE), Commission on Water and Sanitation, regional governments, and civil population.

[b]Basin Organisms are composed of representatives from ANA, MARENA, municipal majors, INETER, MAGFOR, and MINSA.

Source: Authors' own elaboration.

5. UNDERSTANDING INTERACTIONS AND OUTCOMES FOR WATER LAW IMPLEMENTATION

The following section is based on the main results obtained from the analysis of the interviews. Firstly, aggregated results are summarized. Subsequently, a disaggregated and comparative analysis is presented.

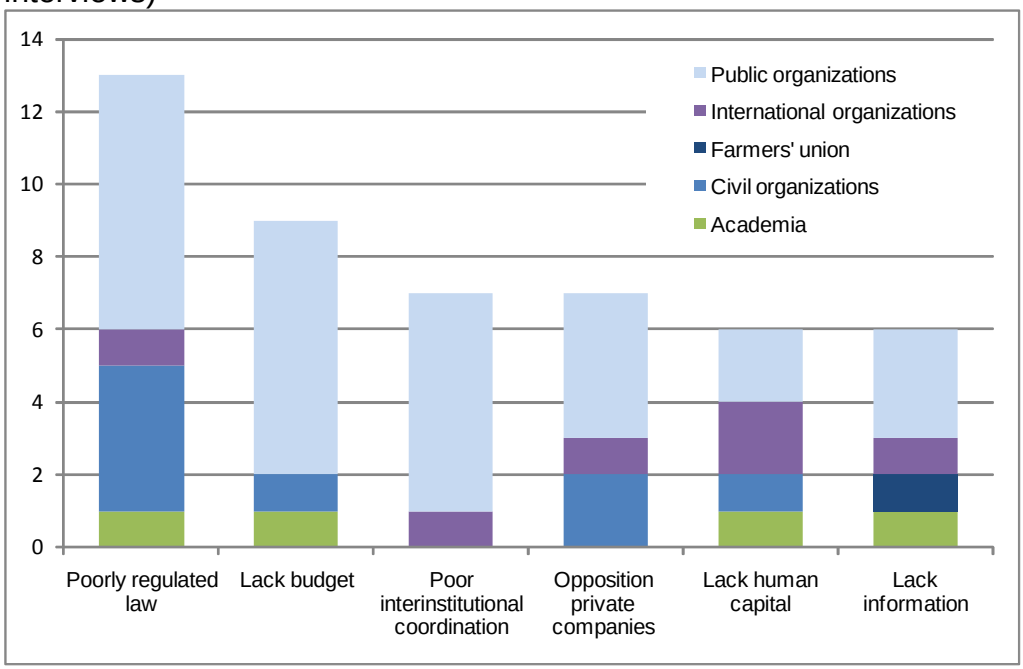
5.1. Aggregated analysis: What are the major factors retarding law implementation?

Institutional changes might be motivated either by endogenous or exogenous factors. In Nicaragua the lack of a water regulatory framework became patent in 2001 when the government made a bid for exclusive management of one of the major country's hydroelectric plants. In response, consumer and anti-privatization groups claimed for the development of a water regulatory framework. Thus, in line with Bruns et al. (2005b) and Saleth and Dinar (2005), in Nicaragua a major change in the socioeconomic context triggered the development of the water law.

Contrary to the water reforms analyzed in Bruns et al. (2005a), in the Nicaraguan case, the civil society, mainly consumer and anti-privatization groups, played an important role in the water sector reform, shifting from an opposing to a proposing position. In this respect, it is important to take into account the influence that previous water reforms experiences in other Latin America countries and, in particular, grassroots movements that accompanied these processes may have had in Nicaraguan reform.

The factors presented in Figure 5 are those that result from the coding process and on average represent at least 15 percent of the stakeholder sample. The results show that most stakeholders consider poor law regulation as one of the major factors retarding the process. This lack of clearly defined rules is patent in the competences' conflict for water and sanitation sector management, both in urban and rural areas, as well as in the distribution and coordination of competences between national and local levels.

Figure 5. Major factors retarding water law implementation (responses' frequency in interviews)



Source: Authors' own elaboration

The lack of budget is the factor mentioned in second place by stakeholders. In most cases, it is considered as a side effect of both actual crisis and national budget priorities. As recognized by an interviewee from a public organization: *"The law sets deadlines, which have not been achieved because of economic factors. The government works by priorities in terms of budget"*.

It is worth noting that interviewees from international organizations do not point out lack of budget as a possible constraint. In addition, one of the civil organizations interviewed recognized that there are a number of donors willing to support the water law implementation through integrated river basin management programs. Nevertheless, some of the major donors have begun to reduce, and in some cases withdraw, their development aid to Nicaragua.

