



Can Water Reform Survive Politics? Institutional Change and River Basin Management in Ceará, Northeast Brazil

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Summary. — This study examines the implementation of participatory river basin management in the Baixo Jaguaribe/Banabuiú valleys in Ceará, NE Brazil. It specifically analyzes the creation of Users Commissions and River Basin Committees, which are deliberative organisms that make decisions about river basin management with the participation of water users, state and societal representatives. It argues that the ability of policymakers to sustain the project's more innovative aspects—namely stakeholder participation, decentralization and integration—depends, first, on the “character” of the policy networks entrusted with the implementation of different portions of the new regulatory framework; second, on the ability of these networks to garner support of other influential actors inside and outside the state government; and third, on the ability of the network and its supporters to diffuse policy opposition.

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1. INTRODUCTION

Throughout the world, the concern over the future of water resources has increasingly engaged governments, nongovernmental organizations (NGOs), and communities. More and more, countries seek to implement water management policies that at the same time address economic development and environmental sustainability. In their pursuit of these goals, governments—especially in emergent democracies—have experimented with governance practices that seek not only to respond to fiscal constraints but also to public frustration with centralized state-led policymaking. In order to achieve better natural resource management and improved participatory policymaking, one favored approach has been the creation of decentralized decisionmaking bodies, such as

river basin councils, which incorporate public and private stakeholders in their decisionmaking

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and integrate policymaking across different policy areas.

This new paradigm for water management has been quickly spreading around the world, fueled by a powerful combination of strong support from multilateral organizations such as the World Bank and from water experts and conservation advocates convinced that the sustainability of water resources can only be achieved through decentralized, integrated management. Inspired by this new paradigm, in the early 1990s, a few Brazilian states, including Ceará and São Paulo, initiated policy to reform their water resources management. In 1997, Brazil followed suit by replacing its outdated, inefficient, sectorally-based water management system with a new set of regulatory frameworks. The system included a new Water Resource Law that, in turn, instituted the National Policy for Water Resources and created the National System for the Management of Water Resources. Besides decentralization and integration, the law introduced specific institutional arrangements to incorporate public participation by creating River Basin Committees. It also defined water as an economic good and created a bulk water use permit and charge system designed at the basin level. With the reform, water management decisionmaking moved from the federal, state and municipal levels to the river basin initiating a period of great activity and experimentation whose variation across the country provides a unique opportunity for the study of decentralization and participation of natural resources management.

This study examines the implementation of participatory water management in the Jaguaribe River basin, in the state of Ceará, Brazil. It specifically analyzes the Jaguaribe/Banabuiú Participatory Management Project (Projeto de Gerenciamento Participativo do Jaguaribe/Banabuiú) carried out by Ceará's Water Resources Management Company (Companhia de Gestão de Recursos Hídricos—COGERH).¹ The most innovative aspect of COGERH's approach has been the organization of Users' Commissions to debate and decide on the use and management of bulk water in the basin. These unique bodies—within Brazil, first created in Ceará—function as *de facto* water allocation organizations among different users in the river basin. This model has attracted a considerable amount of attention both in Brazil and abroad and has been hailed as one to be followed by federal water manage-

ment organizations such as the National Water Agency (*Agência Nacional de Água—ANA*)² and the National Department of Public Works against Drought (Departamento Nacional de Obras Contra Secas—DNOCS).³

The institutional stability of the Ceará model has, however, recently been challenged by the introduction of a number of changes both at the institutional and implementation levels. Among such changes are the drafting and submission of a new water resources law to the State Assembly, an attempt to re-structure the organizational composition of water management and the revision of COGERH's approach to water reform. Indeed, COGERH's role has increasingly shifted from one of technical support for the River Basin Committees to one of an operational company in charge of establishing and managing Ceará's bulk water permit and charge system.

While there has been considerable attention paid to the different aspects of the decentralization of natural resources management all around the world (see, for example, Ribot, 2002), most of the focus has been on examining constraints to implementation. Because many studies ground their analysis in the dichotomy between central and local power, they pay less attention to the struggles of different actors at the local level who push for conflicting agendas of natural resources management. In this article, we examine how two policy networks at the local level square off their competing interests in the context of day to day practices which in effect seek to mold institutions so as to achieve their management and political goals.

We contend that the institutional stability of the Ceará participatory model depends on three factors: (a) the *character* of the policy networks involved in the organization of water management (and how it shapes the actions of the actors entrusted with the implementation of the new regulatory framework); (b) the ability of reform-oriented networks to build broader support within and without the state policymaking machinery to their reformist agenda; and (c) the ability of this coalition of reform-oriented technocrats, organized groups in civil society, and influential supporters to resist and diffuse policy opposition.

In the next sections, we describe the action arena, that is, the set of variables—including the actors, the structural rules, the community attributes, and the material conditions—that shape the reform process (Ostrom, 1998). First, we examine the institutional and physical as-

pects defining water use in the state and how they affect and are affected by the implementation of the new set of institutions created by Ceará's Water Resources Law. Next, we briefly describe the analytical framework used to understand the decentralization of water management in Ceará and the role of ideas in shaping the actions of policy networks involved in the implementation of water reform. Finally, we focus the analysis on the sociopolitical processes and actors behind the organization of water users and allocation of water in the state. We conclude with a few remarks about the constraints and possibilities of decentralization of water management in Ceará that can inform similar processes in other river basins in Brazil and other countries.

2. THE PHYSICAL STAGE: WATER SCARCITY AND DROUGHT

In Ceará, the implementation of water management reform has been critically shaped by the state's physical characteristics and low availability of water resources. The majority of the state falls within the semi-arid region of Northeast Brazil known as the *sertão* (hinterland) where most of the rainfall is concentrated between December and March (Ceará Governo do Estado, 1998, p. 22). This period corresponds roughly to the state's planting season and is popularly known in the region as "the winter" despite corresponding to Brazil's summer months. Average rainfall ranges from 400mm (in the hinterland) to 2000mm (in the highlands). Although such rates of rainfall are higher than in many dry regions in the world, in Ceará the combination of impermeable crystalline rocks in the soil and high temperatures produce high rates of evapotranspiration and low levels of water retention and storage. Therefore, multiyear drought events that cause much hardship for both natural and human systems are relatively common. Historically, one of the prevalent approaches to water scarcity in the state has been the construction of large waterworks infrastructure projects (Aguiar, 1983; Lemos, Finan, Fox, Nelson, & Tucker, 2002).⁴ In fact, the policy to build reservoirs within the limits of elite-held farms became an infamous part of what is known as "the drought industry," that is, the misuse of public funds earmarked for drought-relief for private gain. The state has no naturally perennial rivers and rainfall from the four "winter" months

must guarantee supply for the remaining year and possibly to subsequent years in the event of a multiyear drought.