Regarding international organizations and development agencies, in developing countries, it is relevant to consider their influence over national agendas. As suggested in Bruns et al. (2005a) and Wilder (2010), institutional transitions in developing countries have been to a large extent motivated by international donors. In the Nicaraguan case, some of the issues mentioned along the interviews highlight the transition context that characterizes the country. For example, during interviews with civil organizations the ideas of "politized institutions", "caudillism" and

"personalism in institutions" were mentioned. These trends reflect, on the one hand, that informal politics might be as relevant as the formal political system and, on the other hand, that both formal and informal dimensions are closely related.

Lack of human capital and information seem both cause and consequence of the country's context. Overall, high turnover rate of government and local officials, often linked to a change in the ruling party, constrains the implementation of almost every law or project. Interviewees highlight particularly the lack of human capital in municipalities. In this sense, human and social capital development might be linked to power distribution (Meinzen-Dick et al., 2002) and, from a political economy perspective, determine to a large extent how institutional change takes place. Lack of local empowerment is reflected in the poor incentives and long-term commitment for water law application and enforcement, which might be partly explained by the difficulty internalizing the costs locally, whereas the benefits might be spatially broader (Larson, 2002).

Regarding the lack of information, both depressed information systems and access and diffusion of information are highlighted. This latter issue might be closely related to the poor inter-institutional coordination, which is also noted in the monitoring and control systems of water uses.

As shown in the results, water law opposition exerted by private companies is also highlighted as a retarding factor. In this sense, an economic and political conflict of interest is identified by the presence of private interests in the National Assembly which hinder the appointment of the newly created organizations. In this line, some indigenous communities form the South Atlantic Autonomous Region oppose the water law since they consider the law to violate their right to manage and control water resources within their territory (CALPI, 2010). These reactions reflect that institutional changes are not politically neutral, but they usually imply certain power redistribution and political influence.

5.2. Disaggregate analysis: How stakeholders see institutional change?

In order to understand the process of institutional change it is important to analyze how stakeholders involved in the process interpret the change and which patterns of interaction they identify. Codes defined in the interview analysis, based on the conceptual variables for patterns of interaction and presented in Table 1, are shown in Table 3.

Based on the open codification process and interview analysis, four new variables, added to the analytical framework, have been generated. These new conceptual variables, shown in Table 4, are: (I8) power distribution established by the water law, (I9) water resource planning and administration, (I10) resource management and control conflicts, and (I11) participatory processes.

Table3. Interaction patterns and codes for analyzing water law implementation

		Stakeholder*			
Interaction (I)	Code	A	CO	IO	PO
I1 Water uses and	Unaware of other uses than human consumption	1	1		

users					
I2 Information sharing	Poor water law diffusion		2		
	Poor inter-institutional coordination			1	6
	Low local government participation in law consultation process		1	1	
I3 Deliverative processes	Centralized decision-taking in central government	1			2
	Trend to caudillism			1	
I4 Uses/users conflicts	Big vs. small farmers		1		1
	Irrigation vs. human consumption	1			
	Irrigation vs. energy		1		4
I5 Lobbying activities	Private companies opposed to water law		2	1	4
	Big farmers		2	1	
	Anti-privatization and consumer groups		2	1	1
I6 Networking activities	Sandinist party and anti-privatization groups		1		
	Liberal party and private companies		1		
	Civil society and municipalities		1		
I7 Interest conflicts	Economic vs. political		3		1
	Political vs. national		1		

*Stakeholders: A: academia; CO: civil organizations; IO: international organizations; PO: public organizations
Source: Authors' own elaboration

Table 4. Interaction patterns and codes generated based on the interview analysis

		Stakeholder*			
Interaction	Code	A	CO	IO	PO
I8 Power distribution	Executive vs. legislative disequilibria		1		1
I9 Planning and administration	Centralized National Water Authority			1	
	Basin committees at municipal scale	1			
	No basin approach in public administration	1	1		1
	Separate planning of resources and territory			1	
I10 Management and control conflicts	ENACAL vs. INAA		1	1	3
	Local vs. national	1			
I11 Participatory processes	Most processes organized by civil org.		1		
	Low participation of local/regional gov.		1	1	
	Water management mostly by central gov.		2		

*Stakeholders: A: academia; CO: civil organizations; IO: international organizations; PO: public organizations
Source: Authors' own elaboration

As mentioned earlier, information is a key action resource and the lack of it makes difficult planning, control and enforcement of the law and opens the space for strategic behavior. Thus, one of the criticisms to water law is its bias toward water and sanitation (I1). This fact highlights that, as suggested by Mollinga et al. (2007), some interests are more politically powerful than others, as water for agriculture.