Water resources in Ceará are divided among seven large river basins (Jaguaribe, Curú, Metropolitana, Acaraú, Curú, Coastal Rivers, Poti) of which the Jaguaribe—the focus of this study—is the second most important economically, socially and environmentally.⁵ The Jaguaribe River runs south–north for approximately 610km and its basin encompasses an area of 72,043km² and 80 *municípios* corresponding to 48% of the state's territory.⁶

The Jaguaribe basin includes three of the largest and strategically most important reservoirs of the state: Orós, Banabuiú and the newly completed Castanhão (6.7 billion m³ capacity, largest in the state) and is responsible for supplying the state's main urban regions, including the capital city of Fortaleza. Priority for water allocations abides by the following order: human consumption, animal consumption, irrigation, fisheries, agribusiness, industry, and leisure. Figure 1 shows a map of the Jaguaribe Basin including its main reservoirs.

For management purposes, the basin has been divided into five hydrographic regions: Alto Jaguaribe, Médio Jaguaribe, Baixo Jaguaribe, Salgado, and Banabuiú. These basins, however, are interconnected and water allocation and use in one will affect water availability in the others. We concentrate on the Jaguaribe/Banabuiú valleys where the river has been regulated by the construction of the Orós (2 billion m³ capacity), Banabuiú (1.6 billion m³ capacity) and Castanhão reservoirs. The main water users in the Jaguaribe/Banabuiú are the *municípios* (mostly for human consumption), irrigated farmers (large and small), agribusiness, and industry. Currently there are 26,155ha of irrigated land in the Jaguaribe/Banabuiú valleys of which approximately 45% are planted with rice using flood irrigation. Although rice consumes close to 60% of all water earmarked for irrigation, it represents one of the lowest production values in the basin and generates fewer jobs when compared with other crops in the region (COGERH, 2000).

Not surprisingly, conflict over water allocation is exacerbated in times of drought. The decrease in the availability of water and the steady growth in the demand, especially from human consumption and irrigation, combine to create a situation of dispute among the several users. Currently irrigation consumes 70% of all water in the Baixo Jaguaribe/Banabuiú

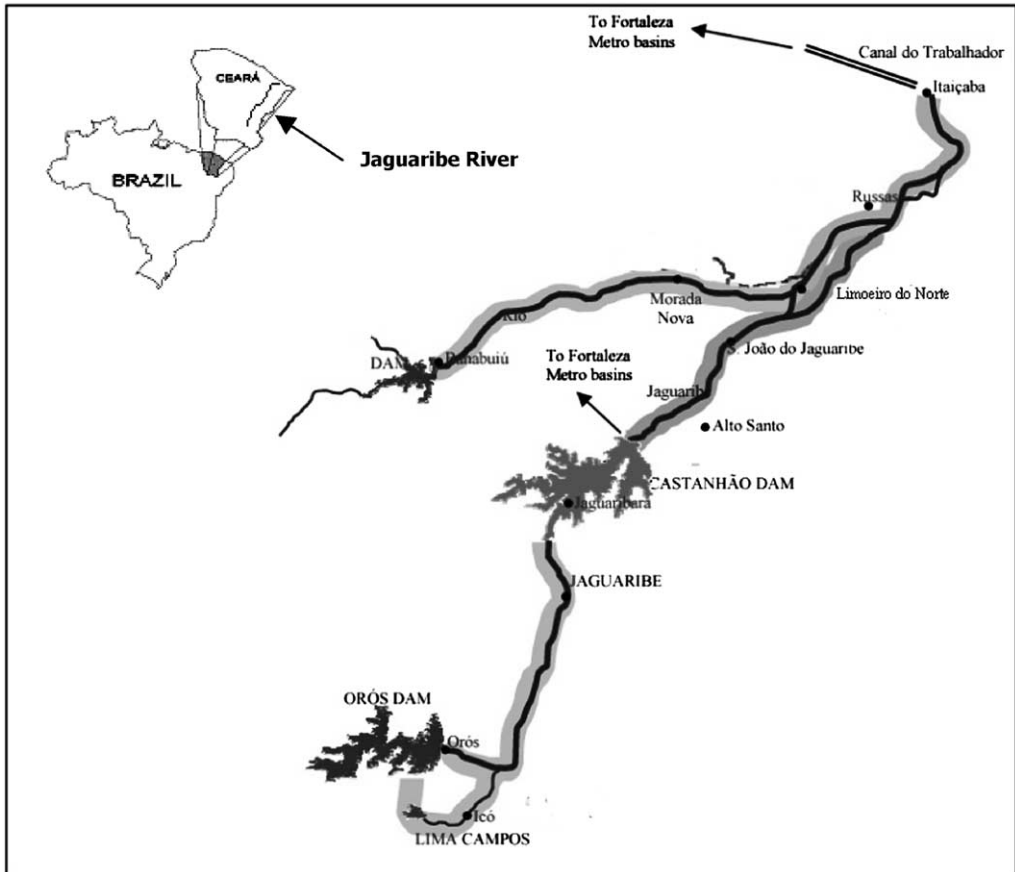


Figure 1. Map of the Jaguaribe and Banabuiú Regulated Valleys. Source: Domingues et al. (2004).

valleys and the introduction of new agricultural practices and users has triggered resistance to increasing allocations, both because of growing water use and negative environmental impacts such as desertification, loss of species and increased pollution.

3. POLICY NETWORKS AND DEMOCRATIC DECENTRALIZATION

Although Ceará's water reform was unquestionably prompted by years of perceived crisis within the state's water management system, its choice of a model was certainly shaped by a package of widely diffused policy prescriptions for "good governance" whose proponents maintain that decentralization, public participation, and shared governance can improve not only policy outcome—through more efficient water management—but also policy process—

through practices such as transparency, accountability, and democratic decisionmaking. This model of democratic decentralization goes beyond the transfer of power from central to local governing bodies to include accountability to local constituencies (Agrawal & Ribot, 1999; Ribot, 2002) and specific action to promote the participation of stakeholders. It also considers a series of variables that can affect the degree of success of decentralization efforts including (but not limited to): (a) adequate regulation (i.e., environmental standards); (b) availability of social capital and civic education; (c) definition and implementation of participation schemes; (d) creation of conflict mediation mechanisms; (e) availability of human and financial resources; (f) the character of political incentives; and (g) levels of local capacity and commitment (Larson, 2001; Ribot, 2002).