Lack or access to information (I2) might be related to participatory processes (I11) and poor law dissemination. According to the interviews hold with civil organizations, most participatory forums were organized and funded by civil organizations. Two interviewees from public organizations recognized that decision taking takes often

place at the central administration. Therefore, there are little incentives for the development of discussion forums at local level without the central government support.

Another aspect to consider is whether deliberation processes (I3) include the participation of civil society and to what extent the poor get their water needs met without directly participating in the process. This issue is closely related to the lobbying activities (I5) and grassroots movements that press and swing the law toward different interests. With respect to the distribution of competences among administrative units, some of the stakeholders recognize that the unclear and fragmented distribution of responsibilities create grey areas of management, and might be associated with certain conflicts among government institutions (I10) and uses and users (I4).

Networking activities (I6) are somehow parallel to lobbying activities (I5). Thus, at the very beginning of the water law elaboration processes the Sandinist party and anti-privatization groups were aligned, while the Liberal party, at that moment the ruling party, was in favor of services privatization. Based on the coalition typology proposed by Meijerink and Huitema (2010), the link among political, social and economic coalitions might be explained by their mutual dependence for carrying out their different objectives in spite of not having, necessarily, a common belief system or problem perception.

Regarding the power distribution (I8), the law establishes is that the ANA council is composed of two members named by the executive power. The legislative needs to approve only one out of the three proposed by the executive to hold ANA's chair. Since Nicaraguan politics are markedly polarized between Sandinistas and Liberals, with the Sandinistas at the executive, the appointment decision of ANA's chair is translated into a power struggle between both major political parties. Since ANA centralizes (I9) all water sector responsibilities and competences, controlling the chair, *a priori*, means a higher power control over resources.

There are also some areas of legal overlapping since the water law and sector regulations and plans have not been harmonized. As political and geographical borders do not perfectly overlap (I9) in terms of water management, river basin committees are being settled at municipal level, violating a crucial tenet of the integrated water resources management approach (I9) as interpreted in countries with more developed management capacities and infrastructure.

Factors and patterns of interaction pointed out by the different stakeholders contribute to explain the delay in the water law implementation. In this respect, public organizations consider the lack of budget, jointly with poor institutional coordination, the major barriers for an effective law application. On the other hand, they highlight, in line with civil organizations, the poor law regulation as a cause and consequence of the non-implementation. Nevertheless, civil organizations point out interest conflicts as the major constraint. This issue seems to be intrinsically linked to the type of coalitions formed along the law elaboration process.

International organizations recognize weak institutions and lack of democratic consolidation as the major delaying factors. It should be noted that water transitions in developing countries take place in parallel to democratic transitions. In this line, issues related to lack of human capital, knowledge and information might be to a large extent endogenous to the system. Academic organizations highlight, in addition to those factors already mentioned, aspects related to resource management and administration.

Stakeholder analysis shows the divergence in the discourse and provides a general overview of the social-ecological water system. From a global perspective, interactions concerning deliberative processes (I3), networking activities (I6) and interest conflicts (I7) would explain the meager advance in the water law implementation, favoring the *status quo* regarding water governance in the country.

6. DISCUSSION

Three major problems, as identified by both public and civil organizations, would provide a rationale for water sector reform: conflicts, pollution and overexploitation. Yet, any of these issues was a major trigger of the new water law. In Nicaragua, the lack of a regulatory framework became evident in 2001 when the Nicaraguan government attempted to privatize one of the largest hydropower plants. In this respect, the law succeed in fulfilling the short-term and most visible objective that is to create a framework to regulate privatization attempts. Although it is too early to assess long-term outcomes and performance of the water law, some of the factors suggest that, as proposed by Butterworth et al. (2010), a “lighter” approach to IWRM based on more local, integrative, and existing institutions and participatory mechanisms might better suit countries with less-developed water sectors.

The Nicaraguan socioeconomic and political setting determines to a large extent the action resources endowment of the different water players. Land tenure reforms and trade policies not only influence the water system but also the bargaining capacity and power balance among interest groups. In addition, the lack of budget and information systems, jointly with information asymmetries and the low water law diffusion may discourage any attempt or create a lock-in effect. But, in this context, players still play a different game that is characterized by other participation channels in water management. While the water law is not being implemented at municipal level, a number of River Basin Committees have already been settled. Thus, it seems more feasible that advances in the water law implementation might follow a bottom-up approach rather than a top-down one. In this line, smaller scale and local initiatives might better suit, at least at initial stages, water management and planning strategies. In this feasible game other coalitions could be formed among public, local and international organizations in order to develop integrated development projects that link water management strategies to other resources and economic opportunities.