Yet, around the world, decentralization experiments have fallen short of their goals

for reasons ranging from lack of political will and state capacity to the role of different local actors who resist changes that threaten their control over natural resources management. While many studies of natural resources management have recently documented the varying degrees of success of decentralization processes (see for example, Agrawal, 2001; Brannstrom, 2004; Gibson & Lehoucq, 2003; Larson, 2001; Ribot, 1999; Ribot, 2002), less research has been carried out to examine how promoters of democratic decentralization effectively negotiate the inclusion of traditionally disenfranchised stakeholders in natural resources management. In this article, we investigate how networks of public and private actors implement democratic decentralization and how their choices and actions shape water management and influence the sustainability of democratic decentralization in the long run.

We start by briefly examining the social networks often behind the execution of natural resources management decentralization.⁷ On one side of the spectrum are democratic decentralization advocates who push central governments to design and adopt new institutional arrangements that effectively move the center of decisionmaking to the local scale where they believe public participation, transparency and accountability will improve the management of natural resources and the livelihoods of local stakeholders. These networks may include reform-oriented public officials (*técnicos*) at several scales of government (municipal, state and federal); local resource users; environmental and social rights NGOs; political organizers (especially linked to leftist parties); and technical cadre from multilateral organizations promoting good governance paradigms.

Resistance to decentralization, in turn, usually stems from local elites and businesses who traditionally have had their interests represented in more politically conservative administrations; large resource users; government technocrats wary of “external” interference in what they believe should be the sphere of technical expertise; and public officials at higher levels of government (state and federal) who resist relinquishing power over resource use to lower scales of government.

These networks are neither homogeneous nor static; they will be shaped by different ideas and practices, and as they evolve and adapt to different conditions, their role in policy implementation will also change. They are also not discrete, nor immutable. Therefore, in the con-

text of natural resources management, social actors are complex, contradictory players who can at the same time join reforms oriented or opposing networks depending on the context of the policy process or issue being pursued. They can also move from one network to another either because of a change in their preferences or opportunistic calculations (e.g., when a new government takes office). Such complexity and fluidity can at the same time be a constraint and an opportunity to policy networks to gather support for specific policy initiatives.

In this sense, the character of policy networks involved in the decentralization of natural resources management is critical in defining opportunities and overcoming constraints to democratic decentralization. In turn, the character of these networks is shaped by ideas—here defined as a cluster of principled beliefs affecting the design of strategies of action geared towards policy outcome. We assume that ideas influence the way actors define their interests (Abers, 2003; Blyth, 2002; Campbell, 1998) and that “normative beliefs may be so strong that they override the self-interests of policy makers” (Derthick & Quirk, 1995; Quirk, 1990 cited by Campbell, 2002, p. 24).

The broader sociopolitical environment in which these networks operate may also significantly shape their behavior. Underlying both the drive toward reform and the efforts to undermine it, are the contradictions inherent to processes of social reform in settings where democratization of policymaking is still challenged by entrenched elites such as high level technocrats and conservative politicians, who resist relinquishing control over the public policymaking process. Thus, despite the presence of an increasingly stronger reformist technocracy, such processes are marred by contradictory pulls within the government machine. On the one hand, reform-oriented *técnicos* garner more support and resources and thus are able to push for reform. On the other hand, entrenched elites still hold much power and are able to oppose reform that hurts their interests. In this scenario, the implementation of policy resembles a “dance” between the several institutional actors that constantly advance, retreat, and adapt in their pursuit for policy implementation.

Within Brazil’s post-democratic transition such contradictory processes have tended to become less prevalent, yet in many cases they are still a significant factor. Their persistence can be explained partly by a pattern of negotiated

transition to democracy where policymaking is shared between old and emerging cadres working within the same policy systems. The old cadre seeks to adapt to the new political climate without fundamentally altering the standards of the old one; because they survive the transition process relatively unscathed, they are able to renegotiate power and reproduce themselves within the state machine. In contrast, emerging political actors in society, in the state bureaucracy and in political parties manage to build up political capital under the new rules of democracy (Lessa, 1989). In a scenario where old and new cadre in the bureaucracy are effectively able to affect the policymaking process, social values of institutional actors become crucial to the kind of issues most likely to get into the governmental agenda (Lemos, 1998). Therefore, the emergence of a reform-oriented cadre within the state apparatus of the democratic transition increases opportunity for the implementation of social reform. Moreover, their chance for success will likely improve if they get the support of other groups outside the state. Social reform also benefits from the emergence of independent actors who are willing to mobilize to push for reform in the political agenda. In the case of Ceará, such interaction has proven critical in the implementation and institutionalization of public participation in water management.

4. DECENTRALIZATION AND WATER REFORM IN CEARÁ

Among the nine states that comprise the semi-arid region of the Brazilian Northeast, Ceará is not an exception in its high vulnerability to drought. Indeed, the use and management of water resources have always been a high priority in the state's public and governmental policy agendas. Besides its importance for economic and human uses, water has traditionally played a key cultural and political role in Ceará where power has been commonly equated with the property of land and water. In this context, it is not surprising that water management is a highly contested and politicized process.

For the past 20 years Ceará has undergone one of the most encompassing political reforms within Brazil's transition to democracy. As a consequence, Ceará went from one of the most entrenched oligarchies in the Northeast to one of the most committed to "modernization."

This transformation entailed not only the overhauling of the state's notorious authoritarian government system but also the effort to innovate policy design and implementation in areas including drought planning and response and water management (Lemos, 2003; Tandler, 1997). The modernization of the Ceará government was the subject of intense examination and attention in Brazil and abroad.⁸ This attention afforded the state a reputation of rupture with authoritarian practices which attracted funding and research from international organizations. Yet, as discussed below, the modernization project in Ceará is rife with contradictions and disruption that make institutional analysis both fascinating and challenging.

In the beginning of the 1990s, as part of Ceará's modernizing government administration, and in response to a long period of drought which threatened water supply to the city of Fortaleza, state and city policymakers engaged in a concerted effort to design a new set of institutions to manage the state's water resources. This included the hiring of expert consultants as well as the study of state-of-the-art management options being implemented in other parts of the world. In 1992, the state enacted the State Water Resources Law that defined policy for water management and created the State Water Resources Management System (Sistema de Gerenciamento de Recursos Hídricos—SIGERH). The new law incorporates technical and participatory organisms, including the state Water Resources Council, a Technical Group, the River Basin Committees and the Users Commissions. The system is implemented by the State Secretariat of Water Resources (Secretaria de Recursos Hídricos—SRH) with the support of its technical agencies: COGERH, Ceará's Foundation for Meteorology and Water Resources (Fundação Cearense de Meteorologia e Recursos Hídricos—FUNCEME) and the Waterworks Superintendence (Superintendência de Obras Hidráulicas—SOHIDRA) which is the agency responsible for building and maintaining the state's water resources infrastructure. Figure 2 shows a simplified chart of water resources management in Ceará.

As mentioned above, this new regulatory framework has as organizing principles the decentralization, integration, and participation of users in the process of water resources management, while creating several levels of water management. The law also defines the river

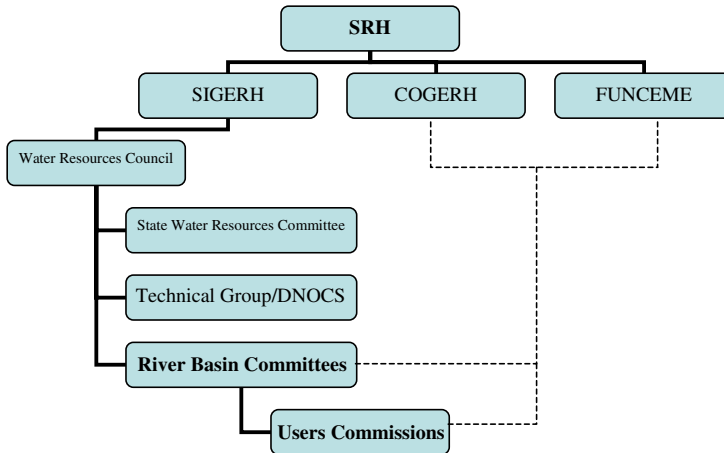


Figure 2. *Simplified water resources management chart.*

basin as the basic planning unit, spells out the instruments of allocation of bulk water permits and charges for the use of water resources, and regulates further construction in the context of the basin (Garjulli, 2001).

At about the same time, the government of Ceará approached the World Bank with a proposal for the Bank to finance new water infrastructure, including the construction of reservoirs in areas not covered by the existing network (Kemper & Olson, 2000). The Bank agreed but insisted on a few conditions: first, that the state implement and use the instruments outlined in the new law, including the creation of users' associations and the introduction of tariffs for all water users (including irrigation); second, that the state create a water resources management company. Thus,

(B)ank officials reasoned that without an implementing agency, the state would be hard pressed to carry out reforms that required improved monitoring, forecasting, and reservoir operations, as well as linkages between the operation of the system and water user market in the project design (Kemper & Olson, 2000, p. 342).

The creation of a state level agency would also enable the state to take over the management of 80 of the state's most important reservoirs previously under the responsibility of DNOCS, a federal agency which had been progressively losing its policy capacity as a function of lack of financial and human resources.

In sum, three factors: (a) a conducive policy environment against the backdrop of Ceará's progressive state government; (b) a particularly

long and costly drought crisis; and (c) the urging of the World Bank, combined to push the state government to reform Ceará's state management system. As a result, COGERH was created in 1993 with financing from the World Bank. At the insistence of outside consultants, COGERH included social scientists in addition to the usual makeup of engineers and hydrologists associated with water management agencies. Since this scheme agreed with the ideas of the reform-oriented network behind water reform implementation, the next step was to create within the organization a department specifically responsible for the organization of users at the basin level—the Department for the Organization of Users (Departamento de Organização dos Usuários—DOU).

The combination of social and physical scientists within the agency allowed for the amalgamation of ideas and technologies that critically affected the way the network of *técnicos* and their supporters went about implementing water reform in the state. Because within the constraints imposed by technological or economic configurations, actors can modify institutions to solve new problems or to facilitate network-based collective learning (Clemens & Cook, 1999), COGERH *técnicos* were able to transform the new set of regulations emerging from the State Water Resources Law into some of the most innovative aspects of water reform in Ceará. Indeed new ideas and technology were instrumental not only in informing the creation of many of the organizational schemes pursued by COGERH but also in mobilizing

users who perceived their participation as meaningful and effective (see more details in the next section). Yet, the inability of the reform-oriented network to build broader consensus around such schemes came back to hurt their stability as state politics went through a new wave of change triggered by the 2002 elections.

5. THE POLITICS OF WATER MANAGEMENT: PARTICIPATION, KNOWLEDGE AND INSTITUTIONALIZATION

The implementation of water reform started in 1994 when the team of *técnicos* from COGERH faced their first crisis as a result of the 1991–94 drought. That year the state's main reservoirs were very low and serious conflicts over water allocation were expected (Alvarez, Oliveira, & Bezerra, 1995). In order to appraise the situation and to get to know the users more closely, DOU *técnicos* started planning for a framework that both addressed the conflict brewing as a consequence of drought and implemented a model that agreed with their own principled ideas of what public participation and decentralization in water management meant. Because in the past participatory schemes in Ceará had not always been effective (Lemos, 2003), DOU *técnicos* went beyond “business as usual”—in which public participation is mostly limited to an advisory capacity—to advocate a model of direct participation of users in water allocation decisions. In this effort, DOU *técnicos* gained essential support from other reform-oriented *técnicos* within COGERH, most of them engineers focusing on technical aspects of water management. This “in-house” network was fundamental for pushing for the most innovative aspects of the Ceará water management model. This model reflects the deep convictions of reform-oriented *técnicos*, grounded both in their professional background (many of them were educated in disciplines deeply influenced by leftist thought) as well as politics (the great majority were involved in leftist politics at the local level).

(a) *Users Commissions: democratic decentralization in the making?*

The first move of DOU *técnicos* was to organize the First Seminar of Users of the Waters of the Jaguaribe and Banabuiú valleys.

Because they had little experience in the region and very little time, the *técnicos* amply advertised the meeting in radios, newspapers, fliers, and direct mail to reach a broad number of water users. In the end, 180 users, representing 63 organizations, attended the meeting. Its main outcome was the creation of an operation plan to manage the basin. The assembly also elected a 26-member Committee of Representatives to oversee the implementation of the plan. In the second half of 1994, the team of *técnicos* began charting the institutional map shaping water management in the 19 *municípios* within the Jaguaribe/Banabuiú valleys. Meanwhile, the group met monthly with the Committee of Representatives to discuss the opportunities and constraints for the implementation of the plan and operationalization of effective participatory management for the following year. The underlying principle for the organization of the Users Commission was both to create an oversight organization but also to promote the idea of independence between the Users Commission and COGERH (Oliveira, Garjulli, & Silva, 2001). The agency was also working at the state level to publicize the role of the Users Commission and to garner support for the plan from other actors within the state apparatus. The implications of the Commission's informal character were twofold. Initially, lack of institutionalization shielded COGERH *técnicos'* mobilization effort because it may have been perceived by the conservative network as less threatening than formal institutional arrangements. Lack of institutionalization may also have made the User Commissions more vulnerable to opposition and seriously affected their ability to enforce its decisions.