Based on the results a number of policy recommendations can be drawn in order to guide the action to the implementation of the Nicaraguan 2007 water law. Thus, it would be necessary to set up a realistic time framework for prioritizing and sequencing institutional actions regarding both water law and supporting programs.

In this respect, the water law does not address how pre-existing customary water rights will be recognized and safeguarded. Therefore, both criteria and time for qualifying and proving that indeed a customary water use exists need to be defined. In addition, land property issues may pose a serious constraint for developing a water rights system.

Nicaraguan institutional change is strongly driven by its path-dependent nature which is reflected on the influence of the informal rules of the game in development and implementation of the new water law. Caudillism and personalism play a relevant role in shaping both the performance of formal institutions, such as public organizations, and the incentives and expectations of actors. Therefore, one of the major challenges is to structure incentives in such a way that pay-offs induce compliance and effective enforcement of the statutory law. As shown by Acemoglu and Robinson (2008), a change in political institutions does not necessarily lead to a change in economic outcomes if those with greater *de facto* political power offset the *de jure* political change. For this purpose, financial support should be assigned to the development, protection and enforcement of a water rights system. So far, most financial resources are being allocated to water and sanitation, while agriculture still remains as a hidden water consumer from a pricing and financial perspective. In this sense, donors that have traditionally financed the sector may encounter new funding demands and challenges.

Another aspect to take into account is the development of human capital and policy entrepreneurs. In this respect, increasing both financial capacity and public servants might not be translated into investing in human capital if long term labor security and coalitions beyond the public sector are not encouraged.

7. CONCLUSION

The new Nicaraguan Water Law faces a number of barriers that may impede its future complete implementation and that are already delaying many of the processes that should have been launched. Although all new water laws need time to be implemented, our research found that progress in Nicaragua has been meager. With good sense, the new law represents a serious attempt to clarify and reorganize the roles of the government branches, independent agencies, users' organization and territorial administrative agencies. But so far this has not been put into practice.

A major finding is that implementing the new Law is proving more difficult, time-consuming and controversial than expected for a number of reasons. First, while the law's main rationale and functionality was to solve water conflicts, the law's potential to reduce conflict has yet to be translated into practice. Some of the conflicts are typical water externalities (upstream-downstream, pollution), but some others are rooted in equity issues (small and big farmers) and in consumptive (irrigation) versus non-consumptive users (hydropower) that the law does not attempt to change directly.

Secondly, the institutional remapping grants new roles to old actors, as well as old roles to new actors. The complexity of the reform seems an excessive burden for the current affairs of the Nicaraguan State. The changes in the mental models clash

because for many actors, within government and outside it, observed outcomes are inconsistent with expectations.

Third, our research also found that lobbies representing sugar-cane mills, rice and coffee industries have presence in the parliament and block the appointment of managers in the newly created institutions. There are conflict of interests in setting water charges and a lack of water rights.

At the root of the problems in Nicaragua is the apparent inconsistency of setting advanced water objectives which land on weak institutions -- some new, some old-- that will have to deliver them. The law originated from a strong grassroots movement against privatization, but the very same roles people fought to keep in the hands of public agencies are a heavy burden and need a strong financial support.

From a stakeholder perspective, results show that interaction patterns related to deliberative processes, networking activities and conflicts of interest may explain to a large extent the delay in the law implementation. A disaggregate analysis reveals that stakeholders have different perceptions about what are the major barriers for an effective law application. In this sense, not only the types of interactions, but the perception divergences may be retarding factors in the implementation process.

It is important to take into account the perspective of integrated water resource management and the organizations responsible of its application. Generally, management boundaries of an organization are defined according to the basin geophysical boundaries. However, in the Nicaraguan case, as well as in other less developed countries (Mollinga et al. 2007, Butterworth et al. 2010), smaller scale and local structures may facilitate law implementation by reducing the strategic and transaction costs of the reform and be more adapted to current institutional setting.

From a water systems perspective, Nicaragua is a very diverse country and, therefore, management systems are likely to be diverse too. In addition, most population and economic activity is located in the dryer Pacific area. In this sense, the interaction between water and other systems determines some of the actual socioeconomic and environmental outcomes that the law may aim to improve.

The findings from this study suggest that the social-ecological framework provides a useful approach for understanding the observed outcomes regarding the water law implementation. Although this study focused on the Nicaraguan case, this same approach could yield useful results in other countries and challenge the setting of complex and imported water laws in countries with a great plurality in organizations, institutions, ecosystems and water management objectives.

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