The following year, the Commission was increased to 53 members to include representatives from all the *municípios* in the basin. At the same time, the Commission's members organized local meetings to publicize their work, to attract more participation, and to reinforce their autonomous character *vis-à-vis* COGERH and its *técnicos*. Although large and medium users tended to dominate the water allocation negotiations, the meetings provided critical opportunity for smaller users and other representatives of civil society such as labor unions and NGOs to participate in water management (Ballester, 2004).

Since 1994, the Users' Commissions have met regularly several times per year and more frequently in the months right before the dry season (May/June). Although many aspects of

water management have been on the agenda, the main goal of the Users Commission is to debate and to deliberate over the allocation of water stored in the reservoirs regulating the valleys for the following year. In order to decide how much water to discharge from the reservoirs and how to distribute it among several users, the Commission starts to prepare early in the season. Among the subsidies for its decision, a key tool is reservoir simulation prepared by COGERH—in collaboration with FUNCEME—which is designed to model reservoir discharge and re-charge, as well as the net quantity of water available after each rainy season. The simulations account for two climatic seasons in Ceará: the rainy season (roughly December–May), when reservoirs collect water and the dry season (the rest of the year) when reservoirs have to release water both to multiple users as well as to normalize river flow. Based on this premise, COGERH sets aside enough water so as to guarantee human consumption for at least two years. Next, COGERH and FUNCEME build three to five alternative scenarios simulating different levels of discharge within the amount of water that exceed their margin of insurance. Users then debate the different scenarios taking into consideration the available amount of water and the climate prognosis for the following year. Thus in years when the rainfall prognosis is for below normal for the following rainy season, users tend to be more risk-averse and *vice-versa*.

The effects of the use of the reservoir scenarios as a decision tool were threefold. First, it increased the transparency of the decisionmaking process therefore increasing its legitimacy. Although the methodologies used for building the scenarios are still not accessible for many of the users, the new system vastly improved over DNOCS' old decisionmaking model which not only was carried out behind closed doors but also was based on much less sophisticated criteria (mostly on the amount of rainfall from the previous season). Second, the scenarios did improve the quality of the water allocation decisions since alternatives they provided clearly empowered users to make better informed decisions. They also expanded the knowledge of the limitations and possibilities of basin resources among stakeholders. Third, they contributed to building a relationship of trust between COGERH *técnicos* and water users which not only attracted participation but also would prove very important to the survival of the Users Commissions.⁹

Although there is the risk that direct user input in water allocation would lead to overuse, this has not so far been the case in the Jaguaribe/Banabuiú valleys. The reasons can be traced to existing conflicts along three dimensions: (a) the presence of multiple, conflicting users; (b) the fact that different amounts of water have to be released from the three major reservoirs to meet users' needs; and (c) the tradeoffs between users from the low and high lands of the basin.¹⁰ First, since human consumption is a priority, large users such as urban water supply companies will push for lower levels of discharge to ensure longer periods of water availability. Irrigated farmers, on the other hand, will have an incentive to maximize water consumption as soon as possible to guarantee their economic activity in the short run. Second, the fact that the scenarios are built for the whole system but water is released from different reservoirs within the basin can affect users differently depending on their geographical location in the basin. Therefore, there is an incentive for some users to protect resources in their surrounding area as they negotiate the amounts discharged from specific reservoirs as part of the broader allocation system. Third, the conflict between users from the basin's lower and higher lands also helps to keep water discharge in check. For users in the lowlands, it is better that larger amounts of water are released each season to increase their planted area (the area around the reservoirs which is naturally irrigated as the level of water recedes). For users in the highlands it is more advantageous that the level of the reservoirs remain higher so as to supply their irrigated farms as needed throughout the season.

In 2000, for example, after a year of low rainfall, basin reservoirs were relatively low (Jaguaribe 51% and Banabuiú 16.4%). The Users Commission met in Limoeiro in June 2000 with the participation of *técnicos* from COGERH and representatives of the main users in the basin. The Commission debated and made recommendations on several issues, including suggestions for infra-structure improvement, the establishment of more stringent monitoring of users' compliance, and the implementation of education and training projects with the goal of improving the sustainability of the water system (COGERH, 2000). It also decided by consensus that a relatively conservative volume of water (average 19 m³/s in the Orós and 7 m³/s in the Banabuiú) was to be distributed over the next seven months, with allocation levels

declining incrementally each month. In practice, this meant that some of the users would have to reduce their consumption of water either by decreasing irrigation levels or agreeing to cut back on their activities (e.g., reducing planted area or having only one crop cycle instead of two per season). This decision averted a more serious water shortage crisis and helped to dispel skepticism from more conservative sectors that users would never cut down consumption (voluntarily). Yet, because the Users Commissions do not have an official mandate, their role can be undermined both by their inability to enforce decisions among the users (all compliance is voluntary at this point) as well as by the lack of institutionalization of their role within the water management system more broadly.

(b) *River Basin Committees: continuity and change*

Meanwhile, since the late 1990s, DOU's *técnicos* continued working to form the Jaguaribe/Banabuiú River Basin Committee whose mandate was spelled out in the state's Water Resources Law. In contrast to the Users Commissions, the creation of River Basin Committees was a much more formalized process which had to comply with both national and state regulations. DOU's *técnicos* engaged in a long preparatory process that included the development of a specific methodological framework to be followed in the several basins in the state. The Baixo Jaguaribe/Banabuiú River Basin Committee was formally installed in 2000. According to regulation, the 46-person Committee is constituted of 30% users, 30% groups from organized civil society, 20% the state and/or federal governments, and 20% local government (i.e., municipal government). Governance within the Committee was divided into three main organizations: the Directorate, the Assembly, and the Executive Secretariat with a term of two years, renewable once. A President, a Vice-President, and a General Secretariat formed the Directorate, all elected by direct vote by the general Assembly. For the first term, COGERH was appointed as the Executive Secretariat. The Committee is mandated to meet at least twice a year in public meetings where all information and decisions within its realm are to be publicly available. It can also meet as many times as it deems necessary during the year. Besides water allocation, the Committee also has input on matters of

construction, environmental sustainability and education, implementation of programs, and mediation of conflicts.

Although this framework can be considered innovative within the context of Ceará politics and policymaking, it is considerably more formalized—and in some aspects—more exclusionary than the Users Commissions. First, to comply with the law, the River Basin Committees must have proportional representation from the municipal, state and federal governments; second, they define users as organizations who have formally requested and have been allocated water permits; and third, the Committees can abide or not by the Users Commissions decisions (so far the River Basin Committee has, for the most part, supported the Users Commissions decisions).

On the other hand, because River Basin Committees supposedly represent a broader range of interests than the Users Commissions (e.g., state representatives, broader societal interests), they can, in principle, be more risk-averse than water users. In 2001, for example, because of the low level of the reservoirs, it soon became clear that water stored in the Jaguaribe reservoirs would be insufficient to supply the need of all regular users. COGERH realized that at current levels, approximately only half of all of the irrigated farmers could be supplied for the following planting season. In a meeting of the Users Commission, it was decided that irrigated rice production would have to be reduced by 50% to meet the capacity of the region's two largest reservoirs (Orós and Banabuiú) to supply water. But this reduction was considered insufficient. Despite resistance from the Users Commission, COGERH, SRH and other state and federal agencies¹¹—with the support of River Basin Committee—implemented a special program (Plano de Uso Racional da Água nos Vales do Jaguaribe and Banabuiú—Rational Water Use in the Jaguaribe and Banabuiú Valleys also known as *Águas do Vale*—Valley Waters). The program created a mechanism to compensate farmers for their lost production as long as they agreed to trade their rice crops (which use large amounts of water) for other less thirsty and more profitable cultures such as cantaloupe and banana. Farmers who agreed to forego their rice paddies also became eligible for credit access to buy new irrigation equipment and to join training programs. To finance this program and encourage farmers to re-evaluate their use of land and water, COGERH insti-

tuted a user charge of R\$0.01 (approximately US\$0.003) per thousand liters as a means both to generate funds to compensate farmers who agreed to shift their production off rice and to make it more expensive to the ones who did not (COGERH, 2002). The institution of the bulk water charge system was met with substantial resistance from users who perceived it as a first step for the creation of a water market in the state.¹² But even if the program's results failed to meet original goals¹³ what this example illustrates is that more than each organization, it is the combination of their actions that is likely to yield the best outcomes both in terms of water management and policy process.

(c) *Can the reform survive politics?*

The lack of formal institutionalization of the role of the Users Commission and the move to limit the powers of the River Basin Committees within the official water management system threaten the continuation of DOU's work toward a more open and participatory system of water management in Ceará. Indeed, compliance with the Users Commissions' decisions has been for the most part dependent on the good will of individual decisionmakers and therefore, implicitly vulnerable to changes in government or even change of officials within governmental organizations. For instance, the office under SRH responsible for the allocation of bulk water permits is not required to abide by the Commission's decisions. This means that individuals or organizations who disagree with the decisions made by the Users Commission can still apply for bulk water permits—and be approved—despite consensual decisions made by the Users Commissions.

There are already indications that resistance and opposition to the Users Commissions is growing within the state government and even within SRH. In 2001, for example, *técnicos* from COGERH were prevented from participating in the Eighth Meeting of the Jaguaribe and Banabuiú Users Commission meeting as a result of political intervention at the state level.¹⁴ Within SRH (to which COGERH is subordinate) there has been resistance to institutionalize the role of the Users Commissions relative to both the water permits allocation systems and the River basin Committee's jurisdiction. In addition, there is no institutional support for the organization of new Users Commissions.

Even the River Basin Committees' role has been challenged by government sectors who want to enhance the state's hold over these organisms and curtail their mandate. Indeed, there have been charges that building companies and private consulting firms who have a particularly high stake in how decisions about water infrastructure construction and repair are made, may perceive the River Basin Committees as a threat to their ability to obtain contracts from the government. State officials and technocrats wary of losing control over natural resources management also seek to reassert their authority. While some technocrats perceive the new water institutions as a threat to their control over resources (and therefore political capital), others simply do not believe that users should be in control of a resource they have little incentive to conserve.

Finally COGERH's increasingly flagging support for the River Basin Committees also compromises their ability to accomplish all the goals of the reform. Since COGERH controls the financial and human resources that support the Committees' works, the latter's ability to continue independently and efficiently is significantly compromised by the agency's lack of support. In this sense, the departure of many of COGERH's most committed *técnicos* who left either to work at ANA and other agencies or who were reallocated in the agency's recent reclassification of personnel has been another hard blow to River Basin Committees.

But perhaps the most serious blow to Ceará's innovative model is the state's plan to draft and pass a new water resources law. The new text was first submitted to the state Assembly in 2002 without any input from the Users Commissions and River Basin Committees. After pressure from stakeholders and reform-oriented sectors, the draft was withdrawn and circulated for consultation including River Basin Committees. But many considered the consultation process insufficient both in terms of its breadth and level of responsiveness.¹⁵

The new draft expands the control of the state over water management and curtails many aspects of the River Basin Committees' deliberative, normative and advisory roles. At the same time that it includes representatives of River Basin Committees in the Water Resources State Council and the State Fund Council, it diminishes the more substantive powers of the Committees, particularly the approval of the state's plan for the use, preservation and conservation of water resources.

There is substantial concern over some aspects of the new law—for example, the ability of water permit holders to transfer permits to other users and the ability of users to stake a claim on future use—without the necessary institutional mechanisms to guarantee their functioning in accordance with the principles of the water reform. Reform-oriented *técnicos* and River Basin Committees members are also very concerned with the new draft's strong emphasis on the primacy of the economic over social and environmental principles in water resources use.

In addition, the state government announced plans to create a new agency by merging COGERH and SOHIDRA which, in practice, would weaken the role of the River Basin Committees relative to the construction and planning of new infrastructure. In early 2003, five months after the new state Administration took office, DOU suffered its greatest blow when COGERH closed down the department and dispersed its personnel to other agencies and local offices.¹⁶

While it is too early to evaluate how the changes will affect the levels of mobilization of the existing Users Commissions and River Basin Committees, the process has already been critically affected with the elimination of the DOU from COGERH. This move not only dispersed a group of reform-oriented *técnicos*, many of whom were working together for close to 10 years, but *de facto* halted COGERH's support for the creation of Users Commissions in other basins in the state. The new government argues the move is geared toward further decentralization and consolidation of decisionmaking since the River Basin Committees will remain as the principal organization of management at the basin level. Nevertheless, such changes have in effect watered down many of the most innovative aspects of the reform.

Yet, these actions have been questioned on several fronts. For example, the Metropolitana River basin Committee has filed a complaint with the Brazilian Law Association (Organização dos Advogados do Brasil—OAB) asking for an investigation and a report on the changes being implemented by the new state administration. The World Bank also sent a special mission to Ceará to examine the changes and request an official explanation from the state government. As a result the new administra-

tion's plans to merge COGERH with SOHIDRA have been abandoned.

River Basin Committees and Users Commissions have also vowed to continue their work and their membership is committed to defend the continuity of their participatory model. Especially in the case of Users Commissions, their grassroots character and independence from COGERH may work in their favor during this time of flux. The fact that the reform-oriented network was successful in electing one of its members as the new president of the Baixo Jaguaribe River Basin Committee despite SRH's opposition is a good indication that this network is still a significant player.¹⁷

Finally, DNOCS increasingly important role in pushing for participatory water resources management has also positively influenced water reform in Ceará and expanded it through other Northeastern Brazilian regions. Dormant for many years because of lack of resources and political support, DNOCS has been re-energized by the new federal Administration and is increasingly asserting its role as a management agency. DNOCS has recently signed two formal agreements: one with ANA to support and implement participatory management in federal river basins in collaboration with state governments, and another with Ceará (in this case a renewal) to share the management of the federal reservoirs in the state. By reasserting its mandate and showing support for the Users Commissions and River Basin Committees, DNOCS has been able to pressure local governments and Ceará to continue many of the more innovative aspects of democratic decentralization.

Still, the relative ease with which conservative sectors of the state government have managed to damage the DOU model, while not completely unexpected, suggest an inherent weakness in the support base for the reform-minded network behind the DOU's approach to river basin management. Whereas the general principles of reform seem to be shared by both reform-oriented and conservative networks, their idea of implementation differs considerably. On the one hand, reform-oriented *técnicos* push for broader direct stakeholder participation in water management decision-making. On the other hand, conservative networks are weary of losing control over water management and advocate a model in which

the state retains much of the decisionmaking power.

6. CONCLUSIONS

This study examines the implementation of the Jaguaribe/Banabuiú Participatory Management Project. The project includes the creation of Users Commissions and River Basin Committees with significant stakeholder participation and transparent decisionmaking processes. It argues that the ability of policymakers to sustain the project's more innovative aspects—namely stakeholder participation, decentralization and integration—depends on, first, the character of the networks entrusted with the implementation of different portions of the new regulatory framework; second, on the ability of these networks to garner support of other influential actors within and outside of the state government; and third, on the ability of the network to diffuse policy opposition. In Ceará, we find that the presence of reform-oriented public officials and entrenched conservative officials within the state apparatus has shaped the struggle to define the nature of the water management policy process.

The creation of COGERH in 1993 introduced a cadre of reform-oriented *técnicos* who were committed from the start to include users in the management and allocation of water resources. Here ideas played a critical role in influencing the choices and actions taken by these *técnicos* in the organization of Ceará's water management River Basin Committees and Users Commissions. These choices also reflected the reform-oriented *técnicos'* belief systems and convictions that support a definition of societal participation that goes beyond the usual advisory or symbolic capacity often found in decentralization schemes to include meaningful participation in decisionmaking and that ultimately defined the progressive character of Ceará's water reform. The increasingly reformist character of Ceará's political environment for the past three state administrations provided these *técnicos* with political space to push for the democratization of water management in the state. It also provided COGERH with the financial and human resources to implement the new regulatory framework.

The ability of the reform-oriented network to attract the support of outside actors and organ-

izations such as the World Bank, ANA and most recently, DNOCS also played an important role in supporting a more decentralized and participatory water management framework. The role of the World Bank, first by supporting the design of the Ceará water institutions and, second, by financing the construction of new infrastructure and creation of COGERH, was critical for the implementation of the new model. Similarly, ANA's adoption of the Ceará case as a model to be followed in the semi-arid region might be critical to support its continuation. Finally, severe water scarcity during the 1991–93 drought opened the door for *técnicos* from COGERH to intervene and manage the conflict over water among the several users. The crisis facilitated the creation of the first Users' Commission in the state.

In contrast, traditional patterns of centralized policymaking have constrained the implementation of many aspects of the new regulatory framework, especially integration and decentralization. In this context, it is not uncommon for Users' Commissions to be systematically ignored in the design and implementation of new programs or projects in the regions where such Commissions exist. While the Commissions seem to have conquered a critical deliberative role among users at the river basin level, they still lack the recognition of many sectors in the government and, most important, within certain sectors of the water management technocracy. Hence, despite the creation and regular functioning of the Users' Committees at the basin level, the traditional, more conservative technocracy based in the capital city still holds great power over the decisionmaking process.

Can water reform survive politics? We believe the Ceará case indicates that it can. It also shows that by ignoring politics, especially at the local level, advocates of decentralization may be critically underestimating its role both as a means as well as a constraint to better resource management. Therefore, more detailed case studies of efforts to decentralize water management are still needed if proponents of democratic decentralization want to understand the opportunities and constraints for such models better.

A few conclusions of broader significance can be drawn from this discussion. First, in democratic consolidation scenarios where both

reform-oriented technocrats and entrenched conservatives share the state's policymaking machines, one valuable strategy for the former might be to seek the support of outside groups such as organized movements in civil society with a stake in the issue. On the one hand, contrary to common wisdom, the key obstacle to environmental policymaking within government machines might not be sectors committed to development—although these surely affect the process—but conservative policymakers wary of some of the more innovative and inclusionary aspects of such policies such as decentralization, transparency and stakeholder participation. On the other hand, the kind of attention the government of Ceará was getting internationally because of its state-led reformist character might have created an environment in which reform-oriented sectors had more clout even if some of the reforms would go against the interest of powerful state officials. In such case, the need to protect the international image of the state—which in exchange is getting extra attention and money from agencies such as the World Bank—might have made the government more tolerant toward certain initiatives, especially those which would enhance the visibility of the state and support the idea of the new modernizing administrations. In this sense, it might be that the *idea* of participatory and sustainable frameworks caught on in Ceará as a function of this fertile environment, where it catered both to the interest of some influential actors inside and outside the state. These ideas can, however, be questioned as they challenge deep-rooted principles of conservative sectors troubled by the possibility of losing control over critical political assets such as the management of water in Ceará.

Second, it is critical that a strong bottom-up organization emerges independently from the state. Thus, in the Ceará case, the fact that COGERH sought to encourage the organization of Users Commissions independently from the agency before engaging in more formal aspects of the State Water Resources Law might be critical to the ability of the reformist framework to survive political opposition. In addition, the use of technology, such as reservoir simulations, to democratize decisionmaking may not only support better decisions but also have a positive effect on users' sense of efficacy and stewardship over natural resources. The mutual support generated by this synergistic relationship might reinforce both groups *vis-à-*

vis opposition. Moreover, evidence from the public meetings suggests that even if the role of the Users Commission has not been formally institutionalized, it has become a legitimate and powerful medium for public participation at the basin level. Consequently, either dismantling or reducing its role might be politically costly.

Third, although change in the formal institutional aspects of policymaking and implementation, (i.e., the enactment of a new regulatory framework), is a necessary condition for reform, it is by no means sufficient to guarantee implementation and stability. This finding agrees with the many examples of laws that look good on paper but which never get implemented often found in Latin American environmental policy systems. Yet, the reverse is also true, that is, if there is no push for the enactment of new reformist laws, it is very unlikely that action will ensue.

Fourth, the implementation of water management frameworks is critically affected by the physical characteristics of the water system, the rules in place and the actors involved in the action arena. Thus, in order to understand policy implementation and outcome, we need to examine carefully the several levels of formal and informal institutions shaping the action arena.

Finally, the fact that, in the beginning, the actions of the reform-oriented network ensued almost undetected might have been positive in the short run but detrimental in the long run. Since it failed to build consensus among other sectors of the government involved in the implementation of the new framework, *técnicos* just managed to postpone opposition instead of building support for the process among the opposition. As a result, when political leadership changes, there might be very little support within the new Administration for users' mobilization along with real threat to reform-minded technocrats. Because such networks tend to work well among similarly minded government officials and their supporters but fail to capture the allegiance of broader groups within the state, their contribution to the stability and replicability of the system may be tenuous.

At this stage, the effects of the new administration on Ceará's water reform are uncertain. However, the persistence of the Users Commission and support for the model internally and externally gives reason for optimism for the preservation of the Ceará participatory model.

NOTES

1. For this research, we use thick description of policy processes and tracing of policymakers' perceptions based on in-depth interviews and participatory observation carried out in two field campaigns in 2001–02 and a few interviews with key informants in 2004. We also rely on documental analysis especially COGERH reports and internal unpublished white papers written by members and former members of COGERH's Department for the Organization of Users (Departamento de Organização de Usuários—DOU).
2. The ANA, created in June 2000, oversees the application of Brazil's Water Resources Law and has jurisdiction over the management of interstate river basins.
3. After Ceará's experience, Users Commissions have been created in Rio Grande do Norte with less success. Currently there is a new impetus for the creation of Users Commissions in other NE Brazil states through an initiative of ANA and DNOCS.
4. In the past 200 years, close to 7,000 reservoirs, large and small, have been built in the state, many on private property.
5. After the Metropolitana basin.
6. A *município* is the political subdivision which defines local government in Brazil.
7. Here policy networks are defined as “network of public, semi-public, and private actors participating in certain policy fields” (Kickert, Klijn, & Koppenjan, 1997, p. 1). This concept connects public policies with their strategic and institutionalized context.
8. For more details on the transformation of state politics in Ceará and its effects on policymaking see Judith Tandler's comprehensive analysis of policymaking in Ceará, “Good Government in the Tropics” (1997). Ceará's reformist government attracted the attention of research organizations from several European countries and the United States. The state administration was also given a special award from UNESCO for its tremendous progress in improving social indicators. Yet, the reputation for modernization is still the subject of heated debate, especially among local scholars who question the overly optimistic accounts found in the literature.
9. Although the positive influence of the use of reservoir simulation in the Jaguaribe/Banabuiú valleys seems clear, the deeper effects of the use of knowledge and its implications to the democratization of decision-making at the river basin organism need further examination. This theme is the one of the subjects under research by the Watermark Project.
10. Francisco Assis de Souza Filho, President of Funcepe, personal communication, 2004.
11. Ceará State Secretariat for Irrigated Agriculture (Secretaria de Agricultura Irrigada do Estado do Ceará—SEAGRI), Ceará State Secretariat of Planning (Secretaria do Planejamento do Estado do Ceará—SEPLAN and ANA).
12. This example illustrates one particularly paradoxical aspect of the democratization of basin level water allocation since, in this case, users' decisionmaking seems to have been essentially informed by short-term individual calculations (their next crop season) rather than the long-term sustainability of the whole water system, benefiting a small number of users at the expense of the interests of the population at large. Thus one aspect of the new model of management, stakeholder participation, seems to be in direct conflict with another, sustainability. This situation reflects the basic principle of the logic of collective action (Olson, 1971) where actors and groups with stronger interests at stake will be more willing to mobilize than the more dispersed interests only marginally affected by the issue.
13. Despite succeeding in compensating farmers who chose to shift crops, the program failed to charge the ones who did not. Although expected to collect US\$215,000, only US\$137,000 in water charges were actually issued and of these, only US\$27,000 (R\$80,450) were actually paid, corresponding to less than 20% of the amount charged. This inability to enforce bulk water charges was attributed both to program inefficiency as well as to the fact that since the 2000 drought there has been no shortage of water in the basin reservoirs (Rosa Maria Formiga Johnsson, COPPE/UFRJ, Personal communication, 2004). Yet, it may foretell some of the difficulties COGERH will face to implement a full-fledged bulk water charge system in the river basin in the future.
14. It was believed that COGERH *técnicos* were excluded as an attempt to discredit the meeting because SEAGRI wanted to showcase one of its new irrigation projects for which the Users Commission had not approved water allocation. Other sources speculate that the reason behind the ban was related to a brewing conflict between local and state politics. According to

these sources, the state government wanted to prevent the leader of the opposition at the State Senate from speaking during the Users Commission meeting. Personal interviews, 2001.

15. The Baixo Jaguaribe River basin Committee alone submitted in excess of 50 amendments to the original draft which are not reflected in the revised draft of the law now under discussion in the State Assembly.

16. There have been also speculations that dismantling the DOU may have been at least in part

influenced by Ceará's combative party politics, since many DOU members actively supported the opposition Labor's Party candidate who lost the governor's election by less than a 1% margin. Another hard blow was the sudden death of one of the earliest champions of the Users Commissions model and one of the main *técnicos* responsible for the creation of the reservoir hydrological models used by the Commission to allocate water.

17. Personal interviews, 2004.

